Edinburgh Napier University

Doctoral Thesis

Evaluation of factors influencing the success of forced coopetition in IT multi-sourcing projects

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A thesis submitted in partial fulfilment of the requirements of Edinburgh Napier University, for the award of Doctor of Business Administration

Submission: September 2017

Declaration of Authorship

I, Stefan Buttschardt, hereby declare that the work presented in this thesis is solely carried out by myself at Edinburgh Napier University, and that it has not been submitted for any other degree.

Signed:

Date:

Abstract

The concept of coopetition was introduced by Brandenburger and Nalebuff in 1996 and is defined as a combination of cooperation and competition between multiple organisations. Since then, the number of articles on coopetition has constantly increased. As part of this process, the literature introduced the paradigm of forced coopetition. This recently developed paradigm describes a situation in which a client organisation forces multiple external suppliers to cooperate, even though the suppliers are competitors on an inter-organisational level. Hence, forced coopetition is an integral part of IT multi-sourcing projects with multiple IT supplier organisations.

This research project focuses on an evaluation of factors that influence the success of forced coopetition relations in IT multi-sourcing projects. Due to the simultaneous coexistence of cooperation and competition, the client organisation experiences tensions, which may cause the multi-sourcing project to fail. As a result, the awareness of factors that are critical for the success of such relationships is crucial for a client organisation. This is particularly important because supplier organisations play an increasing role in the success of the client organisation. Despite the increased importance of coopetition management, only a limited body of research has examined which factors and control mechanisms have an impact on successful forced coopetition relations. This research project is first attempt to bridge this research gap.

The study applied an explanatory sequential mixed method design, with priority placed on quantitative methods. First, the study conducts a quantitative survey to identify the critical success factors of a forced coopetition relation in IT a multi-sourcing project. Finally, explanatory semi-structured interviews are conducted within the study to discuss the quantitative findings in more detail while integrating the literature. Ultimately the study identified a set of factors which are considered as critical for forced coopetition relations.

The study makes two main contributions. First, the study provides a framework of critical success factors in forced coopetition relations. Second, it offers guidance to

managers of IT multi-sourcing projects as to which factors needs to be taken into account in order to successfully manage IT multi-sourcing projects with competing suppliers.

Acknowledgements

I would like to thank the following people who supported me throughout my doctoral journey.

First, I would like to thank Dr Nathalia Tjanda, Dr Collins Osei and Dr Maktoba Omar who gave me the opportunity to work on my research project at the Business School of the Edinburgh Napier University. Their professional guidance, energy and patience played a significant role in completing the project as a part-time researcher. I have to consider myself lucky to have such an amazing team.

I would also like to thank Dr Janice McMillan and Dr Gerardine Matthews-Smith who always had a sympathetic ear during the DBA programme. Many thanks go out to my DBA cohort. It was a pleasure to work with them in both good and bad times.

Finally, I want to thank my parents and friends for their patience over the past few years. They served as a critical sounding board at crucial times along the way and kept me going.

This research is dedicated to my grandparents, who have been there for me all my life. Danke Oma, danke Opa!

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Chapter 1

Introduction

1.1 Background to the Study

Cooperation between competing organisations has become a popular strategy in order to address technological challenges (Chiambaretto & Fernandez, 2016). For instance, Samsung Electronics and Sony Corporation have established a joint venture to develop and manufacture LCD displays (Gnyawali & Park, 2011). More recently, the BMW Group, Audi AG and Daimler AG jointly acquired the digital mapping company HERE from Nokia for their mobility services (BMW Group, 2015). The simultaneous existence of cooperation and competition in such business relationships is defined as coopetition (Brandenburger & Nalebuff, 1996). Because these opposing forces may cause the relationship to fail, proper management of coopetitive relations is critical for their success (Chiambaretto & Fernandez, 2016).

Coopetition relations also exist in IT multi-sourcing projects, which emerged as the leading edge of organisational project forms in the last two decades (Bapna, Barua, Mani, & Mehra, 2010; Goldberg, Satzger, & Kieninger, 2015). IT multi-sourcing projects are characterised by a client organisation that contracts multiple external IT supplier organisations to achieve a common goal. Hence, the cooperation between the IT supplier organisations in IT multi-sourcing projects is forced rather than voluntary. This paradigm is defined as forced coopetition, which is becoming increasingly complex to manage (Ilmo & Nahar, 2010; Wiener & Saunders, 2014b). Therefore, the study at hand contributes to the management of such forced coopetition relations by identifying the critical success factors for IT multi-sourcing projects.

The remainder of this chapter is structured as follows. First, the chapter outlines the research questions. Second, the chapter discusses the aims and objectives, followed by the scope, research methods used, and contribution to practice and knowledge. Finally, it presents the overall structure of the thesis

1.2 Research Questions and Justification

The vast amount of literature focuses on voluntarily initiated coopetitive relations (Bengtsson & Kock, 2000; Osarenkhoe, 2010; Mele, 2011; Sarker, Sarker, Sahaym, & Bjorn-Andersen, 2012; Tidström, 2014; Fernandez, Le Roy, & Gnyawali, 2014; Lempinen & Rajala, 2014; Le Roy & Fernandez, 2015). However, to date, literature has devoted very little attention on forced coopetition, especially in the IT sector (Wiener & Saunders, 2014b). Due to the constant change of coopetitive relations, tensions are inevitable and affect the stability of inter-organisational relations (Pellegrin-Boucher, Le Roy, & Gurău, 2013; Tidström, 2014). As a result, both coopetitive and forced coopetitive relations require proper management in order to successfully achieve the project goals (Chiambaretto & Fernandez, 2016). This is particularly important because supplier organisations play an increasing role in the success of the client organisation (Roseira, Brito, & Henneberg, 2010).

Despite the increased importance of coopetition management, limited research has examined which factors and control mechanisms have an impact on successful forced coopetition relations. In order to bridge this research gap, the main research question of this study is therefore:

What are the critical success factors of a forced coopetition in IT multi-sourcing projects?

The study addresses this question in three phases. First, it reviews relevant literature on traditional coopetition in order to develop a conceptual framework. Second, the study conducts a quantitative survey to identify the critical success factors of a forced coopetition relation in IT a multi-sourcing project. Finally, explanatory semi-structured interviews are conducted within the study to discuss the quantitative findings in more detail while integrating the literature.

1.3 Aims and Objectives

The aim of the thesis is to evaluate critical success factors of forced coopetition relations in IT multi-sourcing projects. Therefore, the main objectives of the study are:

- Undertaking a critical review of the existing coopetition management literature related to IT multi-sourcing.
- Conducting primary research on forced coopetition using quantitative and qualitative methods.
- Proposing a framework that outlines the critical success factors of forced coopetition relations, testing it through a survey with experts in IT multi-sourcing projects.
- Providing practitioners with recommendations as to which factors are relevant in order to successfully manage forced coopetition relations in IT multi-sourcing projects.

1.4 Scope of the Study

In order to meet the above-mentioned aim and objectives, a clear focus is required. Therefore, the scope of this DBA study is limited to software development multi-sourcing projects in the German market. Second, the research focuses on software development projects in general and is not limited to specific technologies (for instance SAP implementation projects). Third, the research concentrates on the management of IT multi-sourcing projects from the client organisations perspective; in other words, the organisation which benefit from the project results.

1.5 Research Philosophy and Methods

This study adapts a post-positivist philosophical underpinning, which acknowledges contextual factors for the research purpose (Phillips & Burbules, 2000). Post-positivistic research findings are not universally generalisable to all cases and situations (Clark, 1998; Phillips & Burbules, 2000). Therefore, post-positivism claims

that it is only possible to approximate the truth rather that to explain it perfectly or completely (Onwuegbuzie, Johnson, & Collins, 2014).

Post-positivism heavily relies on quantitative data (Clark, 1998), which is consistent with the researcher's educational background as a business informatics graduate. However, post-positivism also allows the use of qualitative research methods (Denzin & Lincoln, 2011). Ultimately, the epistemological stance provides the opportunity to identify and evaluate the critical success factors in forced coopetition relations based on quantitative and qualitative data.

Following the research philosophy, the study adapts an explanatory sequential mixed method design, with priority placed on quantitative methods (Ivankova, 2006). This approach is suited for researchers with a strong quantitative background (Creswell, 2014). Ultimately, the chosen research method allows the use of a self-completion questionnaire to collect quantitative data as well as explanatory semi-structured interviews in order to explore the quantitative data in more depth. This triangulation results in a robust evaluation of critical success factors with a high validity for practitioners (Salehi & Golafshani, 2010).

1.6 Contribution to Practice and Knowledge

Due to the increased use of multi-sourcing projects (Goldberg et al., 2015), the successful management of forced coopetition relations is becoming more and more important for client organisations. The result of the study offers guidance on the successful management of the simultaneous existence of competition and cooperation to IT Project Managers from client organisations.

Ultimately, IT Projects Managers need to be aware of those factors that are relevant for project success in order to cope with the demand to deliver software development projects faster (Ilmo & Nahar, 2010). Furthermore, the research assists other practitioners in better understanding forced coopetition relations and their role in today's IT multi-sourcing projects.

In addition, the study contributes to knowledge. First, it provides an overview of coopetition management approaches, resulting tensions, and factors of traditional coopetition relations. Second, the study provides a framework of critical success

factors in forced coopetition relations, which now can be tested by practitioners and provides the bases for further research.

1.7 Structure

The thesis is divided into seven chapters.

Chapter two provides a comprehensive review of the current literature regarding coopetition. In particular, the literature review focuses on coopetition types, tensions in coopetition relations, coopetition management approach, and critical success factors of traditional coopetition relations. The chapter concludes with the research gap.

Chapter three discusses the development of the research questions and hypotheses, and lays out the conceptual framework which serves as the basis for this research project.

Chapter four presents the methodological approach. In particular, the chapter discusses the research philosophy, the research design, and ethical considerations of the study at hand. It also describes the data collection techniques and the findings from the pilot study.

Chapter five focuses on the quantitative analysis of the data collected. This includes a presentation of the response rate, and the definition of the statistical procedures. Furthermore, the chapter presents the descriptive and inferential statistics to accept and reject the hypotheses.

Chapter six integrates the quantitative findings with explanatory qualitative interviews and the literature in order to outline the critical success factors in forced coopetition relations.

Chapter seven concludes the study by reflecting on the research aim and objectives, and summarising the implications for both academics and practitioners. It also outlines the limitations of the study and suggests avenues for future research.

Chapter 2

Literature Review

Academic literature has paid little attention on forced coopetition relations in IT multi-sourcing projects. Therefore, this chapter critically reviews related work on traditional coopetition. The remainder of the chapter is arranged as follows. First, the concept of outsourcing and multi-sourcing is presented. Second, the chapter discusses traditional coopetition, resulting tensions and the management of such relations. The following section discusses critical factors for success in traditional coopetition relations. The final section outlines the research gap.

2.1 Outsourcing

There is a wide variety of definitions for the term "outsourcing". According to Dibbern, Goles, Hirschheim, and Jayatilaka (2004, p.9), the definitions on IT outsourcing vary "from use of contract programmers to third party facilities management." Lacity and Hirschheim (1993, p.74) provide a general definition of outsourcing and argue that it is "the purchase of a good or service that was previously provided internally." In a similar vein, Oshri, Kotlarsky, and Willcocks (2011, p.2) argue that outsourcing is the "act through which work is contracted or delegated to an external or internal entity that could be physically located anywhere." With regard to IT-Outsourcing Hirschheim, Loebbecke, Newman, and Valor (2005, p.1003) state that "IT Outsourcing (domestic and international) refers to the practice of using external agents to perform activities, to deliver products and/or services previously done by internal IT functions that are now transferred to third party vendors." While Hirschheim et al. (2005) address services that have previously be done internally,

Oshri et al. (2011) on the other hand provide a more general definition. They agree with the assertion of Leimeister (2010, p.20) that outsourcing is "handing over to one or more third party vendors [..] the provision of some or all of an organisation's IT functions such as, e.g., IT assets, activities, people, processes, or services for a contractually agreed monetary fee and period of time."

IT outsourcing can be analysed using different theories such as transaction cost theory, core competencies theory, relational theory, resource-based theory, evolutionary economics theory, agency theory, neoclassical economic theory, social exchange theory, or the economy of information theory (Gottschalk & Solli-Sæther, 2005; Vaxevanou & Konstantopoulos, 2015).

Transaction cost theory is one of the most widely discussed theories in outsourcing (Whitten & Wakefield, 2006). The theory supports organisations in the make-or-buy decision of IT services (Lacity, Willcocks, & Khan, 2011), as well as in the formal and relational governance of outsourcing engagements (Schermann, Dongus, Yetton, & Krcmar, 2016). A potentially suitable IT service (transaction) is assessed by its specificity, frequency, and uncertainty surrounding the transaction (Alaghehband, Rivard, Wu, & Goyette, 2011). It is argued that a high degree of uncertainty results in higher costs of writing, monitoring and enforcing outsourcing contracts. In this case, outsourcing is less efficient than providing the IT service internally (Gottschalk & Solli-Sæther, 2005).

Schermann et al. (2016) mention that fixed price contracts have a low level of uncertainty as they include a detailed description of requirements, service level, and projects plans. Therefore, it is argued that fixed price contracts have low monitoring costs for a client organisation, because budget overruns affect the supplier organisation. Furthermore, fixed price contracts are outcome-based, and therefore allow client organisations to control suppliers to a certain extent (Logan, 2000; Gottschalk & Solli-Sæther, 2005). In line with the agency theory, which addresses the relationship between the client and supplier organisations, fixed price contracts therefore reduce and prevent opportunistic behaviour (Vaxevanou & Konstantopoulos, 2015).

As depicted in figure 2.1, outsourcing can be classified based on two basic dimensions, which are location (i.e. what country is used?) and ownership (i.e. what property model shall be used?). Additional dimensions are function (i.e. what IT services shall be sourced?), degree (e.g. to what extent shall IT services be outsourced?), or number of suppliers (Westner & Strahringer, 2008; Wiener, Vogel, & Amberg,

2010; Wiener & Saunders, 2014a). Sourcing relations with a single supplier are described as single-sourcing, whereas the use of multiple suppliers is described as multi-sourcing (Cohen & Young, 2006).

		Location	
		Onsite	Offshore
Ownership	Make	In-house delivery	Captive Center
	Buy	Onshore outsourcing	Offshore outsourcing

FIGURE 2.1: Basic sourcing dimensions
Based on Oshri (2011, p. 32)

According to Bapna et al. (2010), a straightforward adaptation of single-sourcing research findings to a multi-sourcing context falls short of addressing specific challenges that arise with multiple suppliers. Therefore, the following section discusses the concept of multi-sourcing in more detail.

2.2 Multi-Sourcing

Multi-sourcing has emerged as an important sourcing strategy in information technology (IT), as it helps to mitigate risks associated with a single-sourcing strategy, which might include, for example, suppliers acting opportunistically (Jayatilaka, 2006; Bhattacharya, Gupta, & Hasija, 2012; Wiener & Saunders, 2014a; Goldberg et al., 2015). Although a multi-sourcing strategy can involve internal and external suppliers, practitioners typically refer to multi-sourcing as the use of external suppliers (Su & Levina, 2011; Lin, 2015).

The definitions found in the literature vary depending on the publication year. In an early definition, Lacity and Willcocks (1998) state that multi-sourcing implies multiple companies. A central definition in the context of multi-sourcing is provided by Cohen and Young (2006, p.1) who define multi-sourcing as the "disciplined provisioning of business and IT services from the optimal set of internal and external providers in the pursuit of business goals." This definition highlights that multi-sourcing can be performed with internal and external providers, and furthermore, emphasises the importance of the overall goal of the business.

More recent definitions introduce an additional dimension, which accounts for collaboration between providers. Bapna et al. (2010, p.786) state that multi-sourcing "refers to the delegation of IT and IT-enabled services to multiple vendors, who must work collaboratively to deliver services to a client organisation." In addition, Bapna et al. (2010) identified a significant positive trend in the usage of multi-sourcing between 1996 and 2008 based on an analysis of the IDC database. This trend continued after 2008, making multi-sourcing one of the most common organisational forms.

Loboda (2014) analysed the motivation behind why companies increasingly engage in multi-sourcing engagements. Based on an analysis of the transaction cost theory, resource-based view, game theory and strategic management theory, Loboda identified that companies choose multi-sourcing models to reduce uncertainty associated with single-sourcing, to get access to new skilled resources, to increase effectiveness, and to learn. Other external motives, such as globalization, are also relevant. Bhattacharya et al. (2012) confirm that companies use multi-sourcing to reduce risks associated with single-sourcing, which are vendor lock-in, wrong vendor selection, opportunistic vendor behaviour and limited vendor competence.

The identified motives are in line with the advantages of multi-sourcing outlined by other scholars. Access to a broader vendor skill set, the improvement of service quality and time-to-market, the ability to adapt to changing market conditions, the reduction of IT service costs due to vendor competition as well as the improvement of agility and flexibility are all key benefits of multi-sourcing (Cohen & Young, 2006; Su & Levina, 2011; Bapna et al., 2010; Goldberg et al., 2015). However, the benefit of reduced IT service costs is not valid for the initial phase of a multi-sourcing engagement. Additional suppliers increase management overhead, and therefore increase the costs and interdependencies in the project portfolio associated with multi-sourcing (Nagle & Maughan, 2008; Bapna et al., 2010). Lacity and Willcocks (2001) confirm that post-contract costs associated with multi-sourcing are about 8% of the overall outsourcing costs. Hence, cost savings are not expected in the initial phase of multi-sourcing and are therefore not a primary motivation to use a multi-sourcing strategy (Loboda, 2014).

The key factor differentiating multi-sourcing from single-sourcing is the collaboration between external suppliers and the resulting interdependence between the tasks performed by the suppliers (Bapna et al., 2010). As a result of the task interdependence, companies face an increased management effort, especially in the initial

phase of a multi-sourcing project (Wiener & Saunders, 2014a). Multi-sourcing may involve two types of cooperation, which are a collaboration among suppliers and collaboration between the client organisation and the suppliers. The suppliers are usually competitors, which are required to collaborate to successfully deliver the project (Osarenkhoe, 2010). Hence, the suppliers cooperate and compete at the same time, which is referred to as coopetition (Brandenburger & Nalebuff, 1996).

If a company decides to apply a multi-sourcing strategy, it is necessary to choose an organisational multi-sourcing model. The organisational model has a direct impact on the service integration, which is defined as the management of suppliers and the integration of their interdependent tasks (Gulati, Lawrence, & Puranam, 2005; Anderson & Parker, 2013). Service integration can be achieved on an organisational and technical level (Goldberg, Kieninger, Satzger, & Fromm, 2014). The study at hand focuses on organisational service integration rather on technical service integration (e.g. web service orchestration).

According to Wiener and Saunders (2014b), there are two organisational models for multi-sourcing arrangements. The direct model is the most commonly used model. It describes a client organisation that engages with multiple suppliers, having direct interfaces with each supplier. The mediated model, also referred to as the guardian vendor model, is one of the more recently discussed multi-sourcing models (Bapna et al., 2010; Nevo & Kotlarsky, 2014). In this model, a client organisation engages with multiple suppliers where each supplier is responsible for a dedicated area. In addition, the client organisation selects one supplier as the single point of contact. The responsibility of this guardian vendor is the coordination of the other suppliers on behalf of the client organisation, and to ensure the successful delivery of the contracted tasks (Wiener & Saunders, 2014b).

Multi-sourcing projects can be analysed within different paradigms, such as supply chain management (Wilhelm, 2011), IT outsourcing governance (Lin, 2015), IT outsourcing theories (Gottschalk & Solli-Sæther, 2005; Vaxevanou & Konstantopoulos, 2015) or coopetition management (Wiener & Saunders, 2014a). This research adopts the coopetition perspective, which is defined as the simultaneous existence of competition and cooperation in IT multi-sourcing projects in relationships between multiple external supplier organisations (Brandenburger & Nalebuff, 1996; Lin, 2015). Other theories such as supply chain management, transaction cost theory, agency theory or core competencies theory are therefore not addressed in the remainder of the study.

The tension due to the simultaneous existence of competition and cooperation influences the stability of a multi-sourcing project, and therefore may cause the project to fail (Pellegrin-Boucher et al., 2013; Fernandez et al., 2014; Bengtsson & Raza-Ullah, 2016). Consequently, the proper management of coopetitive relations is crucial for the client organisation, because otherwise the effects of the horizontal supplier relationships are not predictable (Roseira et al., 2010). The following sections will discuss the concept of coopetition in more detail.

2.3 Coopetition

The concept of coopetition was introduced by Brandenburger and Nalebuff (1996), and is defined as the simultaneous existence of cooperation and competition between multiple organisations. The following sections will discuss coopetition in more detail.

2.3.1 Definition

According to Osarenkhoe (2010, p.204), "cooperation is defined as a relation in which individuals, groups and organisations interact through the sharing of complementary capabilities and resources, or leveraging these for the purpose of mutual benefit." Bengtsson and Kock (2000) highlight that participation in collective actions in order to achieve common goals is a precondition for cooperation. Organisations share resources, skills, and capabilities to achieve common goals, which may result in a positive-sum game, or a "win-win" situation for all actors (Thomason, Simendinger, & Kiernan, 2013). According to Tanghe, Wisse, and van der Flier (2009), the existence of trust and commitment is a prerequisite for a successful cooperation.

The opposing paradigm of cooperation is competition. Cooperation leads to a positive-sum-game, whereas competition may result in a negative or zero-sum-game, because an organisation strives for something that the other organisation cannot obtain (Thomason et al., 2013). According to Osarenkhoe (2010, p.203), competition can be defined as a "dynamic situation that occurs when several actors in a specific market struggle for scarce resources, and/or produce and market very similar products or services that satisfy the same customer need."

Building on this definition, IBM and Accenture can be classified as competitors, because they offer the same services (i.e. IT Consulting) for the same market (i.e.

German automotive industry) and customers (i.e. BMW Group). Bengtsson and Kock (2000, p.413) outline that "competition is an interactive process where individual, and thereby organisational, perceptions and experiences affect organisational actions, and thus affect interactions between competitors."

After 20 years of research, scholars have not agreed on a common definition of coopetition, which is mainly due to a lack of rigorous theoretical conceptualization (Wilhelm, 2011; Bengtsson & Kock, 2014). However, the concept of coopetition has found substantial resonance on all levels of analysis, which are individual, intra-firm, inter-firm and network level (Dorn, Schweiger, & Albers, 2016; Bengtsson, Raza-Ullah, & Vanyushyn, 2016).

On an intra-firm level, scholars have studied the effect of cooperation and competition on parent resources, cooperative support, power delegation, market expansion and global positions between units of one organisation (Luo, 2005; Ritala, Välimäki, Blomqvist, & Henttonen, 2009). More contributions have dealt with the inter-firm and network level. On the one hand, contemporary literature studied the collaboration of organisations that act within one network (Brandenburger & Nalebuff, 1996; Das & Teng, 2000; Luo, 2005; Gnyawali, 2006; Pellegrin-Boucher et al., 2013). On the other hand, literature focused on organisations that cooperate on activities that are not visible to the customer, and simultaneously compete on activities that are not close to the customer (Bonel & Rocco, 2007; Bengtsson & Kock, 1999; Gnyawali & Madhavan, 2001; Dagnino & Mariani, 2010; Gnyawali & Park, 2011; Tidström, 2014).

In all of the above-mentioned research, it is assumed that organisations voluntarily decide to cooperate. The cooperating organisations share complementary capabilities and resources, or leverage them for the purpose of mutual benefit (Osarenkhoe, 2010). Coopetition aligns the interests of the organisations towards a common objective, removes external obstacles, and neutralizes threats (Chin, Chan, & Lam, 2008).

There are several examples of coopetition in practice. For instance, Volkswagen and Ford cooperated to expand in Latin America (Bengtsson et al., 2016), BMW Group, Daimler AG, and Audi AG cooperate in developing real-time digital maps (BMW Group, 2015). Sony and Samsung, for example, compete in the consumer electronics sector, but cooperated on the development and production of LCD display (Gnyawali & Park, 2011). These examples show that today's organisations voluntarily decide

to cooperate, even though they are competitors. For the remainder of this study, this paradigm is described as traditional coopetition (see figure 2.2).

A more recent research stream focuses on the inter-firm level, in particular, the relation between a client organisation and multiple supplier organisations. According to Wiener and Saunders (2014b), this relation is defined as forced coopetition, which describes a phenomenon in which a client organisation initiates coopetition by forcing multiple supplier organisations to cooperate within the context of a multi-sourcing project, even though the suppliers are competitors on an inter-firm level (see figure 2.2). It is argued that a forced coopetition requires the management of the dyadic relations between the client and supplier organisations, as well as the horizontal supplier relations (Wilhelm, 2011).

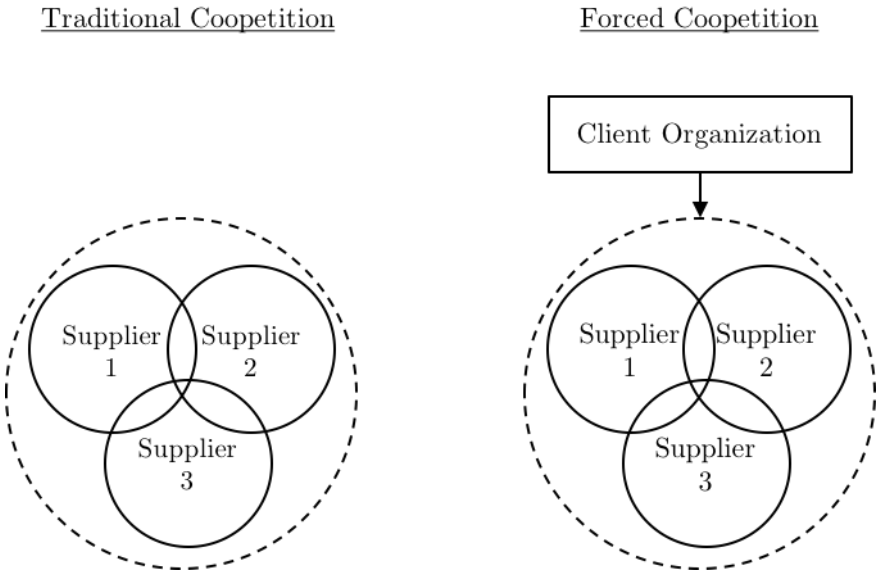

FIGURE 2.2: Traditional Coopetition and Forced Coopetition
Based on Wiener and Saunders (2014b, p.222)

Bengtsson et al. (2016) claim that forced coopetition is driven by the client organisation. However, Tidström (2014) argues that forced coopetition can result from external factors without the interference of a client organisation. According to Tidström (2009), an overall decline within an industry might force competing organisations to cooperate in order to maintain their business. However, the remainder of the study focuses on forced coopetition relations, which are initiated by a client organisation.

The definition of forced coopetition used in this thesis refines the definition of Wiener and Saunders (2014b) by considering IT multi-sourcing projects initiated by a client

organisation. Hence, forced coopetition is defined as the simultaneous existence of coopetition and cooperation among the suppliers in an IT multi-sourcing project, having been initiated by a client organisation.

Forced coopetition differs from a traditional coopetition in two ways (Wiener & Saunders, 2014b). Firstly, the relational orientation among suppliers in a traditional coopetition scenario is characterised by the mutual interest in strategic cooperation, whereas the relation in a forced coopetition is task-oriented and focuses on delivering benefits for the client organisation. Secondly, companies usually cooperate on input-activities of a transformation process and compete on output activities, because the output is visible to the client (Bengtsson & Kock, 2000). In a forced coopetition situation, it is the opposite; suppliers compete on input activities (e.g. bidding process) and are required to cooperate on output activities (Wiener & Saunders, 2014b).

Figure 2.3 depicts the coopetitive relations in a multi-sourcing arrangement. First, there are cooperative ties between the client organisation and supplier organisations. Second, there are coopetitive ties between the supplier organisations (Wilhelm, 2011). From a client organisations' perspective, forced coopetition affects the vertical relation with the supplier organisations. From a supplier organisations' perspective, forced coopetition concerns the vertical relations with the client organisation, but also the horizontal relations with other suppliers.

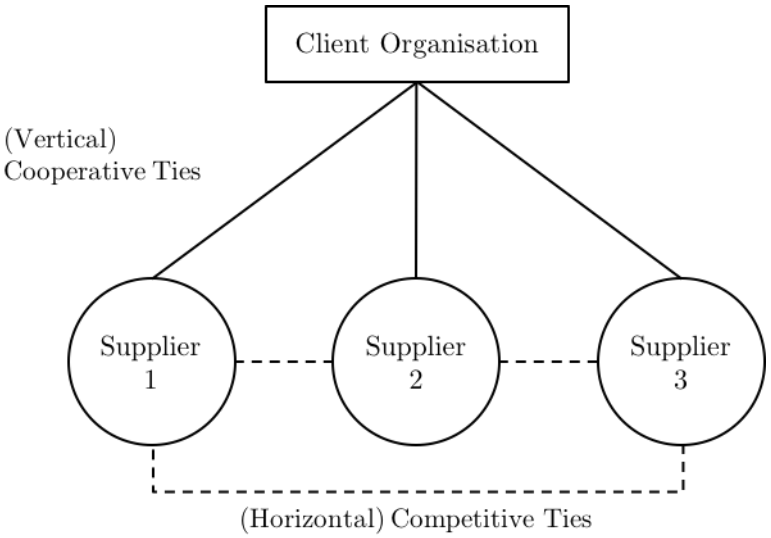

FIGURE 2.3: Coopetitive Relations
Based on Wilhelm (2011, p.665)

According to Ritter, Wilkinson, and Johnston (2004), vertical relations are positively dependent, whereas horizontal relations are negatively dependent. Wilhelm (2011) further highlights that horizontal supplier-supplier relations are comprehensive. Hence, it is necessary to consider both horizontal and vertical relations when managing a forced coopetition.

2.3.2 Balance of Competition and Cooperation

Coopetition can be described along two continua of cooperation and competition. Therefore, it is possible to "account both for the simultaneity of contradictory interactions and for the degree of cooperation and competition that variously can be low/low, low/high, balanced, high/low, high/high" (Bengtsson & Kock, 2000, p.182). Hence, coopetition can be classified as cooperation-dominated, competition-dominated, or as an equal relation of cooperation and competition (Bengtsson & Kock, 2000). This is in line with Chin et al. (2008), who define four types of coopetition that an organisation can adapt (see figure 2.4).

The coopetition types vary depending on the degree of competition and cooperation (Chin et al., 2008): A type 1 organisation is referred to as the monoplayer, which is characterised by low competition and cooperation. Hence a monoplayer does not significantly interact with other competitors. Contenders are defined as type 2 organisations with high competition and low cooperation. A contender vies with competing organisations for market share. A type 3 organisation, which is referred

		Cooperation	
		Low	High
Competition	High	Type 2 - Contender	Type 4 - Adapter
	Low	Type 1 - Monoplayer	Type 3 - Partner

FIGURE 2.4: Coopetition Types
Based on Chin et al. (2008)

to as partner, seeks synergies by maintaining low competition and high cooperation. It is assumed that type 3 organisations provide the highest added value to a client organisation. Type 4 organisations are referred to as adapters and are characterised by high competition and high cooperation.

Within a forced coopetition relation, supplier organisations compete on an inter-organisational level, and are simultaneously required to maintain a high level of cooperation on a project level (Wiener & Saunders, 2014b). Hence, a forced coopetition can also be classified as type 4 coopetition. Due to the high level of competition and cooperation, a proper management of such "forced marriages" is required (Lin, 2015). However, there is little research available that focuses on factors for balancing cooperation and competition in IT multi-sourcing projects (Tidström & Hagberg-Andersson, 2012; Näsholm & Bengtsson, 2014). Nevertheless, the existence of opposing paradigms in IT multi-sourcing projects creates tensions, which increase the instability of coopetitive relations (Clarke-Hill, Li, & Davies, 2003; Pellegrin-Boucher et al., 2013; Tidström, 2014). Therefore, the following section discusses tensions in coopetitive relations in more detail.

2.3.3 Tensions in Coopetitive Relations

In recent years, the research on tension has played a central role in coopetition research (Bengtsson et al., 2016). Tensions in a forced coopetition result from the simultaneous existence of cooperation between the client organisation and its suppliers, and competition among the suppliers (Tidström, 2014; Goldberg et al., 2014; Bengtsson et al., 2016; Chiambaretto & Fernandez, 2016). Wilhelm (2011, p.664) states that there is "an inherent tension between cooperation and competition", and therefore equates tension with coopetition. Tensions influence the stability of a

coopetitive relation (Pellegrin-Boucher et al., 2013), and may cause a project to fail (Fernandez et al., 2014; Bengtsson & Raza-Ullah, 2016). This is especially important within a forced coopetition, where multiple suppliers are forced to cooperate rather than voluntarily work together (Wiener & Saunders, 2014b).

A key source of tensions in coopetitive relations is the opportunistic behaviour of competing suppliers (Osarenkhoe, 2010; Tidström, 2014). According to Le Roy and Fernandez (2015), tensions are multidimensional and multi-level. Fernandez et al. (2014), who focused their investigation of the sources of tensions on sources in traditional coopetitive relation, argue that tensions can occur on an inter-organisational level, intra-organisational level, and inter-individual level. This is in line with Gnyawali, Madhavan, He, and Bengtsson (2012) and Ritala and Tidström (2014), who argue that on an inter-organisational level, the dilemma between common value creation and appropriation of private value causes tensions.

In addition, tensions arise on an inter-organisational level from the risk of transferring confidential information to a competing organisation, which may then foster technological imitation (Fernandez et al., 2014). Furthermore, tensions on an inter-organisational level may arise due to differing strategic priorities (Fernandez et al., 2014), contracting goals (Bengtsson, Hinttu, & Kock, 2003; Mele, 2011), or an imbalance of power with regard to the involved organisations (Osarenkhoe, 2010; Tidström, 2014).

On an inter-organisational level, Fernandez et al. (2014) claim that resource limitations of internal business units may cause tensions in coopetitive relations. In addition, the findings of Fernandez et al. (2014) and Gnyawali and Park (2011) claim that an unwillingness for organisational change by the employees may cause tensions on an intra-organisation level.

Third, tensions are also existent on an inter-individual level, which can be also referred to as project level (Le Roy & Fernandez, 2015). However, research on the inter-individual level is still scarce. Individuals have to choose if they either want to follow a cooperative or individual strategy. Even though individuals are aware that the success of a coopetitive relation depends on collaboration, they still try to defend their own interests (Fernandez et al., 2014). An individual strategy with limited cooperation has a negative impact on the performance of a coopetitive relation on a

project level (Gnyawali & Park, 2011; Raza-Ullah, Bengtsson, & Kock, 2014). Furthermore, Fernandez et al. (2014) state that tensions may result because individuals are required to cooperate, even though they have different cultural backgrounds.

Tensions and the resulting conflicts vary depending on the project's life cycle, with fewer conflicts during the initial project phases (Mele, 2011). Furthermore, Mele argues that conflicts are typically perceived as negative, however, they may foster creativity and debate and are thus not necessarily negative. There are five types of conflicts that should be considered in coopetitive relations on a project level.

First, task-related conflicts may occur in the planning and execution phase of a project due to differences within the project team (Mele, 2011). Process-related conflicts, on the other hand, emerge in the execution phase and are caused by disagreements on the execution of tasks. This finding is consistent with Tidström (2014), who argues that similar processes foster cooperation of organisations on a project level. Third, value-related conflicts must be considered during the initiating and planning phase (Mele, 2011), because the common value system is the basis for the existence and development of a homogeneous group. However, Lempinen and Rajala (2014) state that homogeneous groups with equal values are rather unlikely, because each organisation is likely to have different aims and competencies. Fourth, it is argued that responsibilities of participants within the project team may cause role-related conflicts during the initiating, planning, and closing phase (Mele, 2011). In order to avoid such conflicts, Le Roy and Fernandez (2015) proposed duplicating key managerial functions within the project team. Finally, affective conflicts caused by emotional arguments on an inter-individual level may impact the closing phase of a project (Mele, 2011). Again, this finding is consistent with Le Roy and Fernandez (2015), who claim that personal connections are critical for a successful cooperation.

As outlined in this section, tensions may cause a coopetitive relation to fail. Hence, the management of tensions in a forced coopetition environment is an important task for a client organisation. Tensions must be managed rather than minimised, since the reduction of either cooperation or competition dimension may hinder the expected gains of coopetition (Bengtsson & Kock, 2000; Gnyawali, He, & Madhavan, 2008; Gnyawali et al., 2012; Fernandez et al., 2014). The following section will discuss the management of tensions.

2.3.4 Coopetition Management

As outlined in the previous section, tensions result from the coexistence of cooperation and competition in a coopetitive relationship. In traditional coopetition relations, all organisations are responsible for the management of the coopetitive relation and the resulting tensions (Bengtsson & Kock, 2000). However, the management responsibility in forced coopetition relations shifts towards the client organisation that is able to influence the supplier cooperation (Wu, Choi, & Rungtusanatham, 2010).

Scholars of organisational research have focused on the management of paradoxical tensions (Tse, 2013; Jarzabkowski, Le, & Van de Ven, 2013), but relatively few studies focused on the management of threats, such as conflicts and stress, which impact the relationship (Mele, 2011). Organisational research literature describes two research streams on the management of paradoxical tensions. The first research stream recommends the splitting of paradoxical paradigms (Poole & Van de Ven, 1989), while the second research stream recommends the acceptance of the paradox (Smith & Lewis, 2011). The management approaches for tensions in a coopetition relationship are based on these two research streams. Tensions in coopetition can be managed using the separation or integration of competition and cooperation; however, there is no evidence available as to which approach is more suitable (Fernandez et al., 2014).

The separation principle pursues the independent management of competition and cooperation (Chiambaretto & Fernandez, 2016). Scholars of this research stream argue that individuals cannot cooperate and compete with each other simultaneously, and that it is necessary to separate the management of competitive and cooperative processes (Bengtsson & Kock, 2000). The separation concept is popular in western research, because the paradox of competition and cooperation is often considered within an "either/or" framework (Chen, 2008; Raza-Ullah et al., 2014). A separated management can be achieved by either a functional or a spatial separation. Both separation concepts require a specific team dedicated to the management of cooperation and another team dedicated to the management of competition (Fernandez et al., 2014). The use of the separation management approach has been proposed for inter-organisational coopetitive relations which are voluntarily initiated (Castaldo, Möllering, Grosso, & Zerbini, 2010; Le Roy & Fernandez, 2015). Furthermore, the organisations involved in such traditional coopetitive relations can jointly select a

third independent actor that is responsible for the separated management of competition and cooperation (Castaldo et al., 2010). However, the findings of Fernandez et al. (2014) show that a third actor is not able to successfully manage a coopetitive relation. A separated management approach has its limitations, because it creates internal tensions among the teams dedicated to the management of cooperation and coopetition (Chen, 2008; Das & Teng, 2000). Hence, Chen and other scholars argue that an integrated management approach is more effective than the separated management approach (Das & Teng, 2000; Gnyawali & Park, 2011).

In contrast, the integrated management approach puts emphasis on the balance and integration of opposites, and the consideration of a paradox within a "both/and" framework (Raza-Ullah et al., 2014). Hence, the integrated approach requires a simultaneous management of both competition and cooperation, which is more difficult than a separated management approach (Bengtsson & Kock, 2000; Oshri & Weeber, 2006). Even though an integrated management is difficult, the approach is recommended for coopetitive relations with a high level of tension (Le Roy & Fernandez, 2015).

As a consequence of the integrated management of both competition and cooperation, management actions that target the competitive dimension may affect the cooperation dimension and vice-versa. Furthermore, the resulting effect can be mixed and influence both competition and cooperation, or it can be non-existent (Chen, 2008). Park, Srivastava, and Gnyawali (2014) support Chen's position and propose a balancing strategy for the integrated management of coopetition relations. This balancing strategy suggests that competition should be managed dependent on the level of cooperation and vice versa. Hence, a high level of competition also requires a high management of cooperation.

Recently, it has been argued that the separation and integration approach can be used simultaneously (Pellegrin-Boucher et al., 2013; Fernandez et al., 2014; Le Roy & Fernandez, 2015). In particular, Le Roy and Fernandez (2015) propose a different management approach dependent on the organisational level of coopetition. On the inter-individual level, the findings suggest the use of the integrated management approach, which heavily relies on the individuals' capabilities to understand the coopetitive relation in order to behave not too cooperatively or too competitively. On the inter-organisational level, the findings suggest the separated management approach. Finally, on the project-level, the findings of Le Roy and Fernandez (2015)

suggest a co-management approach, which in essence is the use of duplicated governance structures and managerial functions to balance competition and cooperation.

The research of Tidström (2014) contributes notably to the management of tensions in a coopetition relationship, by conducting a multiple case study approach. The first case focused on a coopetition relation among four firms of the manufacturing industry. The findings indicate that a cooperative management approach results in mutually positive outcomes for all involved companies. A competitive management style, on the other hand, results in mixed outcomes (Tidström, 2014). The second case involves 10 companies from the natural products industry. These organisations were required by industry regulators to cooperate; hence, the companies were engaged in forced coopetition. The findings of this case indicate that organisations tend to apply an avoidance strategy rather than a competitive or cooperative management of tensions.

Ultimately, the successful management of a coopetitive relation depends on the awareness of the factors influencing the relationship. Hence, the following section will discuss critical success factors of a coopetition strategy

2.4 Critical Success Factors

Critical success factors are defined as "areas of activity that should receive constant and careful attention from management" (Esteves de Sousa, 2004, p.46). Hence, in the context of this research project, critical success factors are defined as areas that improve the cooperation between the client and supplier organisations and, therefore, the quality of the forced coopetition relation from a client organisation's perspective. Building in the argument of Thomason et al. (2013), a successful coopetitive relation exists when the supplier organisation collaborates with the client organisation and its competitors in a relationship of trust, mutual benefit and commitment.

Even though there is no ideal relationship between a client organisation and its supplier organisations due to a number of influencing factors (Roseira et al., 2010), there are contributions to critical success factor research on coopetition engagements. Chin et al. (2008) conducted a quantitative case study of the Hong Kong manufacturing industry, focusing on a type-2 coopetition, which is characterised by high competition and low cooperation. According to Chin et al. (2008), critical success factors of coopetition relations can be categorised broadly into three clusters:

management commitment, relationship development, and communication management. In addition, the following literature review identified factors that cannot be categorised in the cluster introduced by Chin et al. (2008). Therefore, these factors are categorised into two additional clusters, which are supplier management and supplier selection. The following sections critically review existing literature related to coopetition relations in order to identify potential critical success factors of forced coopetition relations in IT multi-sourcing projects.

2.4.1 Supplier Management

There is a large body of literature focusing on supply chain management, and therefore on the management of suppliers. However, there is not much research available with a specific focus on coopetitive relations. Wilhelm (2011), who mainly draws on Dyer and Nobeoka (2000), identified three supplier management practices that foster cooperation in coopetitive relations.

First, Wilhelm (2011) and Dyer and Nobeoka (2000) propose the use of supplier associations as a management practice in horizontal supply chain relations. Supplier associations are described as regular meeting, which provide an opportunity to all suppliers to regularly meet with each other and the client organisation. The findings of Wilhelm (2011) indicate that supplier associations are a rather common practice among European car manufacturers. The meetings foster vertical (customer-supplier) and horizontal (supplier-supplier) cooperation. At the same time, supplier associations foster competition between supplier organisations enabling a direct comparison of suppliers. For software development outsourcing projects in particular, it is argued that these face-to-face meetings with the suppliers facilitate a successful communication of project goals by the client organisation (Ilmo & Nahar, 2010). Therefore, it is argued that regular supplier associations with a clear professional focus support successful horizontal supply chain relations (Wilhelm, 2011).

The second management practice by Wilhelm (2011) is supplier consultancy, which is described as a support service of client organisations provided to their suppliers. The support service provides production experts of the client organisation, who assist the supplier in strengthening his competencies. Wilhelm (2011) argues that supplier consultancy offers valuable insights into the client organisation about the processes and performance of the suppliers. This knowledge can be used as a basis for supplier benchmarking, which is a typical approach in order to continuously assess

and improve the quality of the suppliers (Matook, Lasch, & Tamaschke, 2009). However, the effectiveness of supplier benchmarking is highly dependent on the transparency of the ranking, and whether the suppliers ascribe a high importance to the ranking (Wilhelm, 2011).

The third management practice is the implementation of voluntary learning groups between suppliers that consult with other suppliers regarding production problems (Dyer & Nobeoka, 2000). The research findings indicate that learning groups foster cooperation between supplier organisations if the suppliers are no direct competitors (Wilhelm, 2011). This is in line with Richardson (1993), who observed that assistance between suppliers of Japanese automotive companies resolves problems in the production process. To achieve a better cooperation between partnering organisations, it is argued that regular workshops should be established (Eriksson, 2010), to foster teamwork (Ilmo and Nahar, 2010). This is underpinned by Dorn et al. (2016), who emphasised the continuity of such measures.

The research of Wiener and Saunders (2014b) also contributes to the supplier management cluster. The research findings indicate that a client organisation can foster supplier cooperation by implementing contractual agreements. Contractual agreements ensure that suppliers provide sufficient training to each other, which fosters a smooth transition of tasks (Wiener & Saunders, 2014b). In addition, it is argued that contractual agreements are required in multi-sourcing projects in order to align the individual contracts of different supplier organisations (Ilmo & Nahar, 2010). This avoids conflicts due to unaligned scope and unclear accountabilities (Satzger & Kieninger, 2011; Goldberg et al., 2015). Some scholars even claim that contractual agreements are indispensable in order to prevent opportunistic behaviour (Dorn et al., 2016). Fernandez et al. (2014), on the other hand, argue that legal frameworks provide little help to coopetitive relations, as coopetition relations evolve over time and depend on multiple dimensions. In a similar vein, studies show that contractual agreements are not necessary to govern coopetitive relations (Mariani, 2016) or can even cause further tensions between clients and suppliers in a multi-sourcing context (Lin, 2015). These tensions result from contractual agreements that include penalties for suppliers in order to foster cooperation between the organisations. This practice namely threatening to switch suppliers, has been particularly used by Japanese automotive companies (Richardson, 1993; Wu et al., 2010).

2.4.2 Supplier Selection

The supplier selection is considered an important task because it has an impact on the competitiveness of a supply chain network and, therefore, a multi-sourcing project (Vijayvagy, 2012; Gurel, Acar, Onden, & Gumus, 2015; Scott, Ho, Dey, & Talluri, 2015). In a similar vein, Ilmo and Nahar (2010) claim that the supplier selection process is crucial in software development projects, as it is directly linked to the success of such relations.

Some scholars even argue that similar capabilities of suppliers, such as similar processes and cultures, positively relate to coopetition success (Morris, Kocak, & Özer, 2007; Gnyawali & Park, 2011; Soderberg, Krishna, & Bjorn, 2013; Tidström, 2014; Wiener & Saunders, 2014b). Both similarity and balance among suppliers in coopetitive relations are required, since "the key to maintaining a good partnership is for both parties to exert a moderate force to accomplish a common purpose" (Fang, Chang, & Peng, 2011, p.775). Furthermore, it is argued that resource and technological similarity are a precondition to successfully share knowledge between cooperative organisations (Sarker et al., 2012; Goldberg et al., 2015). This argument is in line with Roseira et al. (2010), who focused on cross-over effects in supplier networks based on two case studies. Their research findings indicate that the similarity of suppliers plays an important role in supplier networks, and results in a reduction of prices for the client organisation. However, Tidström (2014) argues that supplier similarity implies a focus on similar customers, which may result in additional tensions. Hence, supplier similarity can relate both positively and negatively to the success of a coopetitive relationship. As described in this chapter, forced coopetition is initiated by the client organisation, which selects the suppliers for an IT multi-sourcing project (Wiener & Saunders, 2014b). Hence, it is the responsibility of the client organisation to consider the similarity of the supplier capabilities during the supplier selection process.

Similar supplier capabilities enable the client organisation to use mixed supplier teams for the same task. According to Wiener and Saunders (2014b), the use of mixed supplier teams may foster the cooperation between supplier organisations and, therefore, increase the quality of the coopetitive relation. Similarly, Su and Levina (2011) claim that the resulting interdependency of tasks requires the suppliers to cooperate. However, it is more difficult for a client organisation to identify the responsible supplier if a task is not delivered in time or in good quality. According

to the research of Aron and Singh (2005), the risk of failure associated with non-codifiable tasks is higher than with codifiable tasks.

Third, Thomason et al. (2013) claim that the supplier size shall be considered during the supplier selection process as well. The research findings indicate that unequally distributed financial resources negatively relate to coopetition success. This is caused by a better network position of larger organisations within in a many-to-many supplier relation (Jaakkola & Hakanen, 2013). In a similar vein, studies show that large organisations have more power over smaller organisations and, therefore, are able to influence the client organisation (Wilhelm, 2011). Furthermore, the power asymmetry facilitates an instability of the coopetitive relation on an inter-organisational level (Mariani, 2016). Thus, a stable coopetitive relation depends on a balanced division of power. Consequently, the client organisation has to consider the supplier size during the supplier selection process (Tidström, 2009).

2.4.3 Management Commitment

In general, the relevant literature highlights that organisations are required to continuously adapt their governance in multi-sourcing projects (Goldberg et al., 2015), which requires management commitment. The research findings of Chin et al. (2008) indicate that management leadership and long-term commitment are the most important critical success factors of the management commitment cluster. Likewise, Mariani (2016) claims that strong management leadership facilitates faster decision making and therefore more effective coopetitive relations. This is also underpinned by scholars focusing on supply chain management. Wen-li, Humphreys, Chan, and Kumaraswamy (2003) and Humphreys, Li, and Chan (2004) identified that top management support as well as long-term commitment are critical success factors for a successful cooperation with suppliers. With regard to multi-sourcing software development projects, it is argued that long-term planning with the supplier is crucial for the success of such relations (Ilmo & Nahar, 2010). In addition, Soderberg et al. (2013) emphasise the importance of management commitment from supplier organisations, as it has a direct impact on the identification and commitment of the project staff with the project goals.

The research of Le Roy and Fernandez (2015) also contributes to the management commitment cluster. The findings indicate that duplicated managerial functions support successful coopetition on a project level. Even though duplicated roles

within a project might be considered a waste of resources, Le Roy and Fernandez argue that the duplication reflects the partnership symmetry among the supplier organisations. The findings of Goldberg et al. (2015), on the other hand, indicate that clearly defined accountabilities and responsibilities are required to successfully cooperate with multiple IT suppliers. Especially in challenging project situations, it is argued that clear responsibilities and accountabilities are required to be transparent for all participants (Ilmo & Nahar, 2010). Thus, their findings do not support the argument of Le Roy and Fernandez (2015) that duplicated management functions are a success factor in coopetition relations.

The duality is not only limited to governance structures but also to management committees and steering committees (Le Roy & Fernandez, 2015). The research findings of Le Roy and Fernandez are underpinned by Thomason et al. (2013), who argue that the governance structure is a critical success factor of coopetition on an inter-organisational level. However, Wallenburg and Raue (2011) show that the effect of governance mechanisms varies. Their research findings indicate that the social control mechanism reduces the extent of conflict in horizontal logistic networks. On the other hand, a formal governance structure, which emphasises standard operating procedures increases the extent of conflicts.

Sarker et al. (2012) propose another noticeable factor for a successful cooperation with other organisations. According to their research, conflicting interests hinder a successful value co-creation, which is in line with Lessard (2014) or Lempinen and Rajala (2014), who emphasised the alignment of interests of all actors. Hence, it is argued that the existence of similar supplier interests by the actors in multi-sourcing projects is a critical success factor for the management commitment cluster. This is underpinned by Ilmo and Nahar (2010) and Goldberg et al. (2015), who emphasise the importance of similar interests and cultures to ensure successful cooperation between stakeholders.

2.4.4 Relationship Management

According to Ilmo and Nahar (2010), investing in relationship management is a key to the successful outsourcing of software development projects. In terms of the relationship management cluster, Chin et al. (2008) point out that development of trust, followed by knowledge and risk sharing are considered the most important factors of a coopetitive relationship. This argument is supported by Thomason et

al. (2013). According to their research, trustworthiness among suppliers and the maintenance of relationships are critical success factors of a coopetitive relationship, which is in line with Morris et al. (2007), Osarenkhoe (2010), Pellegrin-Boucher et al. (2013), and Tidström (2014).

The development of trust is a frequently cited success factor, especially for relations between client organisations and supplier organisations (García, Pender, & Elgoibar, 2016). According to Czakon and Czernek (2016), trust is a precondition for organisations to engage in coopetitive relations. In existing coopetitive relations, it is argued that the level of inter-organisational trust correlates with the performance of such relationships (Zaheer, McEvily, & Perrone, 1998; Soderberg et al., 2013). In addition, the study of Bouncken and Fredrich (2012) showed that a high level of trust and dependency between organisations supports a successful coopetition, and it increases the innovation performance of such relationships. The research of Johnston, McCutcheon, Stuart, and Kerwood (2004) took it one step further and focused on the impact of trust by the supplier organisation and client organisation. Their research findings indicate that the existence of trust by the client organisation has a higher level of impact in the performance of inter-organisational relations than the existence of trust by a supplier organisation.

Nevertheless, it is argued that the existence of trust is a prerequisite for knowledge and resource sharing, as well as for the style of communication (Morris et al., 2007; Liao, Ma, Jiung–Yee Lee, & Ke, 2011). In particular, Ding, Huang, and Liu (2012) highlight the importance of trust for cooperation among competing organisations due to knowledge sharing issues. Knowledge sharing between competitors is certainly challenging due to intellectual property rights. According to Chiambaretto and Fernandez (2016), organisations face the coopetitive dilemma that they must share information and simultaneously protect it from their competitors. Therefore, Heikkilä, Sajasalo, Heikkilä, and Pohjola (2016, p.626) argue that it is necessary to develop practices that motivates "parties to share new ideas within the network without the fear of losing the ownership." Furthermore, studies claim that the decision to share knowledge is based on two dimensions, namely criticality and appropriability (Chiambaretto & Fernandez, 2016). However, Sarker et al. (2012) argue that the capability to create, transfer and exploit knowledge within a cooperative relationship is seen as a manifestation of collective strength. In sum, knowledge sharing and integration is considered to be a key success factor in coopetitive relations (Sarker et al., 2012; Lempinen & Rajala, 2014).

Furthermore, studies revealed that personal employee relations on an inter-individual level are critical for the coopetition success (Le Roy & Fernandez, 2015). According to Mariani (2016), a lack of personal relations prevents the emergence of trust, which is crucial for the success of coopetition relations (García et al., 2016). In a similar vein, the research of Bengtsson et al. (2003) and Tidström (2014) indicate that personal relations decrease the risk of opportunistic behaviour, and therefore positively relate to coopetition success

2.4.5 Communication Management

It is widely accepted that communication management is critical for the success of any outsourcing project. According to Ilmo and Nahar (2010), communication management is even the most important factor in outsourcing of software development. Likewise, both Tidström (2009) and Wiener and Saunders (2014b) argue that the existence of communication management itself is a critical success factor of a coopetitive relationship.

In general, studies show that the use of information systems to manage communication and information is critical for the success of coopetitive relations (Chiambaretto & Fernandez, 2016) because it is a prerequisite for socialization and cooperation (Eriksson, 2010). This is supported by studies related to supplier management, which emphasise the importance of effective communication management systems in supplier relations (Wen-li et al., 2003; Humphreys et al., 2004). In particular, for software development projects, Ilmo and Nahar (2010) recommend the use of integrated tools and methods across all organisations. Furthermore, Goldberg et al. (2015) highlight that tool integration between different organisations is a prerequisite for knowledge management, which ultimately fosters communication between people across organisational boundaries (Bardhan, Krishnan, & Lin, 2013). However, the findings of Lin (2015) outline that the integration of systems across organisations is rather difficult and, therefore, may cause frustration on an inter-individual level.

Chin et al. (2008) argue that the use of a conflict management system fosters coopetitive relations. García et al. (2016) states that there is an interdependency between trust and the need for a proper conflict management in order to establish a constructive long-term relation between organisations. This is supported by Eriksson (2010), who argues that conflict resolution techniques are required to successfully cooperate with other organisations. The research findings of Ilmo and Nahar (2010) state that

conflict resolution techniques are required to cope with problems in multi-sourcing software development projects.

Both Le Roy and Fernandez (2015) and Bengtsson and Raza-Ullah (2016) emphasise the importance of the Project Managers' capabilities in coopetitive relations. In a similar vein, studies show that the Project Manager is a key role in managing and fostering the flow of information (Chiambaretto & Fernandez, 2016; Mariani, 2016). Furthermore, the management of coopetitive relations requires a good understanding and continuous pro-active management in order to successfully integrate the services of the organisations involved in the IT multi-sourcing project (Goldberg et al., 2015). The research of Ilmo and Nahar (2010) claims that multi-sourcing software development projects require people with a broad range of skills to successfully manage such relationships. Also, the Project Manager must be able to balance the management of tensions in order to avoid partnership failure (Fang et al., 2011).

2.5 Research Gap

Based on the above literature review, the study identified critical success factors of traditional coopetitive relations, which have been grouped into five cluster: management commitment, relationship development, communication management, supplier management, and supplier selection (see table 2.1).

Cluster	Potential Critical Success Factor	Source
Management Commitment	Management Leadership	Wen-Li et al., 2003; Humphrey et al., 2004; Chin et al., 2008; Ilmo & Nahar, 2010; Soderberg et al., 2013; Mariani, 2016
	Long-term Commitment	Chin et al., 2008; Wen-Li et al., 2003; Humphrey et al., 2004; Soderberg et al., 2013
	Duplicated Mgmt. Functions	Ilmo & Nahar, 2010; Le Roy & Fernandez, 2015; Goldberg et al., 2015
	Similar Interests	Ilmo & Nahar, 2010; Sarker et al. 2012; Lessard, 2014; Lempinen & Rajala, 2014; Goldberg et al.; 2015

Relationship Development	Development of Trust	Chin et al., 2008; Johnston et al. ,2004; Bouncken & Fredrich, 2012; Thomason et al., 2013; Garcia et al., 2016; Czakon & Czernek, 2016
	Knowledge Sharing	Chin et al., 2008; Morris et al., 2008; Das Teng, 2000; Liao et al., 2011; Sarker et al., 2012; Lempinen & Rajala, 2014; Chiambaretto & Fernandez, 2016
	Personal Relationships	Bengtsson et al., 2003; Tidström, 2014; Le Roy & Fernandez, 2015; Mariani, 2016
Communication Management	Collaborative Software	Chin et al., 2008; Eriksson, 2010; Bardhan et al., 2013; Chiambaretto & Fernandez, 2016
	Conflict Management System	Chin et al., 2008, Ilmo & Nahar, 2010; Eriksson, 2010; Garcia et al., 2016
	Project Manager Capabilities	Ilmo & Nahar, 2010; Goldberg et al., 2015; Le Roy & Fernandez, 2015; Chiambaretto & Fernandez, 2016; Marini, 2016
Supplier Selection	Similar Capabilities	Morris et al., 2008; Tidström, 2009; Roseira et al., 2010; Gnyawali & Park, 2011; Sarker et al., 2012; Wiener & Saunders, 2014a
	Supplier Size	Tidström, 2009; Wilhelm, 2011; Thomason et al., 2013; Lempinen & Rajala, 2014; Mariani, 2016
	Mixed Supplier Teams	Wiener & Saunders, 2014a
Supplier Management	Supplier Associations	Dyer & Nobeoka, 2000; Ilmo & Nahar, 2010; Wilhelm, 2011
	Supplier Consultancy	Dyer & Nobeoka, 2000; Wilhelm, 2011
	Learning Groups	Richardson, 1993; Dyer & Nobeoka, 2000; Eriksson, 2010; Ilmo & Nahar, 2010; Wilhelm, 2011
	Contractual Agreements	Ilmo & Nahar, 2010; Wiener & Saunders, 2014a; Wu et al., 2010; Lin, 2015; Goldberg et al., 2015; Dorn et al., 2016; Mariani, 2016

TABLE 2.1: Potential Critical Success Factors

The study revealed that the vast amount of related literature focuses on voluntarily initiated coopetitive relations, or on sourcing arrangements in general (see appendix A). Only a few studies focused on forced coopetitive relations. In addition, studies mainly focused on the manufacturing, IT, or aerospace sectors, or did not have any explicit industry focus. Apart from that, it can be noted that the majority of studies applied qualitative methods using case studies.

As outlined by Tidström (2014), coopetition relations are subject to constant change, which results from the simultaneous coexistence of cooperation and competition. The resulting tensions affect the stability of a multi-sourcing engagement negatively (Pellegrin-Boucher et al., 2013), and therefore may contribute to project failure (Fernandez et al., 2014). Hence, the management of a forced coopetition relation in an IT multi-sourcing project is crucial for the client organisation.

A noticeable gap emerging from the literature review is the lack of a common understanding of the critical success factors on forced coopetition relations. This gap is underpinned by Ilmo and Nahar (2010, p.2), who outline a lack of studies "dealing with the management of multi-vendors in software production." More recently, Bengtsson et al. (2016, p.23) claim that "prior research has thus far not produced an overarching theory to explain what drives coopetition, what happens during coopetition at and across multiple levels of analysis, and what are the consequences." In particular, Bengtsson et al. (2016) point out that there is little empirical investigation available that addresses the management of tension in coopetition. Dorn et al. (2016) argue that there is a lack of research on the prevention of coopetitive tensions and conflicts. The question then is if the factors identified in studies related to voluntary coopetitive relationships can be used to characterise forced coopetitive relationships as well. This study is a first empirical attempt to bridge this gap by analysing which critical success factors are relevant in instances of forced coopetition. Figure 2.5 depicts the research gap, and shows the potential critical success factors of forced coopetition relations grouped by the clusters of the above literature review.

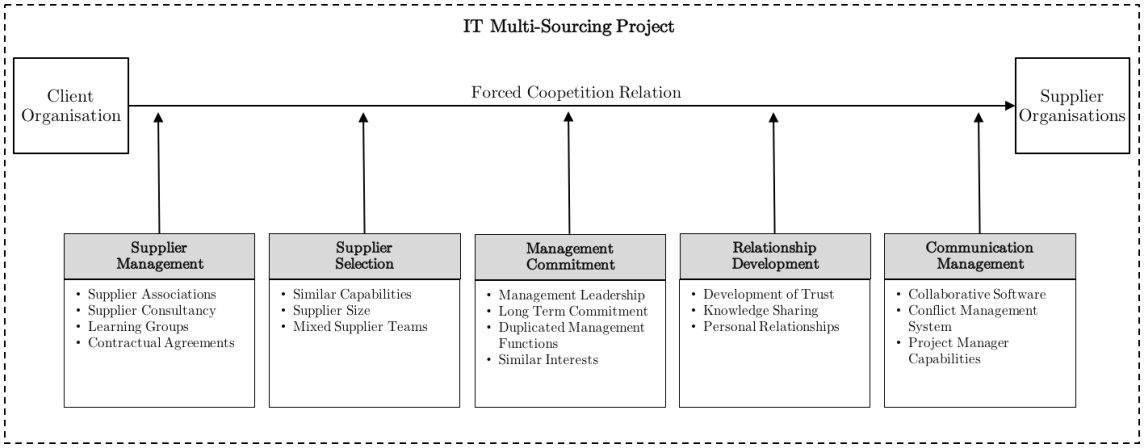

FIGURE 2.5: Research Gap

2.6 Summary

This chapter analysed the existing literature related to traditional coopetition in order to contextualise this study. The literature review discussed tensions and conflicts related to coopetitive relations, as well as relevant approaches to management. Furthermore, the chapter dealt with critical success factors of traditional coopetition relations and outlined the research gap. The following chapter discusses the conceptual framework for the study. Furthermore, the hypotheses are presented.

Chapter 3

Conceptual Framework and Hypotheses

3.1 Introduction

The previous chapter reviewed contemporary literature related to coopetition and, ultimately, presented the research gap. The research gap describes critical success factors of traditional coopetition relations that are potentially relevant for forced coopetition relations in IT multi-sourcing projects. This chapter presents the research question and resulting hypotheses which underpin this research.

3.2 Research Questions and Hypotheses

The research gap shows that literature has devoted scarce attention to the factors relevant for the success of forced coopetition relations. Based on the literature review and the conceptual framework, one main research question has been identified:

Main Research Question: What are the critical success factors of a forced coopetition in IT multi-sourcing projects?

The literature review has identified critical success factors of traditional coopetition relations, which are potentially relevant in forced coopetition relations. The factors are grouped into five clusters - namely, supplier management, supplier selection,

management commitment, relationship development, and communication management. Hence, the main research question is therefore addressed by the following sub-research questions:

Sub-Research Question	
SRQ 1	What are the relationships between the factors of the supplier management cluster and a successful forced coopetition in IT multi-sourcing projects?
SRQ 2	What are the relationships between the factors of the supplier selection cluster and a successful forced coopetition in IT multi-sourcing projects?
SRQ 3	What are the relationships between the factors of the management commitment cluster and a successful forced coopetition in IT multi-sourcing projects?
SRQ 4	What are the relationships between the factors of the relationship development cluster and a successful forced coopetition in IT multi-sourcing projects?
SRQ 5	What are the relationships between the factors of the communication management cluster and a successful forced coopetition in IT multi-sourcing projects?
SRQ 6	Which of the identified clusters of critical success factors is the most important in multi-sourcing projects?

Table 3.1: Sub-Research Questions

The following sections discuss the presented sub-research questions and deduce the hypotheses.

3.2.1 H1: Supplier Management

Contemporary literature related to traditional coopetition has emphasised the importance of supplier management, especially the following critical success factors (see table 3.2)

Potential Critical Success Factor	Source
Supplier Associations	Dyer & Nobeoka, 2000; Ilmo & Nahar, 2010; Wilhelm, 2011
Supplier Consultancy	Dyer & Nobeoka, 2000; Wilhelm, 2011
Learning Groups	Richardson, 1993; Dyer & Nobeoka, 2000; Eriksson, 2010; Ilmo & Nahar, 2010; Wilhelm, 2011
Contractual Agreements	Ilmo & Nahar, 2010; Wiener & Saunders, 2014a; Wu et al., 2010; Lin, 2015; Goldberg et al., 2015; Dorn et al., 2016; Mariani, 2016

TABLE 3.2: Supplier Management - Potential Critical Success Factors

Wilhelm (2011), who focused on inter-organisational relations in the automotive industry, argued that supplier associations and supplier learning groups, which are initiated and moderated by the client organisation, foster the cooperation among the suppliers. In particular, supplier associations facilitate the horizontal and vertical relationships in a coopetitive relationship through regular meetings of the client organisation and the supplier organisations (Ilmo & Nahar, 2010). Supplier learning groups, on the other hand, address solely the horizontal supplier-supplier relationship (Dyer & Nobeoka, 2000). Eriksson (2010) emphasises the importance of supplier associations and supplier learning groups as measures that foster cooperation between organisations. In a similar vein, Wilhelm (2011) argues that both supplier associations and supplier learning groups ultimately build trust between the actors of a multi-sourcing project. However, the frequency of these measures is crucial, as they may also stimulate rivalry between the suppliers (Kilduff, Elfenbein, & Staw, 2010).

Alongside with supplier learning groups, consultancy services offered by the client organisation may increase the supplier commitment (Dyer & Nobeoka, 2000; Wilhelm, 2011). Consultancy services enable a supplier organisation to understand the internal processes and culture of the client organisation, and therefore promote an efficient collaboration within a multi-sourcing project. In addition, this measure provides the client organisation with the opportunity to gain deeper insights into the performance differentials, processes and culture of a supplier organisation. Therefore, consultancy services provide valuable information to the client organisation for a supplier benchmarking.

Furthermore, scholars emphasise the importance of contractual agreements between the client organisation and the suppliers in coopetition relations (Sarker et al., 2012;

Wiener & Saunders, 2014b). Contractual agreements protect against opportunism and ensure that competing suppliers cooperate on the project by providing sufficient training and documentation. Furthermore, coopetition-specific contractual agreements ensure that individual contracts of different external suppliers are aligned, which avoid conflicts due to unclear responsibilities and accountabilities (Ilmo & Nahar, 2010; Goldberg et al., 2015). It is argued that contractual agreements are important for any sourcing engagement because they define the supplier's "contribution to the client in terms of specific benefits." (Dibbern et al., 2004, p.11). However, Mariani (2016) claims that contractual agreements are not necessary in coopetitive relations. Moreover, other studies show that detailed contracts that contain service level agreements hinder the cooperation between organisations and, therefore, cause further tensions in multi-sourcing projects (Lin, 2015).

In light of the above-described importance of measures related to the management of coopetition relations, the following has therefore been hypothesised:

H_1: All factors related to supplier management increase the quality of a forced coopetitive relationship in IT multi-sourcing projects.

3.2.2 H2: Supplier Selection

The selection of appropriate suppliers by the client organisation in a multi-sourcing project is considered an important task in the literature (Ilmo & Nahar, 2010; Scott et al., 2015). It is argued that the supplier selection ultimately impacts the success and competitiveness of the supply chain, and therefore the success of a multi-sourcing project (Gurel et al., 2015). For this reason, the client organisation has to consider multiple criteria in the supplier selection process (see table 3.3)

Potential Critical Success Factor	Source
Similar Capabilities	Morris et al., 2008; Tidström, 2009; Roseira et al., 2010; Gnyawali & Park, 2011; Sarker et al., 2012; Wiener & Saunders, 2014a
Supplier Size	Tidström, 2009; Wilhelm, 2011; Thomason et al., 2013; Lempinen & Rajala, 2014; Mariani, 2016
Mixed Supplier Teams	Wiener & Saunders, 2014a

Table 3.3: Supplier Selection - Potential Critical Success Factors

Contemporary literature on supplier selection discusses factors that are rather general in nature such as costs, quality, flexibility and the delivery capability of supplier organisations (Vonderembse & Tracey, 1999; Vijayvagy, 2012). With regard to coopetition relations, it is argued that the similarity of supplier capabilities is one of the most important factors for the supplier selection process (Morris et al., 2007; Tidström, 2009; Gnyawali & Park, 2011; Sarker et al., 2012; Soderberg et al., 2013). The research findings indicate that similarity of resources, working styles, cultures and processes foster cooperation among multiple supplier organisations. Therefore, it is argued that supplier similarity has a positive impact on successful coopetition relation.

Thomason et al. (2013) proposed that a supplier's financial resources have to be considered in the supplier selection process. It is argued that unequally distributed financial resources negatively correlate with coopetition success, because organisations with larger financial resources have closer relations to the client organisation, which ultimately hinders supplier cooperation. Furthermore, it is argued that larger organisations can balance the challenging relationships in their project portfolio compared to smaller organisations. Therefore, it is easier for larger organisations to establish long-term relationships with the client organisation, as they do not rely on the immediate success of a single project (Das & Teng, 2000; Park et al., 2014; Bengtsson et al., 2016). As a consequence, the supplier size indeed has an impact on successful supplier cooperation, because it potentially changes the balance of power between suppliers (Tidström, 2009; Wilhelm, 2011; Thomason et al., 2013; Lempinen & Rajala, 2014; Mariani, 2016). Hence, the supplier size must be considered in the supplier selection process.

The use of mixed supplier teams which work on the same task is considered an additional measure to foster cooperation among competing suppliers (Wiener & Saunders, 2014b). However, the research of Aron and Singh (2005) indicates that task codifiability has to be considered if a client organisation decides to use mixed supplier teams. It is argued that the risk of failure associated with non-codifiable tasks is higher than the risk associated with codifiable tasks. Hence, the codifiability of tasks in a multi-sourcing project has an impact on the decision whether to use mixed suppliers for the same task.

In light of the above-stated importance of the supplier selection process, the following has therefore been hypothesised:

H_2: All factors related to supplier selection increase the quality of a forced coopetitive relationship in IT multi-sourcing projects.

3.2.3 H3: Management Commitment

Management commitment is strongly linked with successful coopetition and value co-creation. Moreover, management commitment is considered an important factor for any IT project (Englund & Bucero, 2006). Therefore, the client organisation has to consider multiple criteria in coopetitive relations (see table 3.4).

Potential Critical Success Factor	Source
Management Leadership	Wen-Li et al., 2003; Humphrey et al., 2004; Chin et al., 2008; Ilmo & Nahar, 2010; Soderberg et al., 2013; Mariani, 2016
Long-term Commitment	Chin et al., 2008; Wen-Li et al., 2003; Humphrey et al., 2004; Soderberg et al., 2013
Duplicated Mgmt. Functions	Ilmo & Nahar, 2010; Le Roy & Fernandez, 2015; Goldberg et al., 2015
Similar Interests	Ilmo & Nahar, 2010; Sarker et al. 2012; Lessard, 2014; Lempinen & Rajala, 2014; Goldberg et al.; 2015

TABLE 3.4: Management Commitment - Potential Critical Success Factors

Contemporary literature discusses multiple criteria in relation to management commitment. Firstly, it is argued that the existence of strong management leadership by all involved organisations supports a successful inter-organisational relationship (Chin et al., 2008; Mariani, 2016). Furthermore, it is stated that a commitment to long-term business relations between the cooperating organisations, and the resulting willingness to support inter-organisational learning, have a positive impact of coopetition relations (Ilmo & Nahar, 2010; Soderberg et al., 2013).

Le Roy and Fernandez (2015) propose an additional factor, which indicates a high level of management commitment. According to their research, the use of duplicated management functions support successful coopetitive relations. As a consequence, each organisation that is involved in a multi-sourcing project provides a Project Manager that has to cooperate with the Project Managers from other organisations.

On the other hand, some scholars argue that the use of duplicated management functions is a waste of resources and prevents clear responsibilities and accountabilities (Ilmo & Nahar, 2010; Goldberg et al., 2015).

Furthermore, it is argued that organisations which cooperate but have incompatible interests may cause tensions in inter-organisational relations (Lessard, 2014). Particularly, Ilmo and Nahar (2010) emphasise the importance of similar cultures and interests between the stakeholders in software development projects. Hence, the existence of similar interest of organisations in a coopetition relation is considered a potential critical success factor in forced coopetition relations (Tidström, 2009; Sarker et al., 2012; Lempinen & Rajala, 2014; Goldberg et al., 2015).

In the light of the above stated importance of management commitment, the following has therefore been hypothesised:

H_3: All factors related to management commitment increase the quality of a forced coopetitive relationship in IT multi-sourcing projects.

3.2.4 H4: Relationship Development

Contemporary literature on coopetition also emphasises the importance of relationship development. In order to operationalise relationship development, existing literature discusses multiple criteria (see table 3.5).

Potential Critical Success Factor	Source
Development of Trust	Chin et al., 2008; Johnston et al. ,2004; Bouncken & Fredrich, 2012; Thomason et al., 2013; Garcia et al., 2016; Czakon & Czernek, 2016
Knowledge Sharing	Chin et al., 2008; Morris et al., 2008; Das Teng, 2000; Liao et al., 2011; Sarker et al., 2012; Lempinen & Rajala, 2014; Chiambaretto & Fernandez, 2016
Personal Relationships	Bengtsson et al., 2003; Tidström, 2014; Le Roy & Fernandez, 2015; Mariani, 2016

Table 3.5: Relationship Development - Potential Critical Success Factors

The vast number of scholars highlight the importance of trust in coopetitive relations (Chin et al., 2008; Sarker et al., 2012; Thomason et al., 2013). It is particularly argued that trust is a precondition for organisations to engage in coopetitive relations

(Czakon & Czernek, 2016), and to maintain performant coopetition relations between client and supplier organisations (Zaheer et al., 1998; Soderberg et al., 2013; García et al., 2016). Trust is also considered to be a prerequisite for knowledge sharing and personal relationships on an inter-individual level in a multi-sourcing project (Morris et al., 2007). Hence, scholars also emphasise the importance of personal relationships in coopetition relations, which decrease the risk of opportunistic behaviour (Bengtsson et al., 2003; Tidström, 2014; Le Roy & Fernandez, 2015).

In addition to trust and personal relationships, contemporary literature emphasises the importance of knowledge sharing between organisations in order to improve inter-organisational relations (Sarker et al., 2012). However, knowledge and resource sharing is challenging in coopetition relations, due to the risk of knowledge leakage and opportunism by a competing organisation (Ding et al., 2012; Bengtsson and Raza-Ullah, 2016; Fernandez and Chiambaretto, 2016). Nevertheless, knowledge and resource sharing contribute to the development of inter-individual relationships and therefore to successful coopetition relationships (Chin et al., 2008; Morris et al., 2008; Das Teng, 2000; Sarker et al., 2012; Lempinen and Rajala, 2014).

In light of the above-stated importance of relationship development, the following has therefore been hypothesised:

H_4: All factors related to relationship development increase the quality of a forced coopetitive relationship in IT multi-sourcing projects.

3.2.5 H5: Communication Management

Communication management is considered an important area in inter-organisational networks (Chin et al., 2008; Tidström, 2009; Ilmo & Nahar, 2010). Therefore, contemporary literature on coopetition discusses multiple criteria, which operationalise communication management (see table 3.6).

Potential Critical Success Factor	Source
Collaborative Software	Chin et al., 2008; Eriksson, 2010; Bardhan et al., 2013; Chiambaretto & Fernandez, 2016
Conflict Management System	Chin et al., 2008, Ilmo & Nahar, 2010; Eriksson, 2010; Garcia et al., 2016
Project Manager Capabilities	Ilmo & Nahar, 2010; Goldberg et al., 2015; Le Roy & Fernandez, 2015; Chiambaretto & Fernandez, 2016; Marini, 2016

Table 3.6: Communication Management - Potential Critical Success Factors

First, the use of integrated collaborative software is a prerequisite for communication across organisational boundaries and thus also for knowledge sharing in coopetitive relations (Eriksson, 2010; Goldberg et al., 2015; Chiambaretto & Fernandez, 2016). In particular, Ilmo and Nahar (2010) argue that collaborative software and tooling are required for multi-sourcing software development projects. In addition, it is argued that conflict management systems are necessary in order to successfully cooperate with other organisations and to cope with the challenges of such inter-organisational relations (Chin et al., 2008; Eriksson, 2010; Ilmo & Nahar, 2010).

Recent publications emphasise the importance of the Project Manager's capabilities in a coopetition relationship (Le Roy & Fernandez, 2015; Mariani, 2016). Studies show that the management of coopetitive relations requires a broad range of skills (Ilmo & Nahar, 2010), such as the management of information flows (Chiambaretto & Fernandez, 2016), and the integration of services from different organisations (Goldberg et al., 2015). Similarly, Bengtsson and Raza-Ullah (2016) claim that Project Managers are directly involved in cooperation and competition situations in a multi-sourcing project. Therefore, the ability to manage tensions that can arise is crucial to a successful multi-sourcing project.

In light of the above-stated importance of communication management, the following has therefore been hypothesised:

H_5: All factors related to communication management increase the quality of a forced coopetitive relationship in IT multi-sourcing projects.

3.2.6 H6: Ranking of Critical Success Factor Clusters

The previous sections presented the critical success factor clusters and their importance in coopetitive relations. Despite the discussions on critical success factors, research on the ranking of cluster is still scarce.

To the author's best knowledge, Chin et al. (2008) are some of the few scholars that contributed to the prioritization of critical success factor clusters. The findings indicate that management commitment, followed by relationship development and communication management are the most important clusters in Hong Kong manufacturing coopetitions. Ilmo and Nahar (2010) claim that supplier selection is an important area for software development projects, while Wilhelm (2011) argues that supplier management is crucial in the automotive industry.

However, there is little research available that examines the ranking of the abovementioned clusters in the context of forced coopetition relations. Therefore, the following has been hypothesised:

H_6: The critical success factor clusters are not equally important in forced coopetitive relationships.

3.2.7 Conceptual Framework

The previous sections defined the hypotheses H_1-H_6 based on the research questions:

- H_1: All factors related to supplier management increase the quality of a forced coopetitive relationship in IT multi-sourcing projects.
- H_2: All factors related to supplier selection increase the quality of a forced coopetitive relationship in IT multi-sourcing projects.
- H_3: All factors related to management commitment increase the quality of a forced coopetitive relationship in IT multi-sourcing projects.
- H_4: All factors related to relationship development increase the quality of a forced coopetitive relationship in IT multi-sourcing projects.
- H_5: All factors related to communication management increase the quality of a forced coopetitive relationship in IT multi-sourcing projects.

- H_6: The critical success factor clusters are not equally important in forced coopetitive relationships.

Figure 3.1 outlines the resulting conceptual framework as the theoretical underpinning for this research. It illustrates the potential critical success factors of forced coopetition relations in IT multi-sourcing projects. In addition, the framework groups the critical success factors into clusters.

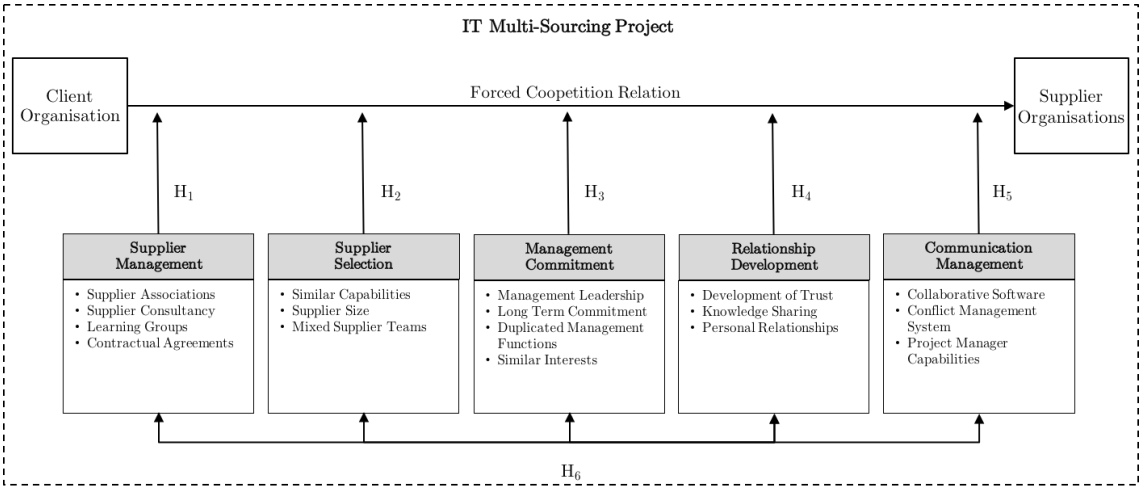

FIGURE 3.1: Conceptual Framework

3.3 Summary

This chapter introduced the hypotheses as well as the conceptual framework, which will be tested in the remainder of the study. The following chapter will discuss the methodological foundation of this research.

Chapter 4

Methodology

4.1 Introduction

The purpose of this chapter is to provide a description and justification of the research process. Therefore, the chapter presents the researcher's philosophical stance and the resulting research roadmap. Furthermore, the chapter reveals the research design, in particular the sampling approach, data collection and data analysis approach. Finally, the chapter discusses ethical considerations

4.2 Research Philosophy

A research philosophy relates to the "development of knowledge and the nature of that knowledge" (Saunders, 2012, p.127). It is considered to be the starting point of a research journey (Bogdan & Biklen, 1998) and it is the "basic belief system or world view that guides the investigation" (Guba & Lincoln, 1994, p.106). The research philosophy is born out of three dimensions, which are ontology, epistemology, and methodology (Denzin & Lincoln, 2011; Creswell, 2014). Ontology discusses the question of the nature of reality (Brand, 2009). Epistemology "concerns what constitutes acceptable knowledge in a field of study" (Saunders, 2012, p.132), and methodology describes the strategy that governs the choice of methods (Meetoo & Temple, 2003).

The selection of an appropriate research method is based on these dimensions (Crotty, 1998; Collis & Hussey, 2009; Creswell & Plano Clark, 2011). Therefore, the

process of identifying the research philosophy is crucial for the personal research journey. There is no golden path found that supports the identification of the research philosophy. However, the researcher considered his ontological and epistemological position in order to identify the appropriate methods for his philosophical worldview. The following sections will discuss the research orientation in more detail.

4.2.1 Ontology

According to Grix (2004), ontology is the starting point of a research philosophy, and can be best described with the question "what kinds of things are there in the world?" (Benton & Craib, 2011) or "what is the form and nature of reality and, therefore what is there that can be known about it?" (Guba & Lincoln, 1994). Other scholars define ontology in more simple terms as the nature of the social world (Tashakkori & Creswell, 2008) or as the beliefs regarding the nature of reality (Leech, Dellinger, Brannagan, & Tanaka, 2010). However, the term ontology is used differently depending on the scientific discipline (Benton & Craib, 2011).

There are two main ontological positions which describe the two extremes on a sliding scale. On the one side of the extreme is the objective ontological position. Objectivists believe that social entities exist in reality externally to social actors (Saunders, 2012). Objectivists try to explain what is happening in the world.

On the other side of the ontological scale is subjectivism or constructivism (Saunders, 2012; Bryman & Bell, 2015). Subjectivists believe that there are multiple realities and that reality and "social phenomena are created from the perceptions and consequent actions of social actors" (Saunders, 2012, p.132) and that the people's behaviour and perceptions are the basis for social phenomena (Lewis & Runde, 2007). Hence, subjectivists try to understand rather than explain. Therefore, subjective research focuses on the individual perceptions of the phenomena under investigation.

4.2.2 Epistemology

Epistemology describes the theory of knowledge production and what is considered valid knowledge (Meetoo & Temple, 2003). Therefore, the epistemological position impacts the strategic choice of methods for a study (Bernard, 2013).

The number of epistemological positions differs from scholar to scholar. Saunders (2012) and Bryman and Bell (2015) state that there are three main epistemological concepts. Positivism employs research methods of natural sciences to the social world; similarly, realism which is similar to positivism in that it "assumes a scientific approach to the development of knowledge" (Saunders, 2012, p.136). Interpretivism is the opposing concept to positivism (Bryman & Bell, 2015).

Other researchers describe a broader scale of epistemological positions. For instance, Crotty (1998) distinguishes between positivism, post-positivism, interpretivism, critical inquiry, feminism, and postmodernism. Creswell (2010), on the other hand, proposes four epistemological worldviews, which are post-positivism, constructivism, participatory, and pragmatism. Onwuegbuzie et al. (2014) build on the work of Creswell, but adds critical theory as an additional epistemological position. To summarise, it can be noted that contemporary literature describes a broad field of epistemological positions with sometimes fluid transitions. Ultimately, the ontological and epistemological orientation of a researcher impacts the research approach and the methodological choice (see figure 4.1).

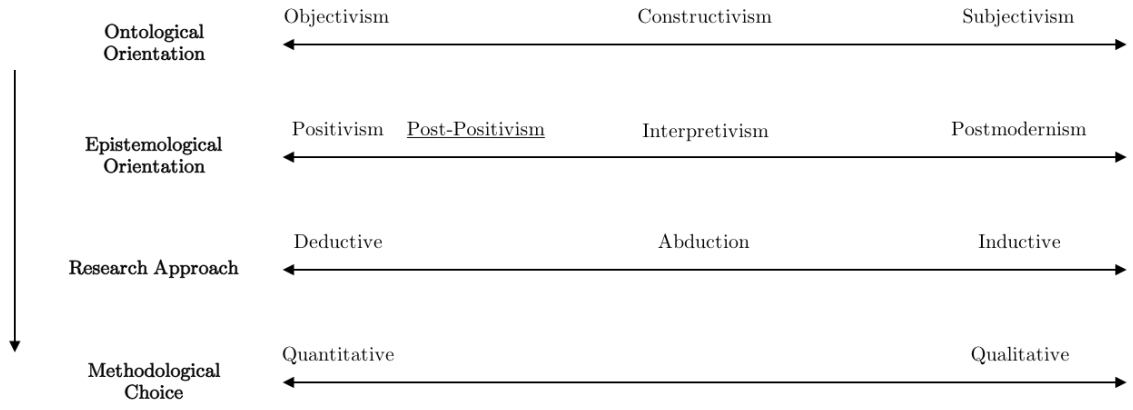

FIGURE 4.1: Research Philosophy Framework

Developed from Benton and Craib (2011); Saunders (2012); Bryman and Bell (2015)

4.2.3 Post Positivism

This study adapts a post-positivist philosophical underpinning, which acknowledges contextual factors for the research purpose (Phillips & Burbules, 2000). Post-positivism is a rejection or modification of central scientific core tenets of positivism which was the dominating research philosophy in the twentieth century (Trochim, 2006; Alvesson & Sköldberg, 2009; Onwuegbuzie et al., 2014). Positivists assume the

existence of a single objective reality and that someone can reach full understanding of the reality based on experiment and observation (Clark, 1998; Ryan, 2006). Post-positivism, on the other hand, claims that it is only possible to approximate the truth rather that to explain it perfectly or completely (Onwuegbuzie et al., 2014).

Conducting research with a post-positivistic epistemology requires the awareness of its limitations and implications. Post-positivistic research is aware that knowledge claims are circumstantial and therefore context-related (Clark, 1998; Brand, 2009; Phillips & Burbules, 2000). Hence, research findings and deduced knowledge are related to the research context and are always imperfect and fallible (Creswell, 2003). Consequently, a post-positivistic research design has to consider the contextual factors during the data collection and analysis phase, which are relevant for the research purpose (Phillips & Burbules, 2000). Ultimately, conclusions are only valid for the researched context and cannot be universally transferred to other cases or situations.

Post-positivism is theory-laden and therefore observations are influenced by theories, hypotheses and assumptions of the researcher (Trochim, 2006). Hence, the researchers' bias cannot be wholly detached from the inquire and must be considered throughout the complete study (Clark, 1998; Phillips & Burbules, 2000). Furthermore, a core tenet of post-positivism is the acceptance of fallibilism (Phillips & Burbules, 2000). The acceptance that knowledge claims can eventually turn to be faulty raises the question on the validity of post-positivistic conclusions. Therefore, the post-positivism applies the concept of triangulation using multiple measures and methods across multiple fallible perspectives in order to approximate objectivity (Onwuegbuzie et al., 2014). As a result, post-positivism enables a researcher to apply a sequential mixed methods research design where the findings of one method corroborate findings generated by another method (Teddlie & Tashakkori, 2010).

Nevertheless, post-positivism heavily relies on quantitative methods influencing the research design as well as the acceptance of existing knowledge. The backbone of a post-positivistic research design are quantitative methods. Therefore, post-positivism values quantitative data more than qualitative data (Clark, 1998). However, post-positivism also allows the use of qualitative research methods (Denzin & Lincoln, 2011).

4.2.4 Axiology

Axiology is defined as a philosophy of values, ethics, aesthetics and defines the view of the researcher on values in research (Morgan, 2007; Given, 2008). According to Saunders (2012), the researcher's values plays an important role in research because it influences the choices and judgments throughout the research process.

This research project is influenced by the author's interest in coopetition management due to his background as an IT Project Manager for multi-sourcing project. In line with the post-positivistic underpinning, the study applies an explanatory mixed method research design with priority placed on quantitative methods, in order to maintain objectivity and to minimise any bias on the findings of this study (Teddlie & Tashakkori, 2010; Biddle & Schafft, 2015).

4.3 Research Design

Research design is defined as a "general plan of how [to answer] research questions" (Saunders, 2012, p.159), and includes considerations regarding data collection, data analysis and ethical considerations. Bryman and Bell (2015, p.49) outline that the research design "reflects decisions about the priority being given to a range of dimensions of the research process."

The research design depends on the nature of the research question and can be classified into two main approaches of understanding research data: induction and deduction (Bernard, 2013; Bryman & Bell, 2015). An inductive approach builds theory-based patterns and observations of events, which have been repeated often times (Adams, Khan, & Raeside, 2014). Hence, induction is working from the specific to the general. Deduction, on the other hand, is working from the general to the specific. Deductive approaches aim to verify theories by developing hypotheses, collecting data and, ultimately, testing the hypotheses with empirical scrutiny (Creswell, 2014; Bryman & Bell, 2015). This research uses a deductive approach, which is in line with the philosophical stance of the researcher and the quantitative nature of the research questions (Onwuegbuzie et al., 2014).

Based on the review of the research philosophies and due to the nature of the research questions, the study at hand applies a mixed-method research approach. In particular, the study uses the explanatory sequential mixed-method design, which is

partially suited for researchers with a strong quantitative background and therefore in line with the researcher's philosophical stance (Creswell, 2014).

The use of a mixed-method strategy is also referred to as methodological triangulation, which describes the use of multiple methods to study the same research problem (Niglas, 2000). This study uses qualitative methods to validate the quantitative results (Bryman & Bell, 2015). The quantitative results provide a general understanding of the research area under investigation, whereas the qualitative method is used to explore the quantitative results in more depth (Ivankova, 2006; Creswell, 2014). Ultimately, the triangulation of methods results in a more robust data analysis, as it confirms the validity of findings using different methods (Salehi & Golafshani, 2010).

Due to the use of both quantitative and qualitative methods, the study has to consider methodological issues, such as the prioritisation, sequence and integration of the quantitative and qualitative data collection and analysis (Creswell, 2003; Ivankova, 2006). Priority is given to the quantitative methods which is in line with a typical explanatory sequential mixed method design and also with the researchers' post-positivistic stance (Ivankova, 2006). Furthermore, the collection of quantitative data using a survey offers a bigger sample of the population to participate in the study (Saunders, 2012).

First, quantitative data was collected. The goal of the quantitative data collection and analysis is the identification of significant critical success factors of forced coopetition relations in IT multi-sourcing projects. Based on the findings of the data collected, the study then collects qualitative data to sense check and validate the quantitative results. This is in line with, for instance Hanson, Creswell, Clark, Petska, and Creswell (2005) or Creswell (2003), who argue that the results of the first phase guide the data collection of the second phase in mixed method research. As a result, the integration or mixing of quantitative and qualitative methods takes place in the discussion section of the study (Creswell, 2014).

Figure 4.2 provides an overview of the research roadmap for the study at hand. The research roadmap links the researcher's own epistemological stance with the methodology and method and thereby outlines the remainder of the study.

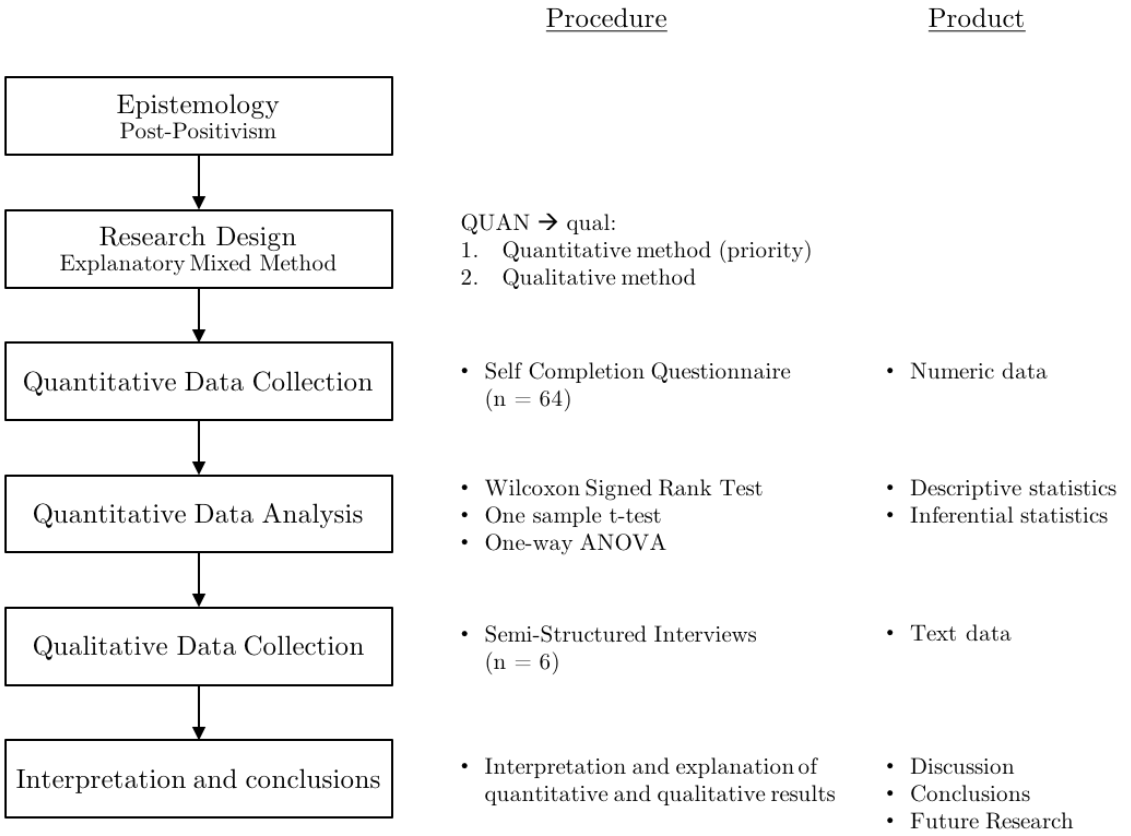

FIGURE 4.2: Research Roadmap
Developed from Ivankova (2006)

4.4 Quantitative Analysis

According to Creswell (2014), the survey approach is typically used to collect quantitative data in explanatory sequential mixed methods. Therefore, the following sections describe the survey approach in more detail.

4.4.1 Survey

Surveys are the most commonly used approach for collecting data at a single point in time from a given population (Keeter, Miller, Kohut, Groves, & Presser, 2000). They are usually associated with a deductive or descriptive research design, and enable the researcher to collect standardised data in an economic way (Janes, 2001; Saunders, 2012). The purpose of the survey is to study a sample from a population, and then to generalise the research findings in order to draw inferences about characteristics

of the population (Creswell, 2014). Hence, the representativeness of the sample is important in a survey approach (Janes, 2001).

According to Given (2008), the survey design depends on the research questions that need to be answered. In addition, the survey design depends on the approach to collect the data from the sample (Bernard, 2013). Given (2008) emphasises the importance of a pilot survey. The pilot survey ensures that the questions are clear to the respondents, and therefore increases the response rate of the final survey. In particular, the pilot survey focuses on the data gathering approach, design and sequence of the questions, the overall questionnaire design, and fieldwork arrangements (Adams et al., 2014).

There are different survey modes, each mode with different characteristics and therefore different appropriateness for the research objective (Janes, 2001). Table 4.1 provides a summary of the most common survey modes, which are self-administered surveys, telephone survey, and face-to-face surveys.

Characteristic	**Self-Completing Survey**	**Telephone Survey**	**Face-To-Face Survey**
Cost	Low	Moderate/High	High
Response Rate	Low/Moderate	Low/Moderate	Moderate/High
Sample Size	High	Dependent on available resources (cost, time)	Dependent on available resources (cost, time)
Confidentiality	High (Mail Survey)	Low	Low
Length	Short	Short	Medium/Long
Use of visual aids	Yes	No	Yes
Types of question	Closed	Open and closed	Open and closed
Possible questionnaire complexity	Moderate	Moderate	High
Influence of interviewer	No	Yes	Yes
Accessibility to population	Moderate	High	High
Length of data collection	Moderate	Fast	Lengthy
Control who responds	Low	High	High

Table 4.1: Survey Modes
Based on Janes (2001); Saunders (2012); Adams et al. (2014)

Table 4.1 outlines that self-completion surveys are the cheapest surveys; however, this survey mode faces low response rates and low control over who responds to the survey. Face-to-face surveys, on the other hand, provide high quality data due to the fact an interviewer is able to capture non-verbal information (Janes, 2001; Saunders, 2012). However, a face-to-face survey is highly dependent on the bias and interview skills of the interviewer; further, this survey mode is the most time-consuming and costly alternative. Due to the nature of the research question, which focuses on quantifiable answers, this study intends to use self-administered surveys. This survey mode enables the researcher to address a large population at a single point in time in an economic way and therefore may increase the validity, and reliability of the research findings (Creswell, 2014).

4.4.2 Questionnaire Design

The study uses a self-completion questionnaire to collect the quantitative data for the sample. A self-completion questionnaire is completed without the help of an interviewer (Creswell, 2014). Therefore, the respondents are less influenced by an interviewer's bias in an interview. According to Oppenheim (2005), one of the main issues in questionnaire design is the knowledge of the respondents on the subject under investigation. The variables in this study, which are used as a basis for the questionnaire, are deduced from the existing theory. Therefore, the variables are known to the respondents, who all work in multi-sourcing projects.

With regard to the design of the questionnaire, the researcher has to consider the types of questions as well as the required depth of the answers (Given, 2008). The questionnaire uses closed questions, which offer the respondent a choice of alternative replies (Oppenheim, 2005).

Existing literature also proposes design principles, which are likely to increase the response rate (Bryman & Bell, 2015). Among other principles, the vast amount of literature emphasizes a short and simple presentation as well as imbedded instructions with examples on how to complete the questionnaire (Oppenheim, 2005; Given, 2008; Bryman & Bell, 2015).

Moreover, the structure of the questionnaire follows the research questions and therefore the conceptual framework. As a result, the questionnaire is presented in three parts. The first part of the questionnaire is used for control questions, and therefore

focuses on the collection of information about the respondent rather than on data directly related to research questions (Given, 2008). The control question collects information on the respondent's organisation and on the respondent's role in an IT multi-sourcing project.

The second part of the questionnaire collects data for the evaluation of the critical success factors, and therefore provides data to answer the sub research questions 1 to 5. The study adapts the five-point Likert scale for this part of the questionnaire because it provides respondents with a simple technique to evaluate variables (Oppenheim, 2005). Furthermore, the Likert scale is used in similar research projects, such as Wu et al. (2010), who focused on factors that determine supplier performance in supplier networks. The scale was developed in 1932 by Rensis Likert in order to quantify the respondents' attitudes (Boone & Boone, 2012). It is argued that the quality of the answers with a five-point Likert scale is higher than with a seven-point or eleven-point scale (Revilla, Saris, & Krosnick, 2014). Hence, respondents are able to evaluate each critical success factor on a scale of 1 to 5, where a 3 represents a neutral evaluation. In accordance with Bryman and Bell (2015), the study uses 5 as the most important evaluation (strongly agree), and 1 for the least important evaluation (strongly disagree). The Likert scale presented is used throughout the entire questionnaire in order to ensure consistency and avoid any possible confusion of respondents.

The third part of the questionnaire focuses on the prioritisation of critical success factor cluster. The clusters include supplier management, supplier selection, management commitment, relationship development, and communication management. In order to ensure a high response rate, the study applies a ranking question to answer the sixth sub research question. Ranking questions with fewer than seven items are easy to answer for respondents (Saunders, 2012), and implicitly imply a pairwise comparison of the variables under investigations (Bernard, 2013). In line with the Likert scale used for the evaluation of critical success factors, the highest score of the ranking scale indicates the most important cluster. As there are five clusters, the ranking scale ranges from 1 to 5, whereby 5 is the most important, and 1 the least important cluster.

The questionnaire is presented in English, which is not the native tongue of the researcher. Therefore, the researcher applied the back-translation approach outlined by Bernard (2013). This approach is considered the best practice translation technique for questionnaires. Therefore, the initial version of the questionnaire was

written in German and then translated into English by a bilingual person, who is a native speaker in English. Then, this English version of the questionnaire has been translated back into German by another bilingual person, who is a native speaker in German. The researcher then compared the initial version of the questionnaire with the back-translated version. The result of the comparison revealed that the questionnaires were almost identical. Therefore, a pilot study was used.

4.4.3 Pilot Study

The pilot study was carried out over a period of two months to test the data collection and data analysis phases prior to conducting the main study. In particular, the pilot study focused on the data gathering technique, design and sequence of questions, and the overall questionnaire design in order to avoid unintelligible questions, unquantifiable responses and uninterpretable results (Oppenheim, 2005; Adams et al., 2014). The pilot study was reviewed by three respondents and therefore went through a number of iterations before the final version was administered.

The pilot study adopted an incremental approach to pilot the data collection phase. The respondents used for the pilot study were IT Project Managers with experience in IT multi-sourcing projects. Therefore, the respondents are similar to those in the main study (Oppenheim, 2005). In accordance with Bernard (2013), the respondents for the pilot study were identified with a purposive sampling approach. The feedback of the respondents was categorised into groups: overall questionnaire design and wording, design of part one of the questionnaire, and design of part two of the questionnaire. The questionnaire was subsequently adapted based on the respondent's feedback. This process was repeated two times, because the feedback of the third respondent did not reveal any necessary changes to the questionnaire design. In summary, the feedback of the respondents resulted in several changes in the structure of the questionnaire, which are described below.

The first respondent works as an IT Project Manager in a client organisation with more than 10 years' experience on IT multi-sourcing Projects. Based on the feedback of the respondent, the step-by-step instruction of the initial questionnaire has been enhanced with screenshots and examples of how to complete the questionnaire. Furthermore, the part of the questionnaire which focused on the evaluation of the

critical success factors has been changed. In particular, the flat list of critical success factors of the initial questionnaire was replaced with statements which provide additional information on the context of each critical success factor.

The second respondent works as an IT Project Manager at a client organisation, with more than 5 years' experience in multi-sourcing projects. The respondent highlighted the statements to evaluate the critical success factors. However, they also mentioned that some statements require additional clarification in order to explain the factor in the context of the research project. As a result, each statement was complemented with an example to promote the comprehensibility in the context of the study. In line with the first respondent, no feedback on the overall questionnaire design was brought to the researcher's attention. However, both respondents criticised the pairwise-comparison matrix, which was part of the initial questionnaire. As a result, the matrix was replaced with a ranking question in order to increase the usability of the questionnaire and therefore to potentially increase the response rate during the main study.

The third respondent works as an IT Project Manager at a supplier organisation with more than 5 years' experience in multi-sourcing projects. In line with the other respondents, the IT Project Manager confirmed that the questionnaire was well-structured. Furthermore, the respondent was able to complete both the evaluation of the critical success factors and the ranking of the cluster with the support of the step-by-step instruction. Ultimately, the respondent did not provide any new comments on the structure and design of the questionnaire. Therefore, the pilot study served its purpose and resulted in a clear questionnaire (Adams et al., 2014). For this reason, the researcher decided not to involve any additional respondent, but to use this version of the questionnaire for the main study.

4.4.4 Sample Frame

A sample, which is investigated by a study is defined as a subset of a population that contains all units (Bryman & Bell, 2015). According to Given (2008), the sampling procedure is deduced from the researcher's aims and objectives, which require subject matter experts of IT multi-sourcing projects. Hence, for the context of the study, the population contains all IT Project Managers of client organisations and supplier organisations that have been involved in IT multi-sourcing projects.

Unfortunately, there is no publicly accessible database available listing all IT Project Managers and their experiences in terms of IT multi-sourcing projects. Likewise, the researcher's own organisation does not have a database which can be used to identify the population for the study. Hence, the overall population is unknown to the researcher, which excludes probability-sampling approaches for the study (Bryman & Bell, 2015).

As probability-sampling approaches are not applicable for the study, the researcher is required to choose a non-probability sampling approach. According to Burns and Burns (2008), the sample has to be selected in a non-random way, which entails a subjective judgement (Saunders, 2012). As outlined above, the study requires IT Project Managers with experience in IT multi-sourcing projects. Bernard (2013) argues that purposive sampling can be used for such hard-to-find-populations. This approach uses "individuals who meet a certain criterion" (Given, 2008, p.697) and, therefore, serve the purpose of the investigation (Bernard, 2013). Therefore, the following criteria are applied for the study: (1) IT Project Managers of client organisations or supplier organisations with a professional experience of at least five years, and (2) the IT Project Managers has participated in at least one IT multi-sourcing project.

Due to the unknown population size and the resulting non-probability sampling approach, the appropriate sample size cannot be calculated (Oppenheim, 2005). However, there are no rules to determine the best sample size (Saunders et al., 2012), because it depends on multiple constraints such as the research questions, time and costs, the need for precision, the availability of resources, and the heterogeneity of the respondents (Bryman & Bell, 2015; Patton, 2015).

Aside from the industry IT Project Managers are working in, the characteristics of IT Project Managers are somewhat similar. Therefore, for the context of this study, the sample is a homogenous group of IT Project Managers. Some scholars argue that a more homogeneous sample requires a smaller sample size compared to heterogeneous groups (Johnson & Christensen, 2012; Bryman & Bell, 2015). Saunders, Lewis, and Thornhill (2012) argues that a sample size of 12-30 is sufficient for a homogeneous population in qualitative research. This is in line with other scholars who argue that a homogenous population increases the representativeness of a sample of any particular size (Check & Schutt, 2012). Therefore, the study requires a smaller sample size than the recommendation of having at least 100 respondents (Oppenheim, 2005).

To be able to receive a sufficient number of responses, the study targets IT Project Managers from the researcher's own professional network. The network is composed of IT Project Managers of large market-listed companies in Germany as well as of IT Project Managers of the world's largest IT consulting organisations.

4.5 Qualitative Analysis

As outlined in the research design section, the study uses qualitative methods to validate the quantitative results. The priority of the explanatory sequential mixed method approach is given to the quantitative method; therefore, the qualitative method is used as sensemaking mechanism (Tan & Hunter, 2002).

The study used semi-structured interviews as a primary qualitative data collection technique. In line with the post-positivistic underpinning of this study, interviewing enables a researcher to directly interact with the respondents in order to contextualise the findings (Schultze & Avital, 2011). Semi-structured interviews refer to a series of open-ended questions, which do not require a specific sequence (Bryman & Bell, 2015). In line with the explanatory sequential approach, the interview questions were developed from the results of the quantitative data collection and analysis (Creswell, 2003). Hence, the interview protocol contained 13 open-ended questions to validate and understand the critical success factors that were statistically significant higher than the neutral evaluation (Saunders, 2012; Oppenheim, 2005; Adams et al., 2014). In addition, the interview protocol (see appendix D) minimised the impact of the researcher on the data collection and ensured consistency across the respondents (Schultze & Avital, 2011).

Due to the priority placed on quantitative data in explanatory research design (Teddlie & Tashakkori, 2010; Harrison & Reilly, 2011), six interviews were conducted, which is comparable to similar research projects (Chin et al., 2008). Based on the argument of Creswell (2014), the respondents were purposefully selected from the questionnaire sample to ensure an in-depth discussion of each critical success factor (Saunders, 2012). Due to the sample criteria, the interviewees are considered experts in IT multi-sourcing projects. Furthermore, the respondents were equally selected from both supplier and client organisations. Two interviews were conducted in English, while the remaining four interviews were conducted in German. In line with the questionnaire, the study applied the back-translation approach for the German

transcripts (Bernard, 2013). All interviews were digitally recorded and transcribed with the permission of the respondents. The interviewees were kept anonymous and are referred to as follows throughout the remainder of the study:

No.	Role/Title	Organisation Type
1	IT Project Manager	Client Organisation
2	IT Project Manager / Team Lead	Client Organisation
3	Management Consultant	Supplier Organisation
4	Executive	Supplier Organisation
5	IT Project Manager	Client Organisation
6	Senior Managing Consultant	Supplier Organisation

Table 4.2: Interview Respondents

The researcher requested one hour for each interview. Due to the participation of the respondents in the survey, the researcher was not required to provide a detailed introduction of the research project. Because of the researcher's professional experience in the area under investigation, it was important to focus on the interviewee's explanation of the quantitative results (Bryman & Bell, 2015). Therefore, the respondents were not interrupted by the researcher in order to avoid influencing the results of the interviews.

The qualitative data was analysed using the repertory grip (RepGrid) technique, which is suitable to study the cognition of individuals in IT organisations (Tan & Hunter, 2002; Schultze & Avital, 2011). Based on the personal construct theory by Kelly (1955), the repertory grip technique supports sensemaking in organisations by using three components (Tan & Hunter, 2002; Bauman, 2015). First, elements represent the objects under evaluation, second, constructs represent the explanations of the respondents, and third, links are used to related constructs and elements (Schultze & Avital, 2011; Bauman, 2015). In the context of this study, each critical success factor is considered as an element, and the responses of the six interviewees represent the constructs. In line with the sequential mixed method design of this study, the elements and constructs are linked in the discussion section (Creswell, 2014).

4.6 Reliability, Validity and Generalisation

In order to ensure the quality of this post-positivistic research and the accuracy of findings, it is necessary to discuss the reliability, validity and generalisability of the study (Adams et al., 2014).

4.6.1 Reliability

Reliability focuses on the replicability of a study and refers to the degree to which a study will reproduce the same results each time it is carried out (Bernard, 2013). According to Bryman and Bell (2015), a study is considered reliable trough the achievement of stability, internal reliability and inter-observer consistency. The stability of a study can be tested using the test-retest method (Adams et al., 2014). In this method, the same sample group answers the same questionnaire on two different occasions. According to Bernard (2013), the result of the test and retest should be at least 80% identical. Internal reliability, which is important for studies that use a Likert scale, checks "whether or not the indicators that make up the scale or index are consistent" (Bryman & Bell, 2015, p.158). A common approach to test the internal reliability of a study is Cronbach's alpha (Bland & Altman, 1997). The result of Cronbach's alpha can range from 0 (no internal reliability) to 1 (perfect internal validity). Even though there is no universal minimal acceptance level, the study adapts an alpha coefficient of 0.70 as an acceptable level of internal reliability in accordance with most business research (Bonett & Wright, 2015).

For the purpose of this research, reliability addresses whether the same evaluation of critical success factors in a forced coopetition would achieve the same result for all respondents. In order to achieve high reliability, the study at hand adopted the well-established five-point Likert scale. Furthermore, a pilot study was conducted prior to the main study to ensure unambiguous definitions of the critical success factors under investigation (Adams et al., 2014). As mentioned above, the study applied Cronbach's alpha in order to statistically measure reliability. Even though Cronbach's alpha is a continuous scale, it is often used to measure the reliability of Likert scale data (Laerd, 2015). The evaluation of the critical success factors resulted in a Cronbach's alpha of 0.73 (see table 4.3). Therefore, the scale has a high level of statistical reliability as the value is higher than 0.7 (DeVellis, 2012).

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
,731	,752	17

TABLE 4.3: Factor Evaluation - Cronbach's Alpha

In total, the analysis included 64 cases, which represents the response rate. According to the case processing summary, none of the cases were excluded from the calculation due to missing values. Hence, all cases are valid.

Case Processing Summary

		N	%
Cases	Valid	64	100,0
	Excluded[a]	0	,0
	Total	64	100,0

a. Listwise deletion based on all variables in the procedure.

TABLE 4.4: Factor Evaluation - Case Processing Summary

The reliability of qualitative research requires the examination of methodological trustworthiness, which is similar to the concept of reliability in quantitative research Healy & Perry, 2000; Golafshani, 2003). According to Healy and Perry (2000), methodological trustworthiness can be achieved by the use of quotations in the written report and a respondents' database. This exercise was adopted for the semi-structured interviews in this study.

4.6.2 Validity

Validity is considered the most important aspect in research (Bernard, 2013), in that it concerns the accuracy and trustworthiness of measurements, data and findings in the study (Adams et al., 2014; Creswell, 2014). Contemporary literature outlines

different types of validity, such as internal validity, external validity, construct validity, content validity, conclusion validity, and criterion validity (Adams et al., 2014; Creswell, 2014).

Internal validity deals with the ability of a research instrument to measure the issues under investigation (Saunders, 2012). To establish internal validity, a pilot study was conducted prior to the main study. The pilot study focused on the data collection and data analysis techniques and therefore ensured that the questions and data collected contributed to answer the sub and main research questions. Therefore, the pilot study also served the purpose of achieving content validity, which focuses on the appropriate measurements (Bernard, 2013).

External validity answers the question if the research findings are generalisable (Adams et al., 2014). In order to achieve external validity, the questionnaire and interviews targeted respondents with experience in the management of multi-sourcing projects. As outlined in the previous section, the respondents were selected based on their experience in IT multi-sourcing projects. According to Saunders (2012), the outlined measures increase the validity of a research project.

4.6.3 Generalisation

The generalisability of a research project is the ability to "produce findings, which are applicable to other situations, organisations, countries and other people dependent on the quality of the underlying theory" (Adams et al., 2014, p.253). The ability to generalise research findings is especially important in quantitative research (Bryman & Bell, 2015). However, the ability to generalise depends on a sufficient sample size of the population. The study at hand applied a non-probability sampling approach, as the population size is unknown to the researcher. Therefore, the degree of generalisability is questionable. Burns and Burns (2008) argue that non-probability samples are likely to be biased and therefore the findings cannot be generalised to a broader population. As a result, the research findings of the study at hand are only valid for the sample and context under investigation.

4.7 Ethical Considerations

Research ethics "refer to the standards of behaviour that guide your conduct in relation to the rights of those who become the subject" of the study (Saunders, 2012, p.229). Even though the sample is drawn from the researcher's professional network, the researcher might face problems of accessing data. According to Saunders et al., formal approvals of organisations might be required, or the respondents might be suspicious due of the use of the data collected.

Hence, the researcher has to assure that ethical principles are followed that emphasise the importance of avoidance of harm to respondents, privacy, confidentiality, anonymity, and a voluntary nature of participation (Saunders, 2012; Bryman & Bell, 2015). To be able to follow the outlined ethical principles, the study was conducted in accordance with the university's "Code of Practice on Research Integrity" (Edinburgh Napier University, 2013), which emphasises the importance of honesty, rigour, open and transparent communication, care and respect, and accountability.

Due to the purposive sampling approach, the respondents are known to the researcher and therefore anonymity is not feasible. However, the data collected does not contain any personal data, which ensures confidentiality in the main study. To ensure data protection, the data collected was stored on a password-secured storage device, which was only accessible to the researcher. Furthermore, the research instruments were approved by the Edinburgh Napier University Research Integrity Committee before they were administered. Also, the respondents were given the opportunity to not participate in the study by simply not responding to the request for the questionnaire or interview.

4.8 Summary

This chapter has discussed various philosophical considerations and justified the researcher's position. Consistent with this position, the chapter subsequently introduced the research roadmap, which outlines the structure of the remainder of the thesis at hand. Furthermore, the chapter described both quantitative and qualitative data collection techniques relevant for this study. Finally, the issues of reliability, validity, generalisation, and ethical considerations were discussed. The next chapter

deals with and analyses the data collected by the questionnaire using descriptive and multivariate analysis procedures.

Chapter 5

Analysis and Findings

5.1 Introduction

The previous chapter introduced the researcher's philosophical stance and the data collection techniques used in this study. This chapter focuses on the analysis of the collected quantitative data in order to accept or reject the hypotheses proposed by the conceptual framework. First, the chapter starts with a description of the response rate and the data collected. Second, the chapter presents the results of the data analysis to test the hypotheses with regard to the prioritisation and evaluation of critical success factors in forced coopetition relations.

5.2 Response Rate

The researcher contacted the sample with a personalised e-mail sent from the private email account (see appendix B). The email briefly introduced the purpose of the attached questionnaire and the research project's rationale. The e-mail also outlined that the researcher's employer did not fund the research project nor would receive any personalised data, in order to avoid bias or non-responses.

The initial request to participate in the study was sent on the 1st of June 2016. The respondents were given three weeks' time to answer the questionnaire. In total, the questionnaire was sent to a population with 95 IT Project Managers with experience in IT multi-sourcing projects. The population was identified from the professional

network of the researcher. After three weeks, 36 respondents completed the questionnaire, for a total response rate of 38%. None of the respondents contacted the researcher to clarify the questionnaire, even though the researcher offered them the option to do so.

In order to increase the response rate, the researcher sent out a reminder to those respondents who did not return a questionnaire within the first three weeks. After the reminder and one extra week, 28 additional experts in IT multi-sourcing projects completed the questionnaire. Therefore, a total of 64 IT Project Managers answered the questionnaire, for a total response rate of 67% (see figure 5.1). According to Diamond (2010), surveys with response rates below 75% and above 50% yield reliable results, but it is necessary to check the potential biases of the respondents.

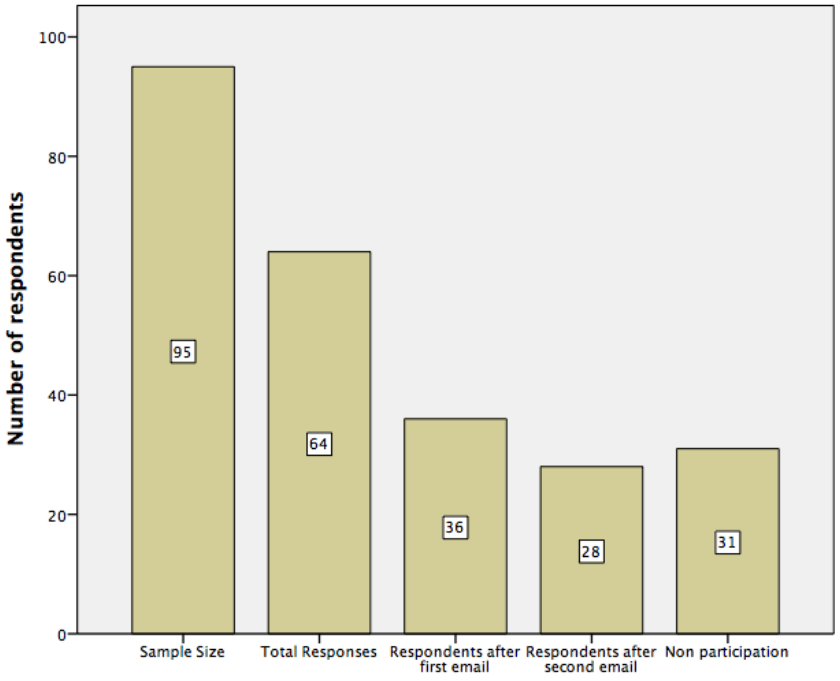

FIGURE 5.1: Response Rate

As depicted in figure 5.1, 31 respondents did not participate in the survey. The ability to generalise the research findings depends on the non-response rate and on the difference between the group of respondents and non-respondents (Moore and Tarnai, 2002). The difference between these groups is defined as non-response bias, which occurs if some of the respondents do not answer a survey and therefore are not a reliable representation of the sample (Van der Stede, Wim A., Young, & Chen, 2005). Thus, a high response rate does not automatically support the validity of study if the non-response bias is high. All in all, the motivation for not participating

in the survey is unknown to the researcher, since the questionnaire did not capture the reasons for non-participation. However, the sample is a homogeneous group of IT Project Managers with experience in IT multi-sourcing projects. Therefore, the difference of respondents and non-respondents is presumed to be low, which supports the validity of the research findings for the context under investigation.

The relevant literature proposes some recommendations to decrease the non-response rate. For instance, Van der Stede, Wim A. et al. (2005) recommends sending follow-up emails to respondents some weeks after the initial mail-out. As mentioned above, the study at hand applied this measure, which increased the overall response rate altogether by 29%. Furthermore, contacting the respondents prior to administering the questionnaire is suggested in order to increase the commitment of the respondents. This measure was applied for the respondents working for the same organisation as the researcher. The remaining respondents were not contacted prior to the first email request.

5.3 Description of Data

The choice of methods to analyse the collected data depends on the nature of the research questions, the number of dependent and independent variables under investigation, and the characteristics of the data collected (Creswell, 2014).

The questionnaire that was sent out to the respondents contains two independent variables: the respondents' type of organisation in an IT multi-sourcing project, and the industry of the organisation. The variable organisational type contains two categories - namely, client organisation and supplier organisation. The respondents were able to choose from the following industries: financial industry, manufacturing industry, IT industry, retail and distribution, telecommunications, public sector and other. Both independent variables contain different categories from which the respondents could choose. Hence, the variables are classified as independent dichotomous (Bryman & Bell, 2015).

Based on the data collected by the questionnaire, 41 of the respondents work for client organisations and 23 work for supplier organisations such as IT consultancy companies. Hence, 64.1% of the respondents are working for the organisation, which receives the outcome of an IT multi-sourcing project. Consequently, 35.9% of the

respondents are responsible for managing and delivering services in an IT multi-sourcing project in order to achieve the common objective. Below are the frequencies of the organisational type and industries of those respondents who completed the questionnaire:

Organisation Type

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Supplier Organisation	23	35,9	35,9	35,9
	Client Organisation	41	64,1	64,1	100,0
	Total	64	100,0	100,0	

TABLE 5.1: Frequency by Organisation Type

Based on the data collected, it appears that the majority of the respondents from a client organisation work in the manufacturing industry, with the next largest group working for the finance industry. This finding is not surprising, as the researcher has an extensive network in these industries. The 23 respondents from supplier organisations assigned themselves to the IT industry, even though some experts additionally specialise in a specific industry.

Industry

Organisation Type			Frequency	Percent	Valid Percent	Cumulative Percent
Supplier Organisation	Valid	IT	23	100,0	100,0	100,0
Client Organisation	Valid	Finance	13	31,7	31,7	31,7
		Manufacturing	23	56,1	56,1	87,8
		Retail & Distribution	4	9,8	9,8	97,6
		Telecomm.	1	2,4	2,4	100,0
		Total	41	100,0	100,0	

TABLE 5.2: Frequency by Industry

The evaluation of critical success factors provides a single dependent variable for each factor under investigation. As mentioned in a previous section, the respondents were able to evaluate each critical success factor using a five-point Likert scale. The second part of the questionnaire focused on the ranking of critical success factor

clusters. In line with the first part of the questionnaire, the respondents were able to rank the five clusters using a Likert scale. Hence, the prioritisation provides additional five dependent variables for the data analysis phase.

There is a continuous debate regarding whether the type of data that results from a Likert scale is ordinal or interval data (Carifio & Perla, 2008; Allen & Seaman, 2007; Boone & Boone, 2012; Sullivan & Artino, 2013). According to Clason and Dormody (1994), there is no right or wrong way to complete a survey; rather, it is a matter of answering the research questions meaningfully. In general, data can be classified as nominal data, ordinal data, interval data, and ratio data (Saunders, 2012; Bryman & Bell, 2015). Ordinal data is typically used to describe rankings of responses that do not allow to measure the distance of a scale (for example "agree" compared to "strongly agree"). Interval data, on the other hand, is typically used for rank data that allow to measure the distance of a scale (for example 0£, 50£, 100£) (Allen & Seaman, 2007).

Robertson (2012) argues that Likert scales provide ordinal data rather than interval data. Her argument is that it is not possible to measure the distance between the responses "agree" and "strongly agree". In a similar vein, other scholars argue that the data collected describes a "greater than" relationship, but does not provide an indication as to the actual difference between the different variables (Jamieson, 2004; Sullivan & Artino, 2013).

However, other scholars take the opposing view that Likert scales provide interval data (Carifio & Perla, 2008). Clason and Dormody (1994) argue that the context of the Likert scale must be taken into account in order to classify the data collected. First, Likert-type items describe data collected for single variables that can be analysed independently from other variables. Their argument suggests that Likert-type items provide ordinal data, which is in line with the argument of Robertson (2012). Therefore, Likert-type items require the median to measure the central tendency and the use of nonparametric tests (Kaptein, Nass, & Markopoulos, 2010; Boone & Boone, 2012; Saunders, 2012). Second, Likert-scale data is used for multiple variables that are dependent on each other and therefore must be combined in the data analysis process in order to answer a research question. According to Clason and Dormody (1994), Likert-scale data is classified as interval data and therefore requires parametric tests and the mean as a measurement for the central tendency (Sheskin, 2011; Robertson, 2012; Anderson, Sweeney, & Williams, 2014).

Building on the classification by Clason and Dormody (1994), this study's questionnaire produces both Likert-type data and Likert-scale data. The variables that focus on the evaluation of the potential critical success factors are considered Likert-type items, as each variable is independent of the other variables. The second part of the questionnaire collects Likert-scale data, which is caused by the interdependency of the variables. The interdependency results from the unique ranks; hence, only one cluster can be ranked as the most important one. Therefore, the questionnaire also collects interval data in order to answer the research question on the ranking of critical success factor clusters.

5.4 Statistical Procedures

All statistical procedures applied in this study were performed using IBM SPSS 20. The study adapts frequency tables for the descriptive statistics. Frequency tables are one way to visualise and compare measures of central tendencies such as the median or mean (Bernard, 2013; Bryman & Bell, 2015).

For the inferential statistics, it is first of all necessary to distinguish between parametric and nonparametric statistics (Saunders, 2012). Among other characteristics, the decision on whether to use parametric or nonparametric tests is based on the normality of data, the existence of an underlying population, and the scale of measurement used in the data collection (Sprent & Smeeton, 2007; Sheskin, 2011; Anderson et al., 2014).

Parametric tasks require normally distributed data and make assumptions about a population, whereas nonparametric tests do not require such prerequisites (Wasserman, 2010). As discussed in previous sections, the population is unknown in the context of this research. Hence, no assumptions can be made about this population, which is an indicator for nonparametric tests. Second, the data collected by the questionnaire is not normally distributed.

Based on the Shapiro-Wilk test for normality, the significance is below 0.05, which indicates a non-normal distribution of the data collected (see table 5.3). Even though a non-normal distribution is an indicator for nonparametric tests, there are some scholars who argue that parametric tests can be applied if the sample size is large enough for the Central Limit Theorem to take effect (Berenson, Levine, & Krehbiel, 2009).

Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Supplier Associations	,239	64	,000	,883	64	,000
Consultancy Services	,288	64	,000	,844	64	,000
Learning Groups	,232	64	,000	,842	64	,000
Contractual Agreements	,204	64	,000	,888	64	,000
Similar Capabilities	,190	64	,000	,913	64	,000
Supplier Size	,204	64	,000	,907	64	,000
Mixed Supplier Teams	,198	64	,000	,906	64	,000
Management Leadership	,216	64	,000	,843	64	,000
Long Term Commitment	,297	64	,000	,849	64	,000
Duplicated Management Functions	,256	64	,000	,886	64	,000
Similar Interests	,217	64	,000	,877	64	,000
Development of Trust	,348	64	,000	,726	64	,000
Knowledge Sharing	,263	64	,000	,854	64	,000
Personal Relationship	,348	64	,000	,726	64	,000
Collaborative Software	,250	64	,000	,861	64	,000
Conflict Management Systems	,275	64	,000	,848	64	,000
Project Manager Capabilities	,385	64	,000	,673	64	,000

a. Lilliefors Significance Correction

TABLE 5.3: Test of Normality

Third, as discussed in the previous section, the data collected by the questionnaire is divided into two groups. The evaluation of the potential critical success factors provides ordinal data, and the ranking of critical success factor clusters provides interval data.

For ordinal data, the use of nonparametric statistical tests is recommended (Kaptein et al., 2010; Sheskin, 2011; Robertson, 2012; Anderson et al., 2014). Hence, the study at hand primary uses nonparametric tests to analyse the evaluation of potential critical success factors. However, due to the ongoing discussion on the data collected by a Likert scale, the study at hand additionally applies parametric tests to underpin the results of the nonparametric tests and to make the overall results more robust. In particular, the study applies the nonparametric one-sample Wilcoxon signed-rank test and the parametric one-sample t-test. The t-test is considered to be more

powerful for small sample sizes; however, other scholars argue that the Wilcoxon signed-rank test performs better for non-normal distributed data (Brink & Brink, 1989; Meek, Ozgur, & Dunning, 2007). According to de Winter and Dodou (2010), both tests have equivalent power for five-point Likert scales.

The one-sample Wilcoxon signed-rank test is a nonparametric test and considered an alternative to the one-sample t-test. The test is named after its inventor Frank Wilcoxon and is based on signed-ranks of a sample (Pratt, 2010). The Wilcoxon signed-rank test verifies if the central tendency of a sample equals a hypothesised median (Sheskin, 2011), whereas the t-test tests the mean (Field, 2011).

Due to the nature of the research questions, the study at hand applies one-sided statistical tests for both the Wilcoxon signed-rank test and the t-test (Berenson et al., 2009; Ludbrook, 2013). In particular, the research questions focus on critical success factors, and therefore only factors that are evaluated greater than the neutral score. Consequently, the alternative hypotheses are defined as directional alternative hypotheses (Sheskin, 2011). In the context of critical success factor evaluation, the hypothesised score is 3, or a neutral evaluation. Hence, an evaluation greater than 3 indicates that a factor is considered critical in forced coopetition relations. Therefore, the Wilcoxon signed-rank test validates whether the sum of ranks of the positive differences to the hypothesised score is greater than the sum of the ranks of the negative differences (Sheskin, 2011).

Based on the above-mentioned justification, H_1-H_5 are tested with both the one-sample Wilcoxon signed-rank test and a one-sample t-test. In accordance with most business researchers, the study adapts a maximum level of statistical significance of $p < 0.05$ (Bernard, 2013; Bryman & Bell, 2015).

The test of H_6 is based on the data collected by the second part of the questionnaire, which is classified as interval data. For interval data, it is recommended to use parametric tests and the mean (Saunders, 2012; Robertson, 2012; Bernard, 2013). To test the ranking of clusters, the study applies the one-way ANOVA, which is the parametric analysis of variance (ANOVA) based on the F-distribution (Sheskin, 2011). The one-way ANOVA allows a comparison of multiple means to identify if there is a significant difference between the associated means (Larson-Hall, 2010; Saunders, 2012). Hence, the one-way ANOVA is suitable for testing if the mean ranks of the critical success factor clusters are significantly different. However, the ANOVA does not indicate the actual difference between the clusters under investigation.

Hence, a post-hoc test is required (Backhaus, Erichson, Plinke, & Weiber, 2016). The selection of the appropriate post-hoc test depends on which assumptions of the one-way ANOVA are met. Alongside a randomly selected sample and normal distributed data, it is argued that ANOVA requires homogeneity of variance (Sheskin, 2011; Anderson et al., 2014).

Table 5.4 shows the results of the Levene test of homogeneity of variances (Larson-Hall, 2010). The results indicate that the data collected violates the assumption of homogeneity of variances (p = 0.008). As a result, the study applies the one-way Welch ANOVA, which does not assume equal variance, as well as the Games-Howell post-hoc test (Janssen & Laatz, 2013; Laerd, 2015). The results of these tests will be presented and discussed in the remainder of this chapter.

Test of Homogeneity of Variances

Prioritization

Levene Statistic	df1	df2	Sig.
3,526	4	315	,008

TABLE 5.4: Levene Test Results

5.5 Descriptive Analysis

The following sections provide the descriptive statistics for the critical success factors under investigation. Due to the nature of the data collected, the median is used to determine the central tendency for each critical success factor. Based on the Likert scale, a median greater than 3 indicates that a factor is considered a critical success factor, while a median smaller than 3 indicates a less significant impact on coopetition relations of a factor under investigation.

5.5.1 Supplier Management

The literature review identified supplier associations, consultancy services, learning groups, and contractual agreements as potential critical success factors of forced coopetition relations. The respondents were asked to evaluate each factor in relation

to its impact on successful forced coopetition in IT multi-sourcing projects. The remainder of this section describes the resulting evaluation for each potential critical success factor.

Statistics

		Supplier Associations	Consultancy Services	Learning Groups	Contractual Agreements
N	Valid	64	64	64	64
	Missing	0	0	0	0
Median		4,00	4,00	4,00	4,00

TABLE 5.5: Supplier Management - Median Scores

The respondents were asked to evaluate each factor in relation to its positive impact on forced coopetition relations. The study respondents, independent of their role in an IT multi-sourcing project, agreed that supplier associations, consultancy services, learning groups, and contractual agreements foster a forced coopetition relation with a median score of 4 (see table 5.5).

Even though the median score for supplier associations is 4, the frequency distribution shows that almost half of the sample did not consider supplier associations a critical success factor in coopetition relations (see table 5.6). In total, 18 respondents (28.1%) either strongly disagreed or disagreed that supplier associations foster coopetition relations, and an additional 11 respondents (17.2%) neither agreed nor disagreed. However, the majority of the sample (35 respondents, 54.7%) agreed or strongly agreed that supplier associations provide a benefit in IT multi-sourcing projects.

Supplier Associations

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	2	3,1	3,1	3,1
	Disagree	16	25,0	25,0	28,1
	Neither agree nor disagree	11	17,2	17,2	45,3
	Agree	23	35,9	35,9	81,3
	Strongly Agree	12	18,8	18,8	100,0
	Total	64	100,0	100,0	

TABLE 5.6: Supplier Management - Frequency Distribution

The majority of the sample (30 respondents, 46.9%) agreed that consultancy services foster the inter-supplier relations in IT multi-sourcing projects (see table 5.7). Additionally, another seven respondents (10.9%) strongly agreed with this statement. Hence, 57.8% of the sample consider consultancy services a critical success factor in forced coopetition relations. However, 21.9% of the sample (14 respondents) disagreed. The remaining 13 respondents (20.3%) neither agreed nor disagreed that consultancy services provide an added-value in IT multi-sourcing projects.

Consultancy Services

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Disagree	14	21,9	21,9	21,9
	Neither agree nor disagree	13	20,3	20,3	42,2
	Agree	30	46,9	46,9	89,1
	Strongly Agree	7	10,9	10,9	100,0
	Total	64	100,0	100,0	

TABLE 5.7: Consultancy Services - Frequency Distribution

Table 5.8 shows the frequency distribution for learning groups for respondents from both supplier and client organisations. The majority of the respondents either agreed (24 respondents, 37.5%) or strongly agreed (22 respondents, 34.4%) that learning

groups which are moderated by the client organisation foster the inter-supplier relations in IT multi-sourcing projects. Less than 10 percent (6 respondents) disagreed with this statement. The remaining 12 respondents (18.8%) neither agreed nor disagreed that learning groups foster forced coopetition relations.

Learning Groups

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Disagree	6	9,4	9,4	9,4
	Neither agree nor disagree	12	18,8	18,8	28,1
	Agree	24	37,5	37,5	65,6
	Strongly Agree	22	34,4	34,4	100,0
	Total	64	100,0	100,0	

TABLE 5.8: Learning Groups - Frequency Distribution

Table 5.9 illustrates the frequency distribution for contractual agreements. In line with supplier associations, consultancy services, and learning groups, this factor is considered to be important in the context of IT multi-sourcing projects. The majority of the sample either agreed (22 respondents, 34.4%) or strongly agreed (11 respondents, 17.2%) that contractual agreements foster cooperation between suppliers. About one third of the respondents neither agreed nor disagreed (21 respondents, 32.8%). The remaining ten respondents disagreed or strongly disagreed in equal parts with the above-mentioned statement (5 respondents each, 7.8%).

Contractual Agreements

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	5	7,8	7,8	7,8
	Disagree	5	7,8	7,8	15,6
	Neither agree nor disagree	21	32,8	32,8	48,4
	Agree	22	34,4	34,4	82,8
	Strongly Agree	11	17,2	17,2	100,0
	Total	64	100,0	100,0	

TABLE 5.9: Contractual Agreements - Frequency Distribution

The median scores change if the organisational type is taken into account (see table 5.10).

Statistics

Organisation Type			Supplier Associations	Consultancy Services	Learning Groups	Contractual Agreements
Supplier Organisation	N	Valid	23	23	23	23
		Missing	0	0	0	0
	Median		4,00	4,00	5,00	4,00
Client Organisation	N	Valid	41	41	41	41
		Missing	0	0	0	0
	Median		3,00	3,00	4,00	4,00

TABLE 5.10: Supplier Management - Median Scores by Organisation Type

It is evident that the supplier organisations consider supplier associations, consultancy services and learning groups to be more important than client organisations. This is not surprising as these factors result in measures from which the supplier organisations benefit the most, but must be organised and managed by the client organisation. In particular, supplier organisations strongly agree that learning groups foster forced coopetition relations (median = 5), whereas respondents from client organisations agree with this factor (median = 4). The medians for supplier associations, consultancy services, and contractual agreements (median = 4) indicate that these factors have a positive impact on a coopetition relation for supplier organisations. Buying organisations, on the other hand, evaluate these factors as neutral in relation to their impact in IT multi-sourcing projects (median = 3).

The remainder of the sections describes the frequency distributions for the critical success factors classified by supplier organisations and client organisations in order to explain the origin of the above-described medians.

Table 5.11 illustrates the frequency distribution for supplier associations classified by the organisational type. The majority of respondents from a supplier organisation either agree (7 respondents, 30.4%) or strongly agree (9 respondents, 39.1%) with the statement that supplier associations foster the inter-supplier cooperation. 21.7%, on the other hand, have a different perception. Four respondents disagree and one respondent even strongly disagrees with the added-value of supplier associations.

The remaining two respondents of a supplier organisations neither agree nor disagree with the above-mentioned statement.

Respondents from a client organisation provide different feedback. The majority of 16 respondents (39%) agrees with the benefit of supplier associations in coopetition relations. Additionally, three respondents (7.3%) even strongly agree. Thirteen respondents, on the other hand, disagree (12 respondents, 29.3%) or strongly disagree (1 respondent, 2.4%). Nine respondents (22%) neither agree nor disagree with the added-value of supplier associations.

Supplier Associations

Organisation Type			Frequency	Percent	Valid Percent	Cumulative Percent
Supplier Organisation	Valid	Strongly Disagree	1	4,3	4,3	4,3
		Disagree	4	17,4	17,4	21,7
		Neither agree nor disagree	2	8,7	8,7	30,4
		Agree	7	30,4	30,4	60,9
		Strongly Agree	9	39,1	39,1	100,0
		Total	23	100,0	100,0	
Client Organisation	Valid	Strongly Disagree	1	2,4	2,4	2,4
		Disagree	12	29,3	29,3	31,7
		Neither agree nor disagree	9	22,0	22,0	53,7
		Agree	16	39,0	39,0	92,7
		Strongly Agree	3	7,3	7,3	100,0
		Total	41	100,0	100,0	

TABLE 5.11: Supplier Associations - Frequency Distribution by Organisation Type

Table 5.12 shows the frequency distribution for consultancy services classified by supplier organisations and client organisations. Four respondents (17.4%) disagreed from a supplier organisation strongly disagreed with the statement that consultancy services increase the inter-supplier cooperation. Instead, the majority of the respondents agreed (14 respondents, 60.9%) or even strongly agreed (3 respondents, 13%) with the above-mentioned statement. Overall, 73.9% of the respondents from a supplier organisation considered consultancy services a critical success factor in

forced coopetition relations. The remaining two respondents (8.7%) neither agreed nor disagreed with the benefit of consultancy services.

The majority of respondents from client organisations provided similar feedback compared to to respondents from supplier organisations. Sixteen respondents (39%) agreed, and additional four respondents (9.8%) even strongly agreed that consultancy services foster forced coopetitive relations. However, approximately one fourth of the respondents disagreed with this statement (10 respondents, 24.4%). Additionally, eleven respondents (26.8%) neither agreed nor disagreed with the added value of consultancy services.

Consultancy Services

Organisation Type			Frequency	Percent	Valid Percent	Cumulative Percent
Supplier Organisation	Valid	Disagree	4	17,4	17,4	17,4
		Neither agree nor disagree	2	8,7	8,7	26,1
		Agree	14	60,9	60,9	87,0
		Strongly Agree	3	13,0	13,0	100,0
		Total	23	100,0	100,0	
Client Organisation	Valid	Disagree	10	24,4	24,4	24,4
		Neither agree nor disagree	11	26,8	26,8	51,2
		Agree	16	39,0	39,0	90,2
		Strongly Agree	4	9,8	9,8	100,0
		Total	41	100,0	100,0	

TABLE 5.12: Consultancy Services - Frequency Distribution by Organisation Type

Table 5.13 illustrates the frequency distribution for learning groups classified by supplier organisations and client organisations. The feedback from respondents from both supplier and client organisations are quite similar. None of the respondents strongly disagreed with the statement that learning groups moderated by the client organisation support the inter-supplier relationships in an IT multi-sourcing project. Only three respondents (13%) from a supplier organisation, and three respondents from a client organisation (7.3%) disagreed with the above-mentioned statement. In total, 12 respondents from both supplier and client organisations neither agreed nor disagreed that learning groups provide a benefit to IT multi-sourcing projects.

Hence, it can be noted that 18 respondents of the sample did not find learning groups useful. Instead, the majority of the sample (46 respondents, 71.9%) agreed or even strongly agreed.

For supplier organisations, one respondent (4.3%) agreed, and 12 respondents (52.2%) strongly agreed with the added value of learning groups. Hence, 56.5% of the respondents from the supplier organisation consider learning groups a critical success factor in forced coopetition relations. This is supported by the feedback from respondents of client organisations. The majority of 23 respondents (56.1%) agreed with the benefit of learning groups. Additionally, ten respondents (24.4%) strongly agreed.

Learning Groups

Organisation Type			Frequency	Percent	Valid Percent	Cumulative Percent
Supplier Organisation	Valid	Disagree	3	13,0	13,0	13,0
		Neither agree nor disagree	7	30,4	30,4	43,5
		Agree	1	4,3	4,3	47,8
		Strongly Agree	12	52,2	52,2	100,0
		Total	23	100,0	100,0	
Client Organisation	Valid	Disagree	3	7,3	7,3	7,3
		Neither agree nor disagree	5	12,2	12,2	19,5
		Agree	23	56,1	56,1	75,6
		Strongly Agree	10	24,4	24,4	100,0
		Total	41	100,0	100,0	

TABLE 5.13: Learning Groups - Frequency Distribution by Organisation Type

Table 5.14 illustrates the frequency distribution of contractual agreements grouped by supplier organisations and client organisations. The minority of respondents from supplier organisations (2 respondents, 8.7%) disagreed with the statement that additional contractual agreements support successful forced coopetition. Nine respondents (39.1%) neither agreed nor disagreed with this statement. To summarise, almost half of the respondents from supplier organisations did not recognise a positive effect of having additional contract agreements in forced coopetition relations. However, almost the same number of respondents either agreed (9 respondents, 39.1%) or strongly agreed (3 respondents, 13%) with the above-mentioned statement.

The frequency distribution for respondents from a client organisation shows a similar pattern. Five respondents (12.2%) strongly disagreed, three respondents (7.3%) disagreed, and an additional 12 respondents (29.3%) neither agreed nor disagreed that enhanced contractual agreements foster forced coopetition relations. The remaining 50.2% of the respondents, on the other hand, considered enhanced contractual agreements a critical success factor. The majority of 13 respondents (31.7%) agreed that contractual agreements provided an added value, additional eight respondents (19.5%) even strongly agreed.

Contractual Agreements

Organisation Type			Frequency	Percent	Valid Percent	Cumulative Percent
Supplier Organisation	Valid	Disagree	2	8,7	8,7	8,7
		Neither agree nor disagree	9	39,1	39,1	47,8
		Agree	9	39,1	39,1	87,0
		Strongly Agree	3	13,0	13,0	100,0
		Total	23	100,0	100,0	
Client Organisation	Valid	Strongly Disagree	5	12,2	12,2	12,2
		Disagree	3	7,3	7,3	19,5
		Neither agree nor disagree	12	29,3	29,3	48,8
		Agree	13	31,7	31,7	80,5
		Strongly Agree	8	19,5	19,5	100,0
		Total	41	100,0	100,0	

TABLE 5.14: Contractual Agreements - Frequency Distribution by Organisation Type

5.5.2 Supplier Selection

The literature review identified similar supplier capabilities, equal supplier size, and mixed supplier teams as potential critical success factors of forced coopetition relations. The respondents were asked to evaluate each factor in relation to its impact on successful forced coopetition in IT multi-sourcing projects. The remainder of this section describes the resulting evaluation for each potential critical success factor.

Statistics

		Similar Capabilities	Supplier Size	Mixed Supplier Teams
N	Valid	64	64	64
	Missing	0	0	0
Median		3,00	3,00	3,50

TABLE 5.15: Supplier Selection - Median Scores

Table 5.15 shows the median scores for the evaluation of the above-listed critical success factors. The results indicate that the central tendency for all three factors are considered to be neither positive nor negative in relation to a forced coopetition relation. For similar supplier capabilities and equal supplier size, the median score is 3, which represents a neutral evaluation.

The majority of the sample responded that they neither agreed nor disagreed (23 respondents, 35.9%) with the statement that similar supplier capabilities foster forced coopetition relations (see table 5.16). However, about one fourth of the sample (17 respondents, 26.6%) agreed with this statement. Additionally, seven respondents even strongly agreed (10.9%). The remaining respondents disagreed (14 respondents, 21.9%) or strongly disagreed (3 respondents, 4.7%) that similar supplier capabilities support the inter-supplier cooperation and therefore foster the forced coopetition relation.

Similar Capabilities

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	3	4,7	4,7	4,7
	Disagree	14	21,9	21,9	26,6
	Neither agree nor disagree	23	35,9	35,9	62,5
	Agree	17	26,6	26,6	89,1
	Strongly Agree	7	10,9	10,9	100,0
	Total	64	100,0	100,0	

TABLE 5.16: Similar Capabilities - Frequency Distribution

The responses on equal supplier size are similar to the previously discussed factor (see table 5.17). The majority of the sample (25 respondents, 39.1%) neither agreed nor disagreed that equally-sized suppliers support inter-supplier relations. 37.5% of the sample, on the other hand, agreed (19 respondents, 29.7%) or strongly agreed (5 respondents, 7.8%) that an equal supplier size fosters forced coopetition relations. The remaining respondents either strongly disagreed (4 respondents, 6.3%) or disagreed (4 respondents, 6.3%) with this statement.

Supplier Size

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	4	6,3	6,3	6,3
	Disagree	11	17,2	17,2	23,4
	Neither agree nor disagree	25	39,1	39,1	62,5
	Agree	19	29,7	29,7	92,2
	Strongly Agree	5	7,8	7,8	100,0
	Total	64	100,0	100,0	

TABLE 5.17: Supplier Size - Frequency Distribution

For mixed-supplier teams, one half of the sample neither strongly disagreed, disagreed, or neither agreed nor disagreed with the statement that mixed supplier teams increase the quality of a forced coopetition relation. The other half agreed or strongly agreed with the above-mentioned statement. Therefore, the median is 3.5 (see table 5.18).

Mixed Supplier Teams

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	3	4,7	4,7	4,7
	Disagree	9	14,1	14,1	18,8
	Neither agree nor disagree	20	31,3	31,3	50,0
	Agree	21	32,8	32,8	82,8
	Strongly Agree	11	17,2	17,2	100,0
	Total	64	100,0	100,0	

TABLE 5.18: Mixed Supplier Teams - Frequency Distribution

The median scores deviate only slightly if the organisational type is taken into account (see table 5.19). The median scores for similar supplier capabilities and equal supplier size are identical for respondents from supplier and client organisations. Hence, the central tendency of the responses from the overall sample and the respondents grouped by their professional role neither agreed nor disagreed that similar supplier capabilities or equal supplier size foster coopetition relations. Respondents from client organisations consider mixed-supplier teams to be more important (median = 4) than did the respondents from supplier organisations (median = 3).

Statistics

Organisation Type			Similar Capabilities	Supplier Size	Mixed Supplier Teams
Supplier Organisation	N	Valid	23	23	23
		Missing	0	0	0
	Median		3,00	3,00	4,00
Client Organisation	N	Valid	41	41	41
		Missing	0	0	0
	Median		3,00	3,00	3,00

TABLE 5.19: Supplier Selection - Median Scores by Organisation Type

Table 5.20 shows the frequency distribution for similar supplier capabilities grouped by supplier organisations and client organisations. In line with the entire sample, the majority of respondents from both supplier organisations (10 respondents, 43.5%)

and client organisations (13 respondents, 31.7%) neither agreed nor disagreed that similar supplier capabilities support forced coopetitive relations in IT multi-sourcing projects.

Seven respondents from supplier organisations disagreed (5 respondents, 21.7%) or strongly disagreed (2 respondents, 8.7%). The remaining respondents agreed with the above-mentioned statement (6 respondents, 26.1%). None of the respondents from a supplier organisation strongly agreed that similar supplier capabilities support coopetition. The respondents from client organisations are more inclined to agree (11 respondents, 26.8%) or even strongly agree (7 respondents, 17.1%) that similar supplier capabilities foster forced coopetition. However, nine respondents (22%) disagreed, one respondent even strongly disagreed (2.4%) that similar supplier capabilities provide an added value to forced coopetition relations in IT multi-sourcing projects.

Similar Capabilities

Organisation Type			Frequency	Percent	Valid Percent	Cumulative Percent
Supplier Organisation	Valid	Strongly Disagree	2	8,7	8,7	8,7
		Disagree	5	21,7	21,7	30,4
		Neither agree nor disagree	10	43,5	43,5	73,9
		Agree	6	26,1	26,1	100,0
		Total	23	100,0	100,0	
Client Organisation	Valid	Strongly Disagree	1	2,4	2,4	2,4
		Disagree	9	22,0	22,0	24,4
		Neither agree nor disagree	13	31,7	31,7	56,1
		Agree	11	26,8	26,8	82,9
		Strongly Agree	7	17,1	17,1	100,0
		Total	41	100,0	100,0	

TABLE 5.20: Similar Capabilities - Frequency Distribution by Organisation Type

Table 5.21 illustrates the frequency distribution for supplier size grouped by organisational type. With regard to the previously described factor In line, the majority of the respondents from both supplier organisations (9 respondents, 39.1%) and client

organisations (16 respondents, 39%) neither agreed nor disagreed that the consideration of the supplier size increases the quality of the forced coopetition relation in IT multi-sourcing projects.

In total, four respondents (9.8%) from client organisations strongly disagreed with the above-mentioned statement, and an additional six respondents (14.6%) disagreed. Hence, almost one fourth of the respondents from client organisations did not consider equal supplier size a critical success factor. Five respondents from supplier organisations (21.7%) support this evaluation.

Even though the feedback from respondents from supplier organisations resulted in a median score of 3, the majority of respondents consider supplier size important in forced coopetition relations. In detail, six respondents (26.1%) agreed, and an additional three respondents (13%) strongly agreed that equally-sized suppliers support the inter-supplier relationships and therefore increase the quality of the forced coopetition relationship.

The frequency distribution of respondents from a client organisation provides a similar pattern. In total, 15 respondents (36.6%) agreed or strongly agreed that the supplier size is a critical success factor. In detail, 13 respondents (31.7%) agreed, additionally two respondents (4.9%) strongly agreed with this statement.

Supplier Size

Organisation Type			Frequency	Percent	Valid Percent	Cumulative Percent
Supplier Organisation	Valid	Disagree	5	21,7	21,7	21,7
		Neither agree nor disagree	9	39,1	39,1	60,9
		Agree	6	26,1	26,1	87,0
		Strongly Agree	3	13,0	13,0	100,0
		Total	23	100,0	100,0	
Client Organisation	Valid	Strongly Disagree	4	9,8	9,8	9,8
		Disagree	6	14,6	14,6	24,4
		Neither agree nor disagree	16	39,0	39,0	63,4
		Agree	13	31,7	31,7	95,1
		Strongly Agree	2	4,9	4,9	100,0
		Total	41	100,0	100,0	

TABLE 5.21: Supplier Size - Frequency Distribution by Organisation Type

Table 5.22 illustrates the frequency distribution for mixed supplier teams grouped by supplier and client organisation. The majority of the 15 respondents from a supplier organisation consider mixed-supplier teams important in forced coopetition relations. Nine respondents (39.1%) agreed, six respondents (26.1%) even strongly agreed with the importance of this factor. Only two respondents disagreed or strongly disagreed (1 respondent each, 4.3%) with this statement. The remaining six respondents (26.1%) from a supplier organisation neither agreed nor disagreed.

The majority of respondents from client organisations also considered mixed supplier teams to be a critical success factor. In detail, 12 respondents (29.3%) agreed, and an additional five respondents (12.2%) strongly agreed that mixed supplier teams promote the coopetition in an IT multi-sourcing project. However, almost one fourth of the sample provided a different response. Eight respondents (19.5%) from client organisations disagreed, and an additional two respondents (4.9%) even strongly disagreed with this statement. The remaining 14 respondents (34.1%) neither agreed nor disagreed.

Mixed Supplier Teams

Organisation Type			Frequency	Percent	Valid Percent	Cumulative Percent
Supplier Organisation	Valid	Strongly Disagree	1	4,3	4,3	4,3
		Disagree	1	4,3	4,3	8,7
		Neither agree nor disagree	6	26,1	26,1	34,8
		Agree	9	39,1	39,1	73,9
		Strongly Agree	6	26,1	26,1	100,0
		Total	23	100,0	100,0	
Client Organisation	Valid	Strongly Disagree	2	4,9	4,9	4,9
		Disagree	8	19,5	19,5	24,4
		Neither agree nor disagree	14	34,1	34,1	58,5
		Agree	12	29,3	29,3	87,8
		Strongly Agree	5	12,2	12,2	100,0
		Total	41	100,0	100,0	

TABLE 5.22: Mixed Supplier Teams - Frequency Distribution by Organisation Type

5.5.3 Management Commitment

The literature review identified management leadership, long-term commitment, duplicated management functions, and similar interests as potentially critical success factors of forced coopetition relations. The respondents were asked to evaluate each factor in relation to its impact on successful forced coopetition in IT multi-sourcing projects. The remainder of this section describes the resulting evaluation for each potentially critical success factor.

Statistics

		Management Leadership	Long Term Commitment	Duplicated Management Functions	Similar Interests
N	Valid	64	64	64	64
	Missing	0	0	0	0
Median		4,00	4,00	2,00	3,50

TABLE 5.23: Management Commitment - Median Scores

Table 5.23 shows the median scores for the evaluation of the above-listed critical success factors. The results indicate that management leadership and long-term commitment are considered to be critical success factors in forced coopetition relations (median = 4). Furthermore, the results show that the existence of similar interests by the organisations in an IT multi-sourcing project is slightly critical in forced coopetition (median = 3.5). The use of duplicated management functions, on the other hand, is considered less significant in forced coopetition relations.

For management leadership, the majority of the sample agreed or strongly agreed that it is a critical success factor (see table 5.24). In detail, 21 respondents (32.8%) agreed, and an additional 23 respondents (35.9%) even strongly agreed with the statement that active management leadership within the client and supplier organisations support the relationships in IT multi-sourcing projects. However, 14 respondents (21.9%) neither agreed nor disagreed with this statement. The remaining six respondents (9.4%) disagreed that the existence of management leadership fosters forced coopetition relations.

Management Leadership

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Disagree	6	9,4	9,4	9,4
	Neither agree nor disagree	14	21,9	21,9	31,3
	Agree	21	32,8	32,8	64,1
	Strongly Agree	23	35,9	35,9	100,0
	Total	64	100,0	100,0	

TABLE 5.24: Management Leadership - Frequency Distribution

In line with the previous factor, the sample considered the willingness to participate in a long-term commitment as a critical success factor. The majority of the respondents (33 respondents, 51.6%) agreed that this factor fosters the inter-supplier cooperation in IT multi-sourcing projects. Additionally, eight respondents (12.5%) even strongly agreed with this statement. About one quarter of the sample (17 respondents, 26.6%) neither agreed nor disagreed, and the remaining six respondents (9.4%) disagreed, that long-term commitment is a prerequisite for successful coopetition relations.

Long-Term Commitment

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Disagree	6	9,4	9,4	9,4
	Neither agree nor disagree	17	26,6	26,6	35,9
	Agree	33	51,6	51,6	87,5
	Strongly Agree	8	12,5	12,5	100,0
	Total	64	100,0	100,0	

TABLE 5.25: Long-Term Commitment - Frequency Distribution

The majority of the sample (51 respondents, 79.7%) did not consider duplicated management functions to be a critical success factor in coopetition relations (see table 5.26). In detail, 12 respondents (18.8%) strongly disagreed, 26 respondents (40.6%) disagreed with the statement that duplicated management functions support inter-supplier relationships. Additionally, 13 respondents (20.3%) neither agreed nor disagreed with this statement. However, 13 respondents (20.3%) considered the use of duplicated management functions important. Eleven respondents (17.2%) agreed with the above-mentioned statement, and the remaining two respondents from the sample (3.1%) even strongly agreed.

Duplicated Management Functions

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	12	18,8	18,8	18,8
	Disagree	26	40,6	40,6	59,4
	Neither agree nor disagree	13	20,3	20,3	79,7
	Agree	11	17,2	17,2	96,9
	Strongly Agree	2	3,1	3,1	100,0
	Total	64	100,0	100,0	

TABLE 5.26: Duplicated Management Functions - Frequency Distribution

For similar interests, none of the respondents strongly disagreed with the statement that this factor increases the quality of a forced coopetition relationship (see table 5.27). However, eight respondents (12.5%) disagreed with the above-mentioned

statement. Additionally, 24 respondents (37.5%) provided a neutral feedback and therefore neither agreed nor disagreed. Hence, 50% of the sample considered similar interests to be a critical success factor. In detail, 24 respondents (37.5%) agreed, and an additional eight respondents (12.5%) even strongly agreed that similar interests of supplier organisations foster forced coopetition relations.

Similar Interests

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Disagree	8	12,5	12,5	12,5
	Neither agree nor disagree	24	37,5	37,5	50,0
	Agree	24	37,5	37,5	87,5
	Strongly Agree	8	12,5	12,5	100,0
	Total	64	100,0	100,0	

TABLE 5.27: Similar Interets - Frequency Distribution

Table 5.28 shows the median scores for the factors of the management leadership cluster grouped by organisational type. Compared to the parent sample, there is no difference in the median scores for management commitment, long-term commitment, and duplicated management functions. A difference in the median scores only exists for similar interests. Respondents from supplier organisations considered this factor critical (median = 4), whereas respondents from client organisations neither agreed nor disagreed (median = 3) that this factor fosters forced coopetition relations.

Statistics

Organisation Type			Management Leadership	Long Term Commitment	Duplicated Management Functions	Similar Interests
Supplier Organisation	N	Valid	23	23	23	23
		Missing	0	0	0	0
	Median		4,00	4,00	2,00	4,00
Client Organisation	N	Valid	41	41	41	41
		Missing	0	0	0	0
	Median		4,00	4,00	2,00	3,00

TABLE 5.28: Management Commitment - Median Scores by Organisation Type

Table 5.29 illustrates the frequency distribution for management leadership grouped by supplier organisations and client organisations. The majority of the respondents from both supplier organisations (8 respondents, 34.8%) and client organisations (15 respondents, 36.6%) strongly agreed that active management leadership supported the relationships in IT multi-sourcing projects. This is supported by an additional seven respondents (30.4%) from supplier organisations and 14 respondents (34.1%) from client organisations who agreed with this statement. Hence, the majority of both professional roles either agreed or strongly agreed. However, three respondents from both supplier organisations (13%) and client organisations (7.3%) disagreed. The remaining five respondents (21.7%) from a supplier organisation and nine respondents (22%) from a client organisation neither agreed nor disagreed.

Management Leadership

Organisation Type			Frequency	Percent	Valid Percent	Cumulative Percent
Supplier Organisation	Valid	Disagree	3	13,0	13,0	13,0
		Neither agree nor disagree	5	21,7	21,7	34,8
		Agree	7	30,4	30,4	65,2
		Strongly Agree	8	34,8	34,8	100,0
		Total	23	100,0	100,0	
Client Organisation	Valid	Disagree	3	7,3	7,3	7,3
		Neither agree nor disagree	9	22,0	22,0	29,3
		Agree	14	34,1	34,1	63,4
		Strongly Agree	15	36,6	36,6	100,0
		Total	41	100,0	100,0	

TABLE 5.29: Management Leadership - Frequency Distribution by Organisation Type

Long-term commitment is considered a critical success factor of both organisations (see table 5.30). The majority of respondents from a supplier organisation agreed (12 respondents, 52.2%) or even strongly agreed (5 respondents, 21.7%) that long-term commitment fosters forced coopetition relations. Only one respondent (4.3%) disagreed, while the remaining five respondents (21.7%) neither agreed nor disagreed with this statement. The frequency distribution for respondents from a client organisation is similar. Likewise, the majority agreed (21 respondents, 51.2%) or strongly

agreed (3 respondents, 7.3%). Five respondents disagreed that long-term commitments foster forced coopetition relations. The remaining 12 respondents (29.3%) neither agreed nor disagreed.

Long-term Commitment

Organisation Type			Frequency	Percent	Valid Percent	Cumulative Percent
Supplier Organisation	Valid	Disagree	1	4,3	4,3	4,3
		Neither agree nor disagree	5	21,7	21,7	26,1
		Agree	12	52,2	52,2	78,3
		Strongly Agree	5	21,7	21,7	100,0
		Total	23	100,0	100,0	
Client Organisation	Valid	Disagree	5	12,2	12,2	12,2
		Neither agree nor disagree	12	29,3	29,3	41,5
		Agree	21	51,2	51,2	92,7
		Strongly Agree	3	7,3	7,3	100,0
		Total	41	100,0	100,0	

TABLE 5.30: Long-Term Commitment - Frequency Distribution by Organisation Type

The existence of duplicated management functions is not considered critical success factor by the parent sample. This is underpinned by the frequency distribution grouped by respondents from supplier and client organisations (see table 5.31).

Four respondents from a supplier organisation strongly disagreed (17.4%), and an additional nine respondents (39.1%) disagreed that duplicated management functions foster inter-supplier cooperation. Two respondents (8.7%) agreed, and the remaining eight respondents (34.8%) neither agreed nor disagreed with this statement. Hence, 91.3% of the respondents from a supplier did not consider duplicated management functions to be a critical success factor in forced coopetition relations.

The responses from client organisation provide a similar pattern. Eight respondents (19.5%) strongly disagreed, and an additional 17 respondents (41.5%) disagreed that duplicated management functions foster coopetition relations. However, nine respondents (22%) agreed, and two respondents (4.9%) strongly agreed with this

statement. The remaining five IT Project Managers (12.2%) neither agreed nor disagreed.

Duplicated Management Functions

Organisation Type			Frequency	Percent	Valid Percent	Cumulative Percent
Supplier Organisation	Valid	Strongly Disagree	4	17,4	17,4	17,4
		Disagree	9	39,1	39,1	56,5
		Neither agree nor disagree	8	34,8	34,8	91,3
		Agree	2	8,7	8,7	100,0
		Total	23	100,0	100,0	
Client Organisation	Valid	Strongly Disagree	8	19,5	19,5	19,5
		Disagree	17	41,5	41,5	61,0
		Neither agree nor disagree	5	12,2	12,2	73,2
		Agree	9	22,0	22,0	95,1
		Strongly Agree	2	4,9	4,9	100,0
		Total	41	100,0	100,0	

TABLE 5.31: Duplicated Management Functions - Frequency Distribution by Organisation Type

Table 5.32 shows the frequency distribution for similar interests grouped by supplier and client organisations. The majority of respondents from a supplier organisation agreed (11 respondents, 47.8%) that similar interests of the organisations in an IT multi-sourcing project increase the quality of the forced coopetition relation. Additionally, three respondents (13%) even strongly agreed. The majority of the respondents from client organisations, on the other hand, neither agreed nor disagreed (17 respondents, 41.5%) with this statement. Eighteen client respondents agreed (13 respondents, 31.7%) or strongly agreed. Hence, the existence of similar interest is considered to be more important in forced coopetition relations by respondents from a supplier organisation (see table 5.32).

The remaining six respondents (14.6%) from a client organisation and two respondents (8.7%) from a supplier organisation disagreed that similar interests foster coopetition relations. None of the respondents strongly disagreed with this statement.

Similar Interests

Organisation Type			Frequency	Percent	Valid Percent	Cumulative Percent
Supplier Organisation	Valid	Disagree	2	8,7	8,7	8,7
		Neither agree nor disagree	7	30,4	30,4	39,1
		Agree	11	47,8	47,8	87,0
		Strongly Agree	3	13,0	13,0	100,0
		Total	23	100,0	100,0	
Client Organisation	Valid	Disagree	6	14,6	14,6	14,6
		Neither agree nor disagree	17	41,5	41,5	56,1
		Agree	13	31,7	31,7	87,8
		Strongly Agree	5	12,2	12,2	100,0
		Total	41	100,0	100,0	

TABLE 5.32: Similar Interests - Frequency Distribution by Organisation Type

5.5.4 Relationship Development

The literature review identified development of trust, knowledge sharing, and personal relationships as potential critical success factors of forced coopetition relations. The respondents were asked to evaluate each factor in relation to its impact on successful forced coopetition in IT multi-sourcing projects. The remainder of this section describes the resulting evaluation for each potential critical success factor.

Statistics

		Development of Trust	Knowledge Sharing	Personal Relationship
N	Valid	64	64	64
	Missing	0	0	0
Median		5,00	4,00	5,00

TABLE 5.33: Relationship Development - Median Scores

Table 5.33 shows the median scores for the respondents from both supplier and client organisations. As a matter of fact, the results indicate that the sample under investigation considers all factors critical success factors in forced coopetition relations.

In detail, the development of trust and the personal relationships on an individual level are considered critical for a successful forced coopetition relation (median = 5). In addition, knowledge sharing is also considered critical, however, the median score is lower (median = 4).

The majority of the sample (36 respondents, 56.3%) strongly agreed with the statement that the development of trust is a precondition for a successful coopetition in IT multi-sourcing projects (table 5.34). Additionally, 19 respondents (29.7%) agreed with this statement. The remaining nine respondents (14.1%) of the sample neither agreed nor disagreed. Hence, none of the respondents disagreed or strongly disagreed that trust is a prerequisite for successful forced coopetition.

Development of Trust

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Neither agree nor disagree	9	14,1	14,1	14,1
	Agree	19	29,7	29,7	43,8
	Strongly Agree	36	56,3	56,3	100,0
	Total	64	100,0	100,0	

TABLE 5.34: Development of Trust - Frequency Distribution

Table 5.35 shows the frequency distribution for personal relationships for respondents from both supplier and client organisations. The responses provide a similar pattern than the previously discussed frequency distribution for development of trust. In total, 56 respondents either agreed or strongly agreed that personal relationships on an individual level support the inter-supplier relationships in IT multi-sourcing projects. The same number of respondents strongly agreed (36 respondents, 56.3%), and an additional 20 respondents (31.3%) agreed with this statement. The remaining eight respondents (12.5%) of the sample neither agreed nor disagreed. In line with development of trust, none of the respondents disagreed or strongly disagreed that personal relationships on an individual level foster forced coopetition.

Personal Relationship

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Neither agree nor disagree	8	12,5	12,5	12,5
	Agree	20	31,3	31,3	43,8
	Strongly Agree	36	56,3	56,3	100,0
	Total	64	100,0	100,0	

TABLE 5.35: Personal Relationships - Frequency Distribution

Table 5.36 illustrates the frequency distribution for the importance of knowledge sharing to respondents from both supplier and client organisations. This is the only critical success factor of the superior cluster that resulted in some negative feedback. In detail, four respondents (6.3%) disagreed that knowledge sharing between supplier organisations foster the inter-supplier relationship. Additionally, 14 respondents (21.9%) neither agreed nor disagreed with this statement. However, the majority of the sample either agreed (30 respondents, 46.9%) or strongly agreed (16 respondents, 25%) that knowledge sharing is a critical success factor in forced coopetition relations.

Knowledge Sharing

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Disagree	4	6,3	6,3	6,3
	Neither agree nor disagree	14	21,9	21,9	28,1
	Agree	30	46,9	46,9	75,0
	Strongly Agree	16	25,0	25,0	100,0
	Total	64	100,0	100,0	

TABLE 5.36: Knowledge Sharing - Frequency Distribution

The median scores do not change if the organisational type is taken into account (see table 5.37). Furthermore, the feedback of the respondents from both supplier and client organisations resulted in the same median scores as the complete sample.

Statistics

Organisation Type			Development of Trust	Knowledge Sharing	Personal Relationship
Supplier Organisation	N	Valid	23	23	23
		Missing	0	0	0
	Median		5,00	4,00	5,00
Client Organisation	N	Valid	41	41	41
		Missing	0	0	0
	Median		5,00	4,00	5,00

TABLE 5.37: Relationship Development - Median Scores by Organisation Type

Table 5.38 shows the frequency distribution for the evaluation of trust grouped by supplier and client organisations. The majority of both groups strongly agreed that development of trust is a critical success factor for coopetition relations. In detail, 15 respondents (65.2%) from a supplier organisation and 21 respondents (51.2%) from a client organisation strongly agreed with this statement; additionally, six respondents (26.1%) from a supplier organisation and 13 respondents (31.7) agreed. Hence, 91.3% from a supplier organisation and 82.9% from a client organisation consider the development of trust to be important for coopetition relations. The remaining seven IT project managers (17.1%) from a client organisation and two respondents (8.7%) from a client organisation provided a neutral evaluation of this factor.

Development of Trust

Organisation Type			Frequency	Percent	Valid Percent	Cumulative Percent
Supplier Organisation	Valid	Neither agree nor disagree	2	8,7	8,7	8,7
		Agree	6	26,1	26,1	34,8
		Strongly Agree	15	65,2	65,2	100,0
		Total	23	100,0	100,0	
Client Organisation	Valid	Neither agree nor disagree	7	17,1	17,1	17,1
		Agree	13	31,7	31,7	48,8
		Strongly Agree	21	51,2	51,2	100,0
		Total	41	100,0	100,0	

TABLE 5.38: Development of Trust - Frequency Distribution by Organisation Type

The respondents from a client organisation consider personal relationships in forced coopetition relations and the development of trust to be equally important (see table 5.39). The frequency distribution for this group is identical for both critical success factors under investigation. Compared to development of trust, more respondents from a supplier organisation agreed (7 respondents, 30.4%) or even strongly agreed (15 respondents, 65.2%) that personal relationships on an individual level foster coopetitive relations. Only one respondent (4.3%) neither agreed nor disagreed with this statement.

Personal Relationship

Organisation Type			Frequency	Percent	Valid Percent	Cumulative Percent
Supplier Organisation	Valid	Neither agree nor disagree	1	4,3	4,3	4,3
		Agree	7	30,4	30,4	34,8
		Strongly Agree	15	65,2	65,2	100,0
		Total	23	100,0	100,0	
Client Organisation	Valid	Neither agree nor disagree	7	17,1	17,1	17,1
		Agree	13	31,7	31,7	48,8
		Strongly Agree	21	51,2	51,2	100,0
		Total	41	100,0	100,0	

TABLE 5.39: Personal Relationships - Frequency Distribution by Organisation Type

Table 5.40 illustrates the frequency distribution for the evaluation of knowledge sharing in forced coopetition relations grouped by organisational type. Only respondents from client organisations disagreed (4 respondents, 9.8%) that knowledge sharing between supplier organisations fosters inter-supplier relationships. Additionally, ten respondents (24.4%) from a client organisation neither agreed nor disagreed. Hence, client organisations provided a less positive evaluation of this critical success factor compared to respondents from a supplier organisation. However, the majority of respondents from a client organisation (22 respondents, 53.7%) agreed, and five respondents even strongly agreed (12.2%), that knowledge sharing fosters a forced coopetition relation. The majority of respondents from a supplier organisation even strongly agreed (11 respondents, 47.8%) with this statement. Additionally, eight respondents agreed (34.8%) on the importance of this critical success factor.

Knowledge Sharing

Organisation Type			Frequency	Percent	Valid Percent	Cumulative Percent
Supplier Organisation	Valid	Neither agree nor disagree	4	17,4	17,4	17,4
		Agree	8	34,8	34,8	52,2
		Strongly Agree	11	47,8	47,8	100,0
		Total	23	100,0	100,0	
Client Organisation	Valid	Disagree	4	9,8	9,8	9,8
		Neither agree nor disagree	10	24,4	24,4	34,1
		Agree	22	53,7	53,7	87,8
		Strongly Agree	5	12,2	12,2	100,0
		Total	41	100,0	100,0	

TABLE 5.40: Knowledge Sharing - Frequency Distribution by Organisation Type

5.5.5 Communication Management

The literature review identified the development of collaborative software, conflict management systems, and project manager capabilities as potential critical success factors of forced coopetition relations. The respondents were asked to evaluate each factor in relation to its impact on successful forced coopetition in IT multi-sourcing projects. The remainder of this section describes the resulting evaluation for each potential critical success factor.

Statistics

		Collaborative Software	Conflict Management Systems	Project Manager Capabilities
N	Valid	64	64	64
	Missing	0	0	0
Median		4,00	3,00	5,00

TABLE 5.41: Communication Management - Median Scores

Table 5.41 shows the median scores for respondents from both supplier and client organisations. The results indicate that the capabilities of the project manager

(median = 5) are considered the most important critical success factor followed by the usage of collaborative software (median = 4) in IT multi-sourcing projects. The use of conflict management systems (median = 3), on the other hand, is considered a neutral factor in forced coopetition relations. In detail, the majority of the sample either agreed (28 respondents, 43.8%) or strongly agreed (7 respondents, 10.9%) with the statement that collaborative software fosters relationships in IT multi-sourcing projects (see table 5.42). Hence, 54.7% of the sample considered the usage of collaborative software important. However, a considerable number of respondents neither agreed nor disagreed (24 respondents, 37.5%) with this statement. None of the respondents strongly disagreed, while five respondents disagreed (7.8%) that collaborative software fosters relationships in IT multi-sourcing projects. Therefore, the majority of the sample (59 respondents, 92.2%) stated that collaborative software does not negatively affect forced coopetition relations.

Collaborative Software

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Disagree	5	7,8	7,8	7,8
	Neither agree nor disagree	24	37,5	37,5	45,3
	Agree	28	43,8	43,8	89,1
	Strongly Agree	7	10,9	10,9	100,0
	Total	64	100,0	100,0	

TABLE 5.42: Collaborative Software - Frequency Distribution

The frequency distribution for conflict management systems shows that one quarter of the sample (16 respondents, 25%) disagreed that this is a critical success factor in forced coopetition relations (see table 5.43). Additionally, 29 respondents (45.3%) from both supplier and client organisations neither agreed nor disagreed. The remaining third of the sample argued that conflict management systems support the relationships among actors in an IT multi-sourcing project. In detail, 11 respondents (17.2%) agreed, and an additional eight respondents (12.5%) even strongly agreed with this statement.

Conflict Management Systems

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Disagree	16	25,0	25,0	25,0
	Neither agree nor disagree	29	45,3	45,3	70,3
	Agree	11	17,2	17,2	87,5
	Strongly Agree	8	12,5	12,5	100,0
	Total	64	100,0	100,0	

TABLE 5.43: Conflict Management Systems - Frequency Distribution

Table 5.44 shows the frequency distribution for the evaluation of the Project Managers' capabilities in coopetitive relations. The results indicate that the majority of the sample strongly agreed (41 respondents, 64.1%) that the Project Managers' capabilities affect the cooperation and, therefore the success of IT multi-sourcing projects. Additionally, 18 respondents (28.1%) agreed with this statement. Hence, less than 10% of the sample did not consider the factor critical in forced coopetition relations. Only one respondent (1.6%) disagreed with this statement, whereas the remaining four respondents (6.3%) neither agreed nor disagreed.

Project Manager Capabilities

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Disagree	1	1,6	1,6	1,6
	Neither agree nor disagree	4	6,3	6,3	7,8
	Agree	18	28,1	28,1	35,9
	Strongly Agree	41	64,1	64,1	100,0
	Total	64	100,0	100,0	

TABLE 5.44: Project Manager Capabilities - Frequency Distribution

Table 5.45 shows the median scores for all factors of the communication management cluster grouped by organisational type. The results indicate that the respondents from both organisations provided an equal evaluation for all factors. In line with the entire sample, the project manager capabilities (median = 5) and collaborative

software (median = 4) are considered critical success factors in coopetition relations. The use of a conflict management system is considered to be neither a positive nor a negative factor.

Statistics

Organisational Type			Collaborative Software	Conflict Management Systems	Project Manager Capabilities
Supplier Organisation	N	Valid	23	23	23
		Missing	0	0	0
	Median		4,00	3,00	5,00
Client Organisation	N	Valid	41	41	41
		Missing	0	0	0
	Median		4,00	3,00	5,00

TABLE 5.45: Communication Management - Median Scores by Organisation Type

The majority of IT Project Managers from supplier and client organisations agreed that collaborative software increases the quality of forced coopetition relations (see table 5.46). In detail, ten supplier respondents (43.5%) and 18 client respondents (43.9%) agreed with this statement. Additionally, four respondents (17.4%) from suppliers and three respondents (7.3%) from client organisations strongly agreed. Hence, more than half of both respondents' groups considered collaborative software to be a critical success factor. However, a significant proportion provided a neutral evaluation. Nine supplier respondents (39.1%) and 15 client respondents (36.6%) neither agreed nor disagreed with the above-mentioned statement. Furthermore, it is worth mentioning that only respondents from client organisations disagreed (5 respondents, 12.2%) that collaborative software supports forced coopetition relations.

Collaborative Software

Organisational Type			Frequency	Percent	Valid Percent	Cumulative Percent
Supplier Organisation	Valid	Neither agree nor disagree	9	39,1	39,1	39,1
		Agree	10	43,5	43,5	82,6
		Strongly Agree	4	17,4	17,4	100,0
		Total	23	100,0	100,0	
Client Organisation	Valid	Disagree	5	12,2	12,2	12,2
		Neither agree nor disagree	15	36,6	36,6	48,8
		Agree	18	43,9	43,9	92,7
		Strongly Agree	3	7,3	7,3	100,0
		Total	41	100,0	100,0	

TABLE 5.46: Collaborative Software - Frequency Distribution by Organisation Type

The use of conflict management systems is considered to be neither a positive nor a negative factor in forced coopetition relations. Therefore, the majority of respondents from both supplier and client organisations provided neutral feedback (see table 5.47). In detail, 12 IT Project Managers (52.2%) from a supplier organisation, and 17 client respondents (41.5%) neither agreed nor disagreed with the statement that conflict management systems support the relationship among actors in an IT multi-sourcing project. Furthermore, 12 client respondents (29.3%) and four respondents (17.4%) from a supplier organisation disagreed with this statement. However, 12 IT Project Managers from a client organisation agreed (4 respondents, 9.8%) or strongly agreed (8 respondents, 19.5%).

Conflict Management Systems

Organisational Type			Frequency	Percent	Valid Percent	Cumulative Percent
Supplier Organisation	Valid	Disagree	4	17,4	17,4	17,4
		Neither agree nor disagree	12	52,2	52,2	69,6
		Agree	7	30,4	30,4	100,0
		Total	23	100,0	100,0	
Client Organisation	Valid	Disagree	12	29,3	29,3	29,3
		Neither agree nor disagree	17	41,5	41,5	70,7
		Agree	4	9,8	9,8	80,5
		Strongly Agree	8	19,5	19,5	100,0
		Total	41	100,0	100,0	

TABLE 5.47: Collaborative Software - Frequency Distribution by Organisation Type

Table 5.48 shows the frequency distribution for the evaluation of the Project Managers' capabilities in forced coopetition relations. The majority of respondents from a supplier organisation (16 respondents, 69.6%) strongly agreed, and an additional 6 respondents (26.1%) agreed that this factor has an impact on forced coopetition relations. Only one respondent (4.3%) provided a neutral evaluation.

The frequency distribution for respondents from a client organisation is similar. In total, 37 respondents either agreed (12 respondents, 29.3%) or strongly agreed (25 respondents, 61%) that a Project Manager's capabilities were a critical success factor. One respondent (2.4%) disagreed with this statement, whereas the remaining three respondents (7.3%) neither agreed nor disagreed.

Project Manager Capabilities

Organisational Type			Frequency	Percent	Valid Percent	Cumulative Percent
Supplier Organisation	Valid	Neither agree nor disagree	1	4,3	4,3	4,3
		Agree	6	26,1	26,1	30,4
		Strongly Agree	16	69,6	69,6	100,0
		Total	23	100,0	100,0	
Client Organisation	Valid	Disagree	1	2,4	2,4	2,4
		Neither agree nor disagree	3	7,3	7,3	9,8
		Agree	12	29,3	29,3	39,0
		Strongly Agree	25	61,0	61,0	100,0
		Total	41	100,0	100,0	

TABLE 5.48: Project Manager Capabilities - Frequency Distribution by Organisation Type

5.5.6 Ranking of Critical Success Factor Clusters

Table 5.49 shows the mean scores for the ranking of the critical success factor clusters. Based on the data collected, the highest ranked cluster is supplier management with a mean score of 3.47. Supplier selection is considered to be the second most important cluster with a mean score of 3.22, followed by communication management with a mean score of 3. The development of personal relationships is considered to be the fourth most important cluster (mean = 2.83), while management commitment is the least important cluster (mean = 2.48).

The analysis of the standard deviations shows that the rankings of supplier selection (SD = 1.24), communication management (SD = 1.29), supplier management (SD = 1.32), management commitment (SD = 1.46), and relationship development (1.56) are more or less equally distributed.

Statistics

	Supplier Management	Supplier Selection	Management Commitment	Relationship Development	Communication Management
Mean	3,47	3,22	2,48	2,83	3,00
N	64	64	64	64	64
Std. Deviation	1,321	1,240	1,469	1,569	1,297

TABLE 5.49: Cluster Prioritisation - Mean Scores

The mean scores broken down by the organisational type reveal a different picture (see table 5.50). In line with the parent sample, the respondents from supplier organisations claim that supplier management (mean = 3.96) is the most important cluster in a forced coopetition. The second most important cluster is communication management (mean = 3.74), followed by supplier selection (mean = 2.83), management commitment (mean = 2.39), and relationship development (mean = 2.09).

IT Project Managers from client organisations, on the other hand, claim that supplier selection (mean = 3.44) is the most important cluster in forced coopetition relations. The second most important cluster is relationship development (mean = 3.23), followed by supplier management (mean = 3.20). The ranking of the cluster communication management (mean = 2.59) and management commitment (mean = 2.54) is identical to the ranks of the parent sample (see table 5.51).

Statistics

		Supplier Management	Supplier Selection	Management Commitment	Relationship Development	Communication Management
Supplier Organisation	Mean	3,96	2,83	2,39	2,09	3,74
	N	23	23	23	23	23
	Std. Deviation	,928	1,302	1,196	1,443	1,251
Client Organisation	Mean	3,20	3,44	2,54	3,24	2,59
	N	41	41	41	41	41
	Std. Deviation	1,436	1,163	1,614	1,496	1,140

TABLE 5.50: Cluster Prioritisation - Grouped Mean Scores

It is worth mentioning that the mean scores of respondents from supplier organisations differ by 0.74 from the parent sample for the relationship management and communication management cluster. Simultaneously, the mean scores differ by 0.41 for respondents from client organisations.

Prioritisation by Organisation Type

Rank	Sample	Supplier Organisation	Client Organisation
1	Supplier Management	Supplier Management	Supplier Selection
2	Supplier Selection	Communication Mgmt.	Relationship Development
3	Relationship Development	Supplier Selection	Supplier Management
4	Communication Mgmt.	Management Commitment	Communication Mgmt.
5	Management Commitment	Relationship Development	Management Commitment

TABLE 5.51: Cluster Prioritisation by Organisation Type

5.6 Testing of Hypotheses

The following sections test the hypotheses derived from the conceptual framework. As described in the introductory section, the factors are compared to the hypothesized score of 3, with both the one-sample Wilcoxon signed-rank test and the one-sample t-test. As IBM SPSS 20 is not able to calculate the one-sided p-value, the value is calculated by the researcher by dividing the two-sided p-value in half (Kraska-Miller, 2013).

5.6.1 H1: Supplier Management

Following H_1, it was expected that the factors related to supplier management would increase the quality of a forced coopetition relation in IT multi-sourcing projects. Consequently, this section will test each potential critical success factor in order to determine whether the evaluation differs in a statistically significantly way from the neutral evaluation.

The Wilcoxon signed-rank test shows that the evaluation for supplier associations of 35 respondents is higher than the neutral score (see table 5.52). Eleven respondents presented a neutral evaluation, and the remaining 18 respondents presented a

lower evaluation than the neutral score. The resulting p-value of the two-sided and consequently one-sided test is <0.05 (see table 5.53). This indicates with statistical significance that the observed median score of 4 is different from the neutral evaluation. On the basis of the Wilcoxon signed-rank test, it can therefore be concluded that supplier associations increase the quality of forced coopetition relations in IT multi-sourcing projects.

Ranks

		N	Mean Rank	Sum of Ranks
Supplier Associations - Neutral Evaluation	Negative Ranks	18[a]	22,94	413,00
	Positive Ranks	35[b]	29,09	1018,00
	Ties	11[c]		
	Total	64		

a. Supplier Associations < Neutral Evaluation
b. Supplier Associations > Neutral Evaluation
c. Supplier Associations = Neutral Evaluation

TABLE 5.52: Supplier Associations - Wilcoxon Ranks Table

Test Statistics [a]

	Supplier Associations - Neutral Evaluation
Z	-2,825[b]
Asymp. Sig. (2-tailed)	,005

a. Wilcoxon Signed Ranks Test
b. Based on negative ranks.

TABLE 5.53: Supplier Associations - Wilcoxon Test Statistics

The result of the t-test shows that the evaluation (mean score = 3.42, standard deviation = 1.152) was higher than the neutral evaluation (see table 5.54). Furthermore, the t-test calculates a two-sided p-value of 0.005, which results in p = 0.0025 for the one-sided test (see table 5.55). Therefore, the mean evaluation for supplier associations is significantly higher than the neutral evaluation. The results of the parametric t-test confirm the results of the nonparametric Wilcoxon signed-rank test. According to both statistical tests, supplier associations increase the quality of forced coopetition relations.

One-Sample Statistics

	N	Mean	Std. Deviation	Std. Error Mean
Supplier Associations	64	3,42	1,152	,144

TABLE 5.54: Supplier Associations - t-test Statistics

One-Sample Test

	Test Value = 3					
					95% Confidence Interval of the Difference	
	t	df	Sig. (2-tailed)	Mean Difference	Lower	Upper
Supplier Associations	2,930	63	,005	,422	,13	,71

TABLE 5.55: Supplier Associations - t-test Results

For consultancy services, the Wilcoxon signed-rank test shows that the evaluation of 37 respondents is higher than the neutral score (see table 5.56). Thirteen respondents presented a neutral evaluation, and the remaining 14 respondents presented a lower evaluation than the neutral score. The resulting p-value of the two-sided and consequently one-sided test is <0.05 (see table 5.57). This indicates with statistical significance that the observed median score of 4 is different from the neutral evaluation. On the basis of the Wilcoxon signed-rank test, it can therefore be concluded that consultancy services increase the quality of forced coopetition relations in IT multi-sourcing projects.

Ranks

		N	Mean Rank	Sum of Ranks
Consultancy Services - Neutral Evaluation	Negative Ranks	14[a]	22,50	315,00
	Positive Ranks	37[b]	27,32	1011,00
	Ties	13[c]		
	Total	64		

a. Consultancy Services < Neutral Evaluation

b. Consultancy Services > Neutral Evaluation

c. Consultancy Services = Neutral Evaluation

TABLE 5.56: Consultancy Services - Wilcoxon Ranks Table

Test Statistics [a]

	Consultancy Services - Neutral Evaluation
Z	-3,552[b]
Asymp. Sig. (2-tailed)	,000

a. Wilcoxon Signed Ranks Test

b. Based on negative ranks.

TABLE 5.57: Consultancy Services - Wilcoxon Test Statistics

The result of the t-test shows that the evaluation (mean score = 3.47, standard deviation = 0.959) was higher than the neutral evaluation (see table 5.58). Furthermore, the t-test calculates a two-sided p-value of <0.05, which results in p <0.05 for the one-sided test (see table 5.59). Therefore, the mean evaluation for consultancy services is, statistically speaking, significantly higher than the neutral evaluation. The results of the parametric t-test therefore confirm the results of the nonparametric Wilcoxon signed-rank test. According to both statistical tests, consultancy services increase the quality of forced coopetition relations.

One-Sample Statistics

	N	Mean	Std. Deviation	Std. Error Mean
Consultancy Services	64	3,47	,959	,120

TABLE 5.58: Consultancy Services - t-test Statistics

One-Sample Test

	Test Value = 3					
					95% Confidence Interval of the Difference	
	t	df	Sig. (2-tailed)	Mean Difference	Lower	Upper
Consultancy Services	3,910	63	,000	,469	,23	,71

TABLE 5.59: Consultancy Services - t-test Results

For learning groups, the Wilcoxon signed-rank test shows that the evaluation of 46 respondents is higher than the neutral score (see table 5.60). Twelve respondents supplied a neutral evaluation, and the remaining 6 respondents provided a lower evaluation than the neutral score. The resulting p-value of the two-sided and

consequently one-sided test is <0.05 (see table 5.61). This indicates with statistical significance that the observed median score of 4 is different from the neutral evaluation. On the basis of the Wilcoxon signed-rank test, it can therefore be concluded that learning groups increase the quality of forced coopetition relations in IT multi-sourcing projects.

Ranks

		N	Mean Rank	Sum of Ranks
Learning Groups - Neutral Evaluation	Negative Ranks	6[a]	15,50	93,00
	Positive Ranks	46[b]	27,93	1285,00
	Ties	12[c]		
	Total	64		

a. Learning Groups < Neutral Evaluation
b. Learning Groups > Neutral Evaluation
c. Learning Groups = Neutral Evaluation

Table 5.60: Learning Groups - Wilcoxon Ranks Table

Test Statistics [a]

	Learning Groups - Neutral Evaluation
Z	-5,613[b]
Asymp. Sig. (2-tailed)	,000

a. Wilcoxon Signed Ranks Test
b. Based on negative ranks.

Table 5.61: Learning Groups - Wilcoxon Test Statistics

The result of the t-test shows that the evaluation (mean score = 3.97, standard deviation = 0.959) was higher than the neutral evaluation (see table 5.62). Furthermore, the t-test calculates a two-sided p-value of <0.05, which results in p <0.05 for the one-sided test (see table 5.63). Therefore, the mean evaluation for learning groups is significantly higher than the neutral evaluation. The results of the parametric t-test therefore confirm the results of the nonparametric Wilcoxon signed-rank test. According to both statistical tests, learning groups thus increase the quality of forced coopetition relations.

One-Sample Statistics

	N	Mean	Std. Deviation	Std. Error Mean
Learning Groups	64	3,97	,959	,120

TABLE 5.62: Learning Groups - t-test Statistics

One-Sample Test

	Test Value = 3					
					95% Confidence Interval of the Difference	
	t	df	Sig. (2-tailed)	Mean Difference	Lower	Upper
Learning Groups	8,082	63	,000	,969	,73	1,21

TABLE 5.63: Learning Groups - t-test Results

For contractual agreements, the Wilcoxon signed-rank test shows that the evaluation of 33 respondents is higher than the neutral score (see table 5.64). Twenty-one respondents provided a neutral evaluation, while the remaining 10 IT Project Managers responded with a lower evaluation than the neutral score. The resulting p-value of the two-sided and consequently one-sided test is <0.05 (see table 5.65). This indicates with statistical significance that the observed median score of 4 is different from the neutral evaluation. On the basis of the Wilcoxon signed-rank test, it can therefore be concluded that contractual agreements increase the quality of forced coopetition relations in IT multi-sourcing projects.

Ranks

		N	Mean Rank	Sum of Ranks
Contractual Agreements - Neutral Evaluation	Negative Ranks	10[a]	24,75	247,50
	Positive Ranks	33[b]	21,17	698,50
	Ties	21[c]		
	Total	64		

a. Contractual Agreements < Neutral Evaluation

b. Contractual Agreements > Neutral Evaluation

c. Contractual Agreements = Neutral Evaluation

TABLE 5.64: Contractual Agreements - Wilcoxon Ranks Table

Test Statistics [a]

	Contractual Agreements - Neutral Evaluation
Z	-2,827[b]
Asymp. Sig. (2-tailed)	,005

a. Wilcoxon Signed Ranks Test

b. Based on negative ranks.

TABLE 5.65: Contractual Agreements - Wilcoxon Test Statistics

The result of the t-test shows that the evaluation (mean score = 3.45, standard deviation = 1.112) was higher than the neutral evaluation (see table 5.66). Furthermore, the t-test calculates a two-sided p-value of <0.05, which results in p <0.05 for the one-sided test (see table 5.67). Therefore, the mean evaluation for contractual agreements is significantly higher than the neutral evaluation. The results of the parametric t-test therefore confirm the results of the nonparametric Wilcoxon signed-rank test. According to both statistical tests, contractual agreements increase the quality of forced coopetition relations.

One-Sample Statistics

	N	Mean	Std. Deviation	Std. Error Mean
Contractual Agreements	64	3,45	1,112	,139

TABLE 5.66: Contractual Agreements - t-test Statistics

One-Sample Test

	Test Value = 3					
					95% Confidence Interval of the Difference	
	t	df	Sig. (2-tailed)	Mean Difference	Lower	Upper
Contractual Agreements	3,261	63	,002	,453	,18	,73

TABLE 5.67: Contractual Agreements - t-test Results

In sum, both the Wilcoxon signed-rank test and t-test have shown that the study evaluations vary in a statistically significant way from the neutral evaluation with respect to all factors related to supplier management. In line with business research, the p-value of both statistical tests is below the maximum value of p <0.05 (Bernard,

2013; Bryman & Bell, 2015). Hence, the sample considers supplier associations, consultancy services, learning groups and contractual agreements to be critical success factors in forced coopetition relations. Therefore, hypothesis 1 (H_1) is accepted for the context under investigation.

5.6.2 H2: Supplier Selection

Following H_2, it was expected that the factors related to supplier selection would increase the quality of a forced coopetition relation in IT multi-sourcing projects. Consequently, this section will test each potential critical success factor in order to determine whether the evaluation differs in a statistically significant way from the neutral evaluation.

The Wilcoxon signed-rank test shows that the evaluation for similar capabilities of 24 respondents is higher than the neutral score (see table 5.68). Twenty-three respondents provided a neutral evaluation and the remaining 17 respondents supplied a lower evaluation than the neutral score. The resulting p-value of the two-sided and consequently one-sided test is >0.05 (see table 5.69). This indicates that the observed median score of 3 is not different from the neutral evaluation. On the basis of the Wilcoxon signed-rank test, it can therefore be concluded that similar capabilities do not increase the quality of forced coopetition relations in IT multi-sourcing projects.

Ranks

		N	Mean Rank	Sum of Ranks
Similar Capabilities - Neutral Evaluation	Negative Ranks	17[a]	19,62	333,50
	Positive Ranks	24[b]	21,98	527,50
	Ties	23[c]		
	Total	64		

a. Similar Capabilities < Neutral Evaluation
b. Similar Capabilities > Neutral Evaluation
c. Similar Capabilities = Neutral Evaluation

TABLE 5.68: Similar Capabilities - Wilcoxon Ranks Table

Test Statistics [a]

	Similar Capabilities - Neutral Evaluation
Z	-1,331[b]
Asymp. Sig. (2-tailed)	,183

a. Wilcoxon Signed Ranks Test

b. Based on negative ranks.

TABLE 5.69: Similar Capabilities - Wilcoxon Test Statistics

The result of the t-test shows that the evaluation (mean score = 3.17, standard deviation = 1.047) was higher than the neutral evaluation (see table 5.70). Furthermore, the t-test calculates a two-sided p-value of 0.194, which results in p = 0.097 for the one-sided test (see table 5.71). Therefore, the mean evaluation for similar capabilities is not higher than the neutral evaluation. The results of the parametric t-test therefore confirm the results of the nonparametric Wilcoxon signed-rank test. According to both statistical tests, similar capabilities do not increase the quality of forced coopetition relations.

One-Sample Statistics

	N	Mean	Std. Deviation	Std. Error Mean
Similar Capabilities	64	3,17	1,047	,131

TABLE 5.70: Similar Capabilities - t-test Statistics

One-Sample Test

	Test Value = 3					
					95% Confidence Interval of the Difference	
	t	df	Sig. (2-tailed)	Mean Difference	Lower	Upper
Similar Capabilities	1,313	63	,194	,172	-,09	,43

TABLE 5.71: Similar Capabilities - t-test Results

For supplier size, the Wilcoxon signed-rank test shows that the evaluation of 24 respondents is higher than the neutral score (see table 5.72). Twenty-five respondents provided a neutral evaluation and the remaining 15 respondents gave a lower evaluation than the neutral score. The resulting p-value of the two-sided test is 0.239

and, therefore 0.119 for the one-sided test (see table 5.73). This indicates that the observed median score of 3 is not different from the neutral evaluation. On the basis of the Wilcoxon signed-rank test, it can therefore be concluded that the supplier size does not increase the quality of forced coopetition relations in IT multi-sourcing projects.

Ranks

		N	Mean Rank	Sum of Ranks
Supplier Size - Neutral Evaluation	Negative Ranks	15[a]	20,70	310,50
	Positive Ranks	24[b]	19,56	469,50
	Ties	25[c]		
	Total	64		

a. Supplier Size < Neutral Evaluation
b. Supplier Size > Neutral Evaluation
c. Supplier Size = Neutral Evaluation

TABLE 5.72: Supplier Size - Wilcoxon Ranks Table

Test Statistics[a]

	Supplier Size - Neutral Evaluation
Z	-1,178[b]
Asymp. Sig. (2-tailed)	,239

a. Wilcoxon Signed Ranks Test
b. Based on negative ranks.

TABLE 5.73: Supplier Size - Wilcoxon Test Statistics

The result of the t-test shows that the evaluation (mean score = 3.16, standard deviation = 1.011) was higher than the neutral evaluation (see table 5.74). Furthermore, the t-test calculates a two-sided p-value of 0.221, which results in p = 0.11 for the one-sided test (see table 5.75). Therefore, the mean evaluation for supplier size is not higher than the neutral evaluation. The results of the parametric t-test therefore confirm the results of the nonparametric Wilcoxon signed-rank test. According to both statistical tests, the supplier size does not increase the quality of forced coopetition relations.

One-Sample Statistics

	N	Mean	Std. Deviation	Std. Error Mean
Supplier Size	64	3,16	1,011	,126

TABLE 5.74: Supplier Size - t-test Statistics

One-Sample Test

	Test Value = 3					
					95% Confidence Interval of the Difference	
	t	df	Sig. (2-tailed)	Mean Difference	Lower	Upper
Supplier Size	1,236	63	,221	,156	-,10	,41

TABLE 5.75: Supplier Size - t-test Results

For mixed-supplier teams, the Wilcoxon signed-rank test shows that the evaluation of 32 respondents is higher than the neutral score (see table 5.76). Twenty respondents provided a neutral evaluation, while the remaining 12 respondents gave a lower evaluation than the neutral score. The resulting p-value of the two-sided and consequently one-sided test is 0.03 (see table 5.77). This indicates with statistical significance that the observed median score of 3.5 differs from the neutral evaluation. On the basis of the Wilcoxon signed-rank test, it can therefore be concluded that mixed supplier teams increase the quality of forced coopetition relations in IT multi-sourcing projects.

Ranks

		N	Mean Rank	Sum of Ranks
Mixed Supplier Teams - Neutral Evaluation	Negative Ranks	12[a]	21,00	252,00
	Positive Ranks	32[b]	23,06	738,00
	Ties	20[c]		
	Total	64		

a. Mixed Supplier Teams < Neutral Evaluation

b. Mixed Supplier Teams > Neutral Evaluation

c. Mixed Supplier Teams = Neutral Evaluation

TABLE 5.76: Mixed Supplier Teams - Wilcoxon Ranks Table

Test Statistics[a]

	Mixed Supplier Teams - Neutral Evaluation
Z	-2,963[b]
Asymp. Sig. (2-tailed)	,003

a. Wilcoxon Signed Ranks Test

b. Based on negative ranks.

TABLE 5.77: Mixed Supplier Teams - Wilcoxon Test Statistics

The result of the t-test shows that the evaluation (mean score = 3.44, standard deviation = 1.082) was higher than the neutral evaluation (see table 5.78). Furthermore, the t-test calculates a two-sided p-value of <0.02, which results in p <0.01 for the one-sided test (see table 5.79). Therefore, the mean evaluation for mixed supplier teams is significantly higher than the neutral evaluation. The results of the parametric t-test therefore confirm the results of the nonparametric Wilcoxon signed-rank test. According to both statistical tests, mixed supplier teams increase the quality of forced coopetition relations.

One-Sample Statistics

	N	Mean	Std. Deviation	Std. Error Mean
Mixed Supplier Teams	64	3,44	1,082	,135

TABLE 5.78: Mixed Supplier Teams - t-test Statistics

One-Sample Test

	Test Value = 3					
					95% Confidence Interval of the Difference	
	t	df	Sig. (2-tailed)	Mean Difference	Lower	Upper
Mixed Supplier Teams	3,235	63	,002	,438	,17	,71

TABLE 5.79: Mixed Supplier Teams - t-test Results

Both the Wilcoxon signed-rank test and t-test have shown that only the evaluation of mixed supplier teams differs in a statistically significant way from the neutral evaluation. Therefore, mixed supplier teams are considered critical success factors in forced coopetition relations. The remaining factors, on the other hand, are not considered critical success factors. Therefore, hypothesis 2 (H_2) is rejected.

5.6.3 H3: Management Commitment

Following H_3, it was expected that the factors related to management commitment would increase the quality of a forced coopetition relation in IT multi-sourcing projects. Consequently, this section will test each potential critical success factor to determine whether the evaluation is statistically speaking significantly different from the neutral evaluation.

The Wilcoxon signed-rank test shows that the evaluation for the long-term commitment of 41 respondents is higher than the neutral score (see table 5.80). Seventeen respondents gave a neutral evaluation, while the remaining 6 respondents a lower evaluation than the neutral score. The resulting p-value of the two-sided and consequently one-sided test is <0.05 (see table 5.81). This indicates with statistical significance that the observed median score of 4 differs from the neutral evaluation. On the basis of the Wilcoxon signed-rank test, it can therefore be concluded that long-term commitment increases the quality of forced coopetition relations in IT multi-sourcing projects.

Ranks

		N	Mean Rank	Sum of Ranks
Long Term Commitment - Neutral Evaluation	Negative Ranks	6[a]	20,00	120,00
	Positive Ranks	41[b]	24,59	1008,00
	Ties	17[c]		
	Total	64		

a. Long Term Commitment < Neutral Evaluation
b. Long Term Commitment > Neutral Evaluation
c. Long Term Commitment = Neutral Evaluation

TABLE 5.80: Long Term Commitment - Wilcoxon Ranks Table

Test Statistics [a]

	Long Term Commitment - Neutral Evaluation
Z	-5,065[b]
Asymp. Sig. (2-tailed)	,000

a. Wilcoxon Signed Ranks Test
b. Based on negative ranks.

TABLE 5.81: Long Term Commitment - Wilcoxon Test Statistics

The result of the t-test shows that the evaluation (mean score = 3.67, standard deviation = 0.818) was higher than the neutral evaluation (see table 5.82). Furthermore, the test calculates a p-value of <0.05 for both the two-sided and the one-sided test (see table 5.83). Therefore, the mean evaluation for long-term commitment is significantly higher than the neutral evaluation. The results of the parametric t-test therefore confirm the results of the nonparametric Wilcoxon signed-rank test. According to both statistical tests, long-term commitment increases the quality of forced coopetition relations.

One-Sample Statistics

	N	Mean	Std. Deviation	Std. Error Mean
Long Term Commitment	64	3,67	,818	,102

TABLE 5.82: Long Term Commitment - t-test Statistics

One-Sample Test

	Test Value = 3					
					95% Confidence Interval of the Difference	
	t	df	Sig. (2-tailed)	Mean Difference	Lower	Upper
Long Term Commitment	6,574	63	,000	,672	,47	,88

TABLE 5.83: Long Term Commitment - t-test Results

For management leadership, the Wilcoxon signed-rank test shows that the evaluation of 44 respondents is higher than the neutral score (see table 5.84). Fourteen respondents presented a neutral evaluation, the remaining 6 respondents a lower evaluation than the neutral score. The resulting p-value of the two-sided and consequently one-sided test is <0.05 (see table 5.85). This indicates with statistical significance that the observed median score of 4 is different from the neutral evaluation. On the basis of the Wilcoxon signed-rank test, it can therefore be concluded that management leadership increases the quality of forced coopetition relations in IT multi-sourcing projects.

Ranks

		N	Mean Rank	Sum of Ranks
Management Leadership - Neutral Evaluation	Negative Ranks	6[a]	14,00	84,00
	Positive Ranks	44[b]	27,07	1191,00
	Ties	14[c]		
	Total	64		

a. Management Leadership < Neutral Evaluation

b. Management Leadership > Neutral Evaluation

c. Management Leadership = Neutral Evaluation

TABLE 5.84: Management Leadership - Wilcoxon Ranks Table

Test Statistics [a]

	Management Leadership - Neutral Evaluation
Z	-5,516[b]
Asymp. Sig. (2-tailed)	,000

a. Wilcoxon Signed Ranks Test

b. Based on negative ranks.

TABLE 5.85: Management Leadership - Wilcoxon Test Statistics

The result of the t-test shows that the evaluation (mean score = 3.95, standard deviation = 0.983) was higher than the neutral evaluation (see table 5.86). Furthermore, the test calculates a p-value of <0.05 for both the two-sided and the one-sided test (see table 5.87). Therefore, the mean evaluation for management leadership is statistically significantly higher than the neutral evaluation. The results of the parametric t-test therefore confirm the results of the nonparametric Wilcoxon signed-rank test. According to both statistical tests, management leadership increases the quality of forced coopetition relations.

One-Sample Statistics

	N	Mean	Std. Deviation	Std. Error Mean
Management Leadership	64	3,95	,983	,123

TABLE 5.86: Management Leadership - t-test Statistics

One-Sample Test

	Test Value = 3					
					95% Confidence Interval of the Difference	
	t	df	Sig. (2-tailed)	Mean Difference	Lower	Upper
Management Leadership	7,758	63	,000	,953	,71	1,20

TABLE 5.87: Management Leadership - t-test Results

For duplicated management functions, the Wilcoxon signed-rank test shows that the evaluation of 13 respondents is higher than the neutral score (see table 5.88). Thirteen respondents returned a neutral evaluation, while the remaining 38 respondents gave an evaluation lower than the neutral score. The resulting p-value of the two-sided and one-sided test is <0.05 (see table 5.89). This indicates with statistical significance that the observed median score of 2 is lower than the neutral evaluation. On the basis of the Wilcoxon signed-rank test, it can therefore be concluded that the duplicated management functions do not increase the quality of forced coopetition relations in IT multi-sourcing projects.

Ranks

		N	Mean Rank	Sum of Ranks
Duplicated Management Functions - Neutral Evaluation	Negative Ranks	38[a]	27,05	1028,00
	Positive Ranks	13[b]	22,92	298,00
	Ties	13[c]		
	Total	64		

a. Duplicated Management Functions < Neutral Evaluation

b. Duplicated Management Functions > Neutral Evaluation

c. Duplicated Management Functions = Neutral Evaluation

TABLE 5.88: Duplicated Management Functions - Wilcoxon Ranks Table

Test Statistics [a]

	Duplicated Management Functions - Neutral Evaluation
Z	-3,602[b]
Asymp. Sig. (2-tailed)	,000

a. Wilcoxon Signed Ranks Test

b. Based on positive ranks.

TABLE 5.89: Duplicated Management Functions - Wilcoxon Test Statistics

The result of the t-test shows that the evaluation (mean score = 2.45, standard deviation = 1.083) was higher than the neutral evaluation (see table 5.90). Furthermore, the test calculates a p-value of <0.05 for both the two-sided and the one-sided test (see table 5.91). Therefore, the mean evaluation for duplicated management function is lower than the neutral evaluation in a statistically significant way. The results of the parametric t-test therefore confirm the results of the nonparametric Wilcoxon signed-rank test. According to both statistical tests, duplicated management functions do not increase the quality of forced coopetition relations.

One-Sample Statistics

	N	Mean	Std. Deviation	Std. Error Mean
Duplicated Management Functions	64	2,45	1,083	,135

TABLE 5.90: Duplicated Management Functions - t-test Statistics

One-Sample Test

	Test Value = 3					
					95% Confidence Interval of the Difference	
	t	df	Sig. (2-tailed)	Mean Difference	Lower	Upper
Duplicated Management Functions	-4,041	63	,000	-,547	-,82	-,28

TABLE 5.91: Duplicated Management Functions - t-test Results

For similar interests, the Wilcoxon signed-rank test shows that the evaluation of 32 respondents is higher than the neutral score (see table 5.92). Twenty-four respondents provided a neutral evaluation, and the remaining 8 respondents returned a lower evaluation than the neutral score. The resulting p-value of the two-sided and consequently one-sided test is <0.05 (see table 5.93). This indicates with statistical significance that the observed median score of 3.5 is different from the neutral evaluation. On the basis of the Wilcoxon signed-rank test, it can therefore be concluded that similar interests increase the quality of forced coopetition relations in IT multi-sourcing projects.

Ranks

		N	Mean Rank	Sum of Ranks
Similar Interests - Neutral Evaluation	Negative Ranks	8[a]	16,50	132,00
	Positive Ranks	32[b]	21,50	688,00
	Ties	24[c]		
	Total	64		

a. Similar Interests < Neutral Evaluation
b. Similar Interests > Neutral Evaluation
c. Similar Interests = Neutral Evaluation

TABLE 5.92: Similar Interests - Wilcoxon Ranks Table

Test Statistics [a]

	Similar Interests - Neutral Evaluation
Z	-3,995[b]
Asymp. Sig. (2-tailed)	,000

a. Wilcoxon Signed Ranks Test
b. Based on negative ranks.

TABLE 5.93: Similar Interests - Wilcoxon Test Statistics

The result of the t-test shows that the evaluation (mean score = 3.50, standard deviation = 0.873) was higher than the neutral evaluation (see table 5.94). Furthermore, the test calculates a p-value of <0.05 for both the two-sided and the one-sided test (see table 5.95). Therefore, the mean evaluation for similar interests is significantly higher than the neutral evaluation. The results of the parametric t-test therefore confirm the results of the nonparametric Wilcoxon signed-rank test. According to both statistical tests, similar interests increase the quality of forced coopetition relations.

One-Sample Statistics

	N	Mean	Std. Deviation	Std. Error Mean
Similar Interests	64	3,50	,873	,109

TABLE 5.94: Similar Interests - t-test Statistics

One-Sample Test

	Test Value = 3					
					95% Confidence Interval of the Difference	
	t	df	Sig. (2-tailed)	Mean Difference	Lower	Upper
Similar Interests	4,583	63	,000	,500	,28	,72

TABLE 5.95: Similar Interests - t-test Results

In sum, both the Wilcoxon signed-rank test and t-test have shown that the study evaluations for management leadership, long-term commitment, and similar interests are different from the neutral evaluation in a statistically significant way. Therefore, these factors are considered critical to the success of forced coopetition relations. The use of duplicated management functions, on the other hand, is not considered a critical success factor. Therefore, hypothesis 3 (H_3) is rejected.

5.6.4 H4: Relationship Development

Following H_4, it is expected that the factors related to relationship development would increase the quality of a forced coopetition relation in IT multi-sourcing projects. Consequently, this section will test each potential critical success factor in order to determine whether the evaluation is statistically significantly different from the neutral evaluation.

The Wilcoxon signed-rank test shows that the evaluation for trust of 55 respondents is higher than the neutral score, while the remaining 9 respondents provided a neutral evaluation (see table 5.96). The resulting p-value of the two-sided and consequently one-sided test is <0.05 (see table 5.97). This indicates with statistical significance that the observed median score of 5 is different from the neutral evaluation. On the basis of the Wilcoxon signed-rank test, it can therefore be concluded that trust increases the quality of forced coopetition relations in IT multi-sourcing projects.

Ranks

		N	Mean Rank	Sum of Ranks
Development of Trust - Neutral Evaluation	Negative Ranks	0[a]	0,00	0,00
	Positive Ranks	55[b]	28,00	1540,00
	Ties	9[c]		
	Total	64		

a. Development of Trust < Neutral Evaluation

b. Development of Trust > Neutral Evaluation

c. Development of Trust = Neutral Evaluation

TABLE 5.96: Development of Trust - Wilcoxon Ranks Table

Test Statistics [a]

	Development of Trust - Neutral Evaluation
Z	-6,720[b]
Asymp. Sig. (2-tailed)	,000

a. Wilcoxon Signed Ranks Test

b. Based on negative ranks.

TABLE 5.97: Development of Trust - Wilcoxon Test Statistics

The result of the t-test shows that the evaluation (mean score = 4.42, standard deviation = 0.73) was higher than the neutral evaluation (see table 5.98). Furthermore, the test calculates a p-value of <0.05 for both the two-sided and the one-sided test (see table 5.99). Therefore, the mean evaluation for trust is higher than the neutral evaluation in a statistically significant way. The results of the parametric t-test therefore confirm the results of the nonparametric Wilcoxon signed-rank test. According to both statistical tests, trust increases the quality of forced coopetition relations.

One-Sample Statistics

	N	Mean	Std. Deviation	Std. Error Mean
Development of Trust	64	4,42	,730	,091

TABLE 5.98: Development of Trust - t-test Statistics

One-Sample Test

	Test Value = 3					
					95% Confidence Interval of the Difference	
	t	df	Sig. (2-tailed)	Mean Difference	Lower	Upper
Development of Trust	15,574	63	,000	1,422	1,24	1,60

TABLE 5.99: Development of Trust - t-test Results

For knowledge sharing, the Wilcoxon signed-rank test shows that the evaluation of 46 respondents is higher than the neutral score (see table 5.100). Fourteen respondents gave a neutral evaluation, and the remaining 4 respondents provided a lower evaluation than the neutral score. The resulting p-value of the two-sided and consequently one-sided test is <0.05 (see table 5.101). This indicates with statistical significance that the observed median score of 4 differs from the neutral evaluation. On the basis of the Wilcoxon signed-rank test, it can therefore be concluded that knowledge sharing increases the quality of forced coopetition relations in IT multi-sourcing projects.

Ranks

		N	Mean Rank	Sum of Ranks
Knowledge Sharing - Neutral Evaluation	Negative Ranks	4[a]	17,50	70,00
	Positive Ranks	46[b]	26,20	1205,00
	Ties	14[c]		
	Total	64		

a. Knowledge Sharing < Neutral Evaluation

b. Knowledge Sharing > Neutral Evaluation

c. Knowledge Sharing = Neutral Evaluation

TABLE 5.100: Knowledge Sharing - Wilcoxon Ranks Table

Test Statistics[a]

	Knowledge Sharing - Neutral Evaluation
Z	-5,724[b]
Asymp. Sig. (2-tailed)	,000

a. Wilcoxon Signed Ranks Test

b. Based on negative ranks.

TABLE 5.101: Knowledge Sharing - Wilcoxon Test Statistics

The result of the t-test shows that the evaluation (mean score = 3.91, standard deviation = 0.849) was higher than the neutral evaluation (see table 5.102). Furthermore, the test calculates a p-value of <0.05 for both the two-sided and the one-sided test (see table 5.103). Therefore, the mean evaluation for knowledge sharing is higher than the neutral evaluation in a statistically significant way. The results of the parametric t-test therefore confirm the results of the nonparametric Wilcoxon signed-rank test. According to both statistical tests, knowledge sharing increases the quality of forced coopetition relations.

One-Sample Statistics

	N	Mean	Std. Deviation	Std. Error Mean
Knowledge Sharing	64	3,91	,849	,106

TABLE 5.102: Knowledge Sharing - t-test Statistics

One-Sample Test

	Test Value = 3					
					95% Confidence Interval of the Difference	
	t	df	Sig. (2-tailed)	Mean Difference	Lower	Upper
Knowledge Sharing	8,537	63	,000	,906	,69	1,12

TABLE 5.103: Knowledge Sharing - t-test Results

For personal relationships, the Wilcoxon signed-rank test shows that the evaluation of 56 respondents is higher than the neutral score, and the remaining 8 respondents provided a neutral evaluation (see table 5.104). The resulting p-value of the two-sided and consequently one-sided test is <0.05 (see table 5.105). This indicates with statistical significance that the observed median score of 5 differs from the neutral evaluation. On the basis of the Wilcoxon signed-rank test, it can therefore be concluded that personal relationships increase the quality of forced coopetition relations in IT multi-sourcing projects.

Ranks

		N	Mean Rank	Sum of Ranks
Personal Relationship - Neutral Evaluation	Negative Ranks	0[a]	0,00	0,00
	Positive Ranks	56[b]	28,50	1596,00
	Ties	8[c]		
	Total	64		

a. Personal Relationship < Neutral Evaluation
b. Personal Relationship > Neutral Evaluation
c. Personal Relationship = Neutral Evaluation

TABLE 5.104: Personal Relationships - Wilcoxon Ranks Table

Test Statistics [a]

	Personal Relationship - Neutral Evaluation
Z	-6,771[b]
Asymp. Sig. (2-tailed)	,000

a. Wilcoxon Signed Ranks Test
b. Based on negative ranks.

TABLE 5.105: Personal Relationships - Wilcoxon Test Statistics

The result of the t-test shows that the evaluation (mean score = 4.44, standard deviation = 0.710) was higher than the neutral evaluation (see table 5.106). Furthermore, the test calculates a p-value of <0.05 for both the two-sided and the one-sided test (see table 5.107). Therefore, the mean evaluation for personal relationships is higher than the neutral evaluation in a statistically significant way. The results of the parametric t-test therefore confirm the results of the nonparametric Wilcoxon signed-rank test. According to both statistical tests, personal relationships increase the quality of forced coopetition relations.

One-Sample Statistics

	N	Mean	Std. Deviation	Std. Error Mean
Personal Relationship	64	4,44	,710	,089

TABLE 5.106: Personal Relationships - t-test Statistics

One-Sample Test

	Test Value = 3					
					95% Confidence Interval of the Difference	
	t	df	Sig. (2-tailed)	Mean Difference	Lower	Upper
Personal Relationship	16,199	63	,000	1,438	1,26	1,61

TABLE 5.107: Personal Relationships - t-test Results

In sum, both the Wilcoxon signed-rank test and t-test have shown that the study evaluations differ from the neutral evaluation in a statically significant way for all factors related to relationship development. In line with business research, the p-value of both statistical tests is below the maximum value of $p < 0.05$ (Bernard, 2013; Bryman & Bell, 2015). Hence, the sample considers trust, knowledge sharing, and personal relationships critical success factors in forced coopetition relations. Therefore, hypothesis 4 (H_4) is accepted in the context of this research.

5.6.5 H5: Communication Management

Following H_5, it is expected that the factors related to communication management would increase the quality of forced coopetition in IT multi-sourcing projects. Consequently, this section will test each potential critical success factor in order to determine whether the evaluation differs from the neutral evaluation in a statistically significant way.

The Wilcoxon signed-rank test shows that the evaluation for collaborative software given by 35 respondents is higher than the neutral score (see table 5.108). Twenty-four respondents provided a neutral evaluation, the remaining 5 respondents a lower evaluation than the neutral score. The resulting p-value of the two-sided and consequently one-sided test is <0.05 (see table 5.109). This indicates with statistical significance that the observed median score of 4 is different from the neutral evaluation. On the basis of the Wilcoxon signed-rank test, it can therefore be concluded that collaborative software increases the quality of forced coopetition relations in IT multi-sourcing projects.

Ranks

		N	Mean Rank	Sum of Ranks
Collaborative Software - Neutral Evaluation	Negative Ranks	5[a]	17,00	85,00
	Positive Ranks	35[b]	21,00	735,00
	Ties	24[c]		
	Total	64		

a. Collaborative Software < Neutral Evaluation

b. Collaborative Software > Neutral Evaluation

c. Collaborative Software = Neutral Evaluation

TABLE 5.108: Collaborative Software - Wilcoxon Ranks Table

Test Statistics [a]

	Collaborative Software - Neutral Evaluation
Z	-4,701[b]
Asymp. Sig. (2-tailed)	,000

a. Wilcoxon Signed Ranks Test

b. Based on negative ranks.

TABLE 5.109: Collaborative Software - Wilcoxon Test Statistics

The result of the t-test shows that the evaluation (mean score = 3.58, standard deviation = 0.793) was higher than the neutral evaluation (see table 5.110). Furthermore, the test calculates a p-value of <0.05 for both the two-sided and the one-sided test (see table 5.111). Therefore, the mean evaluation for collaborative software is significantly higher than the neutral evaluation. The results of the parametric t-test therefore confirm the results of the nonparametric Wilcoxon signed-rank test. According to both statistical tests, collaborative software increases the quality of forced coopetition relations.

One-Sample Statistics

	N	Mean	Std. Deviation	Std. Error Mean
Collaborative Software	64	3,58	,793	,099

TABLE 5.110: Collaborative Software - t-test Statistics

One-Sample Test

	Test Value = 3					
					95% Confidence Interval of the Difference	
	t	df	Sig. (2-tailed)	Mean Difference	Lower	Upper
Collaborative Software	5,833	63	,000	,578	,38	,78

TABLE 5.111: Collaborative Software - t-test Results

For conflict management systems, the Wilcoxon signed-rank test shows that the evaluation of 19 respondents is higher than the neutral score (see table 5.112). Twenty-nine respondents presented a neutral evaluation, the remaining 16 respondents a lower evaluation than the neutral score. The resulting p-value of the two-sided test is 0.114 and, therefore 0.057 for the one-sided test (see table 5.113). This indicates that the observed median score of 3 is not different from the neutral evaluation. On the basis of the Wilcoxon signed-rank test, it can therefore be concluded that the conflict management systems do not increase the quality of forced coopetition relations in IT multi-sourcing projects.

Ranks

		N	Mean Rank	Sum of Ranks
Conflict Management Systems - Neutral Evaluation	Negative Ranks	16[a]	14,00	224,00
	Positive Ranks	19[b]	21,37	406,00
	Ties	29[c]		
	Total	64		

a. Conflict Management Systems < Neutral Evaluation

b. Conflict Management Systems > Neutral Evaluation

c. Conflict Management Systems = Neutral Evaluation

TABLE 5.112: Conflict Management Systems - Wilcoxon Ranks Table

Test Statistics [a]

	Conflict Management Systems - Neutral Evaluation
Z	-1,582[b]
Asymp. Sig. (2-tailed)	,114

a. Wilcoxon Signed Ranks Test

b. Based on negative ranks.

TABLE 5.113: Conflict Management Systems - Wilcoxon Test Statistics

The result of the t-test shows that the evaluation (mean score = 3.17, standard deviation = 0.952) was higher than the neutral evaluation (see table 5.114). Furthermore, the t-test calculates a two-sided p-value of 0.154, which results in p = 0.077 for the one-sided test (see table 5.115). Therefore, the mean evaluation for conflict management systems is not higher than the neutral evaluation. The results of the parametric t-test therefore confirm the results of the nonparametric Wilcoxon signed-rank test. According to both statistical tests, the conflict management systems do not increase the quality of forced coopetition relations.

One-Sample Statistics

	N	Mean	Std. Deviation	Std. Error Mean
Conflict Management Systems	64	3,17	,952	,119

TABLE 5.114: Conflict Management Systems - t-test Statistics

One-Sample Test

	Test Value = 3					
					95% Confidence Interval of the Difference	
	t	df	Sig. (2-tailed)	Mean Difference	Lower	Upper
Conflict Management Systems	1,444	63	,154	,172	-,07	,41

TABLE 5.115: Conflict Management Systems - t-test Results

Regarding capabilities of the Project Manager, the Wilcoxon signed-rank test shows that the evaluation of 59 respondents is higher than the neutral score (see table 5.116). Four respondents provided a neutral evaluation, and one respondent gave an evaluation lower than the neutral score. The resulting p-value of the two-sided and consequently one-sided test is <0.05 (see table 5.117). This indicates with statistical significance that the observed median score of 5 is different from the neutral evaluation. On the basis of the Wilcoxon signed-rank test, it can therefore be concluded that the capabilities of the Project Manager increase the quality of forced coopetition relations in IT multi-sourcing projects.

Ranks

		N	Mean Rank	Sum of Ranks
Project Manager Capabilities - Neutral Evaluation	Negative Ranks	1[a]	10,00	10,00
	Positive Ranks	59[b]	30,85	1820,00
	Ties	4[c]		
	Total	64		

a. Project Manager Capabilities < Neutral Evaluation

b. Project Manager Capabilities > Neutral Evaluation

c. Project Manager Capabilities = Neutral Evaluation

TABLE 5.116: Project Manager Capabilities - Wilcoxon Ranks Table

Test Statistics [a]

	Project Manager Capabilities - Neutral Evaluation
Z	-6,967[b]
Asymp. Sig. (2-tailed)	,000

a. Wilcoxon Signed Ranks Test

b. Based on negative ranks.

TABLE 5.117: Project Manager Capabilities - Wilcoxon Test Statistics

The result of the t-test shows that the evaluation (mean score = 4.55, standard deviation = 0.688) was higher than the neutral evaluation (see table 5.118). Furthermore, the test calculates a p-value of <0.05 for both the two-sided and the one-sided test (see table 5.119). Therefore, the mean evaluation for management leadership is statistically speaking significantly higher than the neutral evaluation. The results of the parametric t-test therefore confirm the results of the nonparametric Wilcoxon signed-rank test. According to both statistical tests, management leadership increases the quality of forced coopetition relations.

One-Sample Statistics

	N	Mean	Std. Deviation	Std. Error Mean
Project Manager Capabilities	64	4,55	,688	,086

TABLE 5.118: Project Manager Capabilities - t-test Statistics

One-Sample Test

	Test Value = 3					
					95% Confidence Interval of the Difference	
	t	df	Sig. (2-tailed)	Mean Difference	Lower	Upper
Project Manager Capabilities	17,975	63	,000	1,547	1,37	1,72

TABLE 5.119: Project Manager Capabilities - t-test Results

The one-sample Wilcoxon signed-rank test and the one-sample t-test have shown that the use of collaborative software and the capabilities of the Project Manager are critical success factors. The responses for both factors are significantly greater than the hypothesised score. Furthermore, it can be concluded that the capability of the Project Manager is the most important critical success factor, followed by collaborative software. Conflict management systems, on the other hand, were not found to be a critical success factor in coopetition relations.

In sum, both the Wilcoxon signed-rank test and t-test have shown that the study evaluations for collaborative systems and the Project Managers' capabilities differ from the neutral evaluation in a statistically significant way. Therefore, these factors are considered to be critical success factors in forced coopetition relations. The use of conflict management systems, on the other hand, is not considered a critical success factor. Therefore, hypothesis 5 (H_5) is only partially accepted.

5.6.6 H6: Ranking of Critical Success Factor Cluster

Following H_6, it was expected that the prioritisation of the critical success factor clusters would differ in forced coopetition relations. Based on the data collected, the supplier management cluster is considered the most important cluster (mean = 3.47), followed by supplier selection (mean = 3.22), communication management (mean = 3), relationship development (mean = 2.83), and management commitment (mean = 2.48).

Even though the means provide a first impression of the ranking of the clusters, the descriptive statistics do not give an indication of the degree of statistical significance. As introduced earlier, the study applied the one-way Welch ANOVA in order to

determine if there is a significant difference in the distribution of the means between the clusters. Table 5.120 shows the results of the one-way Welch ANOVA for the five clusters under investigation. The calculated significance level is less than 0.05, hence it can be concluded that the means are significantly different. However, the ANOVA does not indicate the degree of statistical significance between the clusters.

Robust Tests of Equality of Means

	Statistic [a]	df1	df2	Sig.
Welch	4,555	4	157,229	,002

a. Asymptotically F distributed.

TABLE 5.120: Welch ANOVA Results

In order to analyse the difference between the critical success factor clusters, the study applies the Games-Howell post-hoc test for multiple comparisons (see table 5.121). The results of the Games-Howell test indicate that there is a statistically significant difference between the prioritisation of three clusters. In particular, there is a higher prioritisation of the supplier management cluster (mean = 3.47) and management commitment cluster (mean = 2.48) with a mean increase of 0.984 and a significance level of <0.05. Furthermore, the results show that there is a higher prioritisation of the supplier selection cluster (mean = 3.22) compared to the management commitment cluster (mean = 2.48) with a mean increase of 0.734 and a significance level of 0.023.

The comparisons of the remaining critical success factor clusters exceed the maximum level of statistical significance. Hence, the difference of the prioritisation between these clusters is not significant.

Multiple Comparisons

Dependent Variable: Prioritization
Games-Howell

(I) Cluster	(J) Cluster	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Supplier Management	Supplier Selection	,250	,227	,804	-,38	,88
	Management Commitment	,984*	,247	,001	,30	1,67
	Relationship Development	,641	,256	,098	-,07	1,35
	Communication Management	,469	,231	,260	-,17	1,11
Supplier Selection	Supplier Management	-,250	,227	,804	-,88	,38
	Management Commitment	,734*	,240	,023	,07	1,40
	Relationship Development	,391	,250	,524	-,30	1,08
	Communication Management	,219	,224	,866	-,40	,84
Management Commitment	Supplier Management	-,984*	,247	,001	-1,67	-,30
	Supplier Selection	-,734*	,240	,023	-1,40	-,07
	Relationship Development	-,344	,269	,704	-1,09	,40
	Communication Management	-,516	,245	,225	-1,19	,16
Relationship Development	Supplier Management	-,641	,256	,098	-1,35	,07
	Supplier Selection	-,391	,250	,524	-1,08	,30
	Management Commitment	,344	,269	,704	-,40	1,09
	Communication Management	-,172	,254	,961	-,88	,53
Communication Management	Supplier Management	-,469	,231	,260	-1,11	,17
	Supplier Selection	-,219	,224	,866	-,84	,40
	Management Commitment	,516	,245	,225	-,16	1,19
	Relationship Development	,172	,254	,961	-,53	,88

*. The mean difference is significant at the 0.05 level.

TABLE 5.121: Games-Howell Post-hoc Results

5.7 Hypotheses Testing Results

To make the analysis more robust, the study applies the nonparametric one-sample Wilcoxon signed-rank test as well as the parametric one-sample t-test in order to test each potential critical success factor. It is worth mentioning that the one-sample

Wilcoxon signed-rank test and the one-sample t-test yielded similar results. In sum, table 5.122 presents all the hypotheses tested and the results.

No.	Hypothesis	Implication
H_1	All factors related to supplier management increase the quality of a forced coopetition relation in IT multi-sourcing projects.	Hypothesis accepted
H_2	All factors related to supplier selection increase the quality of a forced coopetition relation in IT multi-sourcing projects	Hypothesis rejected
H_3	All factors related to management commitment increase the quality of a forced coopetition relation in IT multi-sourcing projects.	Hypothesis rejected
H_4	All factors related to relationship development increase the quality of a forced coopetition relation in IT multi-sourcing projects.	Hypothesis accepted
H_5	All factors related to communication management increase the quality of a forced coopetition relation in IT multi-sourcing projects.	Hypothesis rejected
H_6	The critical success factor clusters are not equally important in forced coopetition relations.	Hypothesis accepted

TABLE 5.122: List of hypotheses and results

Even though H_2, H_3, and H_5 were rejected, the corresponding clusters contain critical success factors for forced coopetition relations in IT multi-sourcing projects. The initially proposed conceptual framework described 17 potential critical success factors, grouped into five equally important clusters. As a result of the statistical tests, the number of critical success factors in forced coopetition relations was reduced to 13 (see figure 5.2). Furthermore, the study applied the one-way Welch ANOVA and a post-hoc comparison in order to analyse the ranking of critical success factor clusters. The results confirmed that the critical success factor clusters are not equally important. However, the test also revealed that only the rankings of supplier management and management commitment, as well as supplier selection and management commitment, are significantly different. The rankings of the remaining clusters are not significantly different.

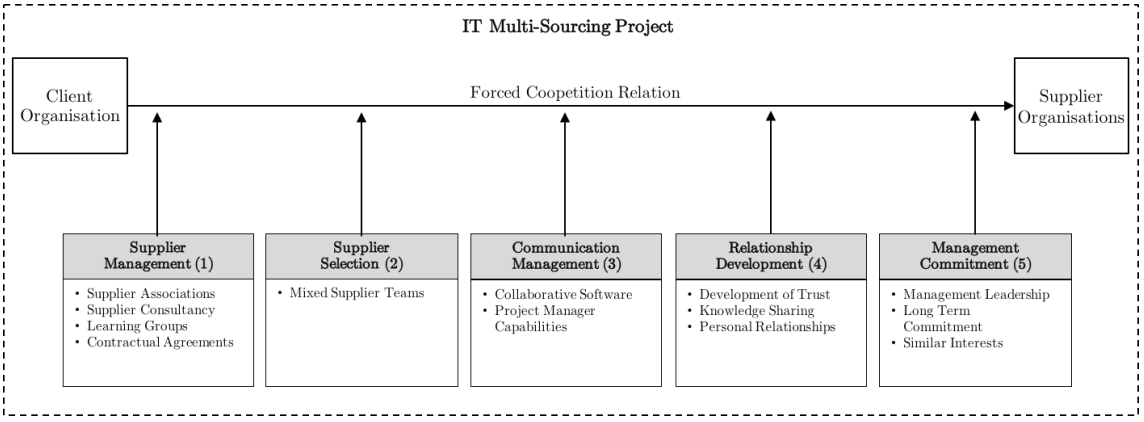

FIGURE 5.2: Critical Success Factor Framework

5.8 Summary

The first section of this chapter described the data collected and introduced the statistical procedures applied to the data. The second section applied descriptive statistics in order to present the data collected on the evaluation of the critical success factors. The following chapter will discuss the results of the hypothesis testing.

Chapter 6

Discussion of Results

6.1 Introduction

The previous chapter discussed the acceptance or rejection of each hypothesis individually. Based on the quantitative findings, this chapter discusses the implications of this study on forced coopetition relations in IT multi-sourcing projects. In accordance with the explanatory mixed method design adopted for this research, the discussion includes the results of the semi-structured interviews.

The remainder of this chapter is structured as follows. First, the chapter will discuss the evaluation of critical success factors. Second, the chapter will discuss the ranking of critical success factor clusters.

6.2 Supplier Management

The literature review identified four critical success factors related to supplier management that potentially increase the quality of forced coopetition relations in IT multi-sourcing projects. The factors are mainly identified from research projects which focused on the automotive or manufacturing industry (Richardson, 1993; Dyer & Nobeoka, 2000; Wilhelm, 2011).

First, the literature suggests initiating supplier associations with regular meetings in order to increase cooperation amongst suppliers. The applied statistical procedures support the importance of supplier associations in forced coopetition relations. From

both the Wilcoxon signed-rank test and t-test, it is clearly evident that the evaluation of supplier associations is significantly higher than the neutral evaluation, with a significant value less than 0.05. Furthermore, the median score of 4 indicates that respondents agreed with the statement that supplier associations are indeed a critical success factor in IT multi-sourcing projects. Hence, this finding is in line with Wilhelm (2011) or Dyer and Nobeoka (2000), who both focused their research on supplier networks of Toyota.

Interestingly, the perceptions of supplier associations differ depending on the type of organisation. Respondents from client organisations provided neutral feedback (median = 3), whereas the IT Project Managers from supplier organisations acknowledge the importance of supplier associations in forced coopetition relations (median = 4). The difference is due to the fact that IT Project Managers from client organisations do not benefit directly from such measures, as confirmed by respondent 1:

> *"As an IT Project Manager, I am typically not involved in activities of supplier associations. In fact, these meetings are organised by the purchasing department in order to share generic information on our IT project portfolio. Hence, my own IT project does not benefit from such measures."*
>
> *(IT Project Manager, Client Organisation)*

On the other hand, supplier organisations, benefit from this measure as they meet their rivals and receive valuable information on the client organisation and its project portfolio. Furthermore, respondent 4 emphasised the importance of face-to-face communication, which is in line with the arguments of Ilmo and Nahar (2010):

> *"Beside the communication on strategic initiatives, regular meetings with the client organisations are important to stay connected with the key persons of the client organisation."*
>
> *(Executive, Supplier Organisation)*

Nevertheless, it is important for the client organisation to find an appropriate level of frequency for meetings, as the interaction between the suppliers may increase rivalry and therefore be detrimental to a successful cooperative relationship (Kilduff et al., 2010).

Second, the literature argues that consultancy services offered by the client organisation support cooperation in supplier networks (Dyer & Nobeoka, 2000; Wilhelm,

2011). It is argued that consultancy services impart knowledge to supplier organisations regarding specifics about the client organisations. Furthermore, it is argued that consultancy services provide valuable insights about the supplier organisation, which can be used for supplier benchmarking.

Overall, this research emphasises the importance of consultancy services in forced coopetition relations with a median score of 4. Both the Wilcoxon signed-rank test and the t-test calculated a significance level of <0.05. Hence, the median score is greater than the neutral evaluation in a statistically significant way, and therefore consultancy services are considered to be a critical success factor in forced coopetition relations.

As with supplier associations, the evaluation of the factors differs between respondents from client and supplier organisations. Respondents from client organisation provided a neutral evaluation (median = 3), whereas IT Project Managers from supplier organisation consider consultancy services to be more important (median = 4). Again, this is not surprising, as this measure requires additional effort from the client organisation. In line with the other interviewees from a client organisation, respondent 2 stated that such additional effort is not foreseen in IT multi-sourcing projects:

> *"My organisation exclusively uses fixed-price contracts for multi-sourcing projects. The goal of such contracts is the purchase of predefined deliverables at a defined date. Additional internal effort such as consultancy services, which has not been agreed upon before project start, is difficult to implement due to missing budget."*
>
> *(IT Project Manager, Client Organisation)*

Supplier organisations, on the other hand, immediately benefit from such measures, because they gain knowledge on specifics about the client organisation. Below is a quote from respondent 6 of a supplier organisation:

> *"Especially in the initial phases of an IT project, consultancy services offered by the client organisation may improve the performance of the project team. Even though the project team has experience in the industry, not all team members are familiar with the special technical or organisational circumstances of the client organisation. In such cases, consultancy services by the client organisation are a valuable measure to avoid losing too much time."*
>
> *(Senior Managing Consultant, Supplier Organisation)*

In addition to the factor discussed above, the findings indicate that the use of learning groups is a critical success factor in forced coopetition relations (median score = 4). This finding is consistent with scholars who highlight the importance of regular workshops to foster a successful cooperation between partnering organisations (Eriksson, 2010; Ilmo & Nahar, 2010). On the other hand, Wilhelm (2011), argues that learning groups are especially valuable in supplier networks with non-competing suppliers. However, the above analysis shows with statistical significance that the existence of learning groups is also considered a critical success factor in forced coopetition relations with competing suppliers. In particular, the respondents from supplier organisations provided the highest evaluation for learning groups with a median score of 5. Compared to the findings by Wilhelm (2011), this is especially surprising, because supplier organisations seem to be open for learning groups with competing suppliers. In a similar vein, IT Project Managers from client organisations claimed that learning groups are important in forced coopetition relations (median score = 4). In line with the factors discussed above, there is a difference in the evaluation of learning groups between respondents from supplier and client organisations. According to respondent 5, this is due to doubts that competing suppliers are willing to openly share their knowledge in learning groups:

> *"Even though we have limited internal capacities, I expect great added-value from learning groups, mainly because such events provide the opportunity to get a common understanding of the project environment and requirements. However, I assume that suppliers are not willing to share key learnings with competing organisation in order to avoid losing their good position."*
>
> *(IT Project Manager, Client Organisation)*

In addition, the relevant literature discusses the role of contractual agreements in multi-sourcing projects. It is argued that additional contractual agreements are required in order to align individual contracts with suppliers in multi-sourcing projects

(Ilmo & Nahar, 2010). Furthermore, the literature outlines that contractual agreements define the supplier interaction in detail and therefore avoid conflicts between suppliers (Satzger & Kieninger, 2011; Wiener & Saunders, 2014b; Goldberg et al., 2015). However, other scholars argue that contractual agreements provide little help in coopetition relations causing further tensions in a multi-sourcing context (Fernandez et al., 2014; Lin, 2015).

In the context of this research project, the existence of contractual agreements is considered to be a critical success factor in forced coopetition relations. The inferential statistics show that the median score of 4 is significantly higher than the neutral evaluation; hence, the findings support the argument by Wiener and Saunders (2014b). Even though some client organisations use contractual agreements to put additional pressure on suppliers (Richardson, 1993), respondents from both organisational types provided an identical evaluation of this factor (median = 4). Respondent 4 confirmed that additional contractual agreements might support the collaboration between supplier organisations in long-term IT multi-sourcing projects:

> *"Additional contractual agreements are rather unusual in IT multi-sourcing projects. However, I consider such agreements useful especially in long-term projects in order to align service levels and to clarify responsibilities."*
>
> *(Executive, Supplier Organisation)*

IT Project Managers from client organisations highlight that the use of specific contractual agreements depends on the cooperation of the internal purchasing or legal department:

> *"The use of project-specific contractual agreements is a good way to align the suppliers in an IT multi-sourcing project. However, the use of such agreements requires the involvement of our purchasing or legal department, and is therefore difficult to realise."*
>
> *(IT Project Manager, Client Organisation)*

In sum, the respondents from both client and supplier organisations confirm the quantitative results from the survey. However, the statements show that IT Project Managers from client organisations may exhibit rather short-term thinking. Only those factors that provide an immediate benefit to their own IT multi-sourcing project were considered critical in forced coopetition relations. The interviews further indicate that this is due to the involvement of other departments of the client

organisation in the supplier management process. For instance, the experts mentioned that the purchasing department is responsible for contractual agreements or has regular meetings with supplier organisations without the involvement of the IT Project Managers. According to the respondents, this functional separation makes it difficult to implement the discussed measures. Furthermore, the discussion showed that client organisations only have limited internal capacities and appear to be inflexible during a project.

Two suggestions for client organisations can be deduced from this study. First, a closer alignment of the supplier-facing departments could facilitate the use of supplier associations and contractual agreements. Additionally, a more flexible capacity planning is suggested in order to facilitate the use of consultancy services. This suggestion is supported by the responses from supplier organisations, which indicate that any form of interaction with the client organisation and other competing suppliers is considered to be critical to the success of a forced coopetition relationship.

6.3 Supplier Selection

The similarity of supplier capabilities is the most widely discussed factor related to the supplier selection process (Morris et al., 2007; Gnyawali & Park, 2011; Soderberg et al., 2013; Tidström, 2014; Wiener & Saunders, 2014b). It is argued that a similarity in resources or technology paves the way to a successful knowledge sharing and therefore fosters cooperation between different organisations (Sarker et al., 2012; Goldberg et al., 2015). However, other scholars argue that similarities between organisations may also result in tensions due to conflicting interests (Tidström, 2014). The study results neither confirmed nor rejected the importance of similar capabilities in forced coopetition relations. The respondents from both client and supplier organisations provided neutral feedback with a median score of 3. In a similar vein, the inferential statistics confirmed that the median score does not significantly differ from the neutral evaluation.

In line with the quantitative results, the interviews neither confirm nor reject the importance of similar supplier capabilities in forced coopetition relations. The following quotation from respondent 1 highlights that similar supplier capabilities may increase the quality of the project due to the resulting competitive situation:

> *"Having multiple suppliers with similar capabilities in the same IT project simplifies their cooperation, but at the same time creates a competitive situation. This situation might be beneficial for the overall project quality and therefore for the client organisation."*
>
> *(IT Project Manager, Client Organisation)*

Hence, the respondent follows the argument by Goldberg et al. (2015), who states that similar supplier capabilities are required to successfully share knowledge between the supplier organisations. However, other respondents from client organisations regard similar supplier capabilities as rather negative in forced coopetition relations. Respondent 2 stated the following:

> *"Suppliers with similar capabilities tend to criticise the results of each other in order to recommend themselves for future projects. Ultimately, this reduces the speed of projects and creates tensions between the suppliers."*
>
> *(IT Project Manager, Client Organisation)*

However, the interviews with respondents from supplier organisations paint a different picture. According to their feedback, similar supplier capabilities are rather negative in forced coopetition relations. The following quotation from respondent 3 states that suppliers with similar capabilities result in tensions within the project:

> *"Cooperation with competitors that have similar capabilities is always difficult. Without an appropriate management of the supplier cooperation by the client organisation, tensions between the suppliers are inevitable on the project level."*
>
> *(Management Consultant, Supplier Organisation)*

The quote confirms the argument by Fang et al. (2011), who emphasises the importance of a balanced relationship to avoid tension in coopetition.

In sum, the results indicate that similar supplier capabilities are not a critical success factor in forced coopetitive relations. However, if a client organisation decides to consider this factor during the supplier selection process, then emphasising on proper project management capabilities is suggested in order to avoid tensions.

In line with the above-discussed factor, the descriptive and inferential statistics revealed that supplier size is not considered to be a critical success factor in forced coopetition relations. With a median score of 3, respondents from both client and

supplier organisations considered the supplier size to be a rather neutral factor in IT multi-sourcing projects. Therefore, the quantitative findings do not support the arguments of Wilhelm (2011), Thomason et al. (2013), and Tidström (2009) for IT multi-sourcing projects. Their research findings indicate that unequally distributed resources in coopetitive relationships have an impact on the network position of organisations and therefore on the balance and division of power. However, respondent 5 alludes that an equal supplier size is especially important in the initial project phase:

> *"The initial phases of an IT Project, in particular the conceptual phases, are characterised by intense discussions on the architecture of an IT system. In my experience, smaller suppliers often shy away from conflicts with larger competitors, which may result in poor decisions for the overall project."*
>
> *(IT Project Manager, Client Organisation)*

Respondent 1 continued that smaller supplier organisations have challenges scaling up the project team if needed:

> *"Our projects are characterised by tight schedules and a volatile project scope. In order to meet the milestones, our suppliers are sometimes required to extend the project team with additional resources, which is challenging for smaller organisations and, therefore, a risk for the project's success."*
>
> *(IT Project Manager, Client Organisation)*

However, the interviewees from supplier organisations argue that supplier size is not a critical success factor in forced coopetition relations, as confirmed by the quote below:

> *"Having worked for both small and larger consulting organisations, I have never had the impression that the supplier size affects the coopetitive situation. In the end, the success of a multi-sourcing project depends on the client organisation's ability to manage and integrate the different suppliers."*
>
> *(Executive, Supplier Organisation)*

In sum, there are mixed views whether the supplier size is considered a critical success factor in forced coopetition relations. However, the quantitative results indicate that it is a neutral factor, and therefore should be considered to some extent during the supplier selection process.

The use of mixed supplier teams is the only factor within the supplier selection cluster, which is considered to be a critical in a forced coopetitive relationships. Both the Wilcoxon signed-rank test and the t-test confirmed the evaluation is significantly higher than the neutral score. The results therefore confirm the argument by Wiener and Saunders (2014b), who claim that mixed-supplier teams dedicated to the same task foster the cooperation between suppliers. However, the evaluation differs depending on the type of organisation. Interestingly, respondents from supplier organisations consider mixed supplier teams in forced coopetition relations to be more important (median = 4) than client organisations (median = 3). According to respondent 1, the difference in evaluation is caused by difficulties in the identification of the responsible supplier in case of failure, which is in line with Aron and Singh (2005):

> *"Due to the use of fixed price contracts with predefined deliverables for each supplier, it is almost impossible to use mixed supplier teams for the same task due to warranty aspects."*
>
> *(IT Project Manager, Client Organisation)*

However, respondent 2 mentioned that the client organisation benefited from mixed supplier teams due to complementary skills:

> *"We can benefit from mixed supplier teams, because we can get the best out of each supplier for our projects."*
>
> *(IT Project Manager, Client Organisation)*

The above view was also echoed by interviewees from a supplier organisation and is confirmed by the quote below. The following quotation from respondent 6 highlights that the use of mixed supplier teams provides best-of-breed results for IT multi-sourcing projects:

> *"In times of an increasing number of fixed-price contracts, mixed supplier teams are difficult to realise even though these teams are able to provide the best-of-breed solution for the client."*
>
> *(Senior Managing Consultant, Supplier Organisation)*

Based on these observations as well as the quantitative results it can be concluded that mixed supplier teams increase the quality of forced coopetition relations. However, the interviews show that fixed-price contracts limit the use of mixed supplier teams.

In sum, the results of the interviews partially reflect the results from the quantitative analysis. Whereas the survey yielded a neutral evaluation for the existence of similar supplier capabilities, the interviews paint a different picture. In particular, the interviewees from supplier organisations mentioned that similar supplier capabilities cause tensions and are therefore rather negative in a forced coopetition relationship. The supplier size, on the other hand, was considered to be a rather neutral factor, and this is shown by both the quantitative and qualitative results. Based on the findings, it can be suggested that mixed supplier teams increase the quality of forced coopetitive relations, but the use of this measure is limited by fixed price contracts.

6.4 Management Commitment

The literature review identified four potential critical success factors related to the management commitment cluster. According to the research findings by Chin et al. (2008), the existence of management leadership is the most important factor for traditional coopetition relations in Hong Kong manufacturing. The applied statistical procedures emphasise the importance of management leadership in forced coopetition relations. From both the Wilcoxon signed-rank test and the t-test, it is clearly evident that the existence of management leadership is considered a critical success factor in forced coopetition relations, with a significance value of <0.05. The median scores from respondents from both client and supplier organisations are identical (median = 4) and thereby confirm the research findings from Wen-li et al. (2003) and Humphreys et al. (2004), who emphasised the importance of management support in supplier networks. This view was also echoed by respondent 5:

> *"From my experience, the performance of a supplier project team heavily depends on the commitment and leadership of their management. Without support of the suppliers' management, project teams often seem unmotivated."*
>
> *(IT Project Manager, Client Organisation)*

Also, the interviewees from supplier organisations confirm that management leadership is a critical success factor in forced coopetition relations. This is in line with Soderberg et al. (2013), who emphasises the importance of management commitment of the supplier organisation:

> *"Our project teams are usually working long hours. It is therefore important to regularly motivate them and to show them my support."*
>
> *(Executive, Supplier Organisation)*

In addition to management leadership, literature suggests that long-term commitment is crucial for the success of coopetition relations (Ilmo & Nahar, 2010). This argument is confirmed by the above analysis, which indicates that both supplier and client organisations consider long-term commitment a critical success factor in forced coopetition relations ($p < 0.05$). In this regard, one interviewee even argued that a long-term commitment of both client and supplier organisation takes the inter-organisational relationship to another level:

> *"Knowing that we are partnering with the client over a longer period of time is not just an economic benefit for us. Rather, we are able to solve the client's challenges in a sustainable way."*
>
> *(Senior Managing Consultant, Supplier Organisation)*

In a similar vein, respondent 2 from a client organisation argues that suppliers act in a more sustainable way if there is a long-term commitment between the organisations:

> *"Suppliers that have a long history in our organisation are usually interested in more sustainable solutions. In addition, these suppliers add value to our projects, as they are familiar with our business processes."*
>
> *(IT Project Manager, Client Organisation)*

In addition, the relevant literature suggests that conflicting interests hinder a successful partnering between organisations (Sarker et al., 2012; Lessard, 2014; Lempinen & Rajala, 2014). This argument is consistent with the findings of the study at hand. Based on both the Wilcoxon signed-rank test and the t-test, the observed median score is significantly higher than the neutral evaluation ($p < 0.05$). In particular, the respondents from supplier organisations emphasised the importance of similar interests by the organisations involved in a forced coopetition relationship, whereas

IT Project Managers from client organisations provided a neutral evaluation. Consistent with Ilmo and Nahar (2010), and Goldberg et al. (2015), interviewees from supplier organisation emphasised the importance of similar interests in software development projects:

> *"Sometimes client organisations or competing suppliers have a hidden agenda, which may result in delays or inefficiencies. Therefore, I can absolutely confirm that the existence of similar interests is a critical success factor in IT multi-sourcing projects."*
>
> *(Management Consultant, Supplier Organisation)*

In a similar vein, respondent 1 confirmed that common goals and interests are critical for the success of IT multi-sourcing projects.

> *"I participated in a multi-sourcing project where one supplier was interested in using proprietary technology in order to make himself indispensable. These different interests resulted in a negative atmosphere in the project team, which ultimately affected the cooperation."*
>
> *(IT Project Manager, Client Organisation)*

In sum, the importance of management leadership, long-term commitment, and similar interests in forced coopetition relationships has been confirmed by the interviewees from both supplier and client organisations. Therefore, it is suggested that these factors be considered when undertaking a forced coopetition relationship.

In a recent publication, Le Roy and Fernandez (2015) suggest that the duplication of key managerial functions reduces tensions in coopetition relations. As a consequence, each role in the project organisation is represented by the client organisation and each supplier organisation. The results of this study suggest otherwise. The quantitative results instead support the argument of Goldberg et al. (2015), who claim that the duplication of management functions prevents clear accountabilities, and therefore is a rather negative factor in forced coopetition relations. Both the Wilcoxon signed-rank test and the t-test confirm with statistical significance that the evaluation is lower than the neutral score. Hence, it can be concluded that this factor is not considered to be a critical success factor in forced coopetition relations by respondents from both supplier and client organisations. In line with Ilmo and Nahar (2010), respondent 2 confirmed that duplicated management functions hinder

transparency in IT multi-sourcing projects. In addition, the interviewee even argued that the use of such measures would create additional tensions.

> *"The duplication of key managerial functions in an IT multi-sourcing project is unusual. However, I expect additional tensions in the project due to unclear accountabilities."*
>
> *(IT Project Manager, Client Organisation)*

In addition, respondent 5 outlined that duplicated management functions are not feasible in IT multi-sourcing projects, due to the use of fixed price contracts and the resulting option for suppliers to structure their projects teams as they wish:

> *"As the Project Manager, I am in close cooperation with all suppliers in a multi-sourcing project. Due to the use of fixed-price contracts, each supplier is able to individually decide on their size and structure of the project team. Therefore, I don't think that duplicated management functions are feasible in our projects."*
>
> *(IT Project Manager, Client Organisation)*

Respondent 6 stated that supplier organisations indeed have an internal counterpart to each managerial function of the client organisation. However, the respondent mentioned that these roles are rather general contact persons for the client organisation rather than actual members of the project teams.

> *"We have contact persons for each managerial function of the client organisation. However, these persons are working for several projects at the same time. Therefore, these roles do not contribute to the success of an individual project."*
>
> *(Senior Managing Consultant, Supplier Organisation)*

Overall, the feedback of the interviewees mirrors the results of the quantitative analysis. Apart from the duplication of key managerial functions in an IT multi-sourcing project, the remaining factors of the management commitment cluster are considered critical success factors in forced coopetition relations. Therefore, the results of the study follow the arguments in the literature. In particular, the existence of management leadership (Wen-li et al., 2003; Humphreys et al., 2004; Chin et al., 2008; Ilmo & Nahar, 2010; Soderberg et al., 2013), long-term commitment (Wen-li et al., 2003; Chin et al., 2008; Humphreys et al., 2004; Soderberg et al., 2013),

and similar interests of the involved organisation (Ilmo & Nahar, 2010; Sarker et al., 2012; Lessard, 2014; Lempinen & Rajala, 2014; Goldberg et al., 2015) are considered critical for the success of forced coopetition relations in IT multi-sourcing projects.

6.5 Relationship Development

The role of trust in coopetition relations is a frequently discussed success factor, especially for relations between client and supplier organisations (Johnston et al., 2004; García et al., 2016). Apart from the argument that trust is a precondition to engaging in coopetitive relations (Czakon & Czernek, 2016), literature claims that the level of trust correlates with overall performance (Zaheer et al., 1998; Soderberg et al., 2013), and level of innovation of such relationships (Bouncken & Fredrich, 2012). These arguments are confirmed by the above analysis. Both the Wilcoxon signed-rank test and t-test show that the evaluation is significantly higher than the neutral score. Hence, it can be concluded that trust is also a critical success factor for forced coopetition relations in IT multi-sourcing projects. This view is echoed by interviewees from both client and supplier organisations. Respondent 3 highlights that trust is a two-way relation:

> *"A lack of trust between the client and the supplier in any project is critical. Even though a supplier delivers services of high quality, the relationship is doomed to failure if the client does not trust the supplier and vice versa."*
>
> *(Management Consultant, Supplier Organisation)*

In a similar vein, the study confirms the argument that relationships on an inter-individual level are a critical success factor in forced coopetition relations. The inferential statistics show with statistical significance ($p < 0.05$) that both respondents from client and supplier organisations strongly agreed that personal relationships are critical for the success of IT multi-sourcing projects (median score = 5). Hence, the findings are in line with Tidström (2014) or Le Roy and Fernandez (2015), who argue that personal connections on a project level are critical for coopetition success. In addition, respondent 6 stated that there is an interdependency between the level of trust and the existence of personal relations within an IT multi-sourcing projects:

> *"A good relationship with a consultant from competing suppliers supports the cooperation within the project. However, such relations can only exist if there is a sufficient degree of trust between the organisations."*
>
> *(Senior Managing Consultant, Supplier Organisation)*

Echoing the arguments of Bengtsson et al. (2003), respondent 2 claimed that personal relationships facilitate cooperation in a forced coopetition and therefore may produce favourable outcomes for the client organisation.

> *"I can tell from my experience that good personal relations pay off during a project. People are more willing to help each other, which sometimes results in better solutions for us as a client organisation."*
>
> *(IT Project Manager, Client Organisation)*

In addition to the trust and personal relations, literature suggests that knowledge sharing is a critical success factor in coopetition relations (Sarker et al., 2012; Lempinen & Rajala, 2014). The statistical procedures applied support the importance of knowledge sharing in forced coopetitive relationships. From both the t-test and Wilcoxon signed-rank test, it is clearly evident that the evaluation of knowledge sharing is significantly higher than from neutral score, with a significant value of <0.05. Therefore, the median score of 4 indicates that knowledge sharing is indeed a critical success factor in IT multi-sourcing projects. However, the interviewees from both supplier and client organisations outlined that knowledge sharing is challenging in forced coopetition due to intellectual property rights, which is in line with Ding et al. (2012). According to Chiambaretto and Fernandez (2016), competitors protect the strategic core of their knowledge. In a similar vein, one expert from a supplier organisation explained that knowledge sharing is limited to areas which do not weaken the position of the individual supplier organisation in the IT multi-sourcing project:

> *"Sharing information with the client and competing organisations is important for the project's success. However, it gets complicated when you share too much information, which can make your organisation dispensable."*
>
> *(Executive, Supplier Organisation)*

Interestingly, respondents working for a client organisation have a different perception on knowledge sharing. All of them acknowledged the importance on knowledge

sharing in IT multi-sourcing projects, but mentioned at the same time that a working approach to share knowledge is difficult to realise:

> *"During the term of a project, we have little time to focus on activities related to knowledge management. This is mainly due to our need to reach the key milestones of the project."*
>
> *(IT Project Manager, Client Organisation)*

Respondent 5 added that knowledge sharing only makes sense for subject areas that are reusable for other projects.

> *"The use of knowledge management has to be decided for each project. From my experience, it obtains the best results for topics that can be reused by other projects and are therefore not too project-specific."*
>
> *(IT Project Manager, Client Organisation)*

In sum, the respondents from both client and supplier organisations confirmed the quantitative results of the survey. The factors of the relationship development cluster, namely trust, personal relationships, and knowledge sharing are considered to be critical success factors for forced coopetition relations in IT multi-sourcing projects. However, for knowledge management, experts from client organisations argue that it is difficult to realise knowledge sharing due to the limited capacities during the project. Therefore, it is suggested the usefulness of knowledge sharing be decided on a case by case basis. This is supported by Chiambaretto and Fernandez (2016) who propose a classification of knowledge before sharing it in coopetitive relations.

6.6 Communication Management

According to Ilmo and Nahar (2010), communication management in general is one of the most important factors for outsourcing software development projects. In line with this argument, the findings indicate that two factors, namely the use of collaborative software and the capabilities of the Project Manager, are critical for the success of a forced coopetition relationship.

Furthermore, the relevant literature suggests a wide range of tools to foster communication within a coopetitive relationship. Some arguments are of a general nature,

such as the use of communication management systems to improve the communication in supply chains (Wen-li et al., 2003; Humphreys et al., 2004). The findings of Ilmo and Nahar (2010) are more specific to IT projects. According to their research, the use of integrated tools and methods are critical for the success of software development projects with multiple suppliers. This argument was also confirmed by the IT Project Managers from both supplier and client organisations that were surveyed. The Wilcoxon signed-rank test shows that the evaluation of this factor is significantly higher ($p < 0.05$, median score = 4) than the neutral evaluation. Hence, the use of collaborative software is considered to be a critical success factor in IT multi-sourcing projects. One IT Project Manager argued that the use of such technology is becoming more important due to the use of geographically dispersed IT suppliers, as also confirmed by Oshri et al. (2011).

> *"Our IT projects are characterised by the intensive use of nearshore and offshore IT suppliers. It is normal that we work with teams from Romania, India or other offshore locations. Therefore, the use of effective collaborative tools is inevitable."*
>
> *(IT Project Manager, Client Organisation)*

In line with Eriksson (2010), respondent 2 stated that the use of collaborative tools simplifies the communication within the team. However, the respondents also highlighted that the availability of such tools is not sufficient. Instead, the project team must recognise the added value in order to use collaborative tools.

> *"In long-term projects with experienced teams, you can really see the benefit of collaborative tools as it increases the efficiency of communication. Nevertheless, the added value depends on the teams and their experience with such tools."*
>
> *(IT Project Manager, Client Organisation)*

For supplier organisations, the use of collaborative tools in IT multi-sourcing projects is essential, as these organisations have to communicate locally with the client organisation and competing suppliers, and at the same time with their nearshore teams. Respondent 4 therefore confirmed the argument by Bardhan et al. (2013), who claim that collaborative tools simplify the communication across organisational boundaries.

> *"One of the key activities of our Consultants is the communication with the local project team and the development team in Romania. I am confident that the use of collaborative tools reduces the communication effort so that our Consultants can focus on value-adding tasks."*
>
> *(Executive, Supplier Organisation)*

In a similar vein, the interviewees repeatedly pointed out that the Project Manager plays a key role in IT multi-sourcing projects. This is supported by Le Roy and Fernandez (2015) or Goldberg et al. (2015), who emphasise the importance of the Project Manager in a coopetition relationship in successfully integrating services from different organisations. The findings of this study confirm this argument. According to the results of the Wilcoxon signed-rank test, the observed evaluation is significantly higher that the neutral score ($p < 0.05$). Hence, it can be concluded that the capabilities of the Project Manager are a critical success factor in forced coopetition relations. This view is also echoed by respondents from both client and supplier organisations. In particular, respondent 1 describes how the Project Manager needs to be able to manage global teams:

> *"The cooperation with multiple external suppliers working in different locations requires the capability to manage these teams. In the end, I have to pull the strings for a successful project."*
>
> *(IT Project Manager, Client Organisation)*

The statement above is consistent with Ilmo and Nahar (2010), who claim that multi-sourcing software development projects require a Project Manager with a range of skills in order to successfully manage such projects. In this regard, respondent 6 provided a more drastic statement, which is in line with Fang et al. (2011).

> *"The Project Manager can make or break an IT multi-sourcing project. He must be able to lead distributed teams from competing suppliers. I am convinced that a project is more challenging without an appropriate level of authority, communication, and openness of the IT Project Manager."*
>
> *(Senior Managing Consultant, Supplier Organisation)*

Finally, the results of the IT Project Managers surveyed from both client and supplier organisation indicate that the use of conflict management systems is a rather neutral factor in forced coopetitive relations. This contradicts the argument of Chin

et al. (2008), who claim that conflict management systems are more important in coopetitive relations than collaborative software. With regard to multi-sourcing software development projects, Ilmo and Nahar (2010) also argue that conflict resolution techniques are required to cope with the problems of such projects. However, the respondents from client organisations instead support the results of the quantitative analysis. According to respondent 5, the use of conflict management techniques is rather unusual in practice.

> *"I am not aware of the existence or usage of conflict management systems for IT projects in our organisation."*
>
> *(IT Project Manager, Client Organisation)*

Respondents from supplier organisations have a different perception altogether. In line with Eriksson (2010), the use of conflict resolution techniques is required in forced coopetition relations due to the omnipresent existence of tensions. Below an example from respondent 3:

> *"Different interests of different suppliers may result in conflicts. I expect that special techniques to resolve these conflicts support a successful IT project."*
>
> *(Management Consultant, Supplier Organisation)*

Respondent 6 added that conflict management systems are used after a conflict caused by poor project management:

> *"From my experience, any form of conflict resolution technique was used after conflicts arose. I don't see this is a prerequisite in IT multi-sourcing projects if the Project Manager is doing a good job."*
>
> *(Senior Managing Consultant, Supplier Organisation)*

In sum, the above-cited respondents confirmed the quantitative results from the survey that the use of collaborative software and the capabilities of the Project Manager are critical success factors in forced coopetition relations. For the use of conflict management systems, the interviews with respondents from supplier organisations provide a different narrative than the quantitative results. Whereas the survey showed a rather neutral evaluation of this factor, the experts from supplier organisations argued that the use of conflict management systems can indeed support a successful IT multi-sourcing project.

6.7 Ranking of Critical Success Factor Clusters

All in all, the literature on coopetition has devoted very little attention to the ranking of critical success factor clusters. Chin et al. (2008) claimed that factors related to management commitment are most important in Hong Kong manufacturing, followed by relationship development, and communication management. With regard to IT multi-sourcing projects, the research of Ilmo and Nahar (2010) provides evidence that the communication management clusters followed by supplier selection are crucial for the success of outsourcing projects. The descriptive and inferential statistics of this study, however, paint a different picture than the arguments from Chin et al. (2008) or Ilmo and Nahar (2010). Based on the data collected, the supplier management cluster is considered to be the most important cluster (mean = 3.47), followed by supplier selection (mean = 3.22), communication management (mean = 3), relationship development (mean = 2.83), and management commitment (mean = 2.48).

In this regard, one expert from a client organisation argued that much of the project's success depends on the project staff and the management of the supplier teams. Therefore, an IT Project Manager emphasises the importance of supplier management in forced coopetition relations.

> *"Supplier Management is one of the most important task in multi-sourcing projects. A poor management of the project teams and the project staff has negative impact on the success of a project."*
>
> *(IT Project Manager, Client Organisation)*

In a similar vein, respondent 5 mentioned that the quality of the supplier teams plays an additional major role in multi-sourcing projects. However, the respondent also mentioned that all clusters are equally important for the success of forced coopetition relations:

> *"The project team has the major share in relation to the success of IT multi-sourcing projects. However, I consider all clusters important for the success of such relations."*
>
> *(IT Project Manager, Client Organisation)*

The above view was also echoed by respondents from supplier organisations, as confirmed by the reflection below, which highlights that in general all clusters are

equally important. Furthermore, the expert mentioned that the Project Manager has to prioritise the clusters and the subsequent critical success factors on an ad-hoc basis, dependent on the project situation:

> *"From my experience, it is quite difficult to identify the most important group of factors. In the end, the prioritisation depends on the project situation and therefore has to be defined and managed by the Project Manager."*
>
> *(Senior Managing Consultant, Supplier Organisation)*

In sum, the results of the quantitative analysis are partially support by the above quotes. Apart from the importance of supplier management, the respondents state that all clusters are equally important in forced coopetition relations or need to be prioritised depending on the situation of the project. Therefore, the findings do not confirm prior research that focused on traditional coopetition relations (Chin et al., 2008; Ilmo & Nahar, 2010). As a consequence, it is suggested that IT Project Managers from client organisations pay equal attention to all critical success factor clusters.

Chapter 7

Conclusions, Recommendations and Limitations

7.1 Introduction

The previous chapter integrated the quantitative and qualitative data to outline the overall research findings. This chapter concludes the study by presenting the key contributions to practice and theory with regard to forced coopetition relations in IT multi-sourcing projects. Furthermore, it reveals recommendations for IT Project Managers of client organisations to successfully manage such relations. Finally, this chapter presents the limitations of the study at hand, as well as suggestions for further research in the area of forced coopetition.

7.2 Aims and Objectives

This section demonstrates how the aims and objectives were individually achieved.

The first objective was to critically review existing literature in order to identify potential critical success factors of forced coopetition relations in IT multi-sourcing projects. Therefore, the literature review identified critical success factors from the relevant literature on coopetition that had been empirically established in other industries and project situations (see appendix A).

The second objective was to conduct primary research using quantitative and qualitative methods. This objective was met by the explanatory sequential mixed method approach with, unequal priority given to the quantitative data. In particular, the study applied a self-completion questionnaire to collect the quantitative data, which was then analysed using both parametric and nonparametric statistics. Based on these survey results, the study conducted semi-structured interviews to validate the findings with experts on IT multi-sourcing projects and forced coopetition relations. The results of both quantitative and qualitative methods were then integrated in the discussion sections of the study.

The third objective was to propose a framework outlining the critical success factors of forced coopetition relations. The resulting framework was presented in the analysis and findings after having been tested using a self-completion questionnaire and corresponding statistical procedures. The resulting framework contains the critical success factors which have been identified as statistically significant in forced coopetition relations. Furthermore, the framework ranks the critical success factor clusters in relation to their importance in IT multi-sourcing projects.

The fourth objective was to provide recommendations to practitioners in order to improve the management of forced coopetitive relations in IT multi-sourcing projects. This objective was met through the identification, statistical analysis, and discussion of critical success factors. Thus, the resulting framework can be used as a basis for the practitioners' management frameworks for IT multi-sourcing projects. This has the advantage that practitioners receive guidance as to which factors require special attention in order to successfully manage forced coopetition relations.

The achievement of the above-mentioned objectives contributes to the aim of the study, which was the evaluation of critical success factors for forced coopetition relations in IT multi-sourcing projects. This aim was fully met by conducting a quantitative survey and semi-structured interviews with IT Project Managers that are experienced in the management of IT Projects with multiple competing supplier organisations. Furthermore, the triangulation of methods ensured a robust data analysis and a high validity of the findings. The study further unveils that the area of forced coopetition is still under-researched. Even though this contribution adds additional depth to the existing literature, there are still several opportunities for additional research, which are outlined in the remainder of this chapter.

7.3 Academic Contribution

The literature review accounted for research on forced coopetition and the management of such relations available, even though the management of tensions in traditional coopetition relationships is under-researched (Dorn et al., 2016).

The study contributes to the body of literature on coopetition management, which argues that the stability in multi-sourcing projects is affected by the resulting tensions of forced coopetition relations (Pellegrin-Boucher et al., 2013; Fernandez et al., 2014; Tidström, 2014). However, prior research did not address drivers of coopetition and their consequences (Bengtsson & Raza-Ullah, 2016). The vast amount of existing literature focused on voluntarily initiated coopetitive relations, or sourcing arrangements in general (Bengtsson et al., 2003; Chin et al., 2008; Fernandez et al., 2014); only one study researched forced coopetition relations in IT (Wiener & Saunders, 2014b). Hence, there is no research available that describes these particular critical success factors respective to this field.

The aim of this research was to fill this knowledge gap. This aim has been met by providing a framework that describes the factors that are critical for the success of forced coopetition relations in IT multi-sourcing projects (see figure 7.1). In this area, the study contributes empirically tested results to the existing body of knowledge.

First, the study provides an overview of coopetition management approaches, resulting tensions, and factors that are particularly important in traditional coopetition relations. Second, the study enriches the understanding of forced coopetition relations and their role in IT multi-sourcing projects. Based on quantitative and qualitative methods, the study provides evidence on factors that are critical for the success of forced coopetition relations. The findings show that traditional and forced coopetition relations do not have an identical set of critical success factors.

This is due to the fact that a client organisation forces supplier organisations to cooperate, and therefore change the dynamics of traditional coopetition relations. The data gathered through this study results in a framework, which provides a series of key factors to focus on when implementing forced coopetition relationships. This framework can now be tested by Project Managers from other industries and therefore provide the basis for further research.

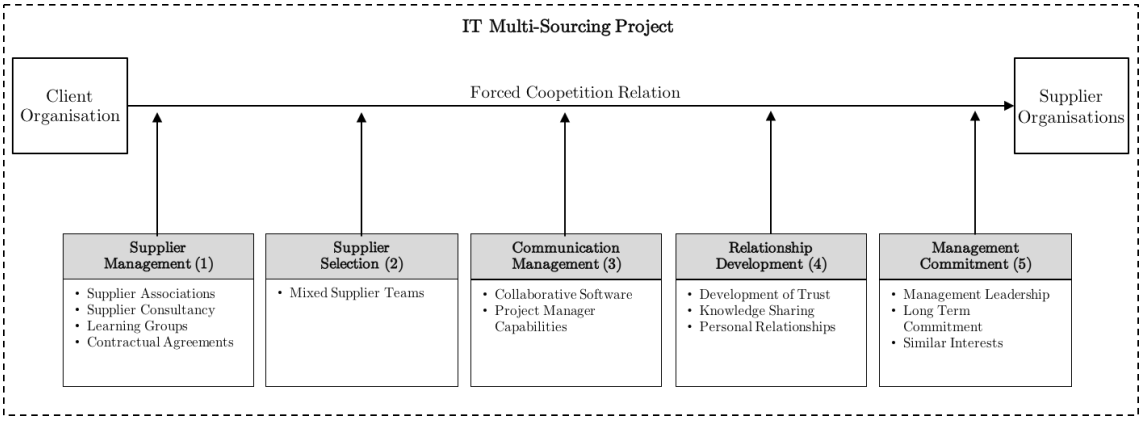

FIGURE 7.1: Academic Contribution

Finally, the study contributes to the body of literature on Likert scales. There is a continuous debate regarding whether the t-test or the Wilcoxon signed-rank test performs better for the data collected using a Likert scale data (Brink & Brink, 1989; Meek et al., 2007). The results of this study show that both tests provide the similar results. Hence, this research underpins the argument of de Winter and Dodou (2010) that both tests have equivalent power for five-point Likert scales.

7.4 Managerial Implications

The study offers practical guidance to IT Project Managers of multi-sourcing projects by providing a framework of critical success factors. The awareness of critical success factors contributes to the management of forced coopetition relations, which is essential for client organisations. The study specifically targets IT multi-sourcing projects, which have become the leading organisational project form in the last two decades (Bapna et al., 2010; Goldberg et al., 2015).

The study shows that supplier management is considered to be the most important cluster in forced coopetition relations. In particular, supplier associations, consultancy services and learning groups were identified as critical success factors. All these factors resulted in increased communication between the client and supplier organisations. However, the feedback from IT project managers of client organisations shows that these strategies are rarely used in practice, as they do not provide an immediate benefit to their own IT multi-sourcing project and due to the necessary involvement of other departments. Therefore, the study suggests two changes to client organisation in order to facilitate supplier associations, consultancy services and learning groups. First, IT project managers of client organisations should be encouraged to adopt more long-term entrepreneurial thinking. Second, the study suggests a closer alignment of supplier-facing roles and departments in order to implement the above-mentioned factors. As mentioned by experts from client organisations, there is a lack of alignment between the purchasing and IT department, which makes it difficult to harness the full potential of supplier associations and contractual agreements.

Third, the study unveiled that the use of fixed-price contracts limits the flexibility of IT multi-sourcing projects. Therefore, the use of consultancy services and mixed supplier teams is difficult to realise for IT Project Managers from client organisations. Hence, the study suggests using more flexible contracts in IT multi-sourcing projects.

The study also shows that knowledge sharing, trust and personal relationships are considered to be critical success factors in forced coopetition relations. In particular, the development of trust and personal relationships requires established and long-term relationships between client and supplier organisations. An excessive replacement of supplier organisations in IT multi-sourcing projects therefore counteracts

the development of trust and personal relationships. It is therefore suggested that client organisations establish long-term relationships with supplier organisations.

In line with this suggestion, the study shows that supplier management and supplier selection are considered to be the two most important critical success factors clusters in forced coopetition relations. The ranking of the remaining clusters (namely, management commitment, relationship development, and communication management) was not significantly different. These clusters are therefore equally important in IT multi-sourcing projects. However, the study revealed that the ranking of the critical success factor clusters depends on the status of the IT multi-sourcing project. Therefore, it is suggested that IT Project Managers of client organisations place attention on all critical success factors clusters equally rather than focus on a single cluster at a time. Furthermore, the project status has to be evaluated on a regular basis in order to adapt the prioritisation of the critical success factor clusters.

Finally, the study emphasised the key role of the Project Manager in IT multi-sourcing projects. This factor has been evaluated as one of the most important critical success factors in forced coopetition relations, as confirmed by respondent 6 from a supplier organisation: "the Project Manager can make or break an IT multi-sourcing project." Hence, the study suggests client organisations need to carefully select IT Project Managers for IT multi-sourcing projects. Figure 7.2 summarises the findings of the study as well as the above described suggestions for client organisations.

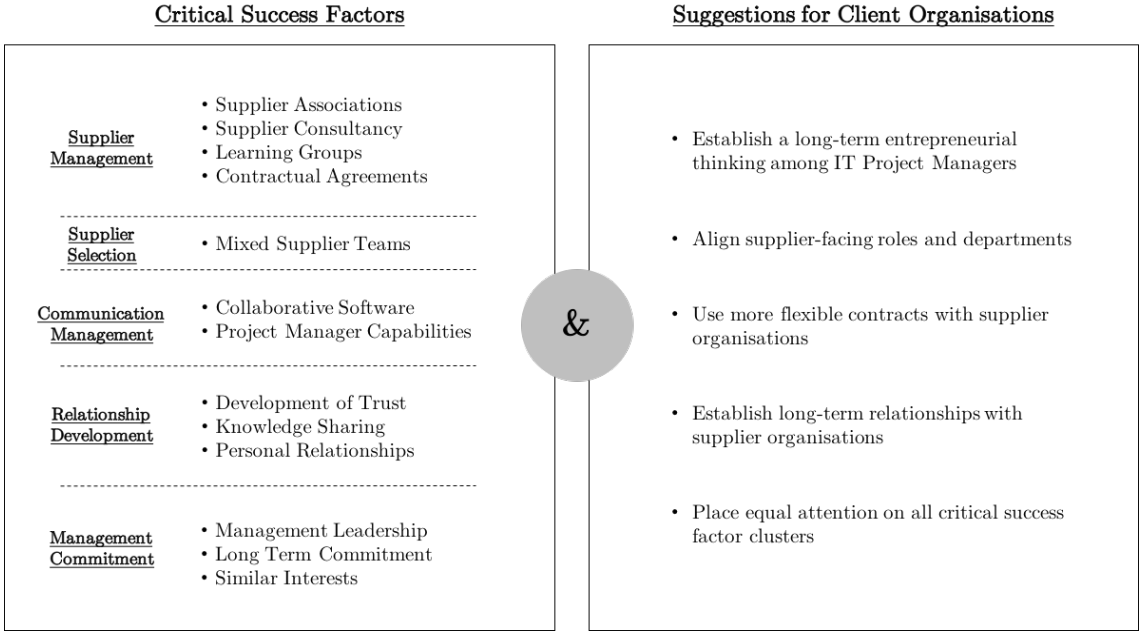

FIGURE 7.2: Managerial Implications

7.5 Limitations and Future Research

This thesis closed the identified gap by evaluating the critical success factors of forced coopetition relations in IT multi-sourcing projects. However, every study has limitations, which in turn provide opportunities for future research. First, the study focused on IT projects in Germany, therefore, caution must be applied in generalising the results to other countries, cultures, or project types. Even though information technology (IT) is universal and not specific to particular countries, the management of IT projects indeed depends on cultural aspects.

Second, the study adopted a coopetition perspective on IT multi-sourcing projects. Therefore, the critical application of other theories such as transaction cost theory, agency theory or core competencies theory in coopetition both within IT multi-sourcing projects and other industries remain viable avenues for future investigation.

Third, the researcher came with several years of experience as an IT Project Manager. In line with the post-positivistic underpinning of this research, the bias on the findings of this study has been minimised by an explanatory mixed method research design, with priority placed on quantitative methods.

Due to an unknown population, the study applied a non-probability sampling approach. Therefore, the researcher used his professional network to identify the sample, which is composed of IT Project Managers of large market-listed companies in Germany as well as IT Project Managers of international IT Consulting organisations.

Taking these contextual factors into account, the researcher does not claim that the findings are generalisable to other populations. Rather, the research provides evidence that is immediately applicable by the researcher's network. Ultimately, this research is a starting point for future research. As literature on forced coopetition in IT multi-sourcing is still scarce, there are some areas for future research, such as the operationalisation of each identified critical success factor in IT multi sourcing projects, or a study on the importance of each factor in relation to the project stage.

This chapter concludes the study by presenting the contribution to practice and knowledge on critical success factors of forced coopetition relations. Furthermore, the chapter outlined limitations of this study and offered areas for future research. Therefore, the thesis closed the gap in the literature.

Appendix A

Literature Summary

Article	Title	Contribution	Quantitative/Qualitative	Sector	Unit of Analysis	Organizational Level
Bardhan et al., 2013	Team Dispersion, Information Technology, and Project Performance	The central contribution is a "empirically tested model to improve the understanding of the operational impact of IT as a vehicle to bridge spatial dispersion among distributed teams that are engaged in knowledge-intensive work."	Quantitative	IT	Cooperation	Intra-Organizational
Bengtsson et al., 2003	Relationships of Cooperation and Competition between Competitors	The paper "outlined some propositions based on earlier studies within the research field of cooperation and competition within the network approach."	Qualitative	not applicable	Traditional Coopetition	Inter-Organizational
Bouncken & Fredrich, 2012	Coopetition: Performance implications and management antecedents	The article contributes "to the understanding of coopetition as a strategy associated with different mixes of trust and dependency."	Quantitative	IT	Traditional Coopetition	Inter-Organizational
Chin et al., 2008	Identifying and prioritizing critical success factors for coopetition strategy	The paper identified and prioritized critical success factors for a coopetition strategy in Hong Kong manufacturing industry.	Qualitative	Manufacturing	Traditional Coopetition	Inter-Organizational
Czakon & Czernek, 2016	The role of trust-building mechanisms in entering into network coopetition: The case of tourism networks in Poland	The study contributes to the understanding of "the role of trust-building mechanisms in the decision to enter into network coopetition."	Qualitative	Tourism	Traditional Coopetition	Inter-Organizational
Das & Teng, 2000	Instabilities of Strategic Alliances: An Internal Tensions Perspective	Proposition of a tensions framework to explain inherent instabilities of strategic alliances.	Qualitative	not applicable	Sourcing	Inter-Organizational
Dorn et al., 2016	Levels, phases and themes of coopetition: A systematic literature review and research agenda	Comprehensive overview of coopetition literature.	Qualitative	Not applicable	Traditional Coopetition	Inter-Organizational, Intra-Organizational, Inter-Individual Level
Dyer & Nobeoka, 2000	Creating and managing a high-performance knowledge-sharing network: the Toyota case	The article developed propositions to create and design a high-performance knowledge-sharing network.	Qualitative	Automotive	Sourcing	Inter-Organizational
Eriksson, 2010	Partnering: what is it, when should it be used, and how should it be implemented?	Propositions of procedures for partnering between organizations.	Qualitative	Manufacturing	Cooperation	Inter-Organizational
Chiambaretto & Fernandez, 2016	Managing tensions related to information in coopetition	The article contributes to the "management of tensions related to in- formation in the context of a coopetitive project."	Qualitative	Aerospace	Traditional Coopetition	Inter-Organizational
Fernandez et al., 2014	Sources and management of tension in co-opetition case evidence from telecommunications satellites manufacturing in Europe.	The article provides insights into the sources and management of tensions.	Qualitative	Manufacturing	Traditional Coopetition	Inter-Organizational, Intra-Organizational, Inter-Individual Level
Garcia et al., 2016	The State of Art: Trust and Conflict Management in Organizational Industrial Relations	The article provides an "overview of key empirical studies on trust and conflict management in the specific context of industrial relations."	Qualitative	Aerospace	Cooperation	Intra-Organizational

Article	Title	Contribution	Quantitative/Qualitative	Sector	Unit of Analysis	Organizational Level
Gnyawali & Park, 2011	Co-opetition between giants: Collaboration with competitors for technological innovation	The article developed a multi-level conceptual framework about the formation, evolution, and impact of co-opetition.	Qualitative	Consumer Electronics	Traditional Coopetition	Inter-Organizational
Goldberg et al., 2015	A Capability Framework for IT Service Integration and Management in Multi-Sourcing	The article developed a "framework of IT capabilities, which enable successful service integration and management."	Qualitative	IT	Sourcing	Inter-Organizational
Humphrey et al., 2004	The impact of supplier development on buyer–supplier performance	The study examines "the role of supplier development in the context of buyer–supplier performance."	Quantitative	Manufacturing	Sourcing	Inter-Organizational
Ilmo & Nahar, 2010	Managing Multi-Vendors in Software Production through International Outsourcing: A Conceptual Perspective	The article developed a model that deals with the "selection and management of multi- vendors in software production through international outsourcing."	Qualitative	IT	Sourcing	Inter-Organizational, Intra-Organizational
Johnston et al., 2004	Effects of supplier trust on performance of cooperative supplier relationships	The study provides an analytic model of buyer–supplier relationships that links the supplier's level of trust to three categories.	Quantitative	Cross-Industry	Cooperation	Inter-Organizational
Le Roy & Fernandez, 2015	Managing Coopetitive Tensions at the Working-group Level: The Rise of the Coopetitive Project Team	Framework on the management of tensions at the working-group level.	Qualitative	Aerospace	Traditional Coopetition	Inter-Organizational, Intra-Organizational
Lempinen & Rajala, 2014	Exploring multi-actor value creation in IT service processes	The article "enriches the understanding of business value creation in IT services by infusing the service logic with traditional IT management perspectives."	Qualitative	IT	Value Co-Creation	Inter-Organizational
Lessard, 2014	Designing and Managing Value Co-Creation in KIBS Engagements	The "article proposes a framework for the design and management of" Knowledge-intensive business services.	Qualitative	Cross-Industry	Value Co-Creation	Intra-Organizational, Inter-Individual Level
Li et al., 2003	Predicting purchasing performance: the role of supplier development programs	The study identifies factors related to supplier development in the context of purchasing performance.	Quantitative	Electronics	Sourcing	Inter-Organizational
Liao et al., 2011	Achieving mass customization through trust-driven information sharing: a supplier's perspective	The article tests the "relationship between trust and manufacturer-supplier information sharing."	Quantitative	Cross-Industry	Cooperation	Inter-Organizational
Mariani, 2016	Coordination in inter-network co-opetitition: Evidence from the tourism sector	The study gains insights of formal governance forms in coopetitive relations.	Qualitative	Tourism	Traditional Coopetition	Inter-Organizational
Morris et al., 2008	Coopetition as a small business strategy: implications for performance	The study assesses "the relationship between coopetition and firm performance."	Quantitative	Cross-Industry	Traditional Coopetition	Inter-Organizational
Pellegrin-Boucher et al., 2013	Coopetitive strategies in the ICT sector: typology and stability	The article "investigates the evolution of inter-firms coopetitive agreements."	Qualitative	IT	Traditional Coopetition	Inter-Organizational
Richardson, 1993	Parallel sourcing and supplier performance in the Japanese automobile industry	Richardson presents a "transaction costs model that shows how parallel sourcing provides incentives for supplier performance"	Qualitative	Automotive	Sourcing	Inter-Organizational
Roseira et al., 2010	Managing interdependencies in supplier networks	The article discusses the "impact of supplier portfolios on the enhancement of focal buyers' performance."	Qualitative	Manufacturing	Sourcing	Inter-Organizational
Sarker et al., 2012	Exploring Value Cocreation in Relationships Between an ERP Vendor and its Partners: A Revelatory Case Study	The study contributes to the "understanding of value cocreation in B2B alliances associated with selling, extending, and implementing ERP systems."	Qualitative	IT	Value Co-Creation	Inter-Organizational

Article	Title	Contribution	Quantitative/Qualitative	Sector	Unit of Analysis	Organizational Level
Soderberg et al., 2013	Global Software Development: Commitment, Trust and Cultural Sensitivity in Strategic Partnerships	The article contributes to the management of IT Outsourcing partnerships from an offshore perspective.	Qualitative	Finance	Sourcing	Inter-Organizational
Thomason et al., 2013	Several determinants of successful coopetition in small business	The study proposes critical success factors for traditional coopetitive relations.	Qualitative	Retail	Traditional Coopetition	Inter-Organizational
Tidström, 2009	Causes of conflict in intercompetitor cooperation	"Understanding about the causes of conflict in intercompetitor cooperation."	Qualitative	Logistics	Traditional Coopetition	Inter-Organizational
Tidström, 2014	Managing tensions in coopetition	The study contributes to the management of tensions of traditional coopetitive relations.	Qualitative	Case 1: Manufacturing Case 2: Natural products industry	Traditional Coopetition	Inter-Organizational
Wiener & Saunders, 2014a	Forced coopetition in IT multi-sourcing	The study sheds light on the "delicate balance between vendor competition and cooperation in IT multi-sourcing."	Qualitative	IT	Forced Coopetition	Inter-Organizational
Wilhelm, 2011	Managing coopetition through horizontal supply chain relations: Linking dyadic and network levels of analysis	The study discusses the "interplay of the supplier–supplier and network of analysis by focusing on the inherent tension between cooperation and competition."	Qualitative	Automotive	Traditional Coopetition	Inter-Organizational
Wu et al., 2010	Supplier–supplier relationships in buyer–supplier–supplier triads: Implications for supplier performance	The study investigates the role of the buyer in coopetitive relations and the impact on the supplier performance.	Quantitative	Aerospace	Traditional Coopetition	Inter-Organizational

Appendix B

E-Mail Text

Sehr geehrte/r Frau/Herr ,

ich forsche derzeit nebenberuflich an der Edinburgh Napier University im Bereich der Steuerung von IT Multi-Sourcing Projekten.

Multi-Sourcing Strategien und der damit verbundene Einsatz mehrerer konkurrierender IT-Dienstleister im selben Projekt sind auch in deutschen Unternehmen gängige Praxis. Das daraus resultierende Spannungsverhältnis aus Kooperation und Wettbewerb zwischen den IT-Dienstleistern kann den Mehrwert einer Multi-Sourcing Strategie reduzieren und somit den Projekterfolg gefährden. Aus diesem Grund ist eine gezielte Steuerung der IT-Dienstleister notwendig.

Zur Identifikation der relevanten Steuerungsfaktoren von IT Multi-Sourcing führe ich eine empirische Studie durch, in welche ich gerne Ihre Expertise mit einbeziehen möchte. Ich würde Sie daher bitten, den Fragebogen im Anhang der E-Mail zu beantworten. Die Beantwortung sollte nicht mehr als 15 Minuten Ihrer Zeit in Anspruch nehmen.

Der Fragebogen fragt nicht nach unternehmensspezifischen oder personenbezogenen Informationen. Alle Daten werden 100 % vertraulich und anonym behandelt. Darüber hinaus möchte ich darauf hinweisen, dass es sich um ein vollständig privates Forschungsprojekt handelt, welches nicht in Verbindung mit meinem Arbeitgeber steht. Es werden daher auch keine Informationen an meinen Arbeitgeber weitergeleitet.

Ich würde mich sehr freuen, wenn Sie mein Forschungsprojekt unterstützen und den Fragebogen innerhalb der nächsten drei Wochen beantworten könnten. Für Rückfragen stehe ich Ihnen jederzeit gerne zur Verfügung.

Vielen Dank und freundliche Grüße

Stefan Buttschardt

Appendix C

Questionnaire

Questionnaire - Critical Success Factors in Forced Coopetition Relations

1. Please describe your organization:

a) Which of the following describes your organization:

Client Organisation	☐	E.g. Car Manufacturer
Supplier Organisation	☐	E.g. IT Consulting Company

b) To which industry does your organisation belong to?

Banking & Insurance	☐
Manufacturing	☐
IT	☐
Retail & Distributions	☐
Telecommunications	☐
Public Sector	☐
Other	☐

2. On a scale of 1 to 5, where 1 is strongly disagree , 3 is neutral or unknown, and 5 is strongly agree, please rate the following statements:

Cluster	Critical Success Factor	Rating 1	2	3	4	5
Supplier Management						
	Supplier Associations increase the cooperation among suppliers in an IT multi-sourcing project. E.g. requesting suppliers in a multi-sourcing project to facilitate continious inter-organizational knowledge exchange.	☐	☐	☐	☐	☐
	Consultancy Services among suppliers in an IT Multi-Sourcing project increases the inter-supplier cooperation. E.g. supplier A offers project specific technology consultancy services to supplier B.	☐	☐	☐	☐	☐
	Supplier learning groups moderated by the client organization support the inter-supplier relationships in an IT multi-sourcing project. E.g. the client organization offers regular trainings on client-specific topics to the suppliers.	☐	☐	☐	☐	☐
	Enhanced Contractual Agreements between the client and supplier organisation foster the collaboration in IT multi-sourcing projects. E.g. the contractual agreement between the client and supplier organisation include a section, which ensures regular inter-supplier knowledge transfer.	☐	☐	☐	☐	☐
Supplier Selection						
	Similar Capabilities of the supplier organizations foster the cooperation among suppliers in an IT multi-sourcing project. E.g. all suppliers of a multi-sourcing project are capable of implementing JAVA solutions.	☐	☐	☐	☐	☐
	Equally sized supplier teams support the inter-supplier relationships in an IT multi-sourcing project. E.g. all supplier teams in a multi-sourcing project consist of 3-5 employees.	☐	☐	☐	☐	☐
	Mixed Supplier Teams working on a single task promote the cooperation in an IT multi-sourcing project. E.g. the IT concept is created by a joint team of all suppliers in the multi-sourcing project.	☐	☐	☐	☐	☐
Management Commitment						
	Active Management Leadership within the client and supplier organizations support the relationships in IT multi-sourcing projects. E.g. there are regular management meetings betwenn the client and supplier organization to demonstrate inter-organizational cooperation.	☐	☐	☐	☐	☐
	The willingness to a Long Term Commitment by the supplier organizations foster the inter-supplier cooperation in IT multi-sourcing projects. E.g. the client and supplier organzations engage in long term cooperation agreement.	☐	☐	☐	☐	☐
	Duplicated Management Functions in IT Multi-Sourcing Projects support the inter-suppler relationships. E.g. each supplier in an multi-sourcing project provides an IT project manager, which directly reports to the client's IT project manager.	☐	☐	☐	☐	☐
	The existence of social control mechanism (relational capital) support the relationships in IT Multi-Sourcing Projects. E.g. formal regulations which define the communication within a multi-sourcing project.	☐	☐	☐	☐	☐
	Similar Interests of the supplier organizations support the inter-supplier cooperation in IT Multi-Sourcing Projects. E.g. all suppliers aim to implement an after-sales solution for the client organization. There is no hidden agenda.	☐	☐	☐	☐	☐
Relationship Development						
	Development of Trust is a precondition for successful IT Multi-Sourcing Projects. E.g. there are regular team building activities	☐	☐	☐	☐	☐
	Knowledge and Resource Sharing among supplier organizations foster the inter-supplier relationship. E.g. suppliers within an multi-sourcing project openly share information on the client's IT landscape among each other.	☐	☐	☐	☐	☐
	Personal Relationships on an individual level support the relationships in IT Multi-Sourcing Projects.	☐	☐	☐	☐	☐
Communication Management						
	Collaborative software fosters the relationships in IT Multi-Sourcing Projects. E.g. the use of a common SharePoint	☐	☐	☐	☐	☐
	The use of Conflict Management Systems support the relationship among actors in an IT Multi-Sourcing Project. E.g. there is an independent, external mediator to resolve any disputes between the supplier organizations.	☐	☐	☐	☐	☐
	The Project Manager Capabilities affect the cooperation in IT Multi-Sourcing Projects. E.g. the Project Manager is required to have good communication and leadership skills to steer all suppliers.	☐	☐	☐	☐	☐

3. From 1 to 5, where 5 is the most important, please rank the following clusters in order of importance to a successful IT multi-sourcing project. If a cluster has no importance at all, please leave blank.

Cluster	Rank
Supplier Management	☐
Supplier Selection	☐
Management Commitment	☐
Relationship Development	☐
Communication Management	☐

Questionnaire Instructions

Purpose of the Questionnaire:

This questionnaire is designed to gather information about relationships among the buying organization and supplier organizations in IT Multi-Sourcing Projects. The data collected will only be used for the purpose of academic study and will be kept in strictest confidence. Under no circumstance, the data will be passed to the researcher's organization.

Questionnaire Structure:

This questionnaire gathers data related to the evaluation of critical success factors of an IT Multi-Sourcing Project. Please evaluate each critical success factor in relation to its impact on the relationships between the actors in an IT Multi-Sourcing Project. To answer the questionnaire you will need to tick the relevant rating scale.

Step-by-Step Instruction

A Please tick the appropriate boxes to describe your organization.

a) Which of the following describes your organization:

Client Organisation	☐ E.g. Car Manufacturer
Supplier Organisation	☐ E.g. IT Consulting Company

b) To which industry does your organisation belong to?

Banking & Insurance	☐
Manufacturing	☐
IT	☐
Retail & Distributions	☐
Telecommunications	☐
Public Sector	☐
Other	☐

A

B On a scale of 1 to 5, where 1 is strongly disagree, 3 is neutral, and 5 is strongly agree, please rate each critical success factor.

Cluster	Critical Success Factor	Rating 1 2 3 4 5
Supplier Management		
	Supplier Associations increase the cooperation among suppliers in an IT multi-sourcing project. E.g. requesting suppliers in a multi-sourcing project to facilitate continious inter-organizational knowledge exchange.	☐ ☐ ☐ ☐ ☐
	Consultancy Services among suppliers in an IT Multi-Sourcing project increases the inter-supplier cooperation. E.g. supplier A offers project specific technology consultancy services to supplier B.	☐ ☐ ☐ ☐ ☐
	Supplier learning groups moderated by the client organization support the inter-supplier relationships in an IT multi-sourcing project. E.g. the client organization offers regular trainings on client-specific topics to the suppliers.	☐ ☐ ☐ ☐ ☐
	The use of Supplier Benchmarks by the client organisation support the inter-supplier relationships in an IT multi-sourcing project. E.g. the client organization regularly evaluates and communicates the performance of all suppliers.	☐ ☐ ☐ ☐ ☐
	Enhanced Contractual Agreements between the client and supplier organisation foster the collaboration in IT multi-sourcing projects. E.g. the contractual agreement between the client and supplier organisation include a section, which ensures regular inter-supplier knowledge transfer.	☐ ☐ ☐ ☐ ☐

B

C On a scale of 1 to 5, where 5 is the most important, and 1 is the least important, please rank the clusters in order of their importance to a successful IT multi-sourcing project. If a cluster has no importance at all, please leave blank.

Cluster	Rank
Supplier Management	
Supplier Selection	
Management Commitment	
Relationship Development	
Communication Management	

C

Appendix D

Interview Guidelines

The following interview guidelines (English / German) have been used within this study:

Please describe your experiences in forced coopetitive relationships with regard to the following factors / Bitte beschreiben Sie ihre Erfahrungen im Bereich Forced Coopetition bezüglich folgender Faktoren:

1. Supplier Associations / Dienstleister Vereinigungen
2. Supplier Consultancy / Beratung von Dienstleistern
3. Learning Groups / Lerngruppen
4. Contractual Agreements / Vertragliche Zusatzvereinbarungen
5. Mixed Supplier Teams / Gemischte Dienstleisterteams
6. Management Leadership / Management Leadership
7. Long Term Commitment / Langfristige Verpflichtungen
8. Similiar Interests / Gemeinsames Interesse
9. Development of Trust / Vertrauen
10. Knowledge Sharing / Knowledge Sharing
11. Personal Relationships / Persönliche Beziehungen
12. Collaborative Software / Kollaborative Software
13. Project Manager Capabilities / Fähigkeiten des Projekt Managers

References

Adams, J., Khan, H. T. A., & Raeside, R. (2014). *Research methods for business and social science students*. New Delhi: Sage Publications. Retrieved from http://gbv.eblib.com/patron/FullRecord.aspx?p=1698991

Alaghehband, Rivard, Wu, & Goyette. (2011). An assessment of the use of transaction cost theory in information technology outsourcing. *The Journal of Strategic Information Systems*, *20*(2), 125–138. doi: 10.1016/j.jsis.2011.04.003

Allen, E. I., & Seaman, C. A. (2007). Likert scales and data analyses. *Quality Progress*, *40*(7), 64–65.

Alvesson, M., & Sköldberg, K. (2009). *Reflexive methodology: New vistas for qualitative research* (2nd ed ed.). Los Angeles and London: SAGE.

Anderson, & Parker. (2013). Integration of global knowledge networks. *Production and Operations Management*, *22*(6), 1446–1463. doi: 10.1111/poms.12181

Anderson, Sweeney, & Williams. (2014). *Statistics for business & economics*. Cengage Learning.

Aron, R., & Singh, J. V. (2005). Getting offshoring right. *Harvard business review*, *83*(12), 135-43, 154.

Backhaus, K., Erichson, B., Plinke, W., & Weiber, R. (2016). *Multivariate analysemethoden: Eine anwendungsorientierte einführung* (14., überarbeitete und aktualisierte Auflage ed.). Berlin, Heidelberg: Springer Gabler. Retrieved from http://dx.doi.org/10.1007/978-3-662-46076-4 doi: 10.1007/978-3-662-46076-4

Bapna, R., Barua, A., Mani, D., & Mehra, A. (2010). Research commentary — cooperation, coordination, and governance in multisourcing: An agenda for analytical and empirical research. *Information Systems Research*, *21*(4), 785–795. doi: 10.1287/isre.1100.0328

Bardhan, I., Krishnan, V. V., & Lin, S. (2013). Team dispersion, information technology, and project performance. *Production and Operations Management*, *22*(6), 1478–1493. doi: 10.1111/j.1937-5956.2012.01366.x

Bauman, A. (2015). The use of the repertory grid technique in online trust research. *Qualitative Market Research: An International Journal*, *18*(3), 362–382. doi: 10.1108/QMR-08-2014-0080

Bengtsson, M., Hinttu, S., & Kock, S. (2003). Relationships of cooperation and competition between competitors. *19th Annual IMP Conference*.

Bengtsson, M., & Kock, S. (1999). Cooperation and competition in relationships between competitors in business networks. *Journal of Business & Industrial Marketing*, *14*(3), 178–194. doi: 10.1108/08858629910272184

Bengtsson, M., & Kock, S. (2000). "coopetition" in business networks—to cooperate and compete simultaneously. *Industrial Marketing Management*, *29*(5), 411–426. doi: 10.1016/S0019-8501(99)00067-X

Bengtsson, M., & Kock, S. (2014). Coopetition—quo vadis? past accomplishments and future challenges. *Industrial Marketing Management*, *43*(2), 180–188. doi: 10.1016/j.indmarman.2014.02.015

Bengtsson, M., & Raza-Ullah, T. (2016). A systematic review of research on coopetition: Toward a multilevel understanding. *Industrial Marketing Management*. doi: 10.1016/j.indmarman.2016.05.003

Bengtsson, M., Raza-Ullah, T., & Vanyushyn, V. (2016). The coopetition paradox and tension: The moderating role of coopetition capability. *Industrial Marketing Management*, *53*, 19–30. doi: 10.1016/j.indmarman.2015.11.008

Benton, T., & Craib, I. (2011). *Philosophy of social science: The philosophical foundations of social thought* (2nd ed., 10th anniversary ed ed.). Houndsmill, Basingstoke, Hampshire and New York: Palgrave Macmillan.

Berenson, M. L., Levine, D. M., & Krehbiel, T. C. (2009). *Basic business statistics: Concepts and applications* (11. ed. ed.). Upper Saddle River, N.J.: Pearson Prentice Hall.

Bernard, H. R. (2013). *Social research methods: Qualitative and quantitative approaches* (2. ed. ed.). Los Angeles: SAGE.

Bhattacharya, S., Gupta, A., & Hasija, S. (2012). Single sourcing versus multisourcing: The role of effort interdependence, metric-outcome misalignment, and incentive design. *INSEAD Working Paper No. 2012/26/TOM*.

Biddle, C., & Schafft, K. A. (2015). Axiology and anomaly in the practice of mixed methods work. *Journal of Mixed Methods Research*, *9*(4), 320–334. doi: 10.1177/1558689814533157

Bland, M. J., & Altman, D. G. (1997). Cronbach's alpha. *BMJ*, *314*, 572.

BMW Group. (2015). *The future is here: Tomorrow's mobility begins with real-time digital maps.* Retrieved 01.07.2016, from https://www.press.bmwgroup.com/global/article/detail/T0246184EN/the-future-is-here:-tomorrow%E2%80%99s-mobility-begins-with-real-time-digital-maps?language=en

Bogdan, R., & Biklen, S. K. (1998). *Qualitative research for education: An introduction to theory and methods* (3. ed. ed.). Boston [etc.]: Allyn and Bacon.

Bonel, E., & Rocco, E. (2007). Coopeting to survive; surviving coopetition. *International Studies of Management and Organization*, *37*(2), 70–96. doi: 10.2753/IMO0020-8825370204

Bonett, D. G., & Wright, T. A. (2015). Cronbach's alpha reliability: Interval estimation, hypothesis testing, and sample size planning. *Journal of Organizational Behavior*, *36*(1), 3–15. doi: 10.1002/job.1960

Boone, H. N., & Boone, D. A. (2012). Analyzing likert data. *Journal of Extension*, *50*(2).

Bouncken, R. B., & Fredrich, V. (2012). Coopetiton: Performance implications and management antecedents. *International Journal of Innovation Management*, *16*(05), 1250028. doi: 10.1142/S1363919612500284

Brand, V. (2009). Empirical business ethics research and paradigm analysis. *Journal of Business Ethics*, *86*(4), 429–449. doi: 10.1007/s10551-008-9856-3

Brandenburger, A. M., & Nalebuff, B. J. (1996). *Co-opetition: 1. a revolutionary mindset that combines competition and co-operation ; 2. the game theory strategy that's changing the game of business* (1. ed. ed.). New York: Doubleday. Retrieved from http://www.loc.gov/catdir/description/random0413/96004900.html

Brink, W. P., & Brink, S. G. J. (1989). A comparison of the power of the t test, wilcoxon's test, and the approximate permutation test for the two-sample location problem. *British Journal of Mathematical and Statistical Psychology*, *42*(2), 183–189. doi: 10.1111/j.2044-8317.1989.tb00907.x

Bryman, A., & Bell, E. (2015). *Business research methods* (4. ed. ed.). Oxford u.a.: Oxford Univ. Press.

Burns, R. B., & Burns, R. A. (2008). *Business research methods and statistics using spss*. Los Angeles: SAGE.

Carifio, J., & Perla, R. (2008). Resolving the 50-year debate around using and misusing likert scales. *Medical education*, *42*(12), 1150–1152. doi: 10.1111/j.1365-2923.2008.03172.x

Castaldo, S., Möllering, G., Grosso, M., & Zerbini, F. (2010). Exploring how third- party organizations facilitate coopetition management in buyer-seller relationships. In S. Yami (Ed.), *Coopetition* (pp. 141–165). Cheltenham, U.K: Edward Elgar.

Check, J. W., & Schutt, R. K. (2012). *Research methods in education*. Los Angeles: SAGE.

Chen, M.-J. (2008). Reconceptualizing the competition– cooperation relationship: A transparadox perspective. *Journal of Management Inquiry*, *17*(4), 288–304. doi: 10.1177/1056492607312577

Chiambaretto, P., & Fernandez, A.-S. (2016). The evolution of coopetitive and collaborative alliances in an alliance portfolio: The air france case. *Industrial Marketing Management*, *57*, 75–85. doi: 10.1016/j.indmarman.2016.05.005

Chin, K.-S., Chan, B. L., & Lam, P.-K. (2008). Identifying and prioritizing critical success factors for coopetition strategy. *Industrial Management & Data Systems*, *108*(4), 437–454. doi: 10.1108/02635570810868326

Clark, A. M. (1998). The qualitative-quantitative debate: moving from positivism and confrontation to post-positivism and reconciliation. *Journal of Advanced Nursing*, *27*(6), 1242–1249. doi: 10.1046/j.1365-2648.1998.00651.x

Clarke-Hill, C., Li, H., & Davies, B. (2003). The paradox of co–operation and competition in strategic alliances: Towards a multi–paradigm approach. *Management Research News*, *26*(1), 1–20. doi: 10.1108/01409170310783376

Clason, D. L., & Dormody, T. J. (1994). Analyzing data measured by individual likert-type items. *Journal of Agricultural Education*, *35*(4), 31–35.

Cohen, L., & Young, A. (2006). *Multisourcing: Moving beyond outsourcing to achieve growth and agility*. Boston, Mass.: Harvard Business School Press.

Collis, J., & Hussey, R. (2009). *Business research: A practical guide for undergraduate & postgraduate students* (3rd ed. ed.). Basingstoke: Palgrave Macmillan.

Creswell, J. W. (2003). *Research design: Qualitative, quantitative, and mixed method approaches* (2nd ed ed.). Thousand Oaks, Calif.: Sage Publications.

Creswell, J. W. (2010). Mapping the developing landscape of mixed methods research. In A. Tashakkori & C. Teddlie (Eds.), *Sage handbook of mixed methods in social & behavioral research* (pp. 45–68). 2455 Teller Road, Thousand Oaks California 91320 United States: SAGE Publications, Inc. doi: 10.4135/9781506335193.n2

Creswell, J. W. (2014). *Research design: Qualitative, quantitative, and mixed methods approaches* (4. ed. ed.). Los Angeles: SAGE.

Creswell, J. W., & Plano Clark, V. L. (2011). *Designing and conducting mixed methods research* (2nd edition ed.). Los Angeles and London and New Dehli and Singapore and Washington DC: SAGE.

Crotty, M. (1998). *The foundations of social research: Meaning and perspective in the research process*. London and Thousand Oaks, Calif: Sage Publications.

Czakon, W., & Czernek, K. (2016). The role of trust-building mechanisms in entering into network coopetition: The case of tourism networks in poland. *Industrial Marketing Management*, *57*, 64–74. doi: 10.1016/j.indmarman.2016.05.010

Dagnino, G., & Mariani, M. (2010). Coopetitive value creation in entrepreneurial contexts: The case of almacube. In S. Yami (Ed.), *Coopetition*. Cheltenham, U.K: Edward Elgar.

Das, T. K., & Teng, B.-S. (2000). Instabilities of strategic alliances: An internal tensions perspective. *Organization Science*, *11*(1), 77–101. doi: 10.1287/orsc.11.1.77.12570

de Winter, J. C., & Dodou, D. (2010). Five-point likert items: t test versus mann-whitney-wilcoxon. *Practical Assessment, Research & Evaluation*, *15*(11).

Denzin, N. K., & Lincoln, Y. S. (2011). *The sage handbook of qualitative research* (4th ed ed.). Thousand Oaks: SAGE.

DeVellis, R. F. (2012). *Scale development: Theory and applications* (3. ed. ed., Vol. 26). Thousand Oaks, Calif.: SAGE Publ.

Diamond, S. S. (2010). Reference guide on survey research. In *Reference manual on scientific evidence* (pp. 229–276). Washington, D.C: National Academies Press.

Dibbern, J., Goles, T., Hirschheim, R., & Jayatilaka, B. (2004). Information systems outsourcing. *ACM SIGMIS Database*, *35*(4), 6–102. doi: 10.1145/1035233.1035236

Ding, X.-H., Huang, R.-H., & Liu, D.-L. (2012). Resource allocation for open and hidden learning in learning alliances. *Asia Pacific Journal of Management*, *29*(1), 103–127. doi: 10.1007/s10490-009-9189-5

Dorn, S., Schweiger, B., & Albers, S. (2016). Levels, phases and themes of coopetition: A systematic literature review and research agenda. *European Management Journal*, *34*(5), 484–500. doi: 10.1016/j.emj.2016.02.009

Dyer, J. H., & Nobeoka, K. (2000). Creating and managing a high-performance knowledge-sharing network: The toyota case. *Strategic Management Journal*, *21*(3), 345–367. doi: 10.1002/(SICI)1097-0266(200003)21:3{\textless}345::AID-SMJ96{\textgreater}3.0.CO;2-N

Edinburgh Napier University. (2013). *Code of practice on research integrity.* Retrieved 4th November 2016, from http://staff.napier.ac.uk/services/research-innovation-office/policies/Documents/2016%2003%2016%20CoP%20version%203.pdf

Englund, R. L., & Bucero, A. (2006). *Project sponsorship: Achieving management commitment for project success* (1st ed. ed.). San Francisco: Jossey-Bass. Retrieved from http://search.ebscohost.com/login.aspx?direct=true&scope=site&db=nlebk&db=nlabk&AN=159622

Eriksson, P. E. (2010). Partnering: What is it, when should it be used, and how should it be implemented? *Construction Management and Economics*, *28*(9), 905–917. doi: 10.1080/01446190903536422

Esteves de Sousa, J. (2004). *Definition and analysis of critical success factors for erp implementation projects. doctoral thesis at the universitat polit6cnica de catalunya, spain.* Retrieved from http://jesteves.com/Tesis_phd_jesteves.pdf

Fang, S.-R., Chang, Y.-S., & Peng, Y.-C. (2011). Dark side of relationships: A tensions-based view. *Industrial Marketing Management*, *40*(5), 774–784. doi: 10.1016/j.indmarman.2011.02.003

Fernandez, A.-S., Le Roy, F., & 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), 222–235. doi: 10.1016/j.indmarman.2013.11.004

Field, A. (2011). *Discovering statistics using spss: (and sex and drugs and rock 'n' roll)* (3. ed., reprinted. ed.). Los Angeles, Calif.: SAGE. Retrieved from http://www.uk.sagepub.com/field3e/main.htm

García, A. B., Pender, E., & Elgoibar, P. (2016). The state of art: Trust and conflict management in organizational industrial relations. In P. Elgoibar, M. Euwema, & L. Munduate (Eds.), *Building trust and constructive conflict management in organizations* (pp. 29–51). Cham: Springer International Publishing. doi: 10.1007/978-3-319-31475-4{\textunderscore}3

Given, L. (Ed.). (2008). *The sage encyclopedia of qualitative research methods.* 2455 Teller Road, Thousand Oaks California 91320 United States: SAGE Publications, Inc. doi: 10.4135/9781412963909

Gnyawali. (2006). Impact of co-opetition on firm competitive behavior: An empirical examination. *Journal of Management*, *32*(4), 507–530. doi: 10.1177/0149206305284550

Gnyawali, He, & Madhavan. (2008). Co-opetition: Promises and challenges. In *21st century management: A reference handbook* (p. I-386-I-398). 2455 Teller Road, Thousand Oaks California 91320 United States: SAGE Publications, Inc. doi: 10.4135/9781412954006.n38

Gnyawali, & Madhavan. (2001). Cooperative networks and competitive dynamics: A structural embeddedness perspective. *Academy of Management Review*, *26*(3), 431–445. doi: 10.5465/AMR.2001.4845820

Gnyawali, Madhavan, He, & Bengtsson (Eds.). (2012). *Contradictions, dualities and tensions in cooperation and competition: A capability based framework.* Boston, MA..

Gnyawali, & Park. (2011). Co-opetition between giants: Collaboration with competitors for technological innovation. *Research Policy*, *40*(5), 650–663. doi: 10.1016/j.respol.2011.01.009

Golafshani. (2003). Understanding reliability and validity in qualitative research. *The Qualitative Report*, *8*(4), 597–606.

Goldberg, M., Kieninger, A., Satzger, G., & Fromm, H. (2014). Transition and delivery challenges of retained organizations in it outsourcing. In W. van der Aalst et al. (Eds.), *Exploring services science* (Vol. 169, pp. 56–71). Cham: Springer International Publishing. doi: 10.1007/978-3-319-04810-9{\textunderscore}5

Goldberg, M., Satzger, G., & Kieninger, A. (2015). A capability framework for it service integration and management in multi-sourcing. *ECIS 2015 Completed Research Papers*(58).

Gottschalk, & Solli-Sæther. (2005). Critical success factors from it outsourcing theories: An empirical study. *Industrial Management & Data Systems*, *105*(6), 685–702. doi: 10.1108/02635570510606941

Grix, J. (2004). *The foundations of research.* New York: Palgrave Macmillan Ltd. Retrieved from `http://gbv.eblib.com/patron/FullRecord.aspx?p=433562`

Guba, & Lincoln. (1994). Competing paradigms in qualitative research. *Handbook of qualitative research*, *2*.

Gulati, R., Lawrence, P., & Puranam, P. (2005). Adaptation in vertical relationships: Beyond incentive conflict. *Strategic Management Journal*, *26*(5), 415–440. doi: 10.1002/smj.458

Gurel, O., Acar, A. Z., Onden, I., & Gumus, I. (2015). Determinants of the green supplier selection. *Procedia - Social and Behavioral Sciences*, *181*, 131–139. doi: 10.1016/j.sbspro.2015.04.874

Hanson, W. E., Creswell, J. W., Clark, V. L. P., Petska, K. S., & Creswell, J. D. (2005). Mixed methods research designs in counseling psychology. *Journal of Counseling Psychology*, *52*(2), 224–235. doi: 10.1037/0022-0167.52.2.224

Harrison, R. L., & Reilly, T. M. (2011). Mixed methods designs in marketing research. *Qualitative Market Research: An International Journal*, *14*(1), 7–26. doi: 10.1108/13522751111099300

Healy, & Perry. (2000). Comprehensive criteria to judge validity and reliability of qualitative research within the realism paradigm. *Qualitative Market Research: An International Journal*, *3*(3), 118–126. doi: 10.1108/13522750010333861

Heikkilä, M., Sajasalo, P., Heikkilä, J., & Pohjola, M. (2016). Management dilemmas in innovative supplier networks. *International Journal of Procurement Management*, *9*(5), 616–635.

Hirschheim, R., Loebbecke, C., Newman, M., & Valor, J. (2005). Offshoring and its implications for the information systems discipline. *ICIS 2005 Proceedings*, *Paper 85*.

Humphreys, P. K., Li, W. L., & Chan, L. Y. (2004). The impact of supplier development on buyer–supplier performance. *Omega*, *32*(2), 131–143. doi: 10.1016/j.omega.2003.09.016

Ilmo, A., & Nahar, N. (2010). Managing multi-vendors in software production through international outsourcing: A conceptual perspective. *Proceedings of PICMET '10: Technology Management for Global Economic Growth (PICMET)*, 1–12.

Ivankova, N. V. (2006). Using mixed-methods sequential explanatory design: From theory to practice. *Field Methods*, *18*(1), 3–20. doi: 10.1177/1525822X05282260

Jaakkola, E., & Hakanen, T. (2013). Value co-creation in solution networks. *Industrial Marketing Management*, *42*(1), 47–58. doi: 10.1016/j.indmarman.2012.11.005

Jamieson, S. (2004). Likert scales: how to (ab)use them. *Medical education*, *38*(12), 1217–1218. doi: 10.1111/j.1365-2929.2004.02012.x

Janes, J. (2001). Survey research design. *Library Hi Tech*, *19*(4), 419–421. doi: 10.1108/EUM0000000006543

Janssen, J., & Laatz, W. (2013). *Statistische datenanalyse mit spss: Eine anwendungsorientierte einführung in das basissystem und das modul exakte tests* (8. Aufl. 2013 ed.). Berlin and Heidelberg: Springer. Retrieved from `http://dx.doi.org/10.1007/978-3-642-32507-6` doi: 10.1007/978-3-642-32507-6

Jarzabkowski, P., Le, J. K., & Van de Ven, A. H. (2013). Responding to competing strategic demands: How organizing, belonging, and performing paradoxes coevolve. *Strategic Organization*, *11*(3), 245–280. doi: 10.1177/1476127013481016

Jayatilaka, B. (2006). It sourcing a dynamic phenomena: Forming an institutional theory perspective. In R. A. Hirschheim, A. Heinzl, & J. Dibbern (Eds.), *Information systems outsourcing.* Berlin and New York: Springer-Verlag.

Johnson, B., & Christensen, L. B. (2012). *Educational research: Quantitative, qualitative, and mixed approaches* (4. ed. ed.). Thousand Oaks, Calif.: SAGE.

Johnston, D. A., McCutcheon, D. M., Stuart, F., & Kerwood, H. (2004). Effects of supplier trust on performance of cooperative supplier relationships. *Journal of Operations Management*, *22*(1), 23–38. doi: 10.1016/j.jom.2003.12.001

Kaptein, M. C., Nass, C., & Markopoulos, P. (2010). Powerful and consistent analysis of likert-type ratingscales. In E. Mynatt, D. Schoner, G. Fitzpatrick, S. Hudson, K. Edwards, & T. Rodden (Eds.), *Chi 2010 - we are hci* (p. 2391). New York, NY: ACM. doi: 10.1145/1753326.1753686

Keeter, S., Miller, C., Kohut, A., Groves, R. M., & Presser, S. (2000). Consequences of reducing nonresponse in a national telephone survey. *Public opinion quarterly*, *64*(2), 125–148.

Kelly, G. A. (1955). *The psychology of personal constructs: Volume 1: A theory of personality.* New York, NY: WW Norton and Company.

Kilduff, G. J., Elfenbein, H. A., & Staw, B. M. (2010). The psychology of rivalry: A relationally-dependent analysis of competition. *Academy of Management Journal*, *53*(5), 943–969.

Kraska-Miller, M. (2013). *Nonparametric statistics for social and behavioral sciences.* Hoboken: CRC Press. Retrieved from `http://gbv.eblib.com/patron/FullRecord.aspx?p=1511153`

Lacity, & Hirschheim. (1993). *Information systems outsourcing: Myths, metaphors and realities* (1. publ ed.). Chichester u.a: Wiley & Sons.

Lacity, & Willcocks. (1998). An empirical investigation of information technology sourcing practices: Lessons from experience. *MIS Quarterly*, *22*(3), 363–408.

Lacity, & Willcocks. (2001). *Global information technology outsourcing: In search of business advantage.* Chichester: Wiley. Retrieved from `http://www.loc.gov/catdir/bios/wiley042/2001267160.html`

Lacity, Willcocks, & Khan. (2011). Beyond transaction cost economics: Towards an endogenous theory of information technology outsourcing. *The Journal*

of Strategic Information Systems, *20*(2), 139–157. doi: 10.1016/j.jsis.2011.04.002

Laerd. (2015). *One-way anova using spss statistics.* Retrieved 12.12.2016, from `https://statistics.laerd.com`

Larson-Hall, J. (2010). *A guide to doing statistics in second language research using spss.* New York, NY: Routledge.

Le Roy, F., & Fernandez, A.-S. (2015). Managing coopetitive tensions at the working-group level: The rise of the coopetitive project team. *British Journal of Management*, n/a-n/a. doi: 10.1111/1467-8551.12095

Leech, N. L., Dellinger, A. B., Brannagan, K. B., & Tanaka, H. (2010). Evaluating mixed research studies: A mixed methods approach. *Journal of Mixed Methods Research*, *4*(1), 17–31. doi: 10.1177/1558689809345262

Leimeister, S. (2010). *It outsourcing governance: Client types and their management strategies: Zugl.: München, techn. univ., diss., 2009.* Wiesbaden: Gabler Verlag / Springer Fachmedien Wiesbaden GmbH Wiesbaden. Retrieved from `http://dx.doi.org/10.1007/978-3-8349-6303-1` doi: 10.1007/978-3-8349-6303-1

Lempinen, H., & Rajala, R. (2014). Exploring multi-actor value creation in it service processes. *Journal of Information Technology*, *29*(2), 170–185. doi: 10.1057/jit.2014.1

Lessard, L. (2014). Designing and managing value co-creation in kibs engagements. *Technology Innovation Management Review*, 36–43.

Lewis, P., & Runde, J. (2007). Subjectivism, social structure and the possibility of socio-economic order: The case of ludwig lachmann. *Journal of Economic Behavior & Organization*, *62*(2), 167–186. doi: 10.1016/j.jebo.2005.03.009

Liao, K., Ma, Z., Jiung–Yee Lee, J., & Ke, K. (2011). Achieving mass customization through trust–driven information sharing: A supplier's perspective. *Management Research Review*, *34*(5), 541–552. doi: 10.1108/01409171111128715

Lin, T. (2015). Multi-sourcing governance: In perception and in practice. In I. Oshri, J. Kotlarsky, & L. P. Willcocks (Eds.), *Achieving success and innovation in global sourcing: Perspectives and practices* (Vol. 236, pp. 187–205). Cham: Springer International Publishing. doi: 10.1007/978-3-319-26739-5{\textunderscore}11

Loboda, B. (2014). Motives for multisourcing in the it sector. *International Journal of Management and Economics*, *38*(1). doi: 10.2478/ijme-2014-0014

Logan. (2000). Using agency theory to design successful outsourcing relationships.

The International Journal of Logistics Management, *11*(2), 21–32. doi: 10.1108/09574090010806137

Ludbrook, J. (2013). Should we use one-sided or two-sided p values in tests of significance? *Clinical and experimental pharmacology & physiology*, *40*(6), 357–361. doi: 10.1111/1440-1681.12086

Luo, Y. (2005). Toward coopetition within a multinational enterprise: A perspective from foreign subsidiaries. *Journal of World Business*, *40*(1), 71–90. doi: 10.1016/j.jwb.2004.10.006

Mariani, M. M. (2016). Coordination in inter-network co-opetitition: Evidence from the tourism sector. *Industrial Marketing Management*, *53*, 103–123. doi: 10.1016/j.indmarman.2015.11.015

Matook, S., Lasch, R., & Tamaschke, R. (2009). Supplier development with benchmarking as part of a comprehensive supplier risk management framework. *International Journal of Operations & Production Management*, *29*(3), 241–267. doi: 10.1108/01443570910938989

Meek, G. E., Ozgur, C., & Dunning, K. (2007). Comparison of the t vs. wilcoxon signed-rank test for likert scale data and small samples. *Journal of Modern Applied Statistical Methods*, *6*(1).

Meetoo, D., & Temple, B. (2003). Issues in multi-method research: Constructing self-care. *International Journal of Qualitative Methods*, *2*(3).

Mele, C. (2011). Conflicts and value co-creation in project networks. *Industrial Marketing Management*, *40*(8), 1377–1385. doi: 10.1016/j.indmarman.2011.06.033

Morgan, D. L. (2007). Paradigms lost and pragmatism regained. *Journal of Mixed Methods Research*, *1*(1), 48–76. doi: 10.1177/2345678906292462

Morris, M., Kocak, A., & Özer, A. (2007). Coopetition as a small business strategy: implications for performance. *Journal of Small Business Strategy*, *18*(1), 35–55.

Nagle, A., & Maughan, A. (2008). Single and multi-sourcing models. *Cross-border outsourcing handbook*.

Näsholm, M. H., & Bengtsson, M. (2014). A conceptual model of individual identifications in the context of coopetition. *International Journal of Business Environment*, *6*(1), 11. doi: 10.1504/IJBE.2014.058021

Nevo, D., & Kotlarsky, J. (2014). Primary vendor capabilities in a mediated outsourcing model: Can it service providers leverage crowdsourcing? *Decision Support Systems*, *65*, 17–27. doi: 10.1016/j.dss.2014.05.008

Niglas, K. (2000). *Combining quantitative and qualitative approaches.* Retrieved 30.10.2016, from `http://www.leeds.ac.uk/educol/documents/00001544.htm`

Onwuegbuzie, A. J., Johnson, R. B., & Collins, K. M. (2014). Call for mixed analysis: A philosophical framework for combining qualitative and quantitative approaches. *International Journal of Multiple Research Approaches*, *3*(2), 114–139. doi: 10.5172/mra.3.2.114

Oppenheim, A. N. (2005). *Questionnaire design, interviewing and attitude measurement* (New ed., reprinted. ed.). London: Continuum.

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), 201–221. doi: 10.1057/dbm.2010.23

Oshri, I. (2011). *Offshoring strategies: Evolving captive center models.* Cambridge, Mass: MIT Press.

Oshri, I., Kotlarsky, J., & Willcocks, L. (2011). *The handbook of global outsourcing and offshoring* (2nd ed ed.). Basingstoke, Hampshire and New York: Palgrave Macmillan.

Oshri, I., & Weeber, C. (2006). Cooperation and competition standards-setting activities in the digitization era: The case of wireless information devices. *Technology Analysis & Strategic Management*, *18*(2), 265–283. doi: 10.1080/09537320600624196

Park, B.-J., Srivastava, M. K., & 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), 210–221. doi: 10.1016/j.indmarman.2013.11.003

Patton, M. Q. (2015). *Qualitative research & evaluation methods: Integrating theory and practice* (4. ed. ed.). Los Angeles, Calif.: SAGE.

Pellegrin-Boucher, E., Le Roy, F., & Gurău, C. (2013). Coopetitive strategies in the ict sector: Typology and stability. *Technology Analysis & Strategic Management*, *25*(1), 71–89. doi: 10.1080/09537325.2012.751011

Phillips, D. C., & Burbules, N. C. (2000). *Postpositivism and educational research.* Lanham, Md.: Rowman & Littlefield Publishers.

Poole, M. S., & Van de Ven, A. H. (1989). Using paradox to build management and organization theories. *Academy of Management Review*, *14*(4), 562–578. doi: 10.5465/AMR.1989.4308389

Pratt, W. E. (2010). Wilcoxon rank sum test. In N. Salkind (Ed.), *Encyclopedia of*

research design. 2455 Teller Road, Thousand Oaks California 91320 United States: SAGE Publications, Inc. doi: 10.4135/9781412961288.n500

Raza-Ullah, T., Bengtsson, M., & Kock, S. (2014). The coopetition paradox and tension in coopetition at multiple levels. *Industrial Marketing Management*, *43*(2), 189–198. doi: 10.1016/j.indmarman.2013.11.001

Revilla, M. A., Saris, W. E., & Krosnick, J. A. (2014). Choosing the number of categories in agree–disagree scales. *Sociological Methods & Research*, *43*(1), 73–97. doi: 10.1177/0049124113509605

Richardson, J. (1993). Parallel sourcing and supplier performance in the japanese automobile industry. *Strategic Management Journal*, *14*(5), 339–350. doi: 10.1002/smj.4250140503

Ritala, P., & Tidström, A. (2014). Untangling the value-creation and value-appropriation elements of coopetition strategy: A longitudinal analysis on the firm and relational levels. *Scandinavian Journal of Management*, *30*(4), 498–515. doi: 10.1016/j.scaman.2014.05.002

Ritala, P., Välimäki, K., Blomqvist, K., & Henttonen, K. (2009). Intrafirm coopetition, knowledge creation and innovativeness. In G. B. Dagnino & E. Rocco (Eds.), *Coopetition strategy* (pp. 64–73). London and New York: Routledge.

Ritter, T., Wilkinson, I. F., & Johnston, W. J. (2004). Managing in complex business networks. *Industrial Marketing Management*, *33*(3), 175–183. doi: 10.1016/j.indmarman.2003.10.016

Robertson, J. (2012). Likert-type scales, statistical methods, and effect sizes. *Communications of the ACM*, *55*(5), 6. doi: 10.1145/2160718.2160721

Roseira, C., Brito, C., & Henneberg, S. C. (2010). Managing interdependencies in supplier networks. *Industrial Marketing Management*, *39*(6), 925–935. doi: 10.1016/j.indmarman.2010.06.012

Ryan, A. B. (2006). Post-positivist approaches to research. in: Researching and writing your thesis: a guide for postgraduate students. *MACE: Maynooth Adult and Community Education*, 12–26.

Salehi, K., & Golafshani, N. (2010). Using mixed methods in research studies: An opportunity with its challenges. *International Journal of Multiple Research Approaches*, *4*(3), 186–191.

Sarker, S., Sarker, S., Sahaym, A., & Bjorn-Andersen, N. (2012). Exploring value cocreation in relationships between an erp vendor and its partners: A revelatory case study. *MIS Quarterly*, *36*(1), 317–338.

Satzger, G., & Kieninger, A. (2011). Risk-reward sharing in it service contracts - a

service system view. In *2011 44th hawaii international conference on system sciences (hicss 2011)* (pp. 1–8). doi: 10.1109/HICSS.2011.365

Saunders, M. (2012). Choosing research participants. *Qualitative Organizational Research: Core Methods and Current Challenges*, 35–52.

Saunders, M., Lewis, P., & Thornhill, A. (2012). *Research methods for business students* (6th ed ed.). Harlow, England and New York: Pearson.

Schermann, Dongus, Yetton, & Krcmar. (2016). The role of transaction cost economics in information technology outsourcing research: A meta-analysis of the choice of contract type. *The Journal of Strategic Information Systems*, *25*(1), 32–48. doi: 10.1016/j.jsis.2016.02.004

Schultze, U., & Avital, M. (2011). Designing interviews to generate rich data for information systems research. *Information and Organization*, *21*(1), 1–16. doi: 10.1016/j.infoandorg.2010.11.001

Scott, J., Ho, W., Dey, P. K., & Talluri, S. (2015). A decision support system for supplier selection and order allocation in stochastic, multi-stakeholder and multi-criteria environments. *International Journal of Production Economics*, *166*, 226–237. doi: 10.1016/j.ijpe.2014.11.008

Sheskin, D. J. (2011). *Handbook of parametric and nonparametric statistical procedures* (5. ed. ed.). Boca Raton, Fla.: CRC Press.

Smith, W. K., & Lewis, M. W. (2011). Toward a theory of paradox: A dynamic equilibrium model of organizing. *Academy of Management Review*, *36*(2), 381–403. doi: 10.5465/amr.2009.0223

Soderberg, A.-M., Krishna, S., & Bjorn, P. (2013). Global software development: Commitment, trust and cultural sensitivity in strategic partnerships. *Journal of International Management*, *19*(4), 347–361. doi: 10.1016/j.intman.2013.04.004

Sprent, P., & Smeeton, N. C. (2007). *Applied nonparametric statistical methods, fourth edition* (4th ed. ed.). Hoboken: Taylor and Francis. Retrieved from `http://gbv.eblib.com/patron/FullRecord.aspx?p=1388842`

Su, N., & Levina, N. (2011). Global multisourcing strategy: Integrating learning from manufacturing into it service outsourcing. *IEEE Transactions on Engineering Management*, *58*(4), 717–729. doi: 10.1109/TEM.2010.2090733

Sullivan, G. M., & Artino, A. R., JR. (2013). Analyzing and interpreting data from likert-type scales. *Journal of graduate medical education*, *5*(4), 541–542. doi: 10.4300/JGME-5-4-18

Tan, F. B., & Hunter, M. G. (2002). The repertory grid technique: A method for

the study of cognition in information systems. *MIS Quarterly*, *26*(1), 39. doi: 10.2307/4132340

Tanghe, J., Wisse, B., & van der Flier, H. (2009). The role of group member affect in the relationship between trust and cooperation. *British Journal of Management*, *51*, 1173. doi: 10.1111/j.1467-8551.2009.00643.x

Tashakkori, A., & Creswell, J. W. (2008). Editorial: Mixed methodology across disciplines. *Journal of Mixed Methods Research*, *2*(1), 3–6. doi: 10.1177/1558689807309913

Teddlie, C., & Tashakkori, A. (2010). *Foundations of mixed methods research: Integrating quantitative and qualitative approaches in the social and behavioral sciences* ([Nachdr.] ed.). Los Angeles: SAGE Publ.

Thomason, S. J., Simendinger, E., & Kiernan, D. (2013). Several determinants of successful coopetition in small business. *Journal of Small Business & Entrepreneurship*, *26*(1), 15–28. doi: 10.1080/08276331.2012.761800

Tidström, A. (2009). Causes of conflict in intercompetitor cooperation. *Journal of Business & Industrial Marketing*, *24*(7), 506–518. doi: 10.1108/08858620910986749

Tidström, A. (2014). Managing tensions in coopetition. *Industrial Marketing Management*, *43*(2), 261–271. doi: 10.1016/j.indmarman.2013.12.001

Tidström, A., & Hagberg-Andersson, A. (2012). Critical events in time and space when cooperation turns into competition in business relationships. *Industrial Marketing Management*, *41*(2), 333–343. doi: 10.1016/j.indmarman.2012.01.005

Trochim, W. (2006). *Research methods knowledge base.* Retrieved 05.04.2015, from `http://www.socialresearchmethods.net/kb/`

Tse, T. (2013). Paradox resolution: A means to achieve strategic innovation. *European Management Journal*, *31*(6), 682–696. doi: 10.1016/j.emj.2013.05.001

Van der Stede, Wim A., Young, S. M., & Chen, C. X. (2005). Assessing the quality of evidence in empirical management accounting research: The case of survey studies. *Accounting, Organizations and Society*, *30*(7-8), 655–684. doi: 10.1016/j.aos.2005.01.003

Vaxevanou, & Konstantopoulos. (2015). Models referring to outsourcing theory. *Procedia - Social and Behavioral Sciences*, *175*, 572–578. doi: 10.1016/j.sbspro.2015.01.1239

Vijayvagy, L. (2012). Decision framework for supplier selection through multi criteria evaluation models in supply chain. *International Journal of Management &*

Innovation, *4*(2), 16.

Vonderembse, M. A., & Tracey, M. (1999). The impact of supplier selection criteria and supplier involvement on manufacturing performance. *The Journal of Supply Chain Management*, *35*(3), 33–39. doi: 10.1111/j.1745-493X.1999.tb00060.x

Wallenburg, C. M., & Raue, J. S. (2011). Conflict and its governance in horizontal cooperations of logistics service providers. *International Journal of Physical Distribution & Logistics Management*, *41*(4), 385–400. doi: 10.1108/09600031111131940

Wasserman, L. (2010). *All of nonparametric statistics*. New York, NY: Springer.

Wen-li, L., Humphreys, P., Chan, L., & Kumaraswamy, M. (2003). Predicting purchasing performance: The role of supplier development programs. *Journal of Materials Processing Technology*, *138*(1-3), 243–249. doi: 10.1016/S0924-0136(03)00079-7

Westner, M., & Strahringer, S. (2008). Evaluation criteria for selecting offshoring candidates: an analysis of practices in german businesses. *Journal of Information Technology Management.*, 16–34.

Whitten, & Wakefield. (2006). Measuring switching costs in it outsourcing services. *The Journal of Strategic Information Systems*, *15*(3), 219–248. doi: 10.1016/j.jsis.2005.11.002

Wiener, M., & Saunders, C. (2014a). Forced coopetition in it multi-sourcing. *The Journal of Strategic Information Systems*, *23*(3), 210–225. doi: 10.1016/j.jsis.2014.08.001

Wiener, M., & Saunders, C. S. (2014b). Who is the favored bride? challenges in switching to a multi-vendor offshoring strategy. In R. Hirschheim, A. Heinzl, & J. Dibbern (Eds.), *Information systems outsourcing* (pp. 289–312). Berlin, Heidelberg: Springer Berlin Heidelberg. doi: 10.1007/978-3-662-43820-6{\textunderscore}12

Wiener, M., Vogel, B., & Amberg, M. (2010). Information systems offshoring - a literature review and analysis. *Communications of the Association for Information Systems*, *27*(25). Retrieved from `http://aisel.aisnet.org/cais/vol27/iss1/25`

Wilhelm, M. M. (2011). Managing coopetition through horizontal supply chain relations: Linking dyadic and network levels of analysis. *Journal of Operations Management*, *29*(7-8), 663–676. doi: 10.1016/j.jom.2011.03.003

Wu, Choi, & Rungtusanatham. (2010). Supplier–supplier relationships in buyer–supplier–supplier triads: Implications for supplier performance. *Journal of Operations Management*, *28*(2), 115–123. doi: 10.1016/j.jom.2009.09.002

Zaheer, A., McEvily, B., & Perrone, V. (1998). Does trust matter? exploring the effects of interorganizational and interpersonal trust on performance. *Organization Science*, *9*(2), 141–159. doi: 10.1287/orsc.9.2.141