

**Key Drivers of University-Industry Relationships and the Impact
of Organisational Culture Difference; A Dyadic Study**

by

Carolin Plewa

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Abstract

This research examines the characteristics of successful university-industry relationships. By integrating the research areas of relationship marketing and technology transfer, it attempts to provide a unique contribution to both streams and the emerging literature on university-industry relationships. This thesis argues that conceptualising relationships beyond those between private sector organisations, the current central focus of relationship marketing theory development, is needed in order to mature the discipline. In particular, university-industry relationships offer research opportunities due to their incorporation of fundamentally different organisational cultures. The aim of this research is to identify key drivers of university-industry relationships by taking into account the impact of organisational culture difference and other relevant antecedents, such as individuals engaged in the relationship process.

Based on a literature review and initial qualitative research, two conceptual models were developed and subsequently tested using Structural Equation Modelling methods. The first generic model identified the key drivers of satisfaction and intention to renew and examined the influence of organisational compatibility and personal experience on university-industry relationships. The second dyadic model focused on identifying the impact of individual dimensions of organisational culture difference on relationship characteristics and success. Comprising the perspectives of both relationship parties, the dyadic data enabled an advanced reflection of cultural differences and relationship dynamics. Four dimensions were analysed, namely differences in time orientation, market orientation, employee empowerment and corporate flexibility. Both models were analysed in three steps, including path analysis and hypotheses testing, model re-specification and multi-group analysis.

Consistent with the literature, trust, commitment and integration were found to positively influence the primary outcome variable, satisfaction, and were thus confirmed as key drivers of successful university-industry relationships. While trust was identified as the strongest driver for satisfaction, commitment emerged as the strongest predictor of intention to renew. Also confirming relationship marketing theory, the results showed interrelationships between these relationship factors:

Trust positively affected commitment and integration and commitment strongly and positively influenced integration. The findings further demonstrated that organisational compatibility positively influenced all relationship characteristics. However, only two significant paths were confirmed between the individual dimensions of organisational culture difference and relationship characteristics: Differences in time orientation and corporate flexibility both impacted commitment negatively. Furthermore, market orientation difference directly and negatively affected the relationship outcome measure intention to renew. The results only showed a weak influence of personal experience, the variable measuring the relevance of individuals for university-industry relationships, on commitment.

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List of Abbreviations

α	Cronbach's coefficient alpha
ρ_{η}	Composite reliability
$\rho_{vc(\eta)}$	Average Variance Extracted (AVE)
χ^2	Chi-Square
χ^2/df	Normed Chi-Square
$\Delta\chi^2$	Chi-Square Difference
AGFI	Adjusted Goodness-of-Fit
ARC	Australian Research Council
CAIC	Consistent Akaike Information Criterion
CFI	Comparative Fit Index
CRC	Cooperative Research Centre
CRM	Customer Relationship Management
GFI	Goodness-of-Fit
IMP	Industrial Marketing and Purchasing
NFI	Normed Fit Index
OECD	Organisation for Economic Co-operation and Development
OCD	Organisational Culture Difference
R&D	Research and Development
RMSEA	Root Mean-Square Error of Approximation
SEM	Structural Equation Modelling
TLI	Tucker-Lewis Index
UIR	University-Industry Relationship

Statement of Declaration

This thesis contains no material which has been accepted for the award of any other degree or diploma in any university or other tertiary institution. To the best of my knowledge and belief, the thesis contains no material previously published or written by another person, except when due reference is made in the text of the thesis.

I give consent to the copy of my thesis, when deposited in the University Library, being available for loan and copying.

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Name of Candidate

Publications from this Thesis since Enrolment

1. Journal Articles - Refereed

Plewa, C., Quester, P., and Baaken, T. (2005) "Relationship Marketing and University-Industry Linkages: A Conceptual Framework", *Marketing Theory*, 5 (4), pp. 431-454 (Appendix 1a).

Plewa, C., and Quester, P. (in press) "Satisfaction with University-Industry Relationships: The Impact of Commitment, Trust and Championship", *International Journal of Technology Transfer and Commercialisation* (Appendix 1b).

Varey, R.J., Baxter, R., Brodie, R.J., Brookes, R.W., Plewa, C., Quester, P., and Shembri, S. (2005) "Buyer-Seller Relationships: Australasian Research and Reflections", *Journal of Customer Behaviour*, 4 (1), 127-146.

Plewa, C., Quester, P., and Baaken, T. (conditionally accepted) „Organisational Culture Differences and Market Orientation: An Exploratory Study of Barriers to University-Industry Relationships", *International Journal of Technology Transfer and Commercialisation*.

2. Book Section

Plewa, C., and Quester, P. (forthcoming) "University-Industry Relationships: The Effect of Imbalance in Flexibility and Market Orientation", to be published in the *Anthology on Science Marketing*, Editor: Thomas Baaken, Germany.

3. Conference Proceedings - Refereed

Plewa, C. (2005) "Differences in Perceived Benefits from University-Industry Relationships", *Proceedings of the Australian and New Zealand Marketing Academy Conference*, Fremantle, (CDROM).

Plewa, C., and Quester, P. (2004) "'Champions' and University-Industry Relationships", *Proceedings of the 12th International Colloquium on Relationship Marketing*, Hamilton, New Zealand, (CDROM).

Plewa, C., Quester, P., and Baaken, T. (2004) "Marketing Orientation in University-Industry Linkages", Proceedings of the Australian and New Zealand Marketing Academy Conference, Wellington, New Zealand, (CDROM).

Plewa, C., and Quester, P. (2004) "Modelling Successful Innovation-Oriented University-Industry Relationships", Proceedings of the 5th International CINet Conference, Sydney, (CDROM).

3. Conference Proceedings and Workshops - Non-Refereed

Horner, N., and Plewa, C. (2005) "Public-private Sector Engagement: A Suppliers View", Presented at the KCA Annual Conference, Adelaide.

Plewa, C. (2004) "Characteristics and Key Success Factors of University-Industry Linkages: a Relationship Perspective", Proceedings of the 2nd and 3rd Conference on Science-to-Business Marketing and Successful Research Commercialisation, Muenster, Germany, and Brussels, Belgium, (CDROM).

Plewa, C., and Quester, P. (2004) "Organisational Culture Difference and University-Industry Relationships: An Exploratory Study", Proceedings of the Marketing Science Conference, Rotterdam, Netherlands, p.60.

Plewa, C. (2004) "Science-to-Business Marketing", Presented at the Workshop: Die erfolgreiche Vermarktung von Forschung, University of Applied Sciences Cologne, Germany.

Plewa, C. (2003) "Characteristics and Key Success Factors of University-Industry Linkages: A Relationship Perspective", Proceedings of the Conference Science Marketing: A Talkfest on Successful Research Commercialisation New and Inspiring Aspects from Australia and Europe, Adelaide, (CDROM).

Plewa, C. (2003) "The Effect of Organisational Culture Distance on Relationship Performance: Introducing Relationship Marketing to University-Industry Relationships", Presented at the Australian and New Zealand Marketing Academy Conference (ANZMAC) Doctoral Colloquium, Adelaide.

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The value of an idea lies in using it – Edison

“Ich habe fertig”. I can’t believe that I did it; three years of hard work have resulted in a thesis of which I am very proud. More importantly, however, the last three years have showed me that an endless number of questions and ideas are waiting to be explored. Edison’s quote on my office wall reminds me of the centre of this thesis: using ideas wisely and valuably. I am sure it will guide me in the future and I can’t wait to see where life takes me from here.

Example is not the main thing in influencing others; it's the only thing - Schweitzer

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If you can give your son or daughter only one gift, let it be enthusiasm - Barton

My deepest thanks go to my family and specifically to my parents. Their unconditional love, support and belief in me have opened up the world to me. My father’s thirst for knowledge, adventure and perfection and my mother’s stability, love and immense strength have made me who I am today. Thanks for giving me not only great enthusiasm but endless opportunities. This is for you.

Small opportunities are often the beginning of great enterprises - Demosthenes

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No road is long with good company – Turkish Proverb

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Chapter One - Introduction

1.1. Background to the Research

The recognition of the importance of relationships is not new (Berry, 1983, Donaldson and O'Toole, 2002, Dwyer and Oh, 1987, Spekman and Johnston, 1986) but has “been naturally incorporated into the marketing theory” (Aijo, 1996, p. 10). Increased competition and technological innovation over the last two decades have led to the exploration of new opportunities for success in today’s marketplace and to an emphasis on strategic relationships (Donaldson and O'Toole, 2002, Wilson, 2000). Correspondingly, relationship marketing (RM hereafter) has emerged as a dominant field in the marketing area, based on the belief that building and maintaining relationships is beneficial for an organisation and more efficient than transactional marketing (Palmer, 2002b).

While many authors agree on the benefits of RM in comparison to the traditional marketing mix approach (Donaldson and O'Toole, 2002, Grönroos, 1997a, Palmer, 2000a), other authors contrast this notion, finding no or limited positive outcomes in relationship building (Anderson, 1990, Fisher, Maltz and Jaworski, 1997, Grayson and Ambler, 1999, Moorman, Zaltman and Deshpandé, 1992). Normative and conceptual rather than empirical approaches to RM have not yet provided a desirable level of generalisability (see Liljander and Roos, 2002, Palmer, 2000a, Siguaw, Baker and Simpson, 2003). Furthermore, a focus on one relationship party rather than the overall relationship in much of the empirical RM literature may limit the usefulness and comparability of findings. Considering that relationship success requires the existence of a win-win situation (Donaldson and O'Toole, 2002, Gummesson, 2002), a single-sided focus may not only be restricting but also misleading. More research is required to investigate relationship dynamics further, integrating the perspectives of all relationship parties.

The nature of relationships, such as constant change (Blois, 1997, Egan, 2001), complexity and multiple facets (Coviello, Brodie and Munro, 1997, Egan, 2001) makes it difficult to analyse the key drivers of relationships and suggests the consideration of differences between parties engaged in a relationship (Medlin, 2001). While a diverse range of organisational demographics and cultural characteristics are believed to be relevant for relationship success and have been

studied in the RM area, only few studies exist on the organisational cultural difference (OCD thereafter) between relationship parties. These scattered studies focus on single variables of cultural distance between relationship actors (Fisher et al., 1997, Moorman et al., 1992, Morgan and Hunt, 1994) and fail to provide a comprehensive examination of cultural difference and its impact on relationships. The lack of research on OCD in RM may stem from the almost exclusive research focus on private sector organisations. While it is generally understood that all organisations differ in terms of their social atmosphere or organisational culture (Reynolds, 1986), the cultural gap between private sector organisations may not be distinct enough to exert a significant influence on a relationship, given that the organisations operate in the same sector and under similar environmental influences and pressures. An empirical examination of the influence of OCD in the relationship between fundamentally different organisations, such as universities and private sector organisations, is yet to be undertaken and is proposed in this research.

The mergers and acquisitions literature has long recognized cultural mismatch as a relevant subject matter, given the impact of OCD on success (Buono, Bowditch and Lewis, 1985, Chatterje, Lubatkin, Schweiger and Weber, 1992, Fralicx and Bolster, 1997). Based on this research stream, OCD has slowly arisen as an area of concern for strategic alliance research in recent years (Leisen, Lilly and Winsor, 2002, Lewis, 2002, Smith and Barclay, 1997). Contrasting views, however, exist on the effect of cultural difference. While most researchers believe that dissimilarity of relationship actors negatively affects relationships (Chatterje et al., 1992, Crosby, Evans and Cowles, 1990, Doney and Cannon, 1997, Weber, 1996), some authors suggest a positive impact of cultural difference on the value an actor can add to a relationship (Moorman et al., 1992), as well as on relationship outcomes (Hewett, Money and Sharma, 2002). Future research is required to clarify the influence of OCD in a relationship context.

While the RM literature focuses on linkages between private sector organisations or between organisations and their end consumers (Abratt and Kelly, 2002, Berry, 2002, Varadarajan and Cunningham, 2000, Johnston, Lewin and Spekman, 1999, Hunt, 1997, The IMP Group, 1997), a stream of research has developed in recent years stressing the increased relevance of relationships between universities and industry entities for the performance of both parties and society at

large (ARC, 2001, Cyert and Goodman, 1997, Stackhouse, Sultan and Kirkland, 2001, see also: Plewa, Quester and Baaken, 2005, in Appendix 1a). This increased importance and the need for today's universities and companies to rethink and extend their focus on research-oriented university-industry relationships (UIRs thereafter) is due to a rapid increase in competition and technology, a decrease in governmental support for universities as well as the shortening of product life cycles (ARC, 2001, Turpin, Aylward, Garrett-Jones, Speak, Grigg and Johnston, 1999).

Despite a general belief in the importance of UIRs, little research has been undertaken in this area and most of it is case specific. While technology transfer has developed as a major topic of interest for practitioners and academics over the last decades (Bozeman, 2000, Steenhuis and De Bruijn, 2002), the literature has to a large degree focused on transactional rather than relational exchanges and a comprehensive research stream on UIRs does not exist. The broadest literature area discussing UIRs is government and working group reports (ARC, 2001, Turpin et al., 1999, Knowledge Commercialisation Australasia, 2003), often focusing primarily on intellectual property and grant schemes. An empirical analysis of UIRs, their characteristics, key drivers and antecedents is required to help both universities and industry entities to manage relationships and successfully operate in today's marketplace.

Furthermore, few authors have considered a potential benefit of introducing marketing or RM principles to universities and UIRs (Baaken, 2003, Hoppe, 2001, see also Plewa et al., 2005, in Appendix 1a). Hence, the introduction of RM theory to UIRs is undertaken in this study.

1.2. Research Context

This research investigates dyadic relationships between university research groups and private sector business units and is anchored in two primary research areas. RM has been identified as the principal parent theory for this research. Its prolific and established nature offers a thorough foundation for this research by providing a comprehensive understanding of business-to-business relationships in a private sector context. Due to the lack of a research stream on UIRs, technology transfer was chosen as the secondary parent theory, providing insight into processes

and cultures related to research and its transfer and commercialisation. Due to the novelty of the research field, this research also draws on related areas of knowledge, such as the innovation and research and development (R&D thereafter) literature. Furthermore, other sources of information on UIRs, such as reports of governments and working groups, are taken into account throughout the literature review and discussion.

1.2.1. Demarcation of the Research Area - Relationship Marketing

A more precise definition of the research context requires a demarcation of the research area from related fields, such as network theory, strategic alliances research, key account management, customer relationship management (CRM thereafter) and services marketing in this research. While an organisation is indisputably embedded in a series of relationships, as acknowledged by most authors in the RM literature (Johnston et al., 1999, Peck, Payne, Christopher and Clark, 1999, Morgan and Hunt, 1994, Rao and Perry, 2002), this research limits its analysis to relationship dyads. This micro approach to RM excludes network approaches, such as the network theory to industrial marketing developed by the Industrial Marketing and Purchasing (IMP) Group or the channel cooperation research. Dealing with a network of relationships involving a series of individual and/or institutional relationship actors, these approaches imply a different perspective on relationship characteristics and dynamics. Due to the novelty of research on UIRs, the focus on dyads rather than on networks allows the elimination of network effects on a relationship (Baraldi and Bocconcelli, 2001, Iacobucci and Hopkins, 1992) and was deemed more relevant for this study.

Strategic alliances research overlaps to some degree with the following definition of RM for this research, developed based on Grönroos (1994b) and Harker (1999) (refer to section 2.3):

“RM involves proactively identifying, creating, developing, maintaining, enhancing and, when necessary, terminating relationships that are trusting, committed and interactive in nature with selected customers [partners], in order to create a mutual value over time.”

The perceived overlap is in line with other authors, who described business alliances as one form of RM (Hunt, Lambe and Wittmann, 2002, Morgan and Hunt, 1994). The definition of alliances as “collaborative efforts between two or more firms that pool their resources in an effort to achieve mutually compatible goals that they could not achieve easily alone” (Hunt et al., 2002, p. 18) further demonstrates the overlap between RM and alliance research. Both areas are concerned with collaborative relationships between two or more parties seeking to gain mutually beneficial outcomes.

However, strategic alliances represent a specific form of relationships and are characterised by long relationship duration and high structural and social commitment. Alliances often entail exclusivity, non-imitability (Varadarajan and Cunningham, 2000) and the creation of a separate entity based on a long-term strategic plan (Webster, 1992). Moreover, strategic alliances in the university-industry context generally involve the comprehensive funding of whole research areas or departments (Bell, 1993). While alliances are one form of the relationships analysed in this research, a broader view of relationships is taken, including long- and short-term, exclusive and non-exclusive relationships, as well as relationships of varying scope.

Similarly, close relations exist between RM and key account management, which is believed to originate in the shift towards RM (Abratt and Kelly, 2002). This notion is clarified in the description of key account management as the “natural development of customer focus and relationship marketing in business-to-business markets” (McDonald, Millman and Rogers, 1997, p. 737). Key account management is defined as “a strategy used by selling organisations to serve high-potential, multi-location accounts with complex needs requiring individual attention through a carefully established relationship” (Abratt and Kelly, 2002, p. 467), with a key account an often powerful and demanding customer of strategic importance (Abratt and Kelly, 2002, Homburg, Workman and Jensen, 2002, Spencer, 1999). Due to the range of relationships to be included in this research, key account management was deemed too restricted as a central theory but was included where appropriate.

In comparison to the restricted focus of strategic alliance and key account management theory, CRM has been described as a more extensive perspective than RM (Zablah, Bellenger and Johnston, 2004). While Boulding, Staelin, Ehret and

Johnston (2005) identified the development of a common definition of CRM, several perspectives on, and definitions of, CRM have been reported in the literature (Payne and Frow, 2005). Zablah et al. (2004) grouped these definitions based on a thorough content analysis into five perspectives, namely process, strategy, philosophy, capability and technological tool. In this thesis, CRM is understood as a focus lying "... on providing optimal value to your customers – through the way you communicate with them, how you market them, and how you service them – as well as through the traditional means of product, price, promotion, and place of distribution" (Nykamp, 2001, p. 4). CRM has grown in popularity over recent years, with a recent special issue published in the *Journal of Marketing* (Boulding et al., 2005).

Despite similarities between RM and CRM, such as the strategic components (Baaken and Bobiatynski, 2002, Crosby and Johnson, 2002, Donaldson and O'Toole, 2002), the emphasis on customer value (Nykamp, 2001, Sheth, 2002) and more specifically dual or mutual value (Boulding et al., 2005, Cao and Gruca, 2005), the focus on relationship building and enhancement and the superior importance of profitable customers (Payne and Frow, 2005, Baaken and Bobiatynski, 2002, Egan, 2001), their fundamental difference lies in their scope. CRM embraces a large range of activities and tactics aimed at building a large portfolio of customer relationships (Zablah et al., 2004), whereas RM, as understood in this research, focuses on trusting, interactive and committed relationships with selected customers or partners. Furthermore, CRM entails an information technology component, not incorporated in RM. Payne and Frow (2005, p. 168) clearly illustrated this issue: "CRM unites the potential of relationship marketing strategies and IT [information technology] to create profitable, long-term relationships with customers and other key stakeholders". Given the foundation of this research in RM theory, CRM was integrated into the discussion where suitable.

Research in the area of services marketing (Berry, 1983, Bitner, 1995) and the Nordic School of Services Management (Grönroos, 1991a, Grönroos, 1999, Gummesson, 1991, Gummesson, 1994b) represent one of the research areas that led to the development of RM (Aijo, 1996). The proximity of services and RM research increased in recent years by a shift from a product to a service focus (Chapman, Soosay and Kandampully, 2002, Gummesson, 2002) and to service economies in

developed countries (Egan, 2001). The relevance of individuals for UIRs, proposed in this research, mirrors the relevance of the services marketing area for this research context. Hence, services marketing knowledge was integrated throughout the discussion.

1.2.2. Demarcation of the Research Area - University-Industry Relationships

This research is undertaken in the field of research-oriented UIRs. The term relationship is understood as a two-way process requiring cooperation and the search for a win-win situation for both partners (Donaldson and O'Toole, 2002, Gummesson, 2002). This understanding excludes by definition the simple funding or sponsorship of university research by another organisation. A single or one-off selling is also eliminated from the analysis, as relationships go beyond transactional or occasional contact. Due to the focus on UIRs, relationships between the university or company and other groups, such as students or commercial arms of universities, are not taken into account, since these might develop based on differing needs and relationship drivers. Also excluded are those university-industry linkages related to non-research related matters.

Despite the emerging research on linkages between research institutions and private sector entities in recent times (ARC, 2001, Cyert and Goodman, 1997, Stackhouse et al., 2001), no comprehensive research exists on UIRs to date. Given the assumption of knowledge and technology transfer as key outcomes of UIRs, this study adopts a broad view of technology, including knowledge, ideas and material products (Bell, 1993). Also, relationships based on commercial as well as non-commercial expectations and outcomes are incorporated. However, spin-off companies are excluded from the research due to their origin in the university. Their close ties to universities and the similarity of their staff and university staff is likely to restrict the investigation of the impact of OCD on relationships.

Research on relationships within the innovation and R&D management literature generally focuses on intra-organisational relationships, often between marketing and R&D functions (Chapman and Hyland, 2004, Griffin and Hauser, 1996, Gupta, Wilemon and Atuah-Gima, 2000). Due to the sparse research on UIRs, knowledge gained in the area of intra-organisational relationships and their impact

on R&D and innovation success is used for this research where relevant. However, its use is limited to assist the development of a conceptual framework and the explanation of findings.

In brief, this research is based on two parent theories, primarily RM and secondarily technology transfer. The previous discussion highlighted the range of relationships incorporated in this study, which aims at reflecting various relationship types of trusting, interactive and committed UIRs. The inclusion and elimination of research streams was highlighted.

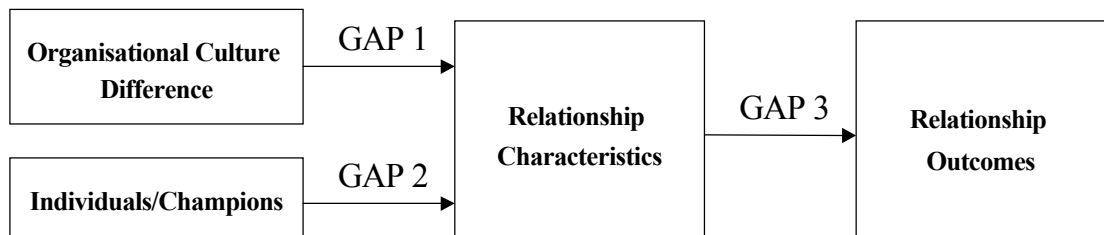
1.3. Research Problem

The prominence of RM theory and practice has led to prolific discussions and numerous publications throughout the previous two decades (Ballantyne, Christopher and Payne, 2003, Berry, 2000, Grönroos, 1994b, Gummesson, 2002, Palmer, 2000b, Sheth and Parvatiyar, 2000, Johnston et al., 1999, Wilkinson and Young, 2002a). The resulting knowledge on antecedents and characteristics of successful relationships in the private sector has become established in the marketing discipline. Given a strong focus on relationships between private sector organisations, however, relationships between two fundamentally different parties, such as universities and industry entities, remain to be examined. Since the relationship concept is a major shift in marketing (Grönroos, 1997a, Gummesson, 2002, Sheth and Parvatiyar, 2002), what should these relationships look like? What characteristics are key drivers for relationships crossing fundamentally different organisational cultures?

Figure 1.1 illustrates the three central knowledge gaps identified for this research. While OCD and its effect on relationships have been reported in the technology transfer and UIR literature (Cyert and Goodman, 1997, Barnes, Pashby and Gibbons, 2002), as well as the mergers and acquisitions literature (Buono et al., 1985, Chatterje et al., 1992, Fralicx and Bolster, 1997), its direct impact on a relationship remains unclear (gap 1). Considering differing cultures, individuals and their skills in crossing these cultures are likely to be critical to a relationship. While the services marketing and technology transfer literature have highlighted the relevance of boundary-spanning individuals and champions (ARC, 1999, Bendapudi

and Leone, 2002, Gummesson, 1991), an empirical investigation in a university-industry context is yet to be conducted (gap 2). Furthermore, despite empirical evidence of the relevance of characteristics such as trust, commitment and communication as key drivers of relationships in the RM area, they have yet to be validated in a technology transfer and UIR context (gap 3).

Figure 1.1 Knowledge Gaps in the Existing RM and UIR Literature



Based on the gaps represented in Figure 1.1, the focus of this research is to investigate the following research questions:

1. Does organisational culture difference affect UIR characteristics?
2. Do individuals/champions influence UIR characteristics?
3. Which relationship characteristics are key drivers of UIRs?

The following section further elaborates on the contribution of this research to marketing and UIR knowledge.

1.4. Contribution of the Research

This research is expected to contribute significantly to both parent theories and to provide managerial implications for universities and industry entities. The integration of knowledge from the established theory of RM and the emerging area of technology transfer, and more specifically UIRs, creates a unique learning opportunity for theorists and practitioners in both areas. The proposed primary contributions relate to four characteristics of this research, namely 1 - the empirical investigation of relationships crossing fundamentally different organisational cultures and of the influence of OCD on UIRs, 2 - the integration of the established RM theory and the emerging technology transfer literature, 3 - the empirical

analysis of the effect of individuals and their boundary-spanning skills on UIRs, and 4 - the dyadic data analysis.

First, the marketing discipline has seen a prolific development of RM thought throughout the last two decades and an established integration of relationship theory in the overall marketing area. Nevertheless, due to a focus on relationships between private sector organisations, RM has not yet recognized the influence of OCD on relationships to the same degree as other research streams have. The primary aim of this research is to analyse OCD on relationships, with findings expected to offer a better understanding of relationships crossing fundamentally different environments and cultures, such as UIRs. Furthermore, given inherent differences of organisational cultures even amongst organisations in the private sector (Reynolds, 1986), this research may enhance our appreciation of the influence of such differences on relationships also in the private sector.

The technology transfer and UIR literatures have long recognized the existence of environmental and organisational differences between universities and industry partners (Cyert and Goodman, 1997, Siegel, Thursby, Thursby and Ziedonis, 2001, Winchell, 1994). While a negative influence of such difference on technology transfer processes is generally assumed, empirical examinations to that effect are missing. Specifically, the identification of individual dimensions in which university research groups and private sector business units differ, is a novelty. Rather than analysing an overall concept of organisational culture, its individual dimensions and their effect on UIRs are analysed in this study. This offers not only a detailed foundation for future research in this evolving area, but also uncovers specific managerial implications for managers involved, or aiming to get involved, in these relationships.

Second, this research aims at significantly contributing to the development of a comprehensive UIR research stream. A largely transactional perspective of the technology transfer and commercialisation literature (Harman, 2001, Lee, Tinsley and Bobko, 2003), combined with a number of government and working group reports recognising the relevance of relationship strategies in the area of technology transfer (EUA, EIRMA and EARTO, 2005, ARC, 2001), have only translated into scattered empirical research on UIRs (Mora-Valentín, Montoro-Sánchez and Guerras-Martín, 2004, see also: Plewa and Quester, in press, in Appendix 1b). The

development of a research stream, however, requires not only the combination of different methodological approaches but also purposeful research continuously building on the available understanding and literature (Carson and Coviello, 1996). The application of RM theory in a technology transfer context provides a thorough basis for future UIR research. By providing a systematic foundation, this research is anticipated to encourage the development of a comprehensive UIR research stream.

Furthermore, the introduction of marketing, and more specifically RM, theory has led to the use of satisfaction as the primary relationship outcome measure in this research. The majority of the technology transfer and commercialisation literature has focused on measurable outcomes such as patents and intellectual property (Coupé, 2003, Ernst, 1998), neglecting the range and diversity of potential benefits universities and organisations may receive from UIRs. Satisfaction, on the other hand, enables an overall assessment of relationship outcomes, taking into account different motivations and perceptions of relationship parties. This enables the identification of key drivers for UIRs, broadening the previously limited assessment of relationship performance.

Third, a high level of interaction between relationship partners (Tikkanen and Tuominen, 2000) implies the strong relevance and responsibility of individuals engaged in the process. Authors in the areas of innovation, technology transfer and UIRs have reported on the importance of individuals or champions in the process (ARC, 1999, Howell, Shea and Higgins, 2005, Santoro and Chakrabarti, 2002, Shane, 1994), often highlighted in the services marketing literature and the service-based research streams in RM (Bendapudi and Leone, 2002, Gummesson, 1991). Given that UIRs cross fundamentally different organisational environments and cultures, the skills of individuals to understand, and work with, the other environment appear crucial. However, much of the RM and technology transfer literature assumes the relevance of individuals, and fails to empirically investigate these individuals. An increasingly strident call for further empirical validation has been heard in recent years (Howell et al., 2005, Markham and Aiman-Smith, 2001), justifying this research.

Fourth, despite the increasing interest placed on understanding relationship dynamics, a difficult data collection process has limited the number of dyadic studies reported in the literature (Straub, Rai and Klein, 2004, Gundlach and

Cadotte, 1994, Hewett et al., 2002, Kim, 2000, Smith and Barclay, 1997). Dyadic data enables the researcher to create a more truthful reflection of relationship dynamics than one-sided data, as it integrates the perceptions of both relationship parties. In this study, data analysis is directed at examining the influence of dynamics, such as similarities and differences within a dyad, on the relationship and its success. This investigation plays a major role in enhancing our understanding of relationships, required to enable appropriate processes and management control and, in turn, relationship success.

In brief, the proposed contributions of this research primarily relate to the empirical investigation of the effect of OCD on relationships, the integration of the RM and technology transfer literature, the empirical validation of the importance of individuals for UIRs and the dyadic data analysis. An outline of the thesis is presented next.

1.5. Outline of the Thesis

Chapter One. Chapter one introduces this research, providing a foundation and focus for the following discussion. Besides presenting the background to, and proposed contribution of, this research, the research context is established and segregated from related areas. Furthermore, an overview of individual chapters is provided.

Chapter Two. Chapter two presents a literature review of the principal parent theory, RM. Starting with the evolution of RM, theoretical bases and approaches are discussed and a RM definition for this research is developed. Importantly, this chapter identifies the variables to be included in this study. Following a discussion of the relationship outcomes of value and satisfaction, the relationship characteristics of trust, commitment and communication are introduced. Furthermore, the available literature regarding the antecedents of organisational compatibility and individuals is discussed.

Chapter Three. Chapter three provides a review of the second parent theory, technology transfer and UIRs. Following the structure of the previous section, the chapter begins with the evolution of UIRs and a differentiation of technology transfer and UIRs. Furthermore, relationship outcomes, characteristics and

antecedents are discussed, including the introduction of three OCD dimensions, namely time orientation, market orientation and language. The chapter concludes with a conceptual framework based on the review of RM and technology transfer literature.

Chapter Four. Chapter four outlines the overall research design and the methodology and findings of the preliminary qualitative research step. Following the description and justification of the qualitative research, the refinement of the conceptual framework into two conceptual models is described and the individual variables and their interrelationships detailed. Based on the conceptual models and related propositions, the chapter concludes with hypotheses for further analysis.

Chapter Five. The quantitative step of this research is outlined in chapter five. More specifically, the chapter elaborates on the levels of measurement, theory and statistical analysis and the quantitative data collection method. The questionnaire design is described, detailing the operationalisation of constructs, scales and measurement, as well as the questionnaire draft and pre-test. Furthermore, the sampling procedure, frame and size as well as nonresponse bias are outlined.

Chapter Six. Chapter six provides the research results. Starting with the steps of data preparation, treatment and analysis, relevant issues such as normality, reliability, validity and the calculation of generic and dyadic composite scores are described. Furthermore, important concerns for Structural Equation Modelling (SEM) are presented, including congeneric measurement models, model identification and goodness-of-fit indexes. Following, results for the generic and dyadic model are presented in three steps, namely hypotheses testing, model re-specification and multi-group path analysis.

Chapter Seven. The final chapter elaborates on the results of this research, integrating all findings regarding the influence of UIR drivers and the impact of antecedents on the relationship and relationship success. Based on the discussion, managerial implications, limitations of the research and contributions to the literature are outlined. Before concluding, directions for future research endeavours are given.

Chapter Two - Relationship Marketing

2.1. Introduction

Inter-organisational relationships emerged as one central research theme in the marketing discipline during the last two decades (Varey, Baxter, Brodie, Brookes, Plewa, Quester and Schembri, 2005, Abratt and Kelly, 2002, Rich, 2002, Varadarajan and Cunningham, 2000, Hunt, 1997). Relationships are not new to the business and marketing area (Berry, 1983, Dwyer and Oh, 1987, Johnston et al., 1999, Parvatiyar and Sheth, 2000) but were part of general business practice before industrialisation led to a concentration on mass markets rather than individuals (Egan, 2001, Sheth and Parvatiyar, 1995, Lewin and Johnston, 1997).

The last twenty years saw marketing re-emphasise the importance of direct marketing (Sheth and Parvatiyar, 1995) and thus of inter-personal and inter-organisational relationships and their potential strategic advantages (Coviello, Brodie, Danaher and Johnston, 2002). Technological advances have enabled higher efficiency in interaction between business entities (Perry, Cavaye and Coote, 2002, Sheth and Parvatiyar, 1995) and the individual treatment of mass markets. Similarly, strategic relationships are artificially formed rather than allowed to evolve organically over time (Wilson and Jantrania, 1994). As a result, the character of, and approach to, relationships have changed (Boulding et al., 2005, Johnston et al., 1999, Palmer, 1997) and the failure rate is high (Wilson and Jantrania, 1994).

The significance of relationships in today's marketing theory and practice is reflected in the change of the American Marketing Association's (AMA) definition of marketing. Gummesson (1994a) had criticized the absence of the construct of relationships in the AMA's definition of marketing, and AMA recently acknowledged relationships as a cornerstone of marketing theory in their new definition of marketing as "an organisational function and a set of processes for creating, communicating, and delivering value to customers and for managing customer relationships in ways that benefit the organisation and its stakeholders" (AMA website, 2004). This prominence of relational theory is based on the belief that the building and maintenance of relationships is beneficial for an organisation and more efficient than the traditional marketing mix approach in today's marketplace (Palmer, 2002b).

RM has evolved into one of the most prolific areas in marketing research, following the introduction of the term by Berry (1983) more than twenty years ago. Indeed, the last decade saw RM achieving unprecedented recognition as a major trend in marketing (Coviello et al., 2002), spawning a large amount of articles (e.g. Gummesson, 2002, Rao and Perry, 2002, Sheth, 2002, Sigauw et al., 2003, Sweeney and Webb, 2002), journal issues as well as a specific journal published in the RM area. Today, authors agree that RM has become an integrated and dominant part or sub-field of the marketing literature (Ballantyne et al., 2003, Hennig-Thurau, Gwinner and Gremler, 2002, Sheth and Parvatiyar, 2002).

After discussing at some length whether RM thought sparked a paradigm shift or not (Brodie, Coviello, Brookes and Little, 1997, Gummesson, 1994a), authors now agree that RM is not a universal philosophy (Sheth, 2002) but coexists with a transaction marketing approach (Brodie et al., 1997, Coviello et al., 2002). No consensus, however, exists regarding the stage of RM's evolution. The latest literature variously describes RM as a "new discipline still in search of its roots" (Hougaard and Bjerre, 2003, p. 45) or yet to develop into a discipline (Sheth and Parvatiyar, 2002) or approaching its maturity stage (Hennig-Thurau and Hansen, 2000).

This chapter develops an understanding of RM theory and its central constructs. First, the overall RM concept is introduced, starting with the evolution of RM. Antecedents influencing RM are depicted, followed by a brief discussion of the central marketing theories on which RM is based, as well as different approaches to RM scope. After the development of a RM definition for this study, relationship dynamics and development follow, including a clarification of characteristics differentiating relationship and transaction marketing. Second, RM outcomes in the form of value and satisfaction are discussed. After introducing the concept and the creation of value, a clarification of differences and similarities between value and satisfaction leads to the description of the conceptualisation and relevance of satisfaction for this study. Third, three central relationship characteristics are discussed, including trust, commitment and communication.

Finally, antecedents to relationship characteristics are clarified before concluding the chapter. RM theory has so far largely ignored the potential impact of OCD on relationships and relationship outcomes. Based on research in the mergers

and acquisitions and more recently alliances literature, OCD is proposed as a significant antecedent relevant to RM research. Following an introduction to the concept of organisational culture and research on differences between organisational cultures of relationship partners, research on the diversity and similarity of alliance partners leads to the conceptualisation of the construct of organisational compatibility. Furthermore, individuals engaged in relationships, their characteristics and motivation are also presented as an antecedent to relationship characteristics.

2.2. The Evolution of Relationship Marketing

This chapter elaborates on the evolution of RM by means of environmental factors promoting its development, central research themes building the basis to RM, as well as different approaches to it.

2.2.1. Antecedents to the Evolution of Relationship Marketing

Organisations and relationships are embedded in a range of environments and networks (Gordon, 1998), implying an impact of changes and trends in the economic, technological, social, political, legal and competitive environment on the evolution of marketing thought and RM development. Previous literature has comprehensively presented influence factors, such as the rapid change of the business landscape (Wilkinson and Young, 2002b), and their impact on the evolution of RM (Aijo, 1996, Palmer, 2002b). To develop a basis for further discussion and a link to the evolution of technology transfer and commercialisation (refer to section 3.2), this section briefly introduces antecedents believed to be central to RM development.

Fuelled by factors such as globalisation, the building of alliances between countries (Gummesson, 2002) and the maturing of domestic markets (Siguaw, Simpson and Baker, 1998), competition has increased and changed rapidly (Cartwright, 2000, Siguaw et al., 1998), bringing about challenges regarding customers and business requirements. Increased difficulties in attracting new customers (Aijo, 1996) have emphasised the need to retain current customers and

tailor offerings to more specific requirements (Håkansson and Ford, 2002). This problem is reinforced by social factors such as low population growth (Egan, 2001) and the customers' growing recognition and use of their power and choices (Cartwright, 2000, Palmer, 2002b). Hence, Palmer (2002b) stated that marketing needs to not be directed at customers, but rather to integrate customers in a two-way interaction process, as intended by a RM strategy.

On a business level, cooperation has been described as necessary to compete in today's dynamic marketplace, with network structures offering a degree of assurance and certainty (Gummesson, 1994a). Morgan and Hunt (1994, p. 20) described this paradox: "To be an effective *competitor* (in the global economy) requires one to be a trusted *co-operator* (in some network)". Besides, privatisation presents a political factor promoting the evolution of RM. Leading to a more complex marketplace, privatisation increases the need to cooperate and build networks in order to be competitive in a marketplace (Palmer, 2002b).

Technology is likely to be the most rapidly changing environmental factor with a large impact on other environments. According to McKenna (1991, p. 1), "technology is transforming choice and choice is transforming the marketplace". With Internet, computer telephone integration, data warehouses and mass customisation (Gordon, 1998) as major enablers of the rapid development and implementation of RM (Palmer, 2002b), costs associated with relationship development can be decreased, individual customers can be targeted and cross-functional integration facilitated (Berry, 1995, Sheth, 2002).

Furthermore, a shift from a product to a service focus (Gummesson, 2002) and to service economies in developed countries (Egan, 2001, Lovelock, Patterson and Walker, 2001) has given rise to the development of a different marketing perspective with a priority on customer service and services elements added to products. Marketing services means marketing a performance (Berry, 1980), often rendered at an ongoing or periodic basis. Ongoing interaction, in turn, increases the likelihood of customers developing relationships with people rather than with products (Berry, 1995).

In summary, changes in the external and competitive environment have promoted a focus on relationships away from transactions, enabling and fostering

the evolution of relational theories. The following section further elaborates on the research streams forming the theoretical bases for RM development.

2.2.2. Theoretical Bases for the Evolution of Relationship Marketing

While the term RM was first introduced by Berry (1983), earlier theories on exchanges, such as social exchange theory and research on buyer-seller exchanges, have paved the way for RM to develop. Social exchange theory dates back to Blau (1964) and has been primarily developed in the sociology literature. It deals with the social and economic dimensions related to exchange (Murray and Kotabe, 2005) and examines relations and joint activities between actors as well as the outcomes of these interactions (Anderson and Narus, 1984, Lawler, 2001).

The integration of social relationships in business-to-business ones highlights the relevance of social exchange theory in the development of RM and related literature, with social exchange theory having been applied to studies dealing with strategic alliances and distribution channels (e.g. Murray and Kotabe, 2005, Yasuda and Iijima, 2005). In addition, exchange theory has achieved a strong presence in the marketing literature, for example with work by Arndt (1979), Bagozzi (1974) and Kotler (1984). While concentrating on transactional exchanges and static relationship models (Bejou, 1997), they reflect a shift in marketing thought, forming a basis for the development of RM.

While various themes and perspectives have been integrated under the label of RM (Nevin, 1995, Parvatiyar and Sheth, 2000), leading to its characterisation as an “umbrella concept” (Palmer, 2002b, p. 82), RM has evolved primarily around three major theoretical themes, namely the Nordic School of Services approach to services marketing theory (Grönroos, 1994; Gummesson, 2002), the North American and Anglo-Australian approaches (Sheth and Parvatiyar, 1995; Christopher, Payne and Ballantyne, 1991) and network theory, developed by the Industrial Marketing and Purchasing (IMP) Group (Ford, 1997; Håkansson and Ford, 2002).

Services marketing, and specifically the Nordic School of Services approach to services marketing theory (Grönroos, 1983, 1991b, 1994b, Gummesson, 1987, 1991), has had a major influence on the evolution and significance of RM.

Characteristics of a service, such as the involvement of the customer in the production process (Wikström, 1996, Williams and Anderson, 2005) and the impossible separation of the service from the service provider (Bove and Johnson, 2000), necessitate direct interaction between customers and service suppliers. The development of bonds between interaction parties fosters a relational approach (Sheth and Parvatiyar, 1995). Furthermore, limitations of the traditional marketing approach when applied to services justified the growth of relational principles (Bejou, 1997). With the continuous growth of service economies (Bejou, 1997) and the increasing relevance of services for both the service and product sector (Mathieu, 2001), services marketing and RM thought have become increasingly relevant for mainstream marketing.

The Nordic School of Services started to evolve in the 1970s, pioneering much of the work conducted in the areas of services marketing, management and quality (Grönroos, 1991b). Based in Scandinavia and Finland, authors such as Gummesson (1987, 1999, 2000, 2003), Grönroos (1984, 1990, 1997a, 2000), Edvardson and Olsson (1996) and Lehtinen and Lehtinen (1991) have shaped the services area through their mainly normative and pragmatic research with a focus on action research and case studies (Grönroos, 1991b). Central contributions to marketing theory include conceptions such as the interactive marketing function (Grönroos, 1990, Gummesson, 1987), part-time marketers (Gummesson, 1991) and internal marketing (Grönroos, 1978).

The North American and Anglo-Australian approaches (e.g. Sheth and Parvatiyar, 1995; Christopher, Payne and Ballantyne, 1991), also described as the managerial school of RM (Varey et al., 2005), are viewed as another theoretical theme contributing significantly to the evolution of RM. The establishment of an international conference at the Emory University, United States of America, and an International Colloquium in RM at Monash University, Australia, in the 1990s and the continuation of these conferences reflect the prominence of RM theory and practice. One of the first RM books published by authors from this school of thought deals with the integration of service, quality and marketing (Christopher, Payne and Ballantyne, 1991), reflecting the Anglo-Australian initial research focus. Drawing on recent literature (Varey et al., 2005, Ballantyne et al., 2003, Payne and Holt, 2001) and the 12th Colloquium on Relationship Marketing in 2004, these approaches

appear to show an increasing academic interest in the concept and delivery of value in a relationship setting.

Network theory, the third major theoretical base for RM evolution, originated within the IMP Group (Ford, 1997, Håkansson and Snehota, 2000). Developed in Northern Europe, specifically Sweden, in the 1970s, the IMP Group has grown to become a worldwide network (Fernandes and Proença, 2005, Gummesson, 1999, Pagani, 2003, Ritter, Wilkinson and Johnston, 2002a). Much of the current network theory is anchored in the interaction approach of this group. Focusing primarily on buyer-seller relationships, the interaction approach argued that transactions do not occur independently and should thus be viewed as integrative parts of longer-term relationships between parties, considering personal, social, business and professional relations (Wilkinson and Young, 2002a). Based on initial research dealing with dyadic relationships between actively engaged business partners (Ford, 1997), a focus on networks has developed throughout the last two decades.

This network approach followed the recognition that no organisation or relationship exists in isolation (Anderson, Håkansson and Johanson, 1994). Rather, each organisation is part of a network of relationships, making RM an “interaction in networks of commercial relationships” (Gummesson, 2003, p. 168). Business units act in “complex self-organising systems” (Wilkinson and Young, 2002b, p. 123) in which every action may have a number of effects not only on the direct relationship but also on other relationships and the overall network (Ford and McDowell, 1999). Therefore, business entities have to be viewed in relation to the embeddedness of interacting parties and their specific resources (Håkansson and Ford, 2002). The management of relationship portfolios and positioning in networks constitutes a major interest area (Wilkinson and Young, 2002b).

In summary, RM theory has evolved into an integrated part or sub-field of the marketing literature throughout the last two decades (Hennig-Thurau et al., 2002, Möller and Halinen, 2000). While influenced by a number of research streams (Brodie et al., 1997), the Nordic School of Services, North-American and Anglo-Australian approaches and the network theory developed by the IMP Group are seen as the main contributors to the development and prominence of RM. Due to the large number of influencing streams, different approaches to RM scope are found in

the literature, including micro and macro level approaches. These will be introduced next.

2.2.3. Approaches to Relationship Marketing Scope

The contribution of network, services and other marketing theories to the development of RM has led to the occurrence of both micro and macro level approaches in RM research. Micro level approaches embrace those research studies concentrating on relationships between the firm and one or few customers or partners (Rao and Perry, 2002). In contrast, an institution may be involved in relationships with a large number of individuals or groups, providing a macro level approach to RM. Macro approaches can be classified into three levels. The first level concerns several parties in one market, the second level deals with one or few individuals in numerous markets, whereas the most comprehensive approach involves a large number of parties in a large number of markets or networks.

The term ‘market’ was introduced to the RM area by Christopher et al. (1991). In their “six markets model”, Christopher et al. (1991) presented six relationship groups, including supplier, customer, internal, recruitment, referral and influence, and described them as markets. Peck et al. (1999) modified this model by replacing the previous consumer market with a consumer as well as an intermediary market, based on the need for different marketing approaches in these markets. In addition, Peck et al. (1999) separated horizontal alliance and vertical supplier markets, and excluded both recruitment and referral markets from the model, as its components were already covered by other markets. Several other frameworks have been developed to exemplify relationship groups, including Healy, Hastings, Brown and Gardiner’s (2001) categorisation of three relationship groups, namely relationship, neo-relationship and network marketing, and Doyle’s (2001) description of four partnership groups, specifically customer, supplier, internal, and external partnerships.

Morgan and Hunt (1994) offered a more detailed framework including 10 discrete forms of relational marketing, summarized into four partnership categories: supplier (goods suppliers and service suppliers), lateral (competitors, non-profit organisations and the government), buyer (ultimate customers and intermediate

customers), and internal partnerships (functional departments, employees and business units). Gummesson (1994b) presented an even more comprehensive framework consisting of 30 relationships, which can be grouped into market, nano, and mega relationships as well as relationships concerning organisational issues, form and content.

Many papers in the RM literature increasingly describe the importance of a macro level approach to RM (Cooper, 2002, Gummesson, 1994b, Morgan and Hunt, 1994) since the growing prominence of network theory (Ford, Berthon, Brown, Gadde, Håkansson, Naudé, Ritter and Snehota, 2002, Johnston, Peters and Gassenheimer, 2005, Medlin and Quester, 1999, Ritter, Wilkinson and Johnston, 2002b) and the rise of electronic commerce (Borders, Johnston and Rigdon, 2001). This is based on the potential of a macro approach to capture the embeddedness of a relationship in a network of other relationships (Gummesson, 1994b) and environments (Szmigin and Bourne, 1998) as well as the overlap of relationship groups (Duncan and Moriarty, 1998, Gummesson, 1994b, Peck et al., 1999). Based on a macro level approach, any study dealing with firm level or relationship level constructs requires the consideration of network effects (Wilkinson and Young, 2002b).

However, a large number of researchers to date have taken a micro-level approach, analysing relationships between two parties (Bush, Rose, Gilbert and Ingram, 2001, Doney and Cannon, 1997, Walter, Ritter and Gemunden, 2001, Young, Sapienza and Baumer, 2003). This dyadic or micro level approach is not necessarily based on the assumption of the existence of only one relationship. Rather, the focus on a relationship dyad allows the study of relationship characteristics and differences between relationship parties by eliminating the potential influence of other relationships and networks on the findings (Iacobucci and Hopkins, 1992). The majority of studies based on such a micro-level approach only used a single-sided analyses while very few studies have analysed relationships from a dyadic perspective (Anderson and Weitz, 1989, Iacobucci and Hopkins, 1992, Medlin, 2001, Smith and Barclay, 1997).

This research adopts a micro approach to UIRs, focusing on relationship dyads and thus the building blocks of networks (Straub et al., 2004, Auster, 1990). While acknowledging the limitations of a micro approach due to its elimination of the

probable effects of other relationships in a relationship network (Baraldi and Bocconcelli, 2001, Iacobucci and Hopkins, 1992), the focus on the dyad, the basic unit of embedded relationships, is deemed the relevant approach for this study. First, it allows for testing of the impact of OCD dimensions on a relationship and its outcomes. Second, considering the difficult and complex comprehension of networks (Borders et al., 2001), a comprehensive understanding of dyadic UIRs is required to provide a foundation for future research on multifaceted networks. A single-sided and dyadic data analysis is proposed to further develop our understanding of individual relationships and relationship dynamics.

2.3. Relationship Marketing Definition

A unified definition has long been awaited in the literature (Brodie et al., 1997), as the use of the term RM for a large number of approaches and perspectives spawned numerous definitions of RM. In 1999, Harker (1999) analysed 26 different RM definitions, many of which were described as “narrow” or “single issue” definitions, concentrating on one or few items in the relationship construct built to suit individual studies’ requirements, such as the relationship building process (Berry, 1983, Morgan and Hunt, 1994), or interaction (Gummesson, 2002). Based on a content analysis of these 26 definitions, Harker (1999) found seven conceptual categories of RM to be included in a comprehensive RM definition, namely creation, development, maintenance, interaction, long-term nature, emotional content and output.

Definitions by Grönroos (1997a) and Harker (1999) emerged as best in terms of coverage, with the former accepted by a number of academics and applied to a range of contexts (e.g. Baker, Buttery and Richter-Buttery, 1998, Dibb and Meadows, 2001):

“... to identify and establish, maintain and enhance and when necessary also to terminate relationships with customers and other stakeholders, at a profit, so that the objectives of the parties are met, and that is done by a mutual exchange and fulfilment of promises” (Grönroos, 1997a, p. 327).

“An organisation engaged in proactively creating, developing and maintaining committed, interactive and profitable exchanges with selected customers [partners] over time is engaged in relationship marketing” (Harker, 1999, p. 16).

Despite significant similarities between both definitions, several differences exist and should be considered in the development of a RM definition for this study. First, while Grönroos (1997a) named relationships as the object of RM, Harker (1999) referred to exchanges, clarified by the adjectives committed, proactive and interactive. Commitment has been considered an essential feature of relationships (Jap, 1999, Liljander and Roos, 2002, Morgan and Hunt, 1994), and interactivity and proactivity have been emphasised as important relationship characteristics (Grayson and Ambler, 1999, Tikkanen and Tuominen, 2000) and are also highlighted in this study.

However, exchanges, also called transactions, only characterise the visible part of a relationship but do not indicate the existence of invisible social and technical bonds to relationships (Perry et al., 2002). Neither one nor a series of transactions characterise a relationship but a “state of mutual acknowledgement that the relationship exists” (Palmer, 2000b, p. 4). An exclusive focus on exchanges may therefore limit our understanding of the relationship concept. Another difference between Grönroos’ (1997a) and Harker’s (1999) definitions of RM is the indication of the two-way character of relationships in the former. As authors agree that mutual value or the existence of a win-win situation is required for relationship success (Donaldson and O’Toole, 2002, Gummesson, 2002, Boulding et al., 2005), a RM definition should recognise the reciprocal nature of a relationship and its success.

One shortcoming of both definitions for this study, however, is the strong focus on profit, and thus economic outcomes, rather than the broader concept of value. Recent studies emphasised the importance of non-economic value (Coviello et al., 1997, Sin, Tse, Yau, Lee and Chow, 2002) and the value created by the relationship as such (Mandjääk and Durrieu, 2000, Ravald and Grönroos, 1996, Siguaw et al., 2003). Therefore, the term “value” is used in this study to describe the different types of benefits derived by relationship parties. In addition, neither Grönroos’ (1997a) nor Harker’s (1999) definition included relationship termination as part of their definition. However, many authors have highlighted the

consideration of relationship dissolution for the management of relationships (Dwyer and Oh, 1987, Kotler, 1997, Voss and Voss, 1997). Relationships are multifaceted (Egan, 2001) and characterised by instability (Blois, 1997) and constant change (Blois, 1997, Egan, 2001). These characteristics may lead to the necessity to terminate a currently beneficial relationship due to expected negative relationship outcomes in the future. Therefore, relationship termination should be integrated in any RM definition.

Based on the previous discussion, Grönroos' (1997a) and Harker's (1999) definitions have been adapted into the following RM definition proposed for this study:

“RM involves proactively identifying, creating, developing, maintaining, enhancing and, when necessary, terminating relationships that are trusting, committed and interactive in nature with selected customers [partners], in order to create a mutual value over time.”

Based on this definition of RM, the concept of relationships is further analysed in the following section, elaborating on conceptual categories and the development of relationships, as well as a differentiation of RM from transaction marketing.

2.4. Relationship Dynamics and Development

The term ‘relationship’ has been used for a variety of links between two or more entities, including individuals, groups, institutions or countries, and can be defined as “the way in which two or more people or things are connected, or the state of being connected” (Soanes and Stenvenson, 2003, p. 1486), and “a continuing attachment or association between persons, firms etc.” (Agnes, 1999, p. 1209). For a relationship to exist, both sides have to recognize its existence and have to maintain interaction of a special prominence for the actors (Colgate and Danaher, 2000, Egan, 2001).

A meaningful analysis of business-to-business relationships requires an understanding of the primary characteristics and dynamics of relationships as well as the differentiation of RM against other marketing approaches. Based on Harker (1999) and the definition of RM developed for this study, three categories of RM concern can be identified, including relationship development (creation,

development, maintenance, enhancement and termination), relationship characteristics (interactive, long term and emotional) and relationship output.

First, several conceptual models have been developed to describe *relationship development* over time, illustrating different phases, which can roughly be divided into stages and states theories (Rao and Perry, 2002). Stage models have been developed to explain the change and evolution inherent to relationships and are characterised by the notion that customers or partners move upwards in a series of stages (Egan, 2001). Two widely known and used stage models of relationship evolvment are those developed by Dwyer and Oh (1987) and Christopher et al. (1991). Dwyer and Oh (1987) described five stages of relationship development, namely awareness, exploration, expansion, commitment, and dissolution. Christopher et al. (1991) developed a similar model, namely the ‘relationship marketing ladder of customer loyalty’, classifying customers depending on their relationship stage into prospects, customers, clients, supporters and advocates.

Despite its wide usage by academics, some authors have questioned the appropriateness of the stages theory (Rao and Perry, 2002). A linear approach to characterise relationship development and an irreversible progress may be limited, as change is generally believed to be a non-linear dynamic process (Tikkanen and Tuominen, 2000) and as relationships grow in qualitatively different stages (Grayson and Ambler, 1999). New modified models of relationship development have highlighted the constant chance of negative transitions and relationship dissolution (Kotler, 1997, Voss and Voss, 1997) and recognise the two-way character of relationships (Voss and Voss, 1997). In contrast to stages theory, states theory is based on the belief that different relationships can develop between any states or stay at one phase for an undetermined period of time (Rao and Perry, 2002). States theory thus reflects the complex and unpredictable nature of relationships, offering a more appropriate characterisation of relationship development.

Second, relationships exhibit several *characteristics*, such as interactivity, long-term focus and emotional content (Harker, 1999). Relationships are characterised and developed by interaction (Tikkanen and Tuominen, 2000), defined here as a “two-way dialectic process of boundary spanning activities” (Prenekert, 2000, p. 3). The two-way nature of relationships and relationship interaction has

been illustratively described as two parties dancing (Wilkinson and Young, 1994), including dynamics of leadership and followship (Wilkinson and Young, 2003). This metaphor explicates the dynamic nature in any relationship (Hennig-Thurau and Hansen, 2000), attributable first to the inherently different characteristics of partners involved in a relationship and their subsequent variety of goals (Medlin, 2003). Second, the dynamism of relationships is caused by the constant change in relationships, working conditions and environments over time.

Many authors have emphasised the importance of the time dimension in relationship research (e.g. Anderson and Weitz, 1989, Cannon and Homburg, 2001, Grayson and Ambler, 1999). While RM not only concerns long-term relationships (Baker et al., 1998), the length of a relationship has been described as a core element in the distinction between transaction marketing and RM (Grönroos, 1991a, Rao and Perry, 2002) and as changing the nature of associations between relationship characteristics (Grayson and Ambler, 1999). Despite this general consensus regarding the relevance of relationship duration, different views exist on the impact of time on a relationship and its outcomes.

Many authors have discussed positive aspects of time upon relationships. For example, Grayson and Ambler (1999) found in their study of relationships between advertising agencies and their clients that long-term relationships are associated with a greater influence of interaction and involvement on the use of advertising developed by the agencies. This is consistent with other studies, which find a low degree of communication in long-term relationships (Anderson and Weitz, 1989), suggested to result from high interaction effectiveness based on increased experience and familiarity with the other party's customs. In addition, long-term relationships are often associated with a high degree of fit (Anderson and Weitz, 1989). However, other authors have found relationship duration to negatively influence relationship characteristics and outcomes, reporting, for example, a greater negative effect of conflict on channel relationship outcomes (Webb and Hogan, 2002). Furthermore, Grayson and Ambler (1999) revealed a "dark side" to long-term relationships, with longer relationships between advertising agencies and their clients associated with lower degrees of trust.

Trust, commitment and promises have emerged as the central components of the emotional content in RM theory (Harker, 1999), with trust and commitment

leading research in the behavioural perspective of RM (Hennig-Thurau and Hansen, 2000, Morgan and Hunt, 1994). Trust and commitment, along with personal interaction, characterise the social bonds developed in a relationship (Rao and Perry, 2002), suggesting a great degree of dependence on individuals in a company (Liljander and Roos, 2002). Sections 2.6. and 3.5. further elaborate on the concepts of trust and commitment.

Promises have been emphasised by a range of authors, mainly in the services marketing area (Bitner, 1995, Grönroos, 1990, Grönroos, 1994a). In essence, while making promises may attract customers (Baker et al., 1998), keeping promises is required to move beyond individual transactions to establish, maintain and enhance a relationship (Grönroos, 1994a). As such, the fulfilment of promises has been labelled the “foundation of a relationship” (Baker et al., 1998, p. 58). Furthermore, while transaction marketing integrates the keeping of promises by means of products and product features, interactivity and the individuals engaged in the delivery process have emerged as the central factors determining the fulfilment of promises in dynamic and interactive relationships (Grönroos, 1996).

The literature has always emphasised *relationship output*, or more specifically value creation, as the essence of RM (Cannon and Homburg, 2001, Grönroos, 1991a, Mandjääk and Durrieu, 2000), with the creation and enhancement of mutual economic value labelled the purpose of RM (Parvatiyar and Sheth, 2000). While advocates praise the benefits of relationships in today’s marketplace (Coviello et al., 1997, Grönroos, 1994a, Palmer, 2002b, Smith and Higgins, 2000), studies range in their understanding and measurement of relationship outcomes from “soft” or non-economic performance components, such as loyalty and word-of-mouth communication (Hennig-Thurau et al., 2002), satisfaction (Farrelly, 2002, Jap and Ganesan, 2000), retention or renewal (Farrelly and Quester, 2003b), to “hard” economic measures, such as profitability (Desphandé, Farley and Webster, 1993), return on investment and market share (Sin et al., 2002), or sales volume (Coviello et al., 1997).

To further illustrate the RM concept, central differentiating factors between the RM and transactional marketing approaches are presented in Table 2.1. Based on Grönroos’ (1991a) ‘Marketing strategy continuum’, widely accepted in the literature (Egan, 2001), transaction marketing and RM are defined as the two ends of a

continuum, allowing an indefinite range of marketing strategies between those ends, rather than as two exclusive marketing strategies. The term ‘transaction marketing’ is widely used in the literature, and can be defined as “managing the marketing mix to attract and satisfy customers” (Coviello et al., 2002, p. 34).

Table 2.1 Relationship Marketing versus Transaction Marketing

<i>Criterion</i>	<i>Relationship Marketing</i>	<i>Transaction Marketing</i>
Primary object	Relationship	Single transaction
General approach	Interaction-related	Action-related
Fundamental strategy	Maintaining existing relationships	Acquiring new customers
Perspective	Evolution-dynamic; long-term focus	Static; short-term focus
Dominating quality	Functional quality	Technical quality
Dominating marketing function	Interactive marketing	Marketing mix
Interdependency marketing, operations, personnel	Substantial strategic importance	Limited importance
Type and intensity of contact	Interpersonal; high	Impersonal; low
Importance of employees for business success	High	Low
Role of internal marketing	Substantial strategic importance	No or limited importance
Measurement of customer satisfaction	Managing customer base (directly)	Monitoring market share

Source: adapted from Coviello et al. (2002), Grönroos (1991a), Hennig-Thurau and Hansen (2000)

Table 2.1 shows a categorisation of marketing strategies on a continuum based on criteria adopted from Coviello et al. (2002), Grönroos (1991a) and Hennig-Thurau and Hansen (2000). In comparison, Webster (1992) drew on control and structural integration in order to differentiate marketing strategies. Rao and Perry (2002) refined Webster’s (1992) model by presenting a model with two relationship routes. These routes differentiate relationships based on the level of structural bonding, stressed by Webster (1992), versus the level of social bonding. While Grönroos’ (1991a) Marketing strategy continuum was originally directed at

business-to-consumer situations, Webster's (1992) and Rao and Perry's (2002) continuums focused on business-to-business relationships and in particular on buyer-seller relationships, including strategic alliances and networks as well as vertical integration in the extreme forms (Webster, 1992).

The most comprehensive and integrative conceptualisation and analysis of transactional and relational approaches has been provided by Coviello et al. (1997, 2002) in their studies on contemporary marketing practices. Coviello and her colleagues (1997) developed a conceptualisation of marketing practices, differentiating between transaction marketing and three relational perspectives, namely database marketing, interaction marketing and network marketing. Twelve criteria were used to differentiate these approaches. In relation to Coviello et al.'s (1997) framework, the focus of this research lies on interaction marketing. While interaction marketing highlights social exchange and close interaction between organisations and individuals, database marketing reflects a more distant, retention-oriented focus. Furthermore, the micro approach to RM has been justified in section 2.2.3, eliminating the analysis of network marketing in this thesis.

Coviello et al. (2002) further investigated the relevance of these marketing practices to various types of firms, differing in terms of product offers and the types of customers served. Notably, Coviello et al. (2002) found transaction and interaction marketing as the most prominent marketing practices. While it was argued that database and network marketing are yet to achieve market diffusion, the relevance of interaction marketing, especially for firms reporting a high use of technology, highlights the value of this focus in this study.

A clarification of RM and its characteristics was outlined by means of differentiating RM from transaction marketing. While integrating the development of relationships into the discussion where appropriate, the major focus of this study lies in the analysis of UIR characteristics and outcomes in established UIRs. Hence, these two categories are discussed below.

2.5. Relationship Outcomes and the Importance of Value and Satisfaction

While contradictory results are reported in the literature (Beverland and Lindgreen, 2004), RM advocates praise the benefits of relationships in today's marketplace (Grönroos, 1994b, Palmer, 2002b, Smith and Higgins, 2000) and describe the merits of relationship characteristics on performance (Coviello et al., 1997, Sin et al., 2002). As previously mentioned, some studies focus on "soft" or non-economic performance components, such as loyalty (Hennig-Thurau et al., 2002), word-of-mouth communication (Hennig-Thurau et al., 2002) and renewal (Farrelly and Quester, 2003b), while others apply "hard" economic measures, such as profitability (Desphandé et al., 1993), return on investment and market share or sales growth (Sin et al., 2002).

Research on relationship outcomes has been sparse to date (Donaldson and O'Toole, 2002, Medlin, 2001) and empirical evidence of positive relationship outcomes is still lacking, especially in the business-to-business context (Sheth, 2002). Furthermore, studies examining relationship outcomes have often been limited by a single-sided assessment (Hennig-Thurau, 2000). The lack of research on relationship outcomes as perceived by both relationship actors is surprising, as the RM literature has always emphasised mutual gain, also described as a win-win situation, as the essence of RM (Gummesson, 2002, Donaldson and O'Toole, 2002). Sweeney and Webb (2002, p. 77) noted that "it is not only logical but also necessary to address questions pertaining to benefits from the perspective of both parties".

Recent research underlines this notion by reporting findings that relationship parties perceive different benefits from relationships (Han, Wilson and Dant, 1993, Lee, 2000). Sweeney and Webb (2002), for example, found in their qualitative study that buyers and suppliers in the dyad receive equal benefits (in total), but experience different types of benefits as a result of a relationship. Given the sparsity of empirical research on dyadic relationship outcomes (Gundlach, Achrol and Mentzer, 1995, Medlin, 2001, Smith and Barclay, 1997), this study integrates the perspectives of relationship outcomes by both parties in an empirical way.

In the following sections, the concepts of value and satisfaction, as well as their interrelationship and relevance for marketing and RM theory, are described.

2.5.1. Understanding the Concept and the Creation of Value

Value is a fundamental concept in marketing, illustrated by the literature discussing it already in the pre-industrial era (see Lindgreen and Wynstra, 2005, Payne and Holt, 1999, Sheth and Parvatiyar, 1995). An abstract, complex and dynamic concept (Payne and Holt, 1999, Ravald and Grönroos, 1996), value is grounded in a large number of disciplines (Payne and Holt, 1999). The rising of RM theory, however, fuelled its further and more detailed analysis. While the creation and enhancement of mutual economic value has been described as the purpose of RM (Parvatiyar and Sheth, 2000) and despite the development of a small research stream on relationship value (Varey et al., 2005), no general consensus has yet been achieved on what value represents or how it is related to RM (Payne and Holt, 2001). In the words of Varey et al. (2005, p. 128): “Somehow, ‘value’ was taken as well understood”.

An analysis of literature reviews directed at the value concept in RM and the conceptualisation of value in dyadic and network research (Mandjääk and Durrieu, 2000, Payne and Holt, 1999, Ravald and Grönroos, 1996) revealed that authors have dealt with the concept of value in differing ways. First, value has been conceptualised as an episode and relationship-related construct. A relationship may be viewed as comprising of a number of episodes, with an episode defined as “an event of interaction which has a clear starting point and an ending point and represents a complete exchange” (Ravald and Grönroos, 1996, p. 29). From a transaction-oriented view, the value created in each individual episode might be analysed using the common conceptualisation of customer value as an evaluation of benefits and sacrifices of individual transactions (Anderson, 1998, Eggert and Ulaga, 2002, Ravald and Grönroos, 1996, Walter et al., 2001).

From a relational perspective, the value of episodes may be understood as stimulating repurchasing activity, in turn supporting relationship development (Ravald and Grönroos, 1996). Relationship value, however, goes further. It is based on the notion that “the relationship itself might have a major effect on the total value perceived” (Ravald and Grönroos, 1996, p. 23). Hence, the value of a relationship may exceed the value derived throughout the individual episodes, with dimensions such as safety, credibility and security part of the overall relationship value (Ravald

and Grönroos, 1996). That means, value derived by the relationship as such needs to be determined (Ford and McDowell, 1999).

Furthermore, value in a relationship can be derived at different levels (Ford and McDowell, 1999), including the personal, organisational, relationship and network level. The value derived by individuals in business-to-business relationships has not been a major focus of RM research. While Sweeney and Soutar (2001) found perceived relationship benefits to differ not only between organisations but also between individuals, personal value has not been an integrative part of business-to-business value research. The majority of relationship studies has measured and analysed value as a single-sided organisational concept (e.g. Anderson, 1998, Flint, Woodruff and Fisher Gardial, 2002), most often in terms of customer-perceived value, defined as the "customer's perceived preference for and evaluation of those product attributes, attribute performances, and consequences arising from use that facilitate (or block) achieving the customer's goals and purposes in use situations" (Woodruff, 1997, p. 142). In this context, value is generally understood as an evaluation related to the purchase or relationship on an organisational level (Eggert and Ulaga, 2002, Ravald and Grönroos, 1996, Walter et al., 2001). The majority of research in this area has analysed customer value, with less attention given to the value gained by suppliers (Walter et al., 2001).

From a relationship perspective, this single-sided organisational appraisal is limited. The objective of RM theory and practice is the creation of bilateral value and thus the development of a win-win situation (Parvatiyar and Sheth, 2000). Value creation in RM research should thus be conceptualised and analysed on a relationship rather than organisational level. Relationship value requires the consideration of value for both partners in a relationship. The complexity of value, and possibilities of value creation, on a network level increases with the number of connections (Mandjääk and Durrieu, 2000).

This study deals with the creation of value throughout a relationship rather than individual episodes, taking a broad perspective on the dimensions of value in order to accommodate different perceptions of the importance of each dimension. Furthermore, the dyadic nature of this study excludes the network level perspective, focusing on the conceptualisation of organisational and relationship value. The following section outlines the concept of satisfaction and its relationship with value.

2.5.2. The Related Concepts of Value and Satisfaction

The concept of value has been linked to satisfaction, a construct described as distinct but complementary to value (Eggert and Ulaga, 2002) and as influenced by perceived value (Patterson and Spreng, 1997, Sweeney and Soutar, 2001). Little attention has been given to the interrelationship between satisfaction and value, with notable exceptions, such as Patterson and Spreng (1997) and more recently Lam, Shankar, Erramilli and Murthy (2004) and Keith, Lee and Lee (2004). Conceptual differences between value and satisfaction may explain the limited empirical research on the relationship between the two concepts (Lam et al., 2004, Patterson and Spreng, 1997).

Value is a cognitive construct that considers the suppliers' and competitors' offerings pre- and post-purchase and can thus be described by both current and potential customers (Eggert and Ulaga, 2002, Patterson and Spreng, 1997). That means, perceptions of value can exist without experience (Sweeney and Soutar, 2001). Satisfaction, on the other hand, is understood as an affective construct (Lam et al., 2004, Patterson and Spreng, 1997), capturing an overall post-purchase evaluation based on outcomes and past experiences (Shamdasani and Sheth, 1995) and restricting it to the current customers' assessment of the supplier's offering (Eggert and Ulaga, 2002). Most prominently, satisfaction has been conceptualised as an affective measure based on the disconfirmation paradigm as a feeling based on a comparison between consumers' expectations and the perceived performance of a product or service (Churchill and Suprenant, 1982, Oliver, 1980, Parasuraman, Zeithaml and Berry, 1988).

Previous studies identified that satisfaction mediates the effect of value on loyalty (Lam et al., 2004), future patronage intentions (Keith et al., 2004) and on behavioural intentions (Eggert and Ulaga, 2002, Patterson and Spreng, 1997), illustrating the importance of satisfaction for relationship research (Ravald and Grönroos, 1996). Moreover, the significance of satisfaction for marketing and RM theory has been widely agreed upon, with satisfaction even described as "one of only a few key building blocks in marketing philosophy, theory and practice" (Babin and Griffin, 1998, p. 128). Geyskens, Steenkamp and Kumar (1999) found 71 studies between 1970 and 1996 dealing with the concept of satisfaction solely in channel relationship research. Satisfaction owes its prominence mainly to its effect

on a range of behavioural constructs (Eggert and Ulaga, 2002) such as purchase intentions (Patterson and Spreng, 1997), loyalty and word-of-mouth (Hennig-Thurau et al., 2002).

Despite the central role of satisfaction in marketing theory and practice, a range of conceptualisations and measurement approaches exist in the literature. Research has differentiated economic and non-economic, or social, satisfaction (Geyskens and Steenkamp, 2000). Satisfaction has thus been conceptualised based on whether the evaluation considers economic or psychological outcomes arising from the relationship. Related to the total perceived quality model, which originated in the Nordic School of Services, economic satisfaction may be seen to relate to the technical quality, meaning the quality of the actual outcome (Grönroos, 1984). Social satisfaction, on the other hand, is associated with the functional quality and thus the interaction process used to receive technical quality (Grönroos, 1984, 1997b). Grönroos (1991a) described in his Marketing strategy continuum the growing importance of functional rather than technical dimensions in a relationship situation. Hence, the importance of the process is likely to be high for partners in a relationship. In a UIR context, functional and intermediate economic results may arise throughout a relationship, while technical quality in form of final research results and subsequent economic output is likely to be gained only at the end of a relationship or relationship phase.

Based on previous literature (Bucklin and Sengupta, 1993, Hennig-Thurau et al., 2002, Li and Dant, 1997, Oliver, 1980), this study defines the concept of satisfaction as an affective outcome measure resulting from the evaluation of all aspects of a relationship. An overall satisfaction measure, and thus the conceptualisation of satisfaction based on a range of encounters, was deemed appropriate for this study due to the ongoing engagement of respondents in a relationship. Transaction-specific satisfaction or satisfaction regarding a discrete transaction or service encounter (Jones and Suh, 2000) was deemed too restrictive in a relationship setting. Furthermore, based on the previous discussion, functional quality appears important in a UIR context.

2.6. Trust, Commitment and Communication

Over the last two decades, a large range of relationship characteristics have emerged as relevant to RM theory, including: time focus (Grönroos, 1991a, Hunt et al., 2002), relational or ongoing exchanges (Gordon, 1998, Hunt et al., 2002, Morgan and Hunt, 1994), interaction (Grayson and Ambler, 1999, Tikkanen and Tuominen, 2000), communication (Duncan and Moriarty, 1998, Sharma and Patterson, 1999), reciprocity (Sharma and Patterson, 1999, Sin et al., 2002), conflict handling (Morgan and Hunt, 1994, Webb and Hogan, 2002), trust and commitment (Morgan and Hunt, 1994, Grönroos, 1991a, Sin et al., 2002, Lewin and Johnston, 1997), dependence (Lewin and Johnston, 1997), relationship-specific investments (Anderson and Weitz, 1992, Cannon and Perreault, 1999), structural and social bonding (Liljander and Roos, 2002, Perry et al., 2002, Rao, 2002, Ravald and Grönroos, 1996), internal marketing (Christopher et al., 1991, Grönroos, 1991a) and shared values (Morgan and Hunt, 1994, Sin et al., 2002).

While no general consensus exists on the primary relationship characteristics in the RM literature, trust and commitment have emerged as central to RM theory and practice since Morgan and Hunt's (1994) commitment-trust theory. Besides, the interactive nature of relationships (Gummesson, 1987, Tikkanen and Tuominen, 2000) and the relevance of information for value creation in relationships (Gummesson, 1999) suggest a high relevance of communication for this study. This section elaborates on foundations of these three constructs in the literature.

2.6.1. Trust

Conceptualisations of trust in marketing have been founded on research in other disciplines, most prominently psychology (Lewicki, McAllister and Blies, 1998, Frost, Stimpson and Maughan, 1978). Early research was based on the understanding of trust as a concept of belief, defining trust as confidence in the motives and intentions of another person (Lewicki et al., 1998). This cognitive perspective of trust entails a perception and expectation about the partner's trustworthiness (Moorman et al., 1992) and has been adopted for a range of studies in the marketing discipline (e.g. Anderson and Weitz, 1989, Crosby et al., 1990). Morgan and Hunt (1994, p. 23), for example, defined trust as "confidence in an

exchange partner's reliability and integrity". In comparison, the behavioural perspective on trust conceptualises it as actions that increase one's vulnerability (Zand, 1972; Coleman, 1990). Implying uncertainty and vulnerability, an action taken by one party is viewed as reflecting trust or a lack thereof. Moorman et al. (1992, p. 315) argued that both approaches to trust should be united, as "both belief and behavioural intention components must be present for trust to exist".

A broader perspective on trust has already been argued by earlier researchers, for example in the context of personal selling (Swan and Nolan, 1985). Based on Scott (1980), Swan and Nolan (1985) discussed four dimensions of trust, including the belief that someone can be trusted, the future intention of behaviour, actual behaviour as well as the feeling of trust. While the first dimension relates to the cognitive approach and the second and third dimensions reflect two aspects of the behavioural approach, Swan and Nolan (1985) added an emotional component. This component relates to liking and the perceived ability to predict the other party's intentions and future behaviour (Swan and Nolan, 1985).

In consensus with Rousseau, Sitkin, Burt and Camerer's (1998, p. 395) findings on the cross-disciplinary view of trust, trust in this study is not conceptualised as an actual behaviour, but as an underlying psychological condition based on the overall relationship (Young and Wilkinson, 1989). Hence, trust is defined as "a willingness to rely on an exchange partner in whom one has confidence" (Moorman et al., 1992, p. 315). Based on this definition, Ganesan (1994) conceptualised trust as comprising two components, namely credibility and benevolence, reflecting the partner's perceived reliability and trustworthiness as well as motives and goodwill. In consensus with other authors (Doney and Cannon, 1997, Kumar, Scheer and Steenkamp, 1995, Larzelere and Huston, 1980), measurement of trust in this study integrates both components.

The prominence of trust in the RM literature relates to its empirically tested positive impact on relationship outcomes such as relationship age (Anderson and Weitz, 1989) and the intention to renew sponsorship agreements (Farrelly and Quester, 2003b), relationship performance (Medlin, 2001) and perceived task performance (Smith and Barclay, 1997), as well as satisfaction (Farrelly, 2002). However, research has failed to unearth a positive link between trust and economic outcome measures such as business performance, measured in respect to sales

growth, customer retention, return on investment and market share (Sin et al., 2002), as well as service usage (Grayson and Ambler, 1999, Moorman et al., 1992) and purchase choice in buyer-seller relationships (Doney and Cannon, 1997). This lack of empirical evidence of the influence of trust on performance suggests the need for further research in this area. Such research should be conducted in a high-risk research field.

Trust is generally related to risk and uncertainty (Frost et al., 1978, Rousseau et al., 1998, Young and Wilkinson, 1989), as expressed by Grönroos (1994a, p. 9): “If there is no vulnerability and uncertainty trust is unnecessary”. Hence, the impact of trust on relationship outcomes should be tested in a research field characterised by risk and uncertainty.

2.6.2. Commitment

Closely related to trust, commitment has gained a fundamental role not only in RM theory (Farrelly and Quester, 2003a, Morgan and Hunt, 1994, Perry et al., 2002, Siguaw et al., 2003, Young and Denize, 1995) but also in organisational and buyer behaviour (Meyer and Allen, 1991, Reichers, 1985). A wide range of definitions and conceptualisations of commitment appear in the literature, ranging around three themes, namely a financial or other economic loss associated with leaving, an affective bond to an organisation or partner, and moral obligation (Meyer and Allen, 1991).

The former two perspectives or components of commitment have dominated research in marketing and management, with an accepted differentiation between behavioural or instrumental and attitudinal components (Gundlach et al., 1995, Meyer and Allen, 1991, see Plewa and Quester, in press, in Appendix 1b). Complicating the conceptualisation of commitment, however, is the number of terms used for both perspectives. While the behavioural perspective relates to terms and constructs such as economical commitment, calculative commitment, technical bonds and idiosyncratic investments (Perry et al., 2002, Young and Denize, 1995), the attitudinal component has been referred to as social or affective commitment (Meyer and Allen, 1991, Perry et al., 2002).

Behavioural or instrumental commitment involves a contribution to the relationship (see Plewa and Quester, in press, in Appendix 1b) and thus the presence of inputs or costs that are specific to the situation and relationship (Gundlach et al., 1995). With high sacrifices related to relationship termination or switching, relationship-specific input might lock a party into a relationship (Perry et al., 2002). The idiosyncratic nature of relationship-specific investments implies that they are to a varying degree “difficult or impossible to redeploy in another channel relationship” (Anderson and Weitz, 1992, p. 20), and are therefore often employed under uncertainty of future benefit (Stewart and Durkin, 1999).

Relationship-specific investments gained much consideration in the channel and strategic alliance literature and may range from one-time investments, as for example staff trainings (Anderson and Weitz, 1992) or efforts in increasing customer’s post-purchase skills (Hennig-Thurau, 2000), up to gradual adaptations in processes, products, procedures or facilities (Anderson and Weitz, 1992, Cannon and Homburg, 2001, Cannon and Perreault, 1999). Deliberate dependence is seen, for example, in franchising and just-in-time delivery (Young and Denize, 1995).

Affective or social commitment, on the other hand, is typified by emotional and psychological ties between relationship actors (Young and Denize, 1995, see Plewa and Quester, in press, in Appendix 1b). Characterised by cooperative understanding (Perry et al., 2002), mutual friendship and liking (Hocutt, 1998), positive emotional attachment (Gruen, Summers and Acito, 2000) as well as emotional and psychological ties (Young and Denize, 1995), affective commitment relates closely to other behavioural variables such as motivation, loyalty and involvement (Gundlach et al., 1995). Illustrating the strong personal feature of affective commitment, Rao and Perry (2002, p. 600) defined social bonds as “investments in time and energy to produce positive interpersonal relationships between partners”. Perry et al. (2002) conceptualised social bonds as a broad and comprehensive construct, embracing commitment as well as several other constructs, including conflict, benevolence, equity and trustworthiness.

Inherent to all conceptualisations of commitment is its temporal dimension, with commitment becoming substantive only in the longer-term (Dwyer and Oh, 1987, Gundlach et al., 1995). In their study on commitment in business service relationships, Young and Denize (1995) found relationships to continue despite a

lack of economic or social benefits due to other variables such as aversion to risk, psychological dependence or the partner's reputation. This study adopts Anderson and Weitz's (1992, p. 19) definition of commitment as "a desire to develop a stable relationship, a willingness to make short-term sacrifices to maintain the relationship, and a confidence in the stability of the relationship". This comprehensive conceptualisation entails not only attitudinal commitment and behavioural input but also long-term durability and consistency (Dwyer and Oh, 1987, Martín, Gutiérrez and Camarero, 2004) and the effort put into maintaining the relationship (Young and Denize, 1995). Importantly, it differentiates commitment from the simple intention to renew a contract or continue a relationship.

A decade has passed since the call for research on asymmetry in commitment by Anderson and Weitz (1992) and Gundlach et al. (1995), the latter presenting a notable exception by analysing magnitude and proportionality of commitment inputs. The majority of authors analyse commitment based on data from one side of a relationship dyad, limiting the understanding of its antecedents and effects in a relationship situation. Hence, more dyadic research on commitment appears necessary.

2.6.3. Communication

With relationships being developed by interaction (Tikkanen and Tuominen, 2000), interactivity and connectedness between partners is one of the main determining factors of RM. One interaction activity employed to link people or bodies is communication (Duncan and Moriarty, 1998, Iacobucci and Hopkins, 1992), the "formal as well as informal sharing of meaningful and timely information between firms" (Anderson and Narus, 1990, p. 44). While communication has been integrated in a range of RM studies (Anderson and Weitz, 1992, Johnston et al., 2005, Morgan and Hunt, 1994), it has often been taken for granted (Conway and Swift, 2000) and has not achieved the same level of attention as trust, commitment and satisfaction in the literature (Duncan and Moriarty, 1998). This is surprising, considering the strong association between communication and trust (Anderson and Weitz, 1989, Morgan and Hunt, 1994, Lewin and Johnston, 1997), as well as the necessity of bilateral communication and information sharing

for the creation of satisfaction and value in a relationship (Gummesson, 1999, Mohr, Fisher and Nevin, 1996, Siguaw et al., 2003). Indeed, it has been argued that relationships “are impossible without communication” (Duncan and Moriarty, 1999, p. 3).

This study argues that communication, as well as the integration and participation in the relationship, ought to have the same level of criticality in a RM study as trust and commitment. Duncan and Moriarty (1998, 1999) have taken an even stronger position, advocating the communication perspective on RM, integrating RM theory with the integrated marketing communications literature. Duncan and Moriarty’s (1998) communication-based marketing model for managing relationships relies on differences of the type and centrality of information between transactional and relational approaches, an argument also made by other authors (Anderson and Weitz, 1989, Lindberg-Repo and Grönroos, 2004, Mohr and Nevin, 1990).

Varying conceptual approaches have been adopted to define the concept of communication, limiting a comparability of findings in the literature. Hence, it is suggested that communication characteristics should be clarified to better understand the impact of communication in a relationship setting. A comprehensive outline of communication including the reflection on different features of the complex communication concept is required. Based on organisational and communication theory, Mohr and Nevin (1990) extracted four communication facets, namely frequency, direction, modality and content.

Communication frequency reflects the number of times information is exchanged over a certain period of time (Fisher et al., 1997). High communication frequency has been associated with collaboration and relationship existence (Polonsky, Schupisser and Beldona, 2002, Siguaw et al., 2003, Sin et al., 2002) and is believed to positively influence the credibility and value of information exchanged between actors (Menon and Varadarajan, 1992). While relationships are believed to be characterised by a high communication frequency, direction and reciprocity remain the communication facet distinguishing relational and transactional approaches.

In terms of the direction of communication, one-way communication, often directed at the customer, has dominated transactional approaches (Lindberg-Repo and Grönroos, 2004). Relationship building, on the other hand, requires bi-directional and reciprocal communication (Fisher et al., 1997, Jacobs, Evans, Kleine and Landry, 2001, Pervan and Johnson, 2000), enabling the exchange of information and, in turn, the development of trust (Anderson and Weitz, 1989). Bi-directionality implies a two-way process or dialogue (Fisher et al., 1997), and thus reflects whether communication is directed “to” or undertaken “with” parties (Coviello et al., 1997). Reciprocity, on the other hand, reflects the balance between parties in that dialogue.

Depending on the modality of communication, formal or informal methods may be used to communicate (Mohr and Nevin, 1990). Acknowledging the costs related to communication modes, Cannon and Homburg (2001) indicated that rich modes, such as face-to-face communication, might be relevant for the communication of complex content, while less rich and cheaper modes, such as written or electronic information, might be appropriate for a standardised one. In the RM literature, the decrease of costs has been described as one opportunity to create value, which in turn is required for relationship success (Cannon and Homburg, 2001, Donaldson and O'Toole, 2002, Mandjääk and Durrieu, 2000). Hence, the appropriateness of communication modes may vary depending on the communication content and costs.

The content value of information exchanged is characterised by its relevance and timeliness (Siguaw et al., 2003), its usability for the other party (Cannon and Homburg, 2001, Medlin, Aurifeille and Quester, 2001) and the context (Menon and Varadarajan, 1992). Anderson and Weitz (1989) found low levels of detail in communication associated with long-term relationships, which might indicate a higher level of understanding and greater communication efficiency among long-term partners, leading to less communication costs.

Despite the significant role of communication in relationships and their development process, empirical research on communication as a construct as significant as trust and commitment is sparse, indicating a relevance of future research in this area. The context of this study, relationships crossing sectoral borders, suggests a high significance of communication, as it entails the processing

of a message from one group by another group embedded in a dissimilar environment.

2.6.4. The Interrelationships of Trust, Commitment and Communication

Trust has been consistently linked to commitment in the RM literature (Grayson and Ambler, 1999, Moorman et al., 1992, Morgan and Hunt, 1994). While no consensus has yet been reached on the question of which construct is the antecedent of the other, the majority of research found trust to positively influence commitment (Farrelly, 2002, Grayson and Ambler, 1999, Moorman et al., 1992, Morgan and Hunt, 1994), validated with the vulnerability involved in committing to another party in a relationship and the need for trust to overcome this potential barrier (Morgan and Hunt, 1994). On the other hand, in a study on software firms in the export/import business, Medlin (2002) found commitment to precede and positively influence trust. Despite general limitations in the confident establishment of causality among constructs (Netemeyer, Bentler, Bagozzi, Cudeck, Cote, Lehmann, McDonald, Heath, Irwine and Ambler, 2001), further research and considerations of the specific research context may provide a better understanding of the trust-commitment link.

While the connection of commitment to trust has clearly shaped its prominence in RM, so too have the empirical findings linking commitment with relationship outcome variables such as cooperation and acquiescence (Morgan and Hunt, 1994), decreased conflict (Jap and Ganesan, 2000), customer loyalty and word-of-mouth (Hennig-Thurau et al., 2002), satisfaction (Jap and Ganesan, 2000), relationship performance (Medlin and Whitten, 2001), as well as intention to renew a sponsorship agreement (Farrelly and Quester, 2003b). However, the association of commitment and communication in a relationship context has received less recognition in the RM literature. Some research shows communication as a positive driver for commitment to a relationship, either directly (Duncan and Moriarty, 1998, Sharma and Patterson, 1999) or moderated by trust (Morgan and Hunt, 1994, Sharma and Patterson, 1999). The interaction and exchange of information between parties is seen to create a bond between relationship partners (Sharma and Patterson,

1999) and a dedication to the relationship. Further empirical research, however, is required to gain a better understanding of this interrelationship.

While authors generally agree on an association between trust and communication (Farrelly, 2002, Moorman et al., 1992), the direction of impact is not clear. Anderson and Weitz (1989) stated that the sharing of information protects the relationship from misunderstandings and potential conflict. Furthermore, Grönroos (2000) described bilateral communication as creating a bond between parties. In consensus with Morgan and Hunt's (1994) findings, these studies suggest communication to positively influence trust. Alternatively, other authors have argued for the reverse causality to exist, with parties requiring a certain degree of trust before engaging in communication activities due to the potential risk of opportunistic behaviour (Das and Teng, 1998, Jordan, 2004). It may thus be argued that trust precedes and facilitates communication (Friman, Gärling, Millett, Mattsson and Johnston, 2002), supported by reports on the positive influence of trust on interaction and involvement (Grayson and Ambler, 1999, Moorman et al., 1992).

Based on the discussion of trust, commitment and communication, the following section reflects on key antecedents of these relationship characteristics.

2.7. Antecedents of Trust, Commitment and Communication

Relationships evolve, and are embedded in, a certain environment. Several factors have been discussed in the literature as antecedents to relationships and specific relationship characteristics (Hocutt, 1998, Morgan and Hunt, 1994, Selnes, 1998). So far, however, RM theory has largely ignored the potential impact of differences between partners in regards to organisational cultures. Based on research in the mergers and acquisitions and more recently alliances literature, differences in organisational cultures are proposed as a significant antecedent of, and relevant to, RM research in this section. Following an introduction into the concept of organisational culture, diversity and similarity of relationship partners are discussed, leading to the conceptualisation of the construct of organisational compatibility. Furthermore, individuals engaged in relationships, their characteristics and motivations are presented as another antecedent to relationship characteristics.

2.7.1. Organisational Culture Difference

Following an introduction into the concept of organisational culture and differences between relationship partners in this section, research on the diversity and similarity of alliance partners is discussed, leading to an outline of the construct of organisational compatibility as conceptualised in the current marketing literature.

2.7.1.1. The Concept of Organisational Culture

Organisational culture is an established concept in the business and management area (Desphandé et al., 1993, Lewis, 2002) with special consideration given to the possibilities and practices of changing a culture (Ogbonna and Harris, 2002), a culture's effect on performance (Gordon and Ditomaso, 1992, Juechter, Matthew and Fisher, 1998, Reynolds, 1986, Saffold, 1988) and total quality management (Sureshchandar, Rajendran and Anantharaman, 2001). Human, in comparison to organisational, culture has also been an integrated concept in areas such as anthropology (Grillo, 2003) and sociology (Silber, 2003).

It is generally understood that organisations differ regarding their social atmosphere or culture (Reynolds, 1986). However, the multifaceted and complex nature of organisational culture (Buono et al., 1985) led to the development of different views on the demarcation and definition of this concept (Lewis, 1996, Weber, 1996). Most authors describe organisational culture as involving a combination of invisible values as well as visible practices and patterns (Hofstede, 1994, Lewis, 1996, Thompson and Wildavsky, 1986, Wilson, 2001). In consensus with these authors, organisational culture can be defined as "... the pattern of shared values and beliefs that help individuals understand organisational functioning and this provides them with norms for behaviour in the organisation" (Desphandé and Webster, 1989, p. 4).

Organisational culture occurs in informal arrangements of people (Leisen et al., 2002), not necessarily restricted by company borders, geography or functional area. Therefore, the various levels of culture present in organisations and relationships need to be differentiated. Despite the label 'organisational culture', this concept is not limited to a formal organisational enterprise. While certain principles and beliefs may occur within an entire organisation, multiple cultures and

subcultures are expected to exist within organisations (Lewis, 1996, Wilson, 2001). Hence, depending on the constructs studied, the level of culture or subculture to be analysed may vary.

A culture and inherent norms and values are drawing points for people towards a group or organisation (Schraeder and Self, 2003). They generate a feeling of togetherness and reinforcement (Lewis, 1996) and affect the way the group members interact with each other (Chatterje et al., 1992). Hofstede, Neuijen, Ohayv and Sanders (1990) described this effect when looking at the influence of management on organisations. They found that even though leaders can shape a culture, such culture only affects a group through their execution of shared practices.

Development and maintenance of organisational culture occurs by means of social interaction between members of a group (Wilson, 2001), as well as through adaptation and opposition to the environment and other groups (Thompson and Wildavsky, 1986). Close contact between organisational cultures in a relationship environment is expected to have three main effects. First, the contact of groups allows direct adaptation and opposition and thus serves the development and maintenance of each group's individual culture. Second, close contact with another culture is expected to reveal an organisational culture's specific characteristics and their specific strengths (Buono et al., 1985, Weber, 1996). As organisational culture is seldom specified and generally not put in writing (Arogyaswami and Byles, 1987), members of a group may have an understanding of many cultural characteristics but might not be aware of some components or the full culture richness (Buono et al., 1985) without contact with another culture.

Third, interactivity between individual members of the groups engaged in a relationship is likely to promote the development of a relationship culture. While a relationship culture develops based on the organisational cultures of the relationship partners, it is also unique to the group of people involved in such relationship (Leisen et al., 2002). A high magnitude and frequency of interaction and a sharing of experiences are suggested to increase the likelihood and speed with which a relationship culture grows (Buono et al., 1985). In long-term relationships, the existence of a relationship culture may thus limit opportunities of studying organisational culture mismatch. However, the development of such culture is not

expected to affect the individual cultures in the short or middle term, as “any cultural template is durable and slow to change” (Wilson, 2001, p. 354).

Following, differences between organisational cultures in a relationship situation are discussed further.

2.7.1.2. Organisational Culture Difference between Relationship Partners

An organisational culture is distinctive to one organisation, organisational unit or group (Buono et al., 1985). The development of relationships through interaction between groups thus implies a meeting of different cultures. Surprisingly, RM research has so far largely ignored OCD, and its effect on a relationship and relationship performance is yet unknown. Cultural mismatch between organisations, however, has gained recognition as a relevant subject matter in the mergers and acquisitions literature, which has long recognised the impact of OCD on success (Buono et al., 1985, Chatterje et al., 1992, Fralicx and Bolster, 1997), with the majority of research on cultural mismatch conducted in the 1980s and 1990s. The acknowledgement and analysis of the effect of different organisational cultures is widely credited to the failure of a large number of mergers and acquisitions, later explained by a cultural clash or incompatibility (Chatterje et al., 1992, Weber, 1996). Based on this research stream, OCD has in recent years slowly arisen as an area of concern for strategic alliance research (Leisen et al., 2002, Lewis, 2002).

Mergers and acquisitions imply an extremely high contact and the partial or full integration of differing cultures including the development of a post-merger culture. The high degree of integration in the case of mergers and acquisitions may reveal the full potential of cultural differences (Weber, 1996) and lead to a higher risk of organisational breakdown than in a relationship situation (Davis, 1968). As organisations in a relationship retain their structural independence, the risk in such relationships is suggested to be restricted in most parts to relationship failure. However, based on the close contact between organisations or groups and their respective cultures in mergers, acquisitions and relationships, findings drawn from the merger and acquisition literature should be tested in the RM area. This issue is suggested to be specifically relevant to relationships incorporating organisations with fundamentally different organisational cultures.

Authors dealing with OCD in mergers and acquisitions, as well as recently in the alliances literature, generally describe negative effects of OCD (Buono et al., 1985, Chatterje et al., 1992, Lewis, 2002), with the harmony of values and styles seen as a key to success (Fralicx and Bolster, 1997). The contact or integration of dissimilar cultures leads to disapproving feelings in employees regarding the other party, which in turn negatively affects the cooperation of employees towards boundary-spanning activities (Chatterje et al., 1992). Weber (1996), part of the author team of Chatterje et al. (1992), analysed other variables of the previously gained data. In line with Chatterje et al.'s (1992) finding on employee cooperation, he found acquired managers' perceptions of culture differences to be negatively related to the effectiveness of integration between the previously separated companies.

However, varying findings exist regarding the effect of OCD on performance variables. For example, Chatterje et al. (1992) found a strong negative relationship between the perception of cultural differences and the merger performance as measured by shareholder gains. Weber (1996), on the other hand, measured the financial performance of the merger in terms of the rate of increase in return on assets and did not find support for the proposed impact of culture distance on financial performance. Analysing the indirect impact of OCD on mutual satisfaction, Smith and Barclay (1997) reported a very weak negative effect, primarily limited to differences in strategic horizons and goals and/or control systems.

Despite some findings of the negative impacts of dissimilarity, few researchers rather propose that dissimilarity may have a positive effect on relationship constructs and outcomes (Hewett et al., 2002, Moorman et al., 1992). For example, Rogers (1983) pointed out that information diffusion is greatest when the actors are different from one another. Also, Moorman et al. (1992) indicated, in their study of relationships between providers and users of market research, that high similarity might lead to a low degree of value added by the relationship partner. This suggestion has been encapsulated by Hewett et al. (2002, p. 235) in their proposition that "firms with different corporate cultures might be better suited in terms of their ability to contribute to relationship outcomes". In the specific case of research-oriented relationships, Fisher et al. (1997) indicated that differences

between functions are required to generate “the creative tension”, so vital for R&D success. Also, some authors suggested that specific differences might have a positive rather than negative effect on the merger or alliance (Maron and VanBremen, 1999, Schraeder and Self, 2003) when potentials and experiences incorporated in organisational cultures complement each other.

Despite the lack of research on OCD in RM, international RM research has examined differences between relationship partners on a national culture basis (Ahmed, Patterson and Styles, 1999, Conway and Swift, 2000, Johnston et al., 1999). For example, Johnston et al. (1999) proposed that the complexity of managing relationships rises with increasing cultural difference. Griffith, Hu and Ryans (2000) examined intra- and inter-cultural channel relationships between two pre-defined cultural types. They found commitment to have significantly stronger consequences on other relationship characteristics in inter-cultural relationships, reflected in a stronger positive association between commitment and satisfaction. Also, Medlin and Quester (1997) found in their study on cooperative alliances clear differences between relationship customs in different cultures. While international RM research acknowledges national culture difference as an important influence factor for relationships, Ahmed et al. (1999) advanced this notion, describing not only national culture but also business culture as highly relevant in international relationships.

Lack of research on OCD in a relational context may be anchored in the majority of studies focusing on one relationship actor (Desphandé et al., 1993, Hewett et al., 2002). This approach might not only limit their findings (Medlin, 2001) but also the opportunity to study OCD, as only the view of one side or culture is taken. Hence, dyadic research integrating perceptions on the organisational culture of each relationship partner is needed. A comprehensive empirical test of the effects of individual dimensions of OCD and their influence on a relationship is yet to be undertaken in RM and is proposed in this study.

Typologies have been developed to allow the analysis and comparison of organisational cultures. Desphandé et al.’s (1993) conceptualisation of organisational culture types has been widely accepted in the literature (Conrad, Brown and Harmon, 1998, Hewett et al., 2002, White, Varadarajan and Dacin, 2003). It differentiates organisational cultures based on process characteristics and

organisational emphasis into four types, namely clan, adhocracy, hierarchy and market. While offering certain generalisability and comparability among studies, the use of four cultural types established in the private sector setting may limit research on other organisations, such as those operating in the public sector. Rather, the concept of organisational compatibility was perceived as appropriate for this study and is discussed next.

2.7.1.3. Organisational Compatibility

Research in the area of strategic alliances has recognized the impact of intercultural diversity and similarity on alliance success (Bucklin and Sengupta, 1993, Dyer and Singh, 1998, Johnson and Cullen, 1996). Based on resource dependency theory, Palmer (2002a) found similarity, conceptualised as the complementarity of resources, competence and culture, to negatively affect relationship effectiveness in UK cooperative tourism organisations. In comparison, Johnson and Cullen (1996) argued similarity between partners to positively influence the relationship construct trust, due to its ability to promote understanding and a general affinity between partners. However, no strong support for this argument was found, with similarity not significantly influencing trust when considering a t-value of .05 (Johnson and Cullen, 1996). Different perceptions and findings regarding the impact of similarity and diversity on relationships and relationship outcomes can be attributed to the broad conceptualisations of the measured construct. For example, while Palmer (2002a) operationalised similarity in terms of resource base, competence, goals and culture, Johnson and Cullen (1996) measured similarity based on a range of facets, such as size, product lines, organisational cultures, goals, objectives, time-orientation and innovativeness.

Calling for a more specified conceptualisation of diversity or similarity, Parkhe (1991) developed a typology of intercultural diversity including resource complementarity, often studied in the alliance literature (Johnson and Cullen, 1996, Song, Droge, Hanvanich and Calantone, 2005), as one of two types of diversity. A second type entails differences in partner characteristics, such as corporate ideologies and values, strategic interests, management styles and organisational structures. While the existence and sharing of complementary resources promote the

formation of alliances (Parkhe, 1991) or bilateral relationships (Xie, Osmonbekov and Johnston, 2005), organisational compatibility may be necessary to gain relationship benefits (Dyer and Singh, 1998), even though organisational compatibility on its own may not create these benefits (Sarkar, Echambadi, Cavusgil and Aulakh, 2001).

Based on Parkhe's (1991) conceptualisation of interfirm diversity, Sarkar et al. (2001) empirically tested the impact of resource complementarity as well as cultural and operational compatibility on relationship characteristics and alliance performance in the construction contract industry. Amongst other findings, Sarkar et al. (2001) showed the cultural dimension of organisational compatibility to significantly relate to mutual trust, reciprocal commitment, bilateral information exchange as well as strategic and project performance, demonstrating the relevance of this construct in manufacturing alliances. Hence, it was proposed that similar organisational cultures are likely to lead to strong relationship building, in turn positively influencing relationship performance. According to Kale, Singh and Perlmutter (2000, p. 224), "compatibility between partners fosters the 'chemistry' between them".

The interest of this study lies in the analysis of organisational compatibility in relationships, rather than strategic alliances, operating in fundamentally different environments. Hence, resource complementarity between partners is not considered in this study. Due to the different strengths of universities and private sector organisations and their respective staff (Barnes et al., 2002, George, Zahra and Wood, 2002), the existence of complementary resources as perceived by both partners is assumed. Organisational compatibility is conceptualised based on Bucklin and Sengupta (1993) as compatibility in goals and objectives as well as a similarity in operating philosophies at senior management level. The focus thus lies on the cultural rather than operational organisational compatibility (Sarkar et al., 2001). Of major interest are not only the effect of organisational compatibility on the relationship characteristics of trust, commitment and communication in this context, but also its direct or indirect effect on relationship outcomes.

In the following section, individuals and their characteristics and drivers are discussed as another relevant antecedent to relationship characteristics.

2.7.2. The Relevance of Individuals in the Relationship

Services marketing and the service-based research streams in RM have highlighted the relevance of individuals engaged in the process (Bendapudi and Leone, 2002, Gummesson, 1991, Haytko, 2004), anchored in the high level of interaction between partners during relationship development (Tikkanen and Tuominen, 2000). RM entails a systematic approach to relationship management by creating superior value (Anderson, 1995). The maximization of value is achieved through specialised interaction with, and involvement of, all relationship partners in the value creation process.

Interaction implies a high level of responsibility of staff at the boundary of a RM organisation, as boundary-spanning employees overtake a marketing and relationship-building role (Webster, 1992, Spekman and Johnston, 1986). Gummesson (1991) described these employees as ‘part-time marketer’: While full-time marketers are those staff working in the marketing department of a centralised structured marketing function, part-time marketers are those employees not specialised in marketing, whose role is crucial for relationship building due to their interaction with, and support for, partners and customers. Part-time marketers have dual responsibilities, both for fulfilling their role (e.g. as a researcher), and for making a good impression while doing so (Grönroos, 1999, Ferguson, Paulin and Bergeron, 2005). As a result, the literature describes empowered, motivated and well trained, supported employees as important for implementing relationship-oriented principles (Anton, 1996).

Ferguson et al. (2005) recently empirically confirmed the fundamental positive effect of the closeness of boundary spanners to customers on relationship governance in a banking context. However, much of the business-to-business RM research has concentrated on organisational level constructs, assuming the relevance of individuals without empirically testing it (Haytko, 2004), proposing the need for further research. Similarly, authors in related areas such as CRM call for research on the role of employees in the relationship and CRM implementation processes (Boulding et al., 2005). A strong research area has developed on championship behaviour in the technology transfer literature, underscoring the critical role of individuals and their characteristics, skills and motivation for the transfer of technology (ARC, 1999) and university-industry cooperation (Santoro and

Chakrabarti, 2002). Section 3.6.2 further elaborates on the importance of individuals in UIRs.

2.8. Chapter Summary

Since its introduction more than twenty years ago, RM has achieved increasing academic attention and is now one of the most prolific research areas in current marketing theory and practice. This chapter has given an overview on this primary parent theory to this study. Following a description of the evolution of RM theory and the development of a RM definition, the dynamics and development of relationships were clarified. Then, relationship outcomes were discussed, focusing on the conceptualisation and creation of value and satisfaction in a relationship. Satisfaction, or the affective notion derived from the evaluation of an ongoing relationship, is integrated as an outcome measure into the further analysis.

Three relationship characteristics central to RM theory were discussed. Based on an overview of trust, commitment and communication as reported in the RM and related disciplines, definitions and conceptualisations of these constructs for this study were presented. Finally, OCD and organisational compatibility as well as individuals engaged in relationships were presented as relevant antecedents to the relationship characteristics. However, as discussed in this chapter, consensus has yet to be achieved in relation to the effect of individual relationship characteristics on the performance of relationship parties or about the influence of OCD on a relationship. Specifically, dyadic research is required to better understand relationship dynamics.

The following chapter presents theories that have developed around relationships between universities and industry entities. While no comprehensive research stream has yet evolved specifically on UIRs, literatures in the areas of technology transfer, commercialisation and related research streams have touched on the issue and are utilised as a second parent theory for this study. Furthermore, the discussion of UIR outcomes, constructs and antecedents is anchored in RM theory, overcoming a lack of relational rather than transactional findings in this context so far. While both literatures focus on distinct areas, substantial commonalities exist, including the dealing with business-to-business relationships,

the environmental and competitive forces driving their development, and the large number of exploratory and descriptive studies. The introduction of RM principles to UIRs aims at developing an understanding of these relationships, leading to the development of a conceptual framework to be developed further in a preliminary qualitative research step and to be tested and validated by the final quantitative step of this research.

Chapter Three – University-Industry Relationships

3.1. Introduction

The rapid change of competition and the speed of innovation worldwide have forced private and public sector institutions to cooperate and combine their efforts to foster the diffusion of knowledge and technology within national innovation systems. The evolution of developed countries into knowledge-based economies increases the importance of knowledge exploitable in products, processes and services. It also affects the speed with which this knowledge is created and utilised for industry as well as economies in today's competitive environment (Universität Dortmund, 2003). As a result, innovation-oriented linkages have increased in many countries (OECD, 2000).

Academic interest in this area is reflected in the large amount of research that evolved around the areas of technology transfer and research commercialisation on the university side (Carlsson and Fridh, 2002, Kettler and Casper, 2001, Steenhuis and De Bruijn, 2002). Also, a prolific research stream has devolved around innovation, R&D management and continuous improvement on the industry side (Adnan, Ramanathan and Chapman, 2004, Gupta et al., 2000, Chapman and Hyland, 2000, Griffin and Hauser, 1996). The most comprehensive literature specifically discussing linkages or partnerships between universities and industry entities can be found in government reports, policy papers and working group reports (ARC, 2001, Turpin et al., 1999, Beesley, 2003, Link, Paton and Siegel, 2002), which often focus primarily on legal, financial or policy issues (Irwin, More and McGrath, 1998, Knowledge Commercialisation Australasia, 2003).

While an increased relevance of linkages between universities and private sector organisations for the performance of both parties and society at large appears to exist (ARC, 2001, Baba and Kamibeppu, 2000, Cyert and Goodman, 1997, Stackhouse et al., 2001), the technology transfer and commercialisation literature has to a large degree focused on transactional rather than relational exchanges, and research on UIRs remains limited (Harman, 2001, Lee et al., 2003). To date, the concept 'relationship' has neither been defined nor clearly discussed in a university-industry context. Furthermore, the prolific nature of RM research and the emphasis on relationship development and maintenance in current marketing theory has

primarily been based on relationships between private sector institutions, ignoring relationships crossing sectoral borders, and more specifically UIRs.

A thorough understanding and a specific framework of the characteristics and success factors of these relationships are still missing (George et al., 2002). The primarily exploratory and descriptive nature of related studies often lack theoretical foundation (Geisler, 1995) and are limited by a non-empirical approach (Cyert and Goodman, 1997) or by a focus on one or few cases, industries or universities (George et al., 2002, Harman, 2001). Moreover, despite the bilateral nature of relationships and relationship success, available research has been limited to only one side of the relationship dyad, most often the company side (George et al., 2002, Gray, Lindblad and Rudolph, 2001).

This chapter outlines UIRs, their evolution, dynamics, characteristics, antecedents and outcomes. It commences with the evolution of UIRs, briefly describing environmental factors contributing to their development and illustrating driving forces for society, industry and university to engage in UIRs. The concept of technology transfer is defined and differentiated from UIRs as conceptualised in this study. Finally, available research on relationship outcomes, constructs and antecedents for UIRs are discussed, based on the RM theory presented in the previous chapter. Integrating the RM and technology transfer literature appears valuable for both areas and may contribute to the incorporation of scattered research on UIRs into a developing research stream. For a research stream to evolve, researchers have to build their studies on previous research, utilising different methodological approaches in their attempts to create a thorough understanding of a certain problem area (Carson and Coviello, 1996). Where appropriate, research conducted on innovation management and the interface between the R&D and marketing function within an organisation is included in the discussion.

3.2. The Evolution of University-Industry Relationships (UIRs)

Today's marketplace is characterised by an increasing and rapid change of competition (Aijo, 1996, Bower, 1993, Cartwright, 2000), as well as a shift to knowledge-based economies. This development is fostered by factors such as globalisation (Gummesson, 2002, Palmer, 2002b), the maturing of domestic markets

(Siguaw et al., 1998) and rapid technological change (Adnan et al., 2004, Palmer, 2002b, Santoro and Chakrabarti, 2002). The success of an economy under these circumstances depends on the creation of innovation in a national innovation system (PMSEIC Independent Working Group, 1998). Research enables advancements in knowledge and technology, and thus the innovations that have become key drivers of economic performance (OECD, 2001). Science and industry have therefore been labelled the pillars backing a country's innovation system (Universität Dortmund, 2003).

Before the 1980s, companies and universities conducted research in an isolated way and only over the last twenty years have linkages between universities and industry entities developed albeit to a limited extent (ARC, 2001, Harman, 2001). However, the rapid change of competition and the speed of innovation around the world have forced private and public sector institutions to work together and to unite their research efforts to allow the diffusion of knowledge and technology within national innovation systems. Hence, research-oriented linkages and cooperation are increasing in many countries (OECD, 2000) and the Australian as well as other governments have made major efforts to encourage such research-oriented interaction (Harman, 2001, Montgomery, 1992).

Based on its small population and economy in comparison to other major players in the global environment, Australia in particular depends on the diffusion of knowledge and technology to stimulate the nation's global involvement and competitiveness (Irwin et al., 1998, Knowledge Commercialisation Australasia, 2003). Many efforts in Australia currently focus on the development of spin-off companies despite the Australian Research Council's (ARC thereafter) (2001) concern that this strategy does not assist Australia's success in the global environment. The financial and distributional abilities of medium to large business entities or the development of networks or value chains on a global basis may offer a greater opportunity of innovation reaching a global level (ARC, 2001).

On an industry level, increased competition and the continual introduction of new products (Gupta and Wilemon, 1996) has led to increased pressure on companies to advance knowledge and create new products and technologies to achieve success (ARC, 2001, Santoro and Chakrabarti, 2002). The change of developed countries to knowledge based economies has also increased the

importance of knowledge exploitable in products, processes and services and the speed with which this knowledge is created and utilised in today's competitive environment (Universität Dortmund, 2003).

In Australia, the business sector has enhanced its R&D expenditure considerably (ARC, 1999), while placing a high relevance on R&D speed and budget. The Organisation for Economic Co-operation and Development (OECD thereafter) (2002) has found enlarged industry funding of public sector institutions, OECD wide as well as specifically in Australia. Hence, "firms are... taking greater advantage of technologies developed in other firms and in universities and government research labs" (OECD, 2002, p. 165). The trend of companies looking towards external providers of research and innovation in Australia has been confirmed by the ARC (2001).

Universities increasingly need to find new ways of generating income, as a result of decreased government funding and increased national and international competition regarding students and research support (ARC, 2001, Baaken, 2003, PMSEIC Independent Working Group, 1998). Knowledge Commercialisation Australasia (2003) illustrated the composition of commercial incomes of 25 Australian universities between 2000 and 2001, revealing a high relevance of research- and consultancy-related income. The table showed fee paying students as contributing \$1.2 billion or 54 percent of revenue, while consultancy and contract research contributed \$467million or 21 percent, and technology licensing contributed \$14.6 million or 0.7 percent to the total revenues.

Despite Government discussions about deregulation and a possible increase of student fees, the potential funding of universities from student fees is restricted. Therefore, the commercialisation of research has become a topic of major interest in the university environment, as it offers an opportunity for increased income (Baba and Kamibeppu, 2000). The ARC (2001) recognised that based on the changing environment and the universities' need for research commercialisation, universities are leaving their traditional focus on "discovery research" to take on a more "problem driven" approach.

Based on the evolution of linkages between universities and private sector entities, discussed in this section, academia and practice have seen an increased

interest in technology transfer, research commercialisation and UIRs. The following section further elaborates on these interest areas and differences between the conceptualisations of technology transfer and UIRs.

3.3. Technology Transfer and UIRs

Technology transfer and commercialisation has developed as a major topic of interest for practitioners and academics over the last decades (Bozeman, 2000, Steenhuis and De Bruijn, 2002). Next, technology and technology transfer are defined and the related literature discussed. Based on this understanding, a demarcation between technology transfer and UIRs is developed, leading to the conceptualisation and definition of UIRs as analysed in this study.

3.3.1. Technology Transfer

An increase in the relevance and transfer of research and innovation in economic systems is reflected in the considerable literature on technology transfer and commercialisation that has emerged over the last 35 years (Bozeman, 2000, Carlsson and Fridh, 2002, Joyner and Onken, 2002, Steenhuis and De Bruijn, 2002). The complex nature of technology transfer, grounded in the vast definitions of the term technology in the literature, a range of technology transfer channels and a difficult measurement of transfer success (Bozeman, 2000, Radosevic, 1999) led to a vast array of studies and definitions (Williams and Gibson, 1990). Furthermore, despite a lack of consensus regarding the concept of technology transfer, the majority of studies in recent years do not offer a clear definition but assume a general understanding, increasing the complexity of the research field (Armstrong, 2001, Cohen, 2002, Grossman, Reid and Morgan, 2001, Linton, Lombana and Roming, 2001).

Many conceptualisations of technology have emerged in the academic literature, ranging from hardware to skills and search procedures (Leonard-Barton, 1990). As most authors agree that technology is more than a physical good (Radosevic, 1999, Williams and Gibson, 1990), a broad view of technology has been adopted in a large number of studies. For example, technology has been

defined as a “capability that is physical structure or knowledge embodied in an artefact (software, hardware, or methodology) that aids in accomplishing some task” (Leonard-Barton, 1990, p. 45). While Leonard-Barton’s (1990) definition describes physical structure and knowledge as two separate forms, Bozeman (2000) integrated knowledge as an inherent part of technology, based on Sahal’s (1981) review of alternative concepts of technology. It is argued, “when a technological product is transferred or diffused, the knowledge upon which its composition is based is also diffused” (Bozeman, 2000, p. 629).

This study adopts Bozeman’s (2000) and Sahal’s (1981) conceptualisation of technology, implying knowledge as part of the construct. The term ‘knowledge’, however, should be clearly differentiated from the concept of information. Radosevic (1999) discussed both knowledge and information when conceptualising technology. While information or techniques are adaptable and easily transferable from one user to a next, knowledge is embedded in the organisational structure, culture and resources. Therefore, knowledge is not only dependent on the specific environment and situation but also difficult to reproduce and transfer to another organisation (Radosevic, 1999).

The transfer of technology has been defined as “the process of moving innovations from their origin to their point of operation” (Guerin, 1999, p. 443) or as a “transformation of a technical concept of proven feasibility into a development state closer to its end use in the production of a service or goods” (Leonard-Barton, 1990, p. 45). Both definitions reflect the transfer of technology from the originating to the operating point. In a UIR context, this would include the transfer of technology from the university, the originating research locus, to an industry entity, the operating locus closer to the final market. It is important to note that this study solely focuses on the transfer of technology from universities to private sector organisations, thus excluding technology transfer between private sector organisations or within an organisation. Furthermore, based on the conceptualisation of technology in this study, technology transfer involves the transfer of capabilities including knowledge, not simply information or rights (Radosevic, 1999).

Researchers have taken interest in exploring various channels of technology transfer (Roessner, 1993). Rappert, Webster and Charles (1999), for example, described three main types of channels, namely contacts, literature and recruitment.

While mentioning the benefits of long-term contacts, understanding and trust, they do not differentiate between collaborations, consultancies or conferences, all integrated into the channel type 'contact'. Pries and Guild (2004) recently developed a different categorisation of transfer channels, integrating three methods of transferring technology: creating a new business in form of a spin-off, licensing innovation to firms by retaining the ownership of the innovation, and selling innovation (Pries and Guild, 2004). This categorisation may serve as an example for the limited recognition of collaborative research-oriented relationships, integrating a business partner throughout the research development process. While a stream of research has developed on strategic technology transfer alliances in recent years (Arvanitis and Vonortas, 2000, George et al., 2002, Mowery, Oxley and Silverman, 1996), research on relationships and partnerships in the technology transfer area is still sparse, especially in terms of relationships that are more loosely structured than alliances.

Hence, while an increased relevance of partnerships between universities and industry bodies for the performance of both parties and society at large is apparent (ARC, 2001, Baba and Kamibeppu, 2000, Cyert and Goodman, 1997, Stackhouse et al., 2001), the concept 'relationship' has neither been clearly defined nor systematically discussed in the areas of technology transfer and university-industry linkages. Therefore, the following section provides a differentiation between technology transfer, UIRs and strategic alliances as conceptualised in this research.

3.3.2. Technology Transfer versus UIRs

Technology transfer has been defined as “the process of moving innovations from their origin to their point of operation” (Guerin, 1999, p. 443). Based on this understanding of technology transfer, the order of events is as followed. First, research is conducted within the university. Subsequently, existing research outcomes are offered to industry in form of licenses, patents or consulting services or utilised in spin-off companies. Technology transfer is thus oriented towards selling individual research outcomes in form of technology, research capabilities and capacities in order to gain additional income for universities.

This conceptualisation of technology transfer has several implications. First, interaction between the two parties is limited to brief commercial interactions, leading to the upholding of a structural independence of both involved parties. Interaction between the company staff and academics might be close to zero if third parties such as industry liaison offices or other consultants external to the university initiate the transfer or selling of research outcomes (Carlsson and Fridh, 2002, Markman, Gianiodis, Phan and Balkin, 2004, Siegel, Waldmann and Link, 2003). Third parties are often involved to overcome potential problems arising from an interference of research and commercial activities in a researcher's time allocation and performance. The limited or non-existent interaction between the company and university staff leads to the continuation of the traditional separation of both parties in terms of research and commercialisation activities.

Second, the sparse interaction between the parties in technology transfer is mostly one-way (Auster, 1990), often restricted to formal and one-directional reporting. Research is conducted based on the respective academics' interests and skill base. Hence, outcomes are not specifically formulated to suit one company, but are rather offered to a large number of companies or industries. Experience has shown that this approach may lead to problems in those organisations purchasing the research outcome, as the outcomes may not fit with any company's processes, facilities or staff base (Athaide, Meyers and Wilemon, 1996). Hence, technology transfer has been linked to calls that universities should be managed on a more business-like basis (Knowledge Commercialisation Australasia, 2003) with researchers acting more like business people (Purdon, 1996).

Over the last few years, some authors have mentioned their belief in the fact that technology transfer, as described above, will not stand up to other forms of university-industry linkages over time (Schmoch, 2002). These authors and practitioners advocate a different approach to research-oriented linkages, namely building relationships between research institutions and companies (Geisler, 1995, Barnes et al., 2002, Mora-Valentín et al., 2004). Relationships are characterised by frequent, bi-directional interaction between involved parties before, during and often also after the research process, to not only transfer technology from the university to the company, but to encourage the diffusion of knowledge and research between the parties.

The PMSEIC Independent Working Group (1998, p. 1) stated that the key to successful research diffusion is the “flow of creativity, ideas, skills and people”. Such flow requires a university to engage in a research-oriented relationship with a commercial partner to focus towards valuable outcomes of research (ARC, 2001), incorporating a shift for universities from a science to a user focus (Knowledge Commercialisation Australasia, 2003). Relationships, however, go further than the development of a user focus. They are characterised by high levels of interaction and collaboration (Barnes et al., 2002), making research a more collective effort (OECD, 2002) to achieve mutually beneficial outcomes. Based on changes in the marketplace, the ARC (2001, p. 20) predicts a “move away from traditional forms of business support for universities towards closer alliance relationships where substantial value is created for all participants”.

Strategic alliances have been defined by Hunt et al. (2002, p. 18) as “collaborative efforts between two or more firms that pool their resources in an effort to achieve mutually compatible goals that they could not achieve easily alone”. This definition demonstrates the overlap between relationships as defined in this study and alliance research. Both research areas are concerned with linkages between two or more parties seeking to gain mutual value. However, as previously described, strategic alliances represent a specific form of relationships, as they are more formally structured and are characterised by the creation of a separate entity based on a long-term strategic plan (Webster, 1992), exclusivity as well as non-imitability (Varadarajan and Cunningham, 2000). In addition, strategic alliances in the area of university-industry linkages generally involve funding of whole research areas or departments (Bell, 1993).

This study takes a broader view on relationships, including long-and short-term, exclusive and non-exclusive relationships, as well as UIRs of varying scope, including strategic alliances as one type of relationship. It empirically analyses research-oriented UIRs, integrating views from both sides of relationship dyads. The term ‘research-oriented’ implies a focus on those interactions based on, or oriented towards, research competencies, capacities and results (Baaken, 2003). In other words, it excludes those university-industry interactions associated with non-research related matters. Furthermore, UIRs in this study involve linkages between universities and companies defined in terms of a private enterprise. Relationships

between a university and other groups, as for example students or commercial arms of universities, are not taken into account.

In the literature dealing with UIRs, a range of studies focused on university-industry research centres and liaison offices (Geisler, 1995, Gray et al., 2001). Two general approaches can be distinguished regarding research centres. First, cooperative research centres (CRC thereafter) are built around specific research areas and generally involve a network of people and departments from different universities, companies and potentially government. These centres are relationship networks and involve the macro approach of RM described above. Second, university-wide research centres or liaison offices have been developed in a number of universities to channel research activities from the diverse university departments and individuals towards entities external to the university. Hence, these centres or offices act as a third parties, initiating, administrating or handling contacts from the university side to other parties, which may also be carried out by private consultants.

Given the micro approach taken in this study, the relevance of such third parties for UIRs is not clear, as different views exist regarding the importance for, and effect of, research centres on UIRs. Some authors believe in the relevance of research centres for successful UIRs (Cyert and Goodman, 1997, Geisler, 1995), which may be supported by the development of a large number of research centres and liaison offices in Australia and other developed countries over the last years. However, Lee (2000) found that 52% of faculty members manage their industry-sponsored projects through traditional academic units, while only 26% use university-industry research centres for UIRs. This finding suggests a greater relevance of relationships operated by academic units and justifies a focus on one-to-one relationships to capture relationship constructs, outcomes and OCD without taking into account the impact of a relationship network or third parties.

This chapter has so far introduced the technology transfer literature and described the differences between technology transfer and UIRs. Following the call for the provision of a comprehensive definition of emerging fields (Parvatiyar and Sheth, 2001, Boulding et al., 2005), the following definition of UIRs has been developed for this study:

“UIRs are trusting, committed and interactive relationships between university and industry entities, enabling the diffusion of creativity, ideas, skills and people with the aim of creating mutual value over time.”

Based on the previous discussion of RM theory, the following two sections analyse outcomes and relationship characteristics as found in the UIR and technology transfer literature. The introduction of knowledge gained in the RM area over the last twenty years is believed to be beneficial for the analysis of UIRs, as an understanding of relationships is still lacking in this area.

3.4. Relationship Outcomes in UIRs

To date, empirical research examining UIR outcomes has been sparse (George et al., 2002, Gray et al., 2001, Lee, 2000) and often limited by a one-sided perspective. As established in section 2.5, the two-way nature of relationships requires mutual value or the creation of a win-win situation to be successful (Gummesson, 2002, Parvatiyar and Sheth, 2000). Hence, a relationship is successful when each party involved in the relationship perceives it to be beneficial. While Lee (2000) analysed outcomes for both the university and industry side, these were not matched and an analysis of differences or similarities in perceived outcomes within individual relationships was not attempted. Research has so far focused on the identification and ranking of outcomes (George et al., 2002, Lee, 2000), providing a broad spectrum of economic and non-economic performance indicators.

George et al. (2002) studied the influence of university-industry linkages on the firm's innovative output and financial performance. He found firms with university links to be associated with a greater number of alliances, patents, and with less R&D expenditure (per employee). However, George et al. (2002) did not find support for an effect of university linkages on performance variables such as product development, product introduction or financial performance. Only those linkages of high quality, defined as the firm's links with the main research universities in the United States of America, categorised as “Research-I universities”, had a statistically significant effect on performance. These findings need to be considered in terms of their limitations to the US biotechnology sector.

Gray et al. (2001) studied the outcome variable 'firm retention' in relation to university-industry research centres. They found professional networking benefits, satisfaction with the relevance of the research, as well as satisfaction with administrative operations to predict retention, but did not find support for the effect of UIRs on the technical quality of research. Indirect, non-technical and future benefits emerged as the primary motivation for retention. However, in an earlier study, Gray, Johnson and Gidley (1987) found a higher degree of relevance of technical benefits in one-to-one project relationships in comparison to those existing with research centres. Differences between one-to-one UIRs and those involving research centres have been discussed before, with research centres acting as third parties or networks, and might explain the differing findings.

Despite sparse empirical research on UIR outcomes, the available literature reveals different motives for universities and companies entering a relationship. These motivations can be used to construct a framework of suggested UIR outcomes, as motivation has been found to be strongly related to the benefits realised by the UIR, though not necessarily in a linear way (Gray et al., 2001, Lee, 2000). Following from the differentiation between economic and non-economic satisfaction discussed in chapter 2, motivations of universities and industry entities may be differentiated based on their economic or non-economic nature.

The central motives of universities are believed to be of economic nature, with financial support taking the primary role (Cohen, Florida, Randazzese and Walsh, 1998, Harman, 2001, Santoro and Chakrabarti, 2002). Funding for securing and developing future research, including research assistants and laboratory equipment, has been reported as the strongest motivator and benefit for academics to engage with industry (Lee, 2000). Besides gaining additional funds for research (Santoro and Chakrabarti, 2002), financial support for students is a likely motivator and benefit (Harman, 2001). Other economic motivational factors and benefits perceived by academics may include the number of publications, patents, students trained and new enterprises started (Cyert and Goodman, 1997, Lee, 2000). In their discussion of incentives for universities to engage with industry, Cohen et al. (1998) underlined the existence of two parties at the university, namely administration and faculty and their likely variations in motivation. Cohen et al. (1998) stated that both parties are motivated by financial contribution, administration being interested in

revenue and faculty being interested in research support and personal incomes. Faculty was described as searching for financial support in order to achieve a higher-order incentive, namely academic eminence.

The available literature suggests that pure economic measures may not be appropriate to determine the motivations and outcomes of UIRs, highlighting the relevance of non-economical, behavioural and learning outcomes (Cyert and Goodman, 1997, Knowledge Commercialisation Australasia, 2003, Lee, 2000). Universities and their academics are believed to engage with industry entities for the benefit of their research, including the application of basic research results to industry problems (Harman, 2001, Lee, 2000) and the gain of practical insight in the field for research and teaching purposes (Lee, 2000). Furthermore, motivations may relate to students and the university. Literature described the enhancement of training career opportunities for students (Cyert and Goodman, 1997), the attraction of higher quality PhD students (Harman, 2001), and the improvement of the university's or department's prestige (Harman, 2001) as benefits potentially arising from UIRs as perceived by the university side.

Organisations generally aim at the acquisition of technology, including knowledge, when entering a research-oriented relationship (Cyert and Goodman, 1997, Lee, 2000). The largest benefit from the company's point of view is the access to university research, which is not solely limited to technologies, but rather concerns the creation of knowledge (Lee, 2000). For example, Cohen et al. (1998) described knowledge on research processes and ideas for future research projects as outcomes for industry from relationships with universities. Cyert and Goodman (1997, p. 50) also highlighted the importance of knowledge and organisational learning to be considered as outcome and motive for UIRs by stating “[university-industry] UI relationships are really an opportunity for learning”.

Organisations can acquire knowledge and technologies from several external sources, including competing firms, research organisations, government laboratories, industry research associations as well as universities (Santoro and Chakrabarti, 2002). However, potential benefits from those sources differ. The distinct benefits to be gained from universities are easier access to talent, which is merged in universities (Knowledge Commercialisation Australasia, 2003, Santoro

and Chakrabarti, 2002), facilities as well as public awareness and image (Bell, 1993, Santoro and Chakrabarti, 2002).

Overall, authors have focused on an identification and discussion of a large range of individual performance measures. While an understanding of the diversity of measures established in the literature appears valuable, this research focuses on the overall satisfaction with the relationship, taking into account potentially differing objectives and goals between involved parties. Additional measures may be added if the exploratory research step identifies issues highly relevant for the context of this study.

UIRs can and should be a “win-win” situation (Cyert and Goodman, 1997, George et al., 2002), with the future of a UIR strongly dependent on the creation of mutual value throughout the relationship (Barnes et al., 2002). However, to date, dyadic research is sparse and an empirical validation of the existence and antecedents of win-win situations in a university-industry context is still missing. Attributable to differences in history, cultures, expectations and perceptions, universities, companies and individuals differ in their perceptions of relationship outcomes and the level of importance they place on each outcome (Universität Dortmund, 2003). This implies that relationship success is evaluated differently in every institution. Hence, to achieve a relationship that is satisfactory for both relationship sides, a thorough understanding of each other’s goals, objectives and perceptions appears crucial.

The following section reflects on three relationship characteristics proposed to positively influence relationship outcomes. However, while the previous chapter discussed communication as a relevant concept, the technology transfer literature has focused on the concept of integration. Therefore, trust, commitment and integration are discussed in a UIR context in the following section. Furthermore, the association between communication and integration is integrated into the discussion.

3.5. Trust, Commitment and Integration in UIRs

To date, empirical research on the relationship characteristics in UIRs is still sparse. While the constructs of trust, commitment, communication and integration frequently appear in the technology transfer and commercialisation area (Barnes et

al., 2002, Cyert and Goodman, 1997, Irwin et al., 1998), the majority of studies on UIRs and their characteristics and success factors are of exploratory nature. An empirical validation of the effect of relationship characteristics on UIR outcomes, however, is still missing. Furthermore, the single-sided nature of the majority of UIR research has resulted in a lack of understanding relationship dynamics and dyadic perceptions of relationships between universities and industry partners.

A notable exception is Mora-Valentín et al. (2004), who recently analysed the effect of trust, commitment and communication on the global satisfaction and the evolution of relationships between firms and research organisations. While Mora-Valentín et al. (2004, p. 24) stated the use of data from both firms and research organisations as “one of the most original contributions of this study”, collected data from both sides did not match and thus did not reflect overall relationships. Hence, an analysis of similarities or imbalances in relationship characteristics and satisfaction levels was not feasible. Rather, the effect of variables was analysed for each sample separately, creating independent results for industry entities and research organisations. Mora-Valentín et al. (2004) found commitment as significantly and positively related to both satisfaction and relationship evolution in both samples. The impact of trust and communication on relationship outcomes, on the other hand, differed. While both variables were shown to influence satisfaction and evolution, the identified relationships were only direct between communication and satisfaction as well as trust and evolution, with the remaining associations being of indirect nature.

Trust. The significance placed on trust in the RM literature is reflected to some degree in the technology transfer and innovation area (Barnes et al., 2002, Irwin et al., 1998). However, while the impact of trust on relationship success has been tested in a prolific way in the RM literature, literature on UIRs and R&D collaborations mentioned the importance of trust among partners (Barnes et al., 2002, Christiansen and Vendelø, 2003), but did not study trust extensively. The Knowledge Commercialisation Australasia (2003) report stated that UIRs require high levels of trust, as a lack of trust acts as a barrier to effective collaborative research. Other authors agree (ARC, 2001, Powell, Kobut and Smith-Doerr, 1996, Schibany, Schartinger, Polt and Rammer, 2000), describing trust as positively

influencing the effectiveness and success of collaboration (Barnes et al., 2002, Irwin et al., 1998, Rappert et al., 1999).

Risk involved in research and research-oriented collaboration has emerged as a primary reason for the importance of trust and a central focus of researchers in recent years (Couchman and Fulop, 2001a, 2001b). A joint research process requires the exchange of sensitive information, often related to respective competitive advantages, intensifying a party's vulnerability. Each party thus has to rely upon the other party and trust that it will not act opportunistically (Jordan, 2004, Couchman and Fulop, 2001a). In a study of university spin-offs, Rappert et al. (1999) found trust to reduce the relationship complexity and to facilitate the open exchange of information among parties, allowing the flow of knowledge between them.

The emergent and calculative nature of research (Christiansen and Vendelø, 2003), coupled with the uncertainty of resources and high investment in research activities, further add to the risk, typical in R&D situations (Blomquist, Hurmelinna and Seppänen, 2005, Couchman and Fulop, 2001b). While detailed contracts offer one approach to reduce this risk by establishing a common ground for goals and operations, they are also likely to prohibit flexibility (Ferguson et al., 2005) and, in turn, restrict research, discovery and the development of new knowledge (Blomquist et al., 2005). Trust, on the other hand, reduces the risk perceived in the UIR without inhibiting the research and discovery process.

The importance of trust for UIRs is further underlined by the fundamental differences in environments and organisational cultures between universities and private sector organisations. Coulter and Coulter (2003) stated that familiarity with a certain industry or organisation may reduce perceived uncertainty. Hence, due to the likely lack of familiarity between parties in a UIR, based on different operating cultures and environments, uncertainty is high and trust is seen as essential for successful collaboration (Davenport, Davies and Grimes, 1999). Research-oriented UIRs thus seem a highly appropriate field of researching trust, especially due to a general sparsity of research on relationships crossing fundamentally different environments and sectors.

Commitment. The construct of commitment has not received the same recognition as trust in the literature dealing with UIRs. Few exceptions include

findings on case studies reported by Barnes et al. (2002) and Irwin et al. (1998), as well as Mora-Valentín et al.'s (2004) empirical analysis of commitment as an organisational construct in cooperative agreements between research organisations and firms. These studies confirm the relevance attributed to commitment in the RM literature. Irwin et al. (1998) described both commitment and trust as essential characteristics of innovation and technology transfer and as creating a climate for communication and success. Barnes et al. (2002) confirmed the vital nature of commitment as a characteristic of successful university-industry interaction.

Mora-Valentín et al. (2004) analysed the impact of commitment on satisfaction and relationship evolution in university-industry cooperation. Conceptualised broadly, commitment was measured including the commitment of senior executives and technicians, emotional commitment, prospects of continuity as well as a positive attitude towards investing in the relationship. Commitment emerged as a strong predictor of both satisfaction and relationship evolution for both industry and research organisation samples, indicating its pertinence for UIRs. As no study has yet attempted to empirically examine the impact of commitment in a dyadic way, this study extends Mora-Valentín et al.'s (2004) research, aiming to contribute further to our understanding of relationship dynamics and the relevance of commitment for UIR success.

Knowledge on the motivation for universities and firms to commit to their partner in UIRs is still missing. Moreover, as motivating factors to engage in UIRs may differ, the concept of commitment in this paper demands a comprehensive conceptualisation in order to capture the differing types of, and motivating factors underlying, commitment (Gounaris, 2005). Given that little is known on the relevance of commitment for relationships crossing sectors, further research is necessary.

Integration. Knowledge has become a major asset of organisations and a source of research and innovation (Numprasertchai and Igel, 2005). Carayannis and Alexander (1999, p. 198) described knowledge not only as a source of competitiveness, but also as a “medium of sharing and exchange”, offering an opportunity to further advance competitiveness. In their development of a communication model of technology transfer, Williams and Gibson (1990)

highlighted the significance of communication, and more general participation and integration, in this context.

Two primary reasons underlie this significance. First, technology transfer as conceptualised, amongst others, by Williams and Gibson (1990), Bozeman (2000) and Sahal (1981) and as adopted for this research considers knowledge as an integral part of technology. Hence, research-oriented relationships between two organisations generally aim at the transfer of knowledge (Cyert and Goodman, 1997, Lee, 2000, Schmoch, 2002), explaining the high relevance of information exchange for the success of those relationships. As stated by Williams and Gibson (1990, p. 10) “In brief, technology transfer is the application of knowledge”. Second, UIRs unite organisations and individuals grounded in fundamentally differing environments and cultures. Potential barriers arising from different motives, vocabularies and customs increase the relevance of integration or “boundary spanning” for transfer success (Couchman and Fulop, 2001b, Williams and Gibson, 1990). Hence, both parties should actively participate in the transfer process.

Given the sparse recognition and empirical testing of the impact of communication and integration in a UIR context, Irwin et al. (1998) suggested that the majority of authors assumed their importance in this context. Research on the R&D-marketing interface within organisations, on the other hand, focused more strongly on communication as a characteristic of firms successful in R&D endeavours (Gupta et al., 2000) and as enhancing new product success (Griffin and Hauser, 1996). High communication frequency and bi-directionality between functions have been associated with high information use and perceived relationship effectiveness (Fisher et al., 1997), with frequency additionally been linked to the success of projects (Fisher et al., 1997). Based on the sample of research organisations, Mora-Valentín et al. (2004) found communication to directly influence satisfaction in relationships between firms and research organisations. Communication was measured in their study in terms of frequency and content.

The focus on communication and communication frequency and content, however, might be restrictive in a UIR, with researchers in this area highlighting the relevance of integration for R&D cooperation success (Gomes, de Weerd-Nederhof, Pearson and Cunha, 2003, Gupta, Raj and Wilemon, 1986). The concept of

integration entails the sharing of information as well as involvement and participation in the overall processes (Gomes et al., 2003, Gupta et al., 1986). Gupta et al. (1986, 2000) suggested a positive direct impact of integration on innovation success, and noted the relevance of an early integration of all involved parties (Gupta and Wilemon, 1996). However, Kahn (2001) found that neither marketing nor R&D managers believed integration between departments to be relevant for product development and management performance. Also, Moorman et al. (1992) studied the effect of involvement on relationships in a market research context, and did not find a direct contribution of involvement on commitment or research utilisation.

Such contrasting findings suggest that more research is needed to understand the impact of integration on R&D performance and research usage in different contexts. In this study, integration is conceptualised as participative and integrative behaviour among partners in a UIR, incorporating participation and involvement of both parties in the communication and relationship process and a two-way exchange of information (Dwyer and Oh, 1988, Song and Parry, 1997). Due to the focus on the construct of communication in the RM literature and the relevance of the construct of integration in the technology transfer literature, an initial qualitative research step is used to identify the most appropriate and valuable construct to be included in the quantitative data analysis.

Interestingly, authors have highlighted the relevance of individuals for communication, integration and technology transfer success (Bush et al., 2001, Hoppe, 2001, Santoro and Chakrabarti, 2002). Personal communication among staff involved in a UIR not only improves the understanding of the respective other environment, strategy and organisational culture (Conway and Swift, 2000, Irwin et al., 1998), it also offers a way to overcome the complexity of research and the implied need for an explanation of offers and results (Hoppe, 2001). As Lee (2000, p. 127) stated, “technology and knowledge transfer is really a ‘body contact sport’”. Individuals, also labelled champions, may thus be suggested as an antecedent to integration and other relationship variables and will be discussed in the following chapter. Furthermore, difference in organisational cultures is discussed next as a potential antecedent to relationship characteristics.

3.6. Antecedents of Trust, Commitment and Integration in UIRs

The evolution of UIRs is influenced by a range of factors. Based on the technology transfer literature and studies on UIRs (Barnes et al., 2002, Cyert and Goodman, 1997), differences in organisational environments and cultures are proposed as antecedents to relationships. Furthermore, individuals engaged in the research and innovation process are proposed as affecting relationships and relationship development (Howell et al., 2005, Santoro and Chakrabarti, 2002, Schon, 1963, Shane, 1994). Based on the discussion of relationship antecedents from a RM perspective in section 2.7, OCD and individuals as well as their potential effects on UIRs are discussed next.

3.6.1. Organisational Culture Difference in UIRs

A good understanding of organisational cultures, their development and characteristics has developed in the business and management area (Desphandé et al., 1993, Leisen et al., 2002). Restricted to private sector organisations, however, an understanding of the concept of organisational culture in the public sector is still sparse (Parker and Bradley, 2000). Furthermore, differences between organisations in research-oriented relationships have not been empirically examined to date. Related literature streams, such as the R&D management literature, on the other hand, have studied differences in orientations, beliefs and practices of marketing and engineering functions (Gupta et al., 1986, Moorman et al., 1992). For example, Gupta et al. (1986) indicated that such differences act as barriers to cooperation.

The negative influence of cultural dissimilarity on relationships has also been proposed by Moorman et al. (1992), who compared dyads between researchers with dyads between researchers and managers. While Moorman et al. (1992) found the dyads between researchers to significantly predict commitment as well as research utilisation; those between researchers and marketers did not show the same effect. Based on the assumption that the researcher-manager dyad is characterised by greater cultural difference due to the different functions involved, a negative association between such difference and commitment as well as research utilisation may be implied. Empirical evidence for potential differences in organisational

cultures between universities and industry entities and their impact on UIRs, however, is still missing.

In Australia, universities and industry entities have existed and operated unconnectedly until the 1980s (ARC, 2001), as universities traditionally focused on discovery research and teaching while industry had the role of conducting applied research. Since the 1980s, connections between universities and companies have been made, first to a limited extent (Harman, 2001) but growing in number and size over the last few years (Barnes et al., 2002). Based on the limited contact and cooperation between the two environments, their different centres of attention and consequent adaptation and opposition to the other environment (Schraeder and Self, 2003), distinct cultures had developed between universities and private sector organisations.

In addition to such general differences between institutional environments, varying organisational cultures exist between individual institutions even though they may be part of the same industry (Buono et al., 1985). Due to the lack of focus in UIR literature on OCD, no framework has yet been developed to identify the dimensions in which universities and industry organisational cultures may differ. However, Hayes and Fitzgerald (2005) recently presented preliminary exploratory findings regarding an investigation of boundaries between commercial and scientific organisational cultures and their effect on commercialisation processes, indicating an emerging interest and recognition in this area.

Desphandé et al. (1993) developed a model of organisational cultures, which has been used frequently in the literature dealing with organisational cultures and differences between cultures. This model describes four clusters and is based on two key dimensions, namely processes ranging from organic to mechanistic and the relative organisational emphasis on internal maintenance versus external positioning. While offering comparability among studies, the use of four cultural types established in the private sector setting may limit research on organisations operating in the public sector and do not represent cultural differences specific to UIRs. Dimensions for capturing differences between university and industry organisational cultures must therefore be inferred from available literature. A preliminary exploration crystallised a number of dimensions, entailing time orientation, market orientation and language, discussed next.

3.6.1.1. Time Orientation

Universities and industry entities are believed to differ in their approach to time (Barnes et al., 2002, Cyert and Goodman, 1997, Universität Dortmund, 2003). An organisation's success depends on the speed with which it meets business and customers' needs (ARC, 2001, Santoro and Chakrabarti, 2002). Shortening product life cycles and the rapid introduction of new products by competing firms (Gupta and Wilemon, 1996) has turned a product's 'time to market' into a key factor for product management and success (Siegel et al., 2003). Therefore, organisations often take a short-term perspective on R&D activities (Cyert and Goodman, 1997). On the other side, timeframes are longer-term and less defined for R&D managers and researchers in universities (Cyert and Goodman, 1997, Gupta et al., 1986).

While Cyert and Goodman (1997) state their experience of a negative influence of time orientation difference on UIRs, its relevance and effect on relationships still has to be empirically investigated. Gupta and Wilemon (1996) found in their study on R&D effectiveness in organisations that in comparison to financial aspects, only 34% of the R&D directors interviewed stressed speed over budgets. This finding might indicate a low relevance of time orientation difference on UIRs and their success.

3.6.1.2. Market Orientation

In the past, universities have often been criticized by industry for not being market oriented, illustrating a major cultural difference between both sides of a university-industry dyad. Recently, however, some authors have described research as rapidly changing (ARC, 2001, Fisher and Klein, 2003). The ARC (2001) noted that universities were increasingly concerned with research driven by practical issues. Fisher and Klein (2003) also found in their study of universities in the United Kingdom an increase in the production of commercially exploitable, practicable knowledge in comparison to theoretical knowledge. Nevertheless, this argued shift towards applied research contradicts the ARC's (1999, p. xix) earlier report, which noted that the largest part of university innovation "arises from new discoveries rather than as a response to a market need". Different views regarding the extent of market orientation practiced by universities suggest a need for research on the

discrepancy between universities and industry partners regarding the orientation towards their respective markets and its effect on UIRs.

Indistinct findings emerged in the innovation and R&D management literature regarding the benefits of market orientation. Some authors believe that a concentration on customer-focused projects and researchers acting as business people have a significant positive impact on new products success (Cooper and Kleinschmidt, 1993, Gupta and Wilemon, 1996, Gupta et al., 2000). In addition, Baaken (2003) confirmed the relevance of universities' market orientation on the generation of their third party income in his study conducted in Germany. Empirical research regarding the effect of a university's market orientation on relationships, however, is required. In particular, an empirical test of the effect of different levels of market orientation between universities and industry partners on relationships may provide valuable insight into UIR practice and success, and will thus be investigated in this research.

3.6.1.3. Language

Language dissimilarities between university and company staff have been identified (Cyert and Goodman, 1997, Universität Dortmund, 2003), which might have an impact on communication patterns, the value of exchanged information and especially the understanding of the partner's information and norms. Research on relationships between engineering and marketing functions has suggested that language difference negatively influences the effect of trust on interaction quality (Moorman et al., 1992), resulting in misunderstanding and conflict (Fisher et al., 1997, Gupta et al., 1986). Misunderstanding, in turn, was found to act as a barrier to UIRs (Siegel et al., 2003). However, the existence of language difference and its impact on communication patterns and the overall UIR has yet to be empirically verified.

To conclude, differences in organisational cultures are proposed to exist between universities and industry partners and to affect UIRs. Based on the available literature, time orientation, market orientation and language were presented as potential dimensions of OCD in UIRs. A preliminary qualitative research step is conducted to assess and refine the OCD dimensions, outlined in

section 4.5. Another proposed antecedent to UIRs, namely individuals and their characteristics and motivations, is discussed in the subsequent section.

3.6.2. The Relevance of Individuals in UIRs

Authors have mentioned the critical role some individuals, often referred to as champions, play in innovation (Howell et al., 2005, Shane, 1994), technology transfer (ARC, 1999), as well as for UIR development and success (Santoro and Chakrabarti, 2002). In brief, Schon (1963, p. 84) already stated in his article on innovations that “the new idea either finds a champion or *dies*”. Despite this, few studies have focused primarily on champions and championship behaviour (Howell et al., 2005, Markham and Aiman-Smith, 2001, Schon, 1963), resulting in a lack of empirical investigation of these individuals and an increasing call for further empirical validation in recent years (Howell et al., 2005, Markham and Aiman-Smith, 2001).

Howell et al. (2005) described three ways in which champions influence an organisation and innovation success. First, champions influence the distribution of resources and power on a firm or group level. Second, they impact on the atmosphere and motivation of groups and individuals, and third, champions advance cross-functional dialogue within firms (Howell et al., 2005). In a university-industry context, Santoro and Chakrabarti (2002) found a champion in the company to be associated with greater relationship intensity. However, no association was found between the existence of a champion in the university research centre and relationship success. The latter finding may be based on the characteristic of a university research centre (being a third party in the interaction process between company staff and university research staff). The importance of personal contacts for relationships (Knowledge Commercialisation Australasia, 2003) might require a direct involvement of a champion located in the research group to allow a direct effect on the relationship.

The significant role of individuals, and more specifically champions, in UIRs may relate to the range of roles assigned to them. The role of a champion has been described as informal and as overlapping with the formal role in the organisation (Markham and Aiman-Smith, 2001). Hence, an individual, for example a researcher

in the university research group, may take on the formal role as a researcher as well as informally act as a champion for the UIR. By interacting with the industry partner, he or she becomes crucial for the delivery process, thus taking on the role as the part-time marketer described by Gummesson (1991). The Universität Dortmund (2003) noted that researchers motivated by seeing their research outcomes turned into useful products are needed to successfully market research to industry. Such motivation is likely to imply a certain understanding of, or familiarity with, the industry environment and the processes of market application.

Different definitions of champions have emerged from the literature. Markham and Aiman-Smith (2001, p. 44), for example, defined a champion as an individual who “recognizes a new technology or market opportunity as having significant potential; adopts the project as his or her own; commits personally to the project; generates support from other people in the organisation; and advocates rigorously for the project”. Shane (1994) defined champions as individuals that overcome organisational obstacles, listing six organisational roles champions undertake, namely providing people with autonomy, gathering organisational support for innovation, using loose monitoring mechanisms, establishing equality in terms of decision-making mechanisms, using informal communication channels, and protecting the team from bureaucratic intervention.

In a relational and technology transfer context, a champion has been defined as a staff member or group pushing a project forward as well as overtaking the role of informing and communicating with both relationship sides (Iacobucci and Hopkins, 1992, Santoro and Chakrabarti, 2002). In summary, championship can be defined around two basic themes, namely the ability to promote and to influence an idea, project or relationship (Santoro and Chakrabarti, 2002), and the enthusiasm and intrinsic motivation to succeed (Irwin et al., 1998). In a UIR context, it requires an understanding of both parties’ requirements and ways of working, probably related to some experience in UIRs.

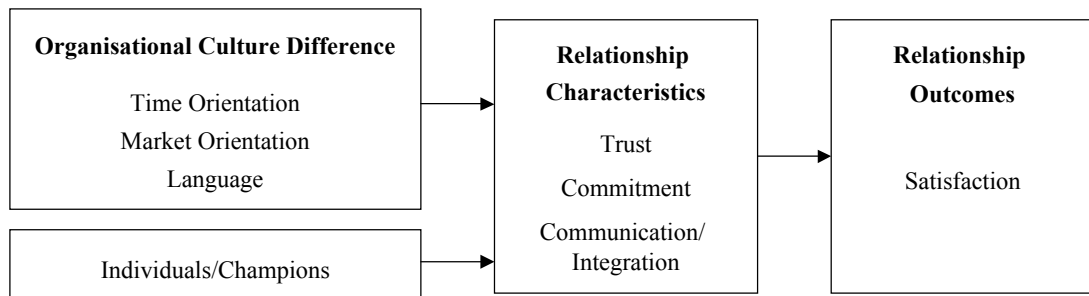
Besides OCD, championship was proposed as a relevant antecedent for UIRs. To identify the appropriate conceptualisation and measurement of championship behaviour for this study, qualitative research was deemed crucial and is reported in section 4.4.3.

3.7. Chapter Summary

UIRs have increased in relevance and scope during recent years (ARC, 2001, Cyert and Goodman, 1997). Despite such increase, research on university-industry collaboration is still limited (Harman, 2001, Lee and Song, 2001) and the relationship concept is not clearly understood in this area. An increasing number of authors have stated the importance of relationships between universities and companies in order to create the technologies and innovation required for successful operations. Despite an evidence of the need for universities and companies to enter into successful relationships, and the sparse knowledge in this area, no attempt has been undertaken to incorporate RM principles into the research on UIR development and management.

Following an introduction into the current knowledge of research-oriented UIRs from the technology transfer and commercialisation perspective, relationship outcomes, constructs and antecedents were discussed based on the RM theory reviewed in chapter 2. Despite the lack of empirical validation and dyadic studies in this context, UIRs are believed to have the potential to be mutually beneficial for both parties involved. Relationship success may depend on the development of relationship characteristics such as trust, commitment and communication/integration, required to overcome potential barriers between the partners. OCD and the characteristics of individuals, or champions, emerged from the literature as potential factors influencing the relationship and relationship success. The overall framework developed based on the review of the RM and technology transfer literature is shown in Figure 3.1.

Figure 3.1 Framework Based on Literature Review



To conclude, this chapter merged the understanding of RM and technology transfer research, outlining the nature of UIRs and extending the current RM focus to relationships between organisations operating in fundamentally different environments and cultures. The following chapter discusses the research design and the qualitative research step undertaken to refine the developed framework for further quantitative empirical testing.

Chapter Four – Qualitative Research Step: Models and Hypotheses Development

4.1. Introduction

Relationships between universities and industry partners are yet to receive from academics the interest they have gained from practitioners. Despite the active discussion of government policies on UIRs (Beesley, 2003, Dits and Berkhout, 1999), few researchers have engaged in analysing UIRs, their characteristics and key drivers, be it from a management or a marketing perspective. Scattered research has emerged in recent years stating the increased relevance of relationships between universities and industry entities for the performance of both parties and society at large, as well as providing the first step for an empirical investigation (Mora-Valentín et al., 2004, Cyert and Goodman, 1997, Barnes et al., 2002). Furthermore, RM theory has overlooked relationships uniting organisations from different sectors or more generally from different organisational cultures and environments, focusing primarily on linkages between private sector organisations or between organisations and their end consumers (Abratt and Kelly, 2002, Berry, 2002, Hunt, 1997, Rich, 2002, The IMP Group, 1997).

To provide a basis for the conceptual development of UIRs from a marketing point of view, the previous chapter examined the connection between the technology transfer and RM theories. In light of the novelty of UIRs as a research area, exploratory qualitative research was conducted to refine the developed framework and generate a conceptual model and related propositions and hypotheses before conducting any further quantitative analysis. Such integration of both qualitative and quantitative methods follows the call for multi-method research approaches in the literature (Carson and Coviello, 1996).

This chapter describes and justifies the research design and the qualitative research methodology and findings. Following a discussion of the multi-method research design, the two components of the qualitative research step are discussed, namely a discussion forum and a subsequent series of in-depth interviews. Key findings of the content analysis of these interviews using the software program QSR NUDIST N6 are then discussed, refining the literature review framework into two conceptual models. The generic model shows relationship characteristics, their

interrelationships and impacts on outcome variables, as well as the effects of organisational compatibility and personal experience on relationship characteristics. A second dyadic model extends the generic model by introducing individual dimensions of OCD believed to influence UIRs. This chapter concludes with sets of hypotheses developed for each model.

4.2. Research Design

Research design, the overall framework of a research, guides data collection and analysis procedures and is often classified according to the research types utilised in a study (Kinnear, Taylor, Johnson and Armstrong, 1993). This study was based on a two-step approach integrating all three research types generally differentiated in the literature, namely exploratory, descriptive, and causal or explanatory research (Kinnear et al., 1993). Following Carson and Coviello's (1996) call for multi-method approaches in order to achieve highly valuable findings, qualitative and quantitative methods were integrated in this study. In order to contribute to the development of a UIR research stream, the integrated methods were based on previous studies in both the RM and technology transfer literature.

Exploratory research is used to investigate unknown or complex phenomena and builds the basis for subsequent research, which can then provide evidence of exploratory findings (Zikmund, 2003). The exploratory first step of this study was justified based on the following aspects. First, the introduction of marketing, and in particular RM, to research-oriented UIRs is new. Despite an increasing acknowledgement of UIRs in the literature, the sparse knowledge existent in the area of these relationships is still mainly limited to government and working group reports. In addition, as the relational and cultural constructs to be tested in this study are of a complex and versatile nature (Carson, Gilmore, Perry and Gronhaug, 2001, Gummesson, 2002), an exploratory investigation of these constructs was deemed crucial for the validity of findings derived from quantitative research (Zikmund, 2003).

The exploratory research was undertaken using qualitative research methods. Qualitative research allows the researcher to focus on people's perceptions and to understand complex issues in depth and detail (Patton, 1990, Ticehurst and Veal,

1999). It has thus been found as particularly valuable for the exploration of new concepts and their interrelationships (Bendapudi and Leone, 2002, Flint et al., 2002, Patton, 1990), as well as for the in-depth understanding of situations, behaviours or activities (Carson et al., 2001).

Descriptive research is used to determine characteristics and frequencies of phenomena involved in this study (Zikmund, 2003). Entailing statistical procedures regarding frequencies and means (Ticehurst and Veal, 1999), it requires the careful planning and structuring of research to ensure accuracy of findings (Kinnear et al., 1993, Ticehurst and Veal, 1999). Hence, a structured questionnaire, specified sample strategy and structured data collection methods were ensured for the second research step, a self-administered mail survey.

However, while descriptive research may be used to predict associations between variables, it is not suitable to explain data patterns (Kinnear et al., 1993, Ticehurst and Veal, 1999). Causal research, also known as explanatory research, thus followed the exploratory and descriptive part of this research. Causal research can be used to verify predictions on causal relationships present in the data (Kinnear et al., 1993, Zikmund, 2003). This study conducted causal research employing path analysis based on Structural Equation Modelling (SEM) principles, testing the hypotheses developed previously. The central advantage of SEM for this study is its potential to evaluate entire models proposed on the basis of previous research steps (Baumgartner and Homburg, 1996, Steenkamp and Baumgartner, 2000).

The second, quantitative research stage was justified based on the following aspects. Many authors have taken exploratory research approaches to RM, leading to a large amount of normative and conceptual findings (Coviello et al., 1997, Liljander and Roos, 2002, Palmer, 2002b). A large number of authors have emphasised the importance of empirical research on relationships to foster the comprehensive understanding and theory development of RM as well as offer a greater generalisability of findings (Donaldson and O'Toole, 2000, Farrelly, 2002, Medlin, 2001, Palmer, 2000a, Parvatiyar and Sheth, 2000). Primarily exploratory and descriptive research on UIRs suggests a need for empirical, explanatory research also in this area.

Following a causal analysis, which enabled hypotheses testing by means of path analysis, re-specifications of the conceptualised models were undertaken. Model re-specification aims at achieving a more parsimonious model and is exploratory in nature. Re-specification procedures lead to a tentative model, which needs to be cross-validated with an independent sample in the future (Byrne, 2001, Diamantopoulos, 1994). This further exploratory investigation of the quantitative data was deemed valuable due to the novelty of the research area and the OCD constructs incorporated in the models. Re-specified models show a higher level of parsimony and may guide future research in this area.

In brief, exploratory qualitative research was conducted as the first step of this study, offering a conceptual basis for the descriptive and explanatory research of the second, quantitative research step. Following the empirical testing of the developed models and hypotheses, a supplementary exploratory research step was undertaken by means of model re-specification. The following section further elaborates on the qualitative research methods employed in the first research step.

4.3. Qualitative Research Methods

The research design for this study entailed a qualitative and a quantitative step. The first step served the exploration of phenomena and dimensions in the area of research using qualitative methods and is further detailed in this section. A range of qualitative research methods is available to researchers, including in-depth interviews, group interviews and focus groups, participant observation and ethnography (Ticehurst and Veal, 1999). As discussed below, a discussion forum with students of a Masters Degree in Technology Transfer and Management was held as a pilot study for the subsequent series of in-depth interviews with key informants from a university and industry environment engaged in UIRs.

4.3.1. Discussion Forum

An inductive discussion forum was conducted to develop an understanding of the research problem, stimulate the creative process and generate relevant topics. Discussion forums and focus groups have often been applied as an exploratory

research technique to develop an understanding of the research problem and stimulate the creative process (Kinnear et al., 1993, Zikmund, 2003). Their key advantage has been seen to lie in the potential of generating ideas and new topics or areas, which might not be encountered in one-to-one interviews (Kinnear et al., 1993, Zikmund, 2003). This advantage was realised in this research based on the fact that the researcher was not a discussion leader but rather a facilitator of the discussion among the members of a group. The discussion between group members was thus free-flowing and flexible (Ticehurst and Veal, 1999), which increased the likelihood of new topics emerging (Kinnear et al., 1993, Zikmund, 2003).

The researcher held a two-hour workshop with students enrolled in a Masters Degree in Technology Transfer and Management. This workshop started with a brief presentation of findings derived from the literature review provided in chapters 2 and 3, gaps in this literature as perceived by the researcher, as well as a brief research proposal. Following, the students were divided into three groups with the task of discussing questions derived from the literature review. A presentation of each group's results to the remaining students and a discussion of these results followed. The use of Masters students in the area of Technology Transfer and Management offered the advantages of a discussion forum without using the limited number of individuals involved in UIRs for this inductive research step.

To conclude, a discussion forum was applied as the first part of the exploratory qualitative step of this research in order to develop an understanding of the research problem and generate relevant topics. A series of interviews followed to further elaborate on the issues and confirm the most relevant variables, their conceptualisations and interrelationships for the quantitative part of this study. The following section elaborates on these interviews.

4.3.2. In-Depth Interviews

An in-depth interview can be defined as a “personal interview, which uses extensive probing to get a single partner respondent to talk freely and to express detailed beliefs and feelings on a topic” (Kinnear et al., 1993, p. 240). In-depth interviews have been found to be valuable when the research aim is to generate a comprehensive list of ideas about a complex concept (Fern, 1982), and when the

expected information is likely to vary considerably (Ticehurst and Veal, 1999). In addition, in-depth interviews are useful in developing hypotheses (Kinnear et al., 1993) and have thus often been used to investigate a topic prior to a large or quantitative study (Ticehurst and Veal, 1999).

Judgement and snowball sampling were used for the exploratory in-depth interviews. Publications on ARC grants between 2001 and 2003 were examined, followed by a search of university and industry websites to identify experts in the area of UIRs as judged by the researcher. Where appropriate, interviewees were asked to indicate other experts in this area, thus using the snowball effect. Snowball sampling utilises referrals of identified members of the target population to identify additional participating members. While implying a high likelihood of bias regarding the respondents' social integration, education and income level, it enables studies dealing with dispersed target populations and those being restricted in terms of financial or time resources (Welch, 1975). As no database of the overall target population was available, snowball sampling was deemed valuable. To keep bias to a minimum, interviewees were chosen to represent a broad range of individuals in several research areas, institutions and Australian states (see Appendix 2).

Two key criteria were used to select interview partners for the sample. First, an extensive knowledge and experience regarding UIRs was required, including experience with more than one UIR and experience and knowledge in both, decision-making and day-to-day interaction between partners. Second, interviewees were selected to represent a broad sample of different industry types or research areas and institution sizes in several Australian states, including Queensland, New South Wales and Victoria.

The semi-structured interviews followed an interview guide based on the literature review and discussion forum. The interview guide consisted of themes (see Appendix 3), which were covered during the discussion without having specified the order of the items prior to the interview. The interview guide method allowed a systematic approach to a series of interviews without limiting the opportunity to uncover and look into issues and topics not integrated in the guideline. At the end of the interview, a preliminary conceptual framework was shown to each interviewee. The visualisation of the framework including the items covered in the interview guide allowed the comparison of the relevance of single variables compared to

others. This step was deemed extremely valuable for overcoming the lack of research in the area of UIRs and the development of conceptual models based on the most relevant constructs in this area.

Interviews were continued until a consensus was reached on the relevant variables to be included in the study and models for the quantitative study could be developed. Notes were taken during the interview period on emerging issues and ideas. However, the interview guide and the visualisation of the framework remained the same for every interviewee to allow the identification of similarities or differences of views on certain themes. All interviews were tape recorded and transcribed. Tape recording is suspected to limit open communication in some cases, as some respondents may be more alert on revealing industry or personal information (Carson et al., 2001). Nevertheless, advantages of recording are believed to outweigh its limitations (Carson et al., 2001, Patton, 1990), as it presents a higher flexibility for the processing of data as well as greater data comprehensiveness (Carson et al., 2001).

The analysis of in-depth interviews was conducted using QSR NUDIST N6 (Brennan, Turnbull and Wilson, 2003, Richards, 2002, Richards and Richards, 1991). Following Miles and Huberman (1994), nodes were developed based on the literature review and discussion forum and modified during data analysis (see Appendix 3). Moving back and forth between the in-depth interview data, data of the discussion forum and the relevant literature, the structure and analysis of findings was amended until a thorough understanding of UIRs, as represented in the data, was developed. This approach offered not only the opportunity to follow up on emerging topics from one data collection phase to the next, but also during the interview phases. Identified issues were then used to conceptualise UIRs based on RM principles.

The interview sample contains several features, which need to be considered in the analysis. First, the term 'industry' incorporates only private sector enterprises. This approach differs from the interpretation of the ARC (1999), which defined 'industry' as including both private and public sector commercial enterprises. The focus on industry in terms of private sector enterprises diminished the potential limitation of findings attributable to differing needs, wants and relationship foundations likely to exist in various groups. Second, interviewees were questioned

about relationships between Australian universities and Australian industry partners to eliminate the impact of national culture issues.

Third, as formal organisations do not contain a single organisational culture (Leisen et al., 2002, Wilson, 2001), interviews focused on the particular group organisational culture and on perceptions on general differences between university and industry organisational cultures where appropriate. Fourth, a current position at a university or company does not imply that a person did not work in the other environment before. In the interview sample of this study, four of the ten university interviewees previously worked in a private enterprise and two of the four industry interviewees experienced the university environment through PhD research. People experienced in both environments are suggested to have a greater understanding of the cultures involved and may be able to work more effectively with potential effects of OCD on relationships. This fact, however, was not seen to affect the ability of interviewees to identify differing organisational culture dimensions.

Findings derived from the analysis of interview data was utilised to develop conceptual models and hypotheses for the second, quantitative research step. The following discussion refers to a large degree to Plewa, Quester and Baaken (2005) (see Appendix 1a) due to a thorough discussion of the findings of the qualitative interview data in this article.

4.4. Generic Model

This section briefly discusses the results of the qualitative research, refining the conceptual framework derived from the literature review into a causal model and respective propositions. The discussion below outlines the generic model, including relationship outcomes, relationship characteristics, as well as organisational compatibility and individuals as relevant antecedents.

4.4.1. Relationship Outcomes

The purpose of building relationships, as described in the RM literature, is the creation and enhancement of mutual economic value (Parvatiyar and Sheth, 2000)

and thus to achieve relationship success. The relevance of creating mutual value in the context of UIRs was confirmed clearly by the interviews:

“I suppose that's on the silent assumption that there is a mutual benefit in the relationship. There's no point extending it if there's no mutual benefit. There might be an early flush of enthusiasm that fades with experience when it's discovered that the other side either can't provide or can't assist or whatever then there isn't much point in trying to stretch it out and just persisting is just going to develop aggravation rather than reach any conclusions” (interviewee I#3).

Given the importance of mutual benefit, our data reflected the highly complex nature of value and the variety of benefits that might determine perceived value and satisfaction in UIRs. Aiming at the determination of value in the given context (Payne and Holt, 2001), interview findings revealed that involved parties perceived different relationship outcomes as beneficial (see Plewa et al., 2005, in Appendix 1a), confirming the appropriateness of employing satisfaction as an overall outcome measure.

Satisfaction. The concept of satisfaction enables the analysis of an overall impression of the relationship value gained by both partners, reflecting their respective expectations and performance perceptions. Hence, while this measure does not account for individual outcome variables and their importance, it provides an overall evaluation of various relationship benefits, such as knowledge advancement and gain, financial outcomes, technology and human capital gain, access to networks and a feeling of ‘togetherness’. Satisfaction was thus deemed an appropriate and valuable measure of relationship outcomes and confirmed for the further research.

Intention to renew. Intention to renew, defined as the likelihood that the relationship will be renewed at the end of the current contract, was added to the conceptual framework as an additional outcome variable due to the strong relevance for both parties, particularly for the university side. Interviewee U#8, for example, described the intention to stay in the relationship as the most important outcome for the university (see Plewa et al., 2005, in Appendix 1a). Industry also named the continuation of a relationship as important, based on familiarity and investments:

“... at the end of this first project we've obviously developed a fair degree of a good relationship with them and it would be a shame to waste all that and just throw it away. So, I mean we would be inclined, as I've indicated already, to stay with them as a research partner in the long term. As long as they're happy to keep working with us we are certainly happy to work with them. I mean it's like changing boyfriends or girlfriends, you establish a relationship with an organisation or a person and that way you feel comfortable about it and you say 'well why would I want to change to some organisation I don't know?' It might be better but it could also be worse” (interviewee I#1).

This finding is consistent with Lee (2000), who found retention, an integral part of RM theory and practice, as one of the most important benefits to be gained from UIRs by industry.

To conclude, interviews clearly substantiated the relevance of creating mutual value, determined by varying types of benefits perceived as important by both relationship parties. Satisfaction was confirmed as an appropriate outcome variable, complemented by the intention to renew a relationship. The following section details the verification of relationship characteristics for the conceptual model and their proposed interrelationships and impact on relationship outcomes.

4.4.2. Trust, Commitment and Communication/Integration

While interviews focused primarily on a discussion of trust, commitment, communication and integration, relationship characteristics highlighted in the RM and technology transfer literature, interviewees were encouraged to freely discuss relationships and their features to not only confirm and refine the conceptual framework but also to avoid the potential failure in identifying major key drivers. Interview findings clearly substantiated the importance of the given relationship characteristics in a UIR context.

Trust. Trust was confirmed by the data as an essential element of UIRs, with all interviewees describing its critical role for relationship development, maintenance and success. For example, U#9 stated that:

“... when you get a relationship that ... sort of develops in stages, series of contracts or projects, agreements and so on, it's an issue of building trust and a relationship matures. And you often see the industry partner start to relax and trust more what we do and what we can deliver. So, they start off with some really rigorous conditions in the agreement and so on. As you build trust

and you see them back away and say: 'Well, we don't need to have those', and that is always enjoyable. So you know then that you are building something that's on a sound foundation" (interviewee U#9).

The development of trust as described in this quote appears related to the form and formality of interaction between relationship parties. In a UIR context, this may depend on the risk involved in these relationships (Couchman and Fulop, 2001b), anchored to a large part in the emergence and thus uncertainty of research, the sensitive information involved and the union of parties from different environments and cultures (see Plewa et al., 2005, in Appendix 1a). Due to the high confidentiality concerns apparent in the qualitative data, potentially inhibiting partners from sharing information, trust is proposed in this study to positively influence communication and integration processes, illustrated by one of the interviewees:

"I think [trust] is crucial because it encourages complete openness. If you don't have trust, people manage the information and so what could be really inconsequential knowledge to one side might be the missing link for the other ... If you don't have trust, people tend to spend as much time managing what they've said and what they've not said whereas with trust it's much more open book and much more frank and much more complete" (interviewee I#3).

While the interrelationships between trust and integration have not been clearly established in a relationship context, some authors report that trust precedes and facilitates communication (Das and Teng, 1998, Friman et al., 2002, Grayson and Ambler, 1999, Jordan, 2004, Moorman et al., 1992), reinforcing our proposition. Furthermore, in agreement with the majority of the literature (Farrelly, 2002, Grayson and Ambler, 1999, Moorman et al., 1992, Morgan and Hunt, 1994), trust is also proposed to influence commitment by decreasing the risk associated with attaching oneself to a relationship.

Commitment. In comparison to trust, interviewees appeared to assign less recognition and significance to the construct of commitment. However, support was found for the importance of commitment for UIRs:

"What I can say of commitment is you need it for it [the relationship] to succeed. So, if you want that link between the university and the organisation to succeed, both parties need to be committed" (interviewee U#4).

Interviewee U#8 also mentioned the importance of commitment, naming as an example a program in which postgraduate students were involved in UIRs (see Plewa et al., 2005, in Appendix 1a). To foster the commitment of the industry partner to the relationship, it was given the ultimate choice of which the doctoral students involved in the relationship would be.

Commitment is proposed to positively influence communication and integration in this study, despite reports of a reversed causality by some authors (Duncan and Moriarty, 1998, Sharma and Patterson, 1999). Commitment reflects a certain investment in the relationship, based on an interest in maintaining it. A committed party puts effort into developing a relationship and is, in turn, likely to proactively participate in that relationship. Furthermore, a party aiming at relationship maintenance is likely to seek frequent interaction and involvement in the research processes. Hence, commitment should positively influence communication and integration processes.

Communication/Integration. Besides trust and commitment, communication and integration emerged from the qualitative data as highly important for UIR success, confirming the conceptual framework developed on the basis of the literature review. The qualitative data analysis clearly underlined the importance of integration, with interviewees describing communication as extremely important, but often not interactive enough to successfully link UIR parties (see Plewa et al., 2005, in Appendix 1a). Hence, integration, rather than communication, was incorporated into the final path model. While the construct of integration involves bilateral communication, it goes further by including frequent interactions, participation and involvement of parties in the overall process. The statement of one interviewee may best describe integration: *“You just want to feel part of the same development team, and that's really how you need your communications to flow”* (interviewee I#2).

The analysis of integration, rather than communication, contributes not only to our understanding of UIRs but also to the development of the RM literature. As previously discussed, the RM literature has focused on communication while the technology transfer and R&D research streams have highlighted the concept of integration as a more comprehensive interaction measure. In our data, integration was linked to the productivity of outcomes (e.g. U#4) and was also described as

influencing the overall relationship and relationship characteristics, supporting RM literature (Duncan and Moriarty, 1998, Morgan and Hunt, 1994, Sharma and Patterson, 1999).

Trust, commitment and communication/integration were confirmed during qualitative data analysis as key drivers of UIRs. The results, however, indicated the relevance of replacing the RM construct of communication with integration, which appeared to better reflect the nature of interactive processes in UIRs analysed in this research. Based on the discussion of these constructs and their interrelationships, two proposed antecedents, organisational compatibility and personal experience, are discussed in the subsequent section.

4.4.3. Antecedents to Trust, Commitment and Integration

Organisational compatibility. Respondents agreed that organisational cultures differ between universities and industry partners, reflecting their specific environments of operation (see Plewa et al., 2005, in Appendix 1a). Results thus supported the current literature on university-industry linkages and our framework, stressing the effect of a clash of cultures between private and public sector institutions on relationships (Barnes et al., 2002, Cyert and Goodman, 1997, Hayes and Fitzgerald, 2005). Organisations and institutions appeared to differ in terms of values, attitudes, practices and expectations, confirming the concept of organisational compatibility as relevant for this study. As described in section 2.7.1.3., organisational compatibility is conceptualised based on Bucklin and Sengupta (1993), measuring the compatibility regarding goals and objectives as well as the similarity in operating philosophies on a senior management level. Based on Sarkar et al. (2001) and our qualitative findings, organisational compatibility is proposed to positively influence relationship constructs, including trust, commitment and integration.

Personal experience. Several interviewees stressed the fact that relationships are built between people, not organisations, a point well captured by U#3:

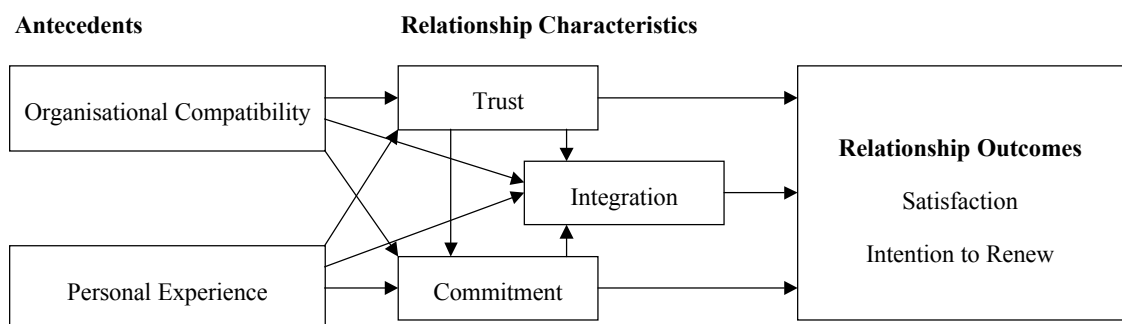
“And in the end, it is all a people thing. ... the truism is people work with people, organisations don't work together ..., it's people within those organisations who actually get on well together, develop common agendas, who drive the organisational cultures to work together” (interviewee U#3).

The importance of champions for UIRs, which emerged from the interview data, validated their inclusion in the conceptual framework. Interviewees defined champions as those individuals helping to accomplish a project by carrying it through to the end (U#2), having passion for it (U#7), believing in what they want to do (U#8), and simply as the energy source for the relationship (I#3) (see Plewa et al., 2005, in Appendix 1a). Interviews showed that these individuals require both the willingness and ability to work with the respective other environment.

While previous research has focused on champions' enthusiasm and intrinsic motivation to succeed (Irwin et al., 1998) or on their talent to promote and to influence an idea, project or relationship (Santoro and Chakrabarti, 2002), an understanding of the other environment clearly emerged as important to enable championship behaviour in a UIR. Such understanding is likely to develop by means of experience in dealing with the other environment (U#3, U#8) (Irwin et al., 1998). Hence, following previous calls to examine the effect of experience in a personal selling context (Johnston and Kim, 1994) and to contribute to our understanding of the influence of experience in dealing with the respective other environment on UIRs, this research analyses the personal experience of individuals rather than the general concept of a 'champion'. Interview findings substantiated a proposed positive impact on trust, commitment and integration.

Following the previous discussion, the literature review framework was refined, leading to a conceptual generic model, illustrated in Figure 4.1. The Figure is followed by the resultant six propositions.

Figure 4.1 Conceptual Generic Model



- P1 Relationship characteristics positively influence relationship outcomes
- P2 Trust positively influences integration
- P3 Trust positively influences commitment
- P4 Commitment positively influences integration
- P5 Organisational compatibility positively influences relationship characteristics
- P6 Personal experience positively influences relationship characteristics

Building on the interrelationships between relationship characteristics and outcomes proposed for the generic model, the following section develops a second dyadic model, further elaborating on individual dimensions of OCD and their proposed effect on a UIR.

4.5. Dyadic Model

Organisational culture integrates several layers, including values, norms, artefacts and behaviours (Homburg and Pflesser, 2000). The discussion of organisational culture dimensions in this thesis, however, does not involve all layers of a corporate culture, as the qualitative data concentrated on specific dimensions of OCD and the clarification of those dimensions of cultures directly relevant to the relationships (Hult, Ketchen and Nichols, 2002). Building on the generic model, this section develops a second dyadic model focusing on the effect of OCD dimensions on relationships. While the generic model incorporates the compatibility of organisational cultures, the dyadic model takes account of individual OCD dimensions.

As previously mentioned, a relationship culture may develop in long-term relationships, which, in turn, may limit opportunities of studying organisational culture mismatch. However, the development of such culture is not expected to affect the individual cultures in the short or middle term, as “any cultural template is durable and slow to change” (Wilson, 2001, p. 354). Research on differences between organisational cultures between universities and their industry partners was thus deemed appropriate in this study. As discussed in section 3.6.1, time orientation, market orientation and language emerged from the literature review and were integrated into the conceptual framework as relevant OCD dimensions. Refining this framework during the qualitative research step, three additional areas

of concern emerged, namely motivations, organisational bureaucracy and corporate flexibility (see Plewa et al., 2005, in Appendix 1a).

Time orientation difference. Qualitative data confirmed time orientation as a relevant OCD dimension. Consistent with the literature on UIRs (Cyert and Goodman, 1997, Siegel et al., 2003), universities and industry partners appeared to differ in their perception of timeframes. Adding to the time-focus, punctuality, or the adherence to deadlines, was identified as a second highly relevant facet of time orientation difference (see Plewa et al., 2005, in Appendix 1a), as illustrated by the following quote: “*Industry works to deadlines, academics don't. Apart from presenting papers at conferences*” (interview U#2). The impact of differing perceptions regarding the importance of punctuality in a relationship context has yet to be explored. Based on the qualitative findings, the OCD dimension of time orientation difference in this research integrates two elements, namely timeframes and the importance of punctuality, and is proposed to negatively influence relationship characteristics.

Market orientation difference. Market orientation emerged from the literature review as a differentiating characteristic between partners in UIRs. An established construct in the industry environment (Desphandé et al., 1993, Narver and Slater, 1990), market orientation has been defined as “the organisation-wide generation of market intelligence pertaining to current and future customer needs, dissemination of the intelligence across departments, and organisation-wide responsiveness to it” (Kohli and Jaworski, 1990, p. 6). Varying opinions regarding a potential difference in the market orientation between universities and industry partners (see Plewa et al., 2005, in Appendix 1a) did not clearly validate propositions made in the current literature. The inclusion of market orientation difference in the conceptual model is justified by a lack of empirical research on the existence and potential impact of this variable. This dimension is also proposed to negatively influence UIR characteristics.

Language difference. While the literature proposes the existence of language dissimilarities between university and industry staff (Cyert and Goodman, 1997) and between engineering and marketing functions (Fisher et al., 1997, Gupta et al., 1986), the qualitative data did not support these differences. Different vocabulary or perceptions might arise in the interaction process but interviewees did not perceive

language issues as a fundamental OCD difference. Hence, language was removed from the framework and the final model.

Difference in motivations and drivers. Interviewees described different motivations or drivers for parties to engage in UIRs. Motivational differences, and thus differences regarding the expected outcomes of UIRs, have also recently been highlighted by Hayes and Fitzgerald (2005) in their exploratory study on cultural differences in CRCs, supporting our findings. In this study, these differences are to some degree integrated in the performance variables. Primarily, the construct of satisfaction accounts for differing motivations and benefits sought from a relationship. To avoid introducing redundant complexity to the model, this study does not further elaborate on the dimension of motivational differences.

Employee empowerment difference. Organisational bureaucracy emerged from the data as an additional difference between organisational cultures of universities and industry partners, not identified in the literature review. Interviewees described bureaucracy, linked in the data to a university's functional organisational structure, as one central reason for the termination of relationships (see Plewa et al., 2005, in Appendix 1a). In this context, employee empowerment emerged as a potentially relevant OCD dimension. Empowerment is said to occur when "the manager gives employees the discretion to make day-to-day decisions about job-related activities" (Hartline and Ferrell, 1996, p. 56). In other words, individuals are enabled and encouraged to take on responsibility, be independent and creative (Kark, Shamir and Chen, 2003), allowing them to act and respond more flexibly towards the partner and relationship matters (Hartline and Ferrell, 1996). Employee empowerment difference was added to the dyadic model as the third OCD dimension, proposed to negatively influence relationship characteristics.

Corporate flexibility difference. Differences in flexibility also appeared to exist between UIR partners (see Plewa et al., 2005, in Appendix 1a), with the industry pressured by competitive surroundings to re-align and change (Aijo, 1996, Bower, 1993) while universities do not face the same environmental demands. To date, no study has examined the imbalance in corporate flexibility between public sector research institutions and their industry partners. Siegel et al. (2003) stated that inflexibility of technology transfer offices relates to the bureaucratic nature of universities' organisational culture, distinguishing between a bureaucratic culture in

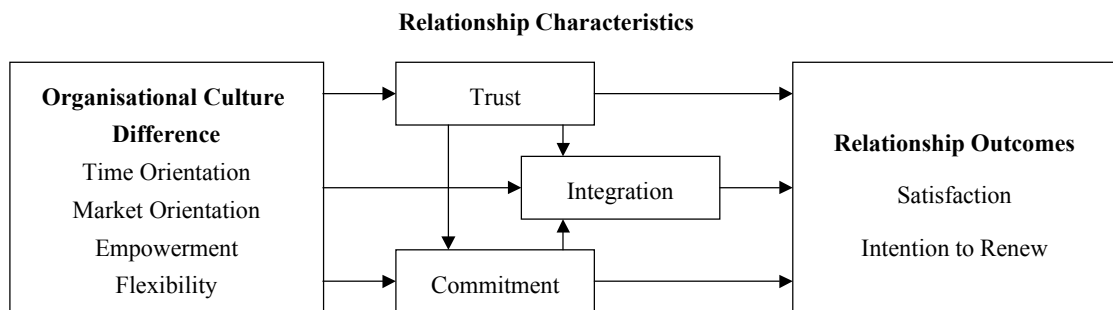
technology transfer offices and a scientific culture at the scientist level without defining either culture further. In a study on the organisational culture of public sector departments in Queensland, Parker and Bradley (2000) showed a high level of control and hierarchy as prevalent in the majority of departments studied. While Parker and Bradley's (2000) study did not focus on university departments, it might suggest inflexibility as a potential characteristic of a public sector and university culture.

While the concept of flexibility is absent from much of the research undertaken on business-to-business relationships, it has been described as an important and desirable component in inter-organisational relationships (Johnson, 1999, Lusch and Brown, 1996) and has been included in the construct of relational norms (Boyle, Dwyer, Robicheaux and Simpson, 1992, Heide and John, 1992). Flexibility can be defined from an attitudinal or behavioural perspective as either the willingness to "respond to changes and accommodate partners as the need arises" (Johnson, 1999, p. 6) or as "smooth alterations in practices and policies by trading partners in light of unforeseen or changing conditions" (Boyle et al., 1992, p. 464). Research on the effect of organisational and relational flexibility in business-to-business relationships has shown the importance of flexibility as an antecedent of the productivity of knowledge (Young et al., 2003), suggesting its fundamental relevance for UIRs. Hence, flexibility difference was added to the dyadic model as another OCD dimension, also proposed to have a negative effect on relationship characteristics.

Overall, six dimensions of OCD in UIRs were discussed, four of which are integrated in the conceptual dyadic model. Analysis does not further elaborate on language differences, which were not perceived as a relevant influence factor by our interviewees. Furthermore, while differences in motivations emerged as relevant in a UIR context, this dimension was not integrated into the model due to its relatedness to relationship outcomes. The dyadic model thus integrates four OCD dimensions, namely differences in time orientation, market orientation, employee empowerment and corporate flexibility. In consensus with the positive effect of organisational compatibility on relationship factors proposed in the generic model, and verified by qualitative data, OCD differences are proposed to negatively influence trust, commitment and integration.

The OCD dimensions established in the qualitative research step as relevant to UIRs are incorporated into the generic model developed earlier. The conceptual dyadic model in Figure 4.2 does not show the variable of personal experience, as it focuses on the effect of OCD dimensions on relationship characteristics. The following propositions integrate the proposed influence of relationship characteristics and outcomes, as discussed in regards to the generic model, and the impact of individual OCD dimensions on relationship characteristics. Given the dyadic treatment of the data (refer to section 6.2.3.2.), propositions state the dyadic relationship characteristics and outcomes.

Figure 4.2 Conceptual Dyadic Model



- P7 Dyadic relationship characteristics positively influence dyadic relationship outcomes
- P8 Dyadic trust positively influences dyadic integration
- P9 Dyadic trust positively influences dyadic commitment
- P10 Dyadic commitment positively influences dyadic integration
- P11 Time orientation difference negatively influences dyadic relationship characteristics
- P12 Market orientation difference negatively influences dyadic relationship characteristics
- P13 Empowerment difference negatively influences dyadic relationship characteristics
- P14 Flexibility difference negatively influences dyadic relationship characteristics

4.6. Chapter Summary

Qualitative research was conducted to refine the framework provided in chapter 3 on the basis of the literature review of RM and technology transfer theory, leading to the development of conceptual models. This chapter began with an outline of the research design and the qualitative research step, including a description of the discussion forum and in-depth interviews conducted. Based on the qualitative data analysis, two conceptual models were developed. A generic model integrated relationships between relationship characteristics, outcome variables and the antecedents of organisational compatibility and personal experience. The dyadic model, on the other hand, focused primarily on the influence of individual OCD dimensions on UIRs.

Several refinements of the conceptual framework were discussed and justified. First, intention to renew was added as a second outcome variable besides satisfaction. Second, integration, rather than communication, was incorporated into the conceptual models as the appropriate interaction variable. The third modification saw the broad construct of championship amended to a construct of personal experience. Experience is perceived to capture an individual's understanding of, and his or her presence in, the respective other environment. The dyadic model extends the generic model by introducing individual dimensions of OCD. The dimensions chosen for the quantitative analysis are differences in time orientation, market orientation, employee empowerment and corporate flexibility.

For further analysis, the propositions developed in this chapter based on literature review and qualitative findings can be refined into hypotheses, listed in Tables 4.1 and 4.2. These hypotheses are tested by means of a quantitative self-administered survey, and analysed using path analysis as the primary method. The following chapter describes this quantitative research step.

Table 4.1 Hypotheses - Generic Model

Hypothesis	Independent variable	Dependent variable	Predicted Relationship
H1a	Trust	Satisfaction	+
H1b	Commitment	Satisfaction	+
H1c	Integration	Satisfaction	+
H1d	Trust	Intention to renew	+
H1e	Commitment	Intention to renew	+
H1f	Integration	Intention to renew	+
H2	Trust	Integration	+
H3	Trust	Commitment	+
H4	Commitment	Integration	+
H5a	Organisational compatibility	Trust	+
H5b	Organisational compatibility	Commitment	+
H5c	Organisational compatibility	Integration	+
H6a	Personal experience	Trust	+
H6b	Personal experience	Commitment	+
H6c	Personal experience	Integration	+

Table 4.2 Hypotheses - Dyadic Model

Hypothesis	Independent variable	Dependent variable	Predicted Relationship
H7a	Trust	Satisfaction	+
H7b	Commitment	Satisfaction	+
H7c	Integration	Satisfaction	+
H7d	Trust	Intention to renew	+
H7e	Commitment	Intention to renew	+
H7f	Integration	Intention to renew	+
H8	Trust	Integration	+
H9	Trust	Commitment	+
H10	Commitment	Integration	+
H11a	Time orientation difference	Trust	-
H11b	Time orientation difference	Commitment	-
H11c	Time orientation difference	Integration	-
H12a	Market orientation difference	Trust	-
H12b	Market orientation difference	Commitment	-
H12c	Market orientation difference	Integration	-
H13a	Empowerment difference	Trust	-
H13b	Empowerment difference	Commitment	-
H13c	Empowerment difference	Integration	-
H14a	Flexibility difference	Trust	-
H14b	Flexibility difference	Commitment	-
H14c	Flexibility difference	Integration	-

Chapter Five – Quantitative Research Step: Data Collection and Sample Design

5.1. Introduction

Anchored in the call for multi-method research approaches (Carson and Coviello, 1996), this study integrates both qualitative and quantitative methods. Following the discussion of the research design and the qualitative research step in the previous chapter, this chapter outlines the quantitative research methodology applied for testing the conceptual models and hypotheses. First, the levels of measurement, theory and statistical analysis for the conceptual models are discussed, followed by a description and justification of the data collection method, a self-administered mail survey. A discussion of the questionnaire design follows, incorporating the operationalisation of constructs, scales and measurement, as well as the drafting and pre-test of the questionnaire. Before concluding the chapter, the final section deals with sampling issues, such as the sampling procedure, sampling frame and size as well as nonresponse bias.

5.2. The Levels of Measurement, Theory and Statistical Analysis

Prior to the questionnaire development and data collection, the unit of analysis has to be determined (Zikmund, 2003). Furthermore, the levels of measurement and theory are to be established and aligned (Currall and Inkpen, 2002). While the majority of studies solely focus on the definition of the unit of analysis, a clarification and justification of all levels appears necessary in this study due to the incorporation of two conceptual models dealing with different levels of theory and analysis.

The level of measurement describes the source of the data, and thus the sampling unit. This level remains the same for the overall study. A key informant approach was utilized (Patterson and Spreng, 1997), demanding data on a personal measurement level. Previous research has shown that a single key informant can provide reliable and valid information on a personal level as well as higher levels of theory (John and Reve, 1982). While the level of measurement remains the same in this study, the levels of theory and analysis differ. The level of theory illustrates the

unit that the researcher wants to examine and to generalise (Klein, Dansereau and Hall, 1994). On the other hand, the level of analysis describes the statistical treatment of data (Klein et al., 1994).

Based on the level of theory and analysis, the generic model integrates three types of constructs. The prevalent level of theory is the group level. A review of publications of the ARC linkage grants awarded between 2001 and 2003 and qualitative exploratory findings showed that UIRs are primarily operationalised on a group level, namely research groups and business units. Hence, this study aims at examining relationship constructs and outcomes on this level. In consent with the level of theory, the group level was also determined as the appropriate level of analysis for relationship and outcome constructs. Key informants were asked to report on their groups' level of trust, commitment, integration, satisfaction and intention to renew.

The construct organisational compatibility, on the other hand, implies a higher level of theory. Examined as the degree of congruence between two groups, the level of theory for the organisational compatibility is the relationship dyad. The level of analysis is in alignment with the level of theory, as organisational compatibility is conceptualised and analysed on a relationship level. In comparison to the dyadic analysis described below, which calculates a dyadic score based on two responses, respondents were asked to comment on their perception of compatibility. Hence, no further calculation of data was required. In comparison to organisational compatibility, personal experience is examined and conceptualised on a personal level, implying both the level of theory and analysis as personal.

As implied by the name, the dyadic model aims at analysing dyadic structures and dynamics in the relationship. The level of theory is the dyad, which is formed of matched pairs of sampling units, in this case the research groups and business units. Therefore, not an individual research group or business unit is examined but the matched pair of both groups within one dyadic relationship. By subtracting or multiplying scores derived from the key informant for each side of the dyad, data is developed into a dyad level for statistical analysis. The dyad serves as the level of measurement and analysis for all constructs integrated into the dyadic model. A dyadic approach was deemed beneficial and even necessary for the analysis of the dyadic model as it accounts for the perception of both relationship parties. Taking a

combined view on the groups' perspectives, a dyadic view allows the construction of a measure, and thus the analysis of similarity or difference in perceptions between both involved parties (Aurifeille and Medlin, 2005, Straub et al., 2004, Iacobucci and Hopkins, 1992). The focus on dyads rather than networks was justified earlier based on the novelty of research in UIRs and the analysis of OCD. Dyadic research eliminates the potential influence of other relationships and networks on the findings (Iacobucci and Hopkins, 1992).

Dyadic research on relationships has been rare (Kim, 2000, Smith and Barclay, 1997), possibly because of the difficulties inherent to dyadic studies, relating to data collection and respondent anonymity (Medlin, 2001). It requires the availability of data from both relationship parties and an analysis accounting for differences between both sides. Available literature shows that despite large samples at the start of the fieldwork, the requirement of corresponding responses often leads to small sample sizes suitable for use (John and Reve, 1982, Medlin, 2001). In addition, the fact that respondents cannot remain anonymous may limit the number of parties willing to participate in the research (Medlin, 2001).

In brief, while only one level of measurement is utilised in this study, varying levels of theory and analysis are applied for constructs incorporated into the generic and dyadic model. The following section outlines the data collection method.

5.3. Data Collection Method

A survey was chosen as the appropriate method of collecting quantitative data for the empirical testing of models and hypotheses developed in this study. Surveys are favourable when the researcher wants to cost-effectively collect data from a large number of respondents (Kinnear et al., 1993, Page and Meyer, 2000), gain quantified information about a population (Ticehurst and Veal, 1999, Zikmund, 2003) and enable the easy use of statistical data analysis (Lukas, Hair, Bush and Ortinau, 2004, Page and Meyer, 2000). Common disadvantages include the reliance on the survey design, the lack of time and response rate, as well as a lack of control over the respondents and whether they respond truthfully (Lukas et al., 2004). Depending on the type of survey method used, such as personal, telephone, fax mail and web-based surveys (Kinnear et al., 1993, Zikmund, 2003), further and more

specific advantages and disadvantages apply. The appropriateness of one type or channel for a particular study may be based on several factors, such as the versatility, cost, time, sample control, quantity of data, quality of data and response rate (Klassen and Jacobs, 2001).

A self-administered mail survey was deemed the most appropriate survey type for this study based on the following disadvantages and advantages. A disadvantage of self-administered surveys is the potential misunderstanding of questions (Lukas et al., 2004). While respondents were invited in the cover letter to contact the researcher and ask questions, respondents may not be aware of a misunderstanding or might discard the questionnaire rather than contacting the sender if problems occur. Second, Klassen and Jacobs (2001) found a lower item completion rate for mail in comparison to online surveys. The higher level of human error adds to the low item completion rate. Data cannot be directly transferred into statistical software but needs to be retyped, leading to lower response accuracy (Forrest, 1999). Furthermore, researchers mention the disadvantage of self-selection, as respondents can, for example, fill out the survey several times (Deal, 2003). Self-selection, however, is seen as an advantage for this study. Respondents were asked to fill out several questionnaires if feasible, one for a single relationship, and to name the respective industry partner and contact person. This indication of the industry partner offered a means to track responses.

In the face of the discussed disadvantages, several advantages are related to the use of a mail survey for this study. First, mail surveys are associated with low costs, primarily consisting of the printing and postage of questionnaires (Aaker, Kumar and Day, 2004, Lukas et al., 2004). Second, as respondents can complete questionnaires at their own time, the level of accuracy for mail surveys has been shown to be high (Aaker et al., 2004, Zikmund, 2003). A degree of flexibility in responding was also deemed highly relevant in the context of this study due to the multiple tasks and time constraints of targeted respondents, including both university academics and industry management.

Third, mail surveys are perceived to be valuable when dealing with sensitive matters (Aaker et al., 2004). Answering questions regarding a relationship, including aspects such as trust, commitment and personal motivation to work with a partner are likely to be viewed as sensitive by respondents. This sensitivity may be

increased by the focus on a specific relationship in the questionnaire. Fourth, while the response rate may be lower than in personal, face-to-face surveys (Lukas et al., 2004), Klassen and Jacobs (2001) found mail surveys to provide a higher response rate than Web, email or fax service. Hence, mail appeared as most beneficial considering the limited costs and sample target pool available for this research.

To conclude, a self-administered mail survey was deemed appropriate for this study. The following sections further elaborate on the questionnaire design and sampling.

5.4. Questionnaire Design

The questionnaire design has to be based on an understanding of the questions to be addressed in the study as well as the information and variables to be asked in order to gain answers to these questions (Ticehurst and Veal, 1999). Two conceptual models and respective hypotheses were developed in chapter 4, indicating relevant variables and proposed associations between such variables for this study. Based on these models and hypotheses, a questionnaire was developed for the data collection phase. Utilising a step-by-step approach (Ticehurst and Veal, 1999), the operationalisation of constructs, the scales and measurement, and the design of a questionnaire draft, pre-test and revision are described below.

5.4.1. Operationalisation of Constructs

The operationalisation of constructs to be integrated in this research required the decision on whether measurement instruments can be used from other studies or whether an adaptation of such measurements is required to suit research situation and topic (Page and Meyer, 2000). Based on the conceptualisation of constructs in previous chapters, appropriate measurement items were identified in the available literature. Due to the lack of any previous application of RM constructs to UIRs, measurement items used in a private sector context were modified based on preliminary interviews and a questionnaire pre-test to capture specific characteristics of UIRs. Individual items used to measure each construct are shown in the questionnaires, provided in Appendices 4a and 4b.

Relationship Outcomes. Researchers have used a wide variety of measurements for the construct of *satisfaction* (Babin and Griffin, 1998, Jones and Suh, 2000). A majority of satisfaction measures in the literature can be traced back to Oliver (1980) and Westbrook and Oliver (1981), reflecting the emotional, affective nature of the construct (Babin and Griffin, 1998, Patterson and Spreng, 1997). Current satisfaction measures can be differentiated into economic and non-economic conceptualisations (Geyskens and Steenkamp, 2000), implying that satisfaction is conceptualised regarding whether an outcome, situation or relationship is evaluated based on economic or psychological aspects.

Satisfaction is conceptualised in this study as an affective outcome measure resulting from the evaluation of all aspects of a UIR and was confirmed by the qualitative research step. Hence, satisfaction is understood as the perceived effectiveness of the relationship and whether it has been productive and worthwhile to that point in time. The relationship setting required an overall satisfaction measure, and thus the conceptualisation of satisfaction based on an ongoing engagement of parties in a relationship. While this definition includes satisfaction with economic and non-economic outcomes, the focus lies on the latter.

This focus is justified by the analysis of currently ongoing relationships and the nature of UIRs. Grönroos (1991a) already described in his Marketing strategy continuum the growing importance of functional rather than technical dimensions in a relationship situation. Furthermore, the qualitative research showed a strong importance of the process for partners in a research-oriented relationship. While intermediate economic results may arise throughout a research-oriented relationship, final research results and subsequent economic output are generally gained only at the end of a relationship phase, such as a project. Given that research-oriented relationship phases are often longer-term, considering the 3-year cycles of major research grants and PhD projects, social satisfaction with the interactions was shown to possess a high relevance for the evaluation of relationships.

The requirement for an overall relationship measure as well as the novelty of the research field limited the utilisable satisfaction scales for this research. For example, a range of scales was found as too restricted in terms of measurement, focusing primarily on the satisfaction with the outcome rather than the relationship (Patterson and Spreng, 1997). Other scales were found as too restricted due to the

specificity of dimensions regarding the research area or field, such as (food) retailing (Schellhase, Hardock and Ohlwein, 2000). In comparison, this study operationalised satisfaction based on Li and Dant (1997), going back to Bucklin and Sengupta (1993), as well as Hennig-Thurau et al. (2002), based on Oliver (1980). Their items allowed measuring multiple facets of overall satisfaction with the relationship unearthed during the qualitative research step, such as the perceived effectiveness of the relationship, outright satisfaction, and feelings about the decision to collaborate with the partner (see section E, Appendices 4a/b).

The second outcome measure is the *intention to renew*, and stay in, the relationship. Several measures are available in the literature to quantify related constructs, such as repurchase intentions, retention or membership renewal. For example, Patterson and Spreng (1997) asked respondents whether they would use a consulting firm again if a similar type of assignment would arise again, offering three intentions, measured on scales such as very probable/not probable, impossible/very possible and no chance/certain. Gray et al. (2001) measured membership renewal in the context of university-industry research centres on a scale from definitely will, to probably will and uncertain/probably not/definitely not.

While these measurements could be utilised in a relationship context and would give a good indication of the intention to renew, a more detailed measurement was chosen. While Lusch and Brown's (1996) measurement of the expectation of relationship continuity in a marketing channel context was perceived as appropriate for this research, an indication of the likelihood that the relationship with the respective partner will be renewed at the end of the current contract was deemed to provide more detail. Hence, the intention to renew, and stay in, the relationship was measured on a Juster scale, ranging from 0% to 100%, following Farrelly's (2002) study of sponsorship relationships (see Appendices 4a/b).

Relationship Constructs. *Trust* has been defined in section 2.6.1 as “a willingness to rely on an exchange partner in whom one has confidence” (Moorman et al., 1992, p. 315), conceptualising trust as comprising two intertwined components, namely credibility and benevolence (Doney and Cannon, 1997, Ganesan, 1994, Kumar et al., 1995, Larzelere and Huston, 1980). Importantly, this definition does not specify the level of trust analysed. Research has shown that trust might be present on differing levels, such as the individual, group, firm and

individual level (Rousseau et al., 1998, Young and Wilkinson, 1989). In their multilevel analysis of trust, Currall and Inkpen (2002) referred to the relevance of clarifying and aligning both the level of measurement and the level of theory. In other words, the source of information and the unit studied by the researcher should be consistent.

This study conceptualises trust on differing levels by means of two perspectives on relationships, namely a one-sided and a dyadic approach. The level of measurement remains the same. An individual key informant is questioned about the perspective of the group's trust in the other group. The level of theory, on the other hand, differs. Whereas the single-sided perspective studies the group level of trust, the dyadic perspective takes a combined view on the group perspectives to create a notional dyad level view. The dyadic perspective is related to Anderson and Weitz's (1989) suggestion that mutual trust is more likely than one-way trust in relationships. It aims at contributing to the sparse knowledge on trust as perceived by both sides of a relationship dyad.

Trust has been measured in a large range of areas and fields, including research, for example, on the trust in a salesperson (Doney and Cannon, 1997), in a manufacturer (Andaleeb, 1996, Dwyer and Oh, 1987, Hennig-Thurau, 2000), a retailer (Ganesan, 1994), a wholesaler (John and Reve, 1982), a supplier (Kumar et al., 1995) and a marketing intelligence provider (Maltz and Kohli, 1996). Due to the high correlation between credibility and benevolence in a large number of studies (Doney and Cannon, 1997, Ganesan, 1994, Kumar et al., 1995), the two components were combined into one construct. Inter-organisational trust scales proven in the previous literature, including Ganesan (1994), Doney and Cannon (1997) and Morgan and Hunt (1994), were adapted for this study (see section A, Appendices 4a/b).

The comprehensive conceptualisation and definition of *commitment* in this research integrates not only attitudinal commitment and behavioural input but also long-term durability and consistency (Dwyer and Oh, 1987) as well as the effort put into maintaining the relationship (Young and Denize, 1995). These different facets had to be reflected in the measurement of the construct, differentiating it clearly from the simple intention to renew a contract or relationship. Furthermore, they prohibited the application of scales clearly focusing on either purely economical or

social commitment (Perry et al., 2002, Young and Denize, 1995). While related constructs such as social bonds, structural bonds and idiosyncratic investments and their measurements were considered (Liljander and Roos, 2002, Perry et al., 2002), commitment was operationalised in this research based on Anderson and Weitz (1992) and Morgan and Hunt (1994), integrating items measuring the importance of the relationship for the respondent, the expectation of relationship continuation, readiness to invest effort into maintaining and developing the relationship, as well as attachment and loyalty (see section B, Appendices 4a/b).

As discussed in section 2.6.3, varying conceptual approaches have been adopted in the literature to analyse communication and its antecedents and effects. However, few researchers have dealt with the broader concept of *integration* used in this study. Based on the qualitative interviews, items based on the concepts of participation and cross-functional integration were used to measure integration in this study, leading to the use of scales employed by Dwyer and Oh (1987, 1988) and Song and Parry (1997). Their items incorporated the level of integration during the entire process, the frequency of interactions and the level of cross-functional team effort, the encouragement of ideas and suggestions by the partner and the reflection of the partner's input in programs and processes (see section C, Appendices 4a/b).

Antecedents. Organisational compatibility and personal experience were included as antecedents to relationship characteristics in the generic model. *Organisational compatibility* as conceptualised in this research and defined previously focuses on cultural rather than operational compatibility. Previous research has measured compatibility or similarity based on a range of facets (Palmer, 2002a), such as size, product lines, organisational cultures, goals, objectives, time-orientation and innovativeness (Johnson and Cullen, 1996), an approach deemed unsuitable for this research. Hence, items used by Bucklin and Sengupta (1993), going back to Ruekert and Walker (1987), and Smith and Barclay (1997) were used to operationalise organisational compatibility in this research. The integration of items measuring the perceived compatibility in goals and objectives as well as a similarity in reward systems and operating philosophies of senior management enabled a clear focus on the compatibility of organisational cultures (see sections H/I, Appendices 4a/b).

Championship has been defined around two basic themes, namely the ability to promote and to influence an idea, project or relationship (Santoro and Chakrabarti, 2002), and an enthusiasm and intrinsic motivation to succeed (Irwin et al., 1998). While this definition was adopted for this research, the preliminary exploratory research step determined experience, including the understanding of the other environment, as the component of championship to be examined in this research. In order to correctly capture the championship/experience component found in the qualitative study, a measure of *personal experience* rather than championship was operationalised and analysed in the quantitative research step. As this construct has not yet been tested in a UIR context, its measurement was based on Patterson, Johnson and Spreng (1997) and Celly and Frazier (1996), who measured the experience with commissioning consultants and with distributors respectively. In a UIR context, personal experience with UIRs and the other environment may be based on previous employment in the respective other environment, previous involvement in UIRs, contacts with people from the other environment or general experience. These facets were all included into the measurement, supplemented by an item stating the degree of understanding university or industry requirements (see section R, Appendices 4a/b).

The dyadic model integrated four dimensions of OCD as antecedents, including time orientation, market orientation, organisational culture flexibility and employee empowerment. The level of culture or subculture to be analysed may vary depending on the constructs studied. In this study, the exploratory research step determined groups as the appropriate level of subculture, including research groups on the university and business units on the industry side. *Time orientation* and differences between countries in terms of perceptions and relevance of time have been studied in an international marketing context (e.g. Parkhe, 1991). In a UIR context, time orientation as reported in previous literature concentrated on a long-versus short-term focus on time (Barnes et al., 2002, Cyert and Goodman, 1997, Universität Dortmund, 2003). Based on the qualitative research, this facet of time orientation was extended by the importance of punctuality or the meeting of deadlines. Therefore, Parkhe's (1991) items of time orientation were adapted from an international to the organisational context of this study and extended by the item

“This research group/business unit goes to any lengths to meet deadlines” to ensure correct and comprehensive measurement (see section K, Appendices 4a/b).

Market orientation, an established construct in the industry environment, can be defined as “the organisation-wide generation of market intelligence pertaining to current and future customer needs, dissemination of the intelligence across departments, and organisation-wide responsiveness to it” (Kohli and Jaworski, 1990, p. 6). Hence, market orientated organisations actively monitor the market, learn from the information gathered and create use of the knowledge to create value for the customer (Cannon and Homburg, 2001, Hurley and Hult, 1998, Ravald and Grönroos, 1996). Based on this definition of market orientation, this construct was measured using items on intelligence generation, dissemination and response (Jaworski and Kohli, 1993, Kohli and Jaworski, 1990, Narver and Slater, 1990, Pelham and Wilson, 1996). Throughout the questionnaire pre-test, university respondents appeared to have difficulties comprehending market orientation items used in the private sector context. As reflected in the interview data, the majority of academics surveyed did not relate the term customers to their industry partners. Hence, the items used to operationalise market orientation were adapted to the university environment. Primarily, the term ‘customer’ was removed from the items and substituted by ‘industry partner’.

Few studies have been undertaken on the imbalance in market orientation between relationship partners and its effect on relationship variables, with the notable exceptions of Farrelly and Quester (2003a) and Steinman, Deshpandé and Farley (2000). While Farrelly and Quester’s (2003a) study in the area of sponsorship integrated the sponsor’s perception of their own market orientation and their property’s market orientation, Steinman et al. (2000) analysed the perception of both parties regarding the supplier’s market orientation and what both parties perceived as a norm. In comparison, this study did not ask one party to comment on the other party’s market orientation. Rather, respondents commented on their own market orientation, with market orientation difference conceptualised as the difference between each party’s perceptions of their own market orientation (see section O, Appendices 4a/b).

Two OCD dimensions were integrated into the conceptual model based on the qualitative research step, namely employee empowerment and corporate flexibility.

Several management authors, such as Chen and Klimoski (2004) and Janssen (2004), have based their measurement of *employee empowerment* on items developed by Spreitzer (1995). These studies measured empowerment as a 12-item measure, including items such as the meaning of the work, competence, self-determination and impact. This research, on the other hand, defined employee empowerment as the degree of authority individual employees have in solving problems and taking initiative, as well as the degree to which employees are trusted to exercise good judgement. Its measurement was thus based on items used by Hartline and Ferrell (1996) in their study on the management of frontline staff and service quality in a hotel context (see section N, Appendices 4a/b).

The construct of *corporate flexibility* has been measured as part of a relationship party and of an organisational culture. For example, Bello and Gilliland's (1997) scale of flexibility reflected a party's expectation of the easy adjustability of contracts or agreements in an export channel relationship. Similarly, Dahlstrom, McNeilly and Speh (1996) measured flexibility as the ability to react to changing conditions in a relationship. While this research deals with relationships, it aims at capturing flexibility as a part of the organisational culture of a group. Hence, corporate flexibility was operationalised utilising items by Kitchell (1995), who analysed the relationship between organisational culture and the adoption of innovation in an industrial marketing context. This measurement reflects the flexible, adaptable and improvement-oriented nature of an organisational culture and was deemed suitable for this research (see section M, Appendices 4a/b).

Based on a discussion of the operationalisation of constructs in this study, scales and measurement are presented in the following section.

5.4.2. Scales and Measurement

Closely related to the operationalisation of constructs are the scales used to measure the differentiating values indicated by respondents. Scales have been referred to as "levels of measurement" (Page and Meyer, 2000) and can be distinguished into four types, namely nominal, ordinal, interval and ratio (Kinnear et al., 1993, Zikmund, 2003).

Nominal scales are the simplest type of scale (Zikmund, 2003) and are used to label or categorise aspects (Weis and Steinmetz, 2002). In this study, nominal scales are used solely for control factors, such as the state in which the institution is located, the type of relationship, current position, previous employment in the respective other environment, and the industry type. Ordinal scales present an objective or subjective order to the value of measured variable (Kinnear et al., 1993). In interval scales, numbers are also used to measure the order of variables, but additionally to indicate the distance between the variables in interval units (Zikmund, 2003). The unit intervals are identical, no definite beginning or zero point exists (Page and Meyer, 2000). Interval data is often used for attitudinal, opinion and predisposition judgements in marketing (Kinnear et al., 1993). Finally, ratio scales can be described as interval scales including a definite zero point. This point indicates the absence of the measured variables in the given case (Kinnear et al., 1993).

The majority of items in this questionnaire were operationalised as 7-point Likert scales anchored with the statements ‘strongly agree’ and ‘strongly disagree’. A Likert scale is ordinal in nature (Zikmund, 2003), however, its treatment as an interval or “ordinally interval scale” (Lukas et al., 2004, p. 334) has generally been accepted by a large number of marketing researchers (Kinnear et al., 1993). The use of Likert scales as interval scales implies that respondents treat the differences between the options from ‘strongly agree’ to ‘strongly disagree’ as identical. All relationship characteristics, antecedents and the outcome variable satisfaction were measured on seven-point Likert scales and treated as interval scales for further analysis. The intention to renew, and stay in the relationship, was measured on a ten-item scale from 0% to 100%, also considered an interval scale in this research.

The four measurement scales in marketing research and their use in this study were described. Due to the novelty of research on UIRs, a pre-test of the questionnaire was deemed necessary to test constructs and scales in this context and ensure accurate and consistent measurement. The drafting and pre-test of the questionnaire are briefly introduced next.

5.4.3. Drafting of Questionnaire and Pre-Test

Following the operationalisation of constructs and the establishment of scales used in this study, a questionnaire draft was developed. Principles of good research design were considered regarding question or statement content, wording, response format and sequence (Kinnear et al., 1993, Ticehurst and Veal, 1999). Individual items were worded carefully to minimize measurement error (Page and Meyer, 2000). While considering general principles of wording, such as using simple language, asking one question at a time and avoiding ambiguity (Ticehurst and Veal, 1999, Zikmund, 2003), the consideration of the respondents' professional or scientific language emerged as important in this study.

Questionnaires for the university and industry side were developed as mirrors. Hence, they were identical except for the addressing of questions to the research group or business unit respectively. The pre-test, however, showed the need for changes in wording, required primarily due to the novelty of applying certain measurement items in UIRs. Specifically, items surrounding the construct of market orientation, with an established meaning in the industry environment, were adapted to the language of academics and other university staff.

A pre-test and revision of the questionnaire was conducted during April 2004 with a small sample of the target population (Narver and Slater, 1990), consisting of nine key informants from a university and three from an industry background, all located in South Australia. Pre-test participants were asked to answer the questionnaire and then comment on potential ambiguous, biased questions or any difficulties they faced during the process (Page and Meyer, 2000, Zikmund, 2003). The pre-test considered the questionnaire itself, individual questions and data analysis (Hunt, Sparkman and Wilcox, 1982) and was conducted to help minimise measurement error and thus to ensure accurate and consistent measurement (Page and Meyer, 2000).

More specifically, the researcher sought feedback on the structure of the questionnaire, the order and flow of questions, the ease of understanding statements and difficulties with the terms used in the questionnaire. Furthermore, respondents were asked which method or channel would be most appropriate for the questionnaire, such as mail, web or telephone. Due to the questionnaire length, the

time required to complete the questionnaire was documented to estimate and potentially alter a feasible questionnaire length. While the questionnaire length remained the same, changes were made to the original questionnaire, particularly regarding the terms used in the university environment. Pre-test participants were asked to repeat and re-phrase those statements or terms they had difficulty to understand. This enabled the researcher to identify whether participants understood the concept and to ascertain more appropriate wording. Based on the pre-test, the researcher was confident that the data gained from the questionnaire would help to meet the research objectives (Zikmund, 2003). The final questionnaires for the university and industry sides are provided in Appendices 4a and 4b, with the pre-test questionnaires presented in Appendices 4f and 4g.

To summarise, the questionnaire design was described in detail, reflecting on the operationalisation of constructs, the scaling and measurement as well as the drafting and pre-test of the questionnaire. The subsequent section outlines sampling issues.

5.5. Sampling

Conducting a survey requires the determination of the respective population and thus the elements that provide the opportunity to give information required to achieve the research objectives (Lukas et al., 2004). A population is a complete collection of elements that share a certain set of characteristics (Zikmund, 2003). Each research requires the definition of the specific population to be studied in terms of the elements about which information is to be gained, the sampling units, as well as the geographical and time characteristics (Kinnear et al., 1993). Such definition sets the boundaries to which research findings may be generalised outside the collected research data (Page and Meyer, 2000).

The population for this research included Australian research groups and business units engaged in UIRs between July 2004 and January 2005. As discussed in section 5.2, varying levels of theory and analysis were employed to analyse the conceptual models and respective hypotheses. However, the level of measurement, and thus the sampling unit, remained the same: Individuals engaged in UIRs at the university and private sector organisation. The geographical focus on Australian

universities and Australian companies was deemed beneficial to eliminate the impact of national culture issues.

The following discussion further elaborates on the sampling procedure utilised to gain dyadic data on UIRs in Australia, the sampling frame and size as well as suggested nonresponse bias.

5.5.1. Sampling Procedure

Many different procedures can be used to select samples for a research (Kinnear et al., 1993). This research requires the consideration of the fact that sampling units involve individuals from the university and industry background and that matched pairs of sampling units are required to gain dyadic data. Therefore, the sampling procedure incorporated two steps. The first step involved a screening of publications detailing ARC linkage grants awarded in the years 2001 to 2003 as well as university websites, aimed at developing a database of key informants engaged in UIRs. As linkage grants are awarded for research conducted in collaboration between university and industry entities, organisations listed in those publications were likely to fit the requirements of this study. Furthermore, where appropriate, academics willing to participate and staff at industry liaison offices were asked to indicate and/or contact colleagues knowledgeable in this area and interested in participating in this research. Such snowball approach was advocated for this study, as it is targeted at a little-surveyed population (Welch, 1975).

Academics with experience in UIRs were then sent a questionnaire and asked to complete it for a single relationship, indicating the specific industry partner and contact person at that company (Kim, 2000, Selnes, 1998). The questionnaire indicated that the contact person provided would be approached with the request to also complete a questionnaire. Furthermore, respondents were asked to name a person they believed to be most knowledgeable about their relationship. This statement aimed at overcoming the potential risk of a respondent naming a person very high in the partner's hierarchy, who might not be directly engaged and thus less knowledgeable regarding relationship characteristics and issues. On receipt of the completed questionnaire, the second step in the sampling process commenced and a

questionnaire was sent out to the individual named as the contact person. This approach ensured the collection of data on matched relationship pairs.

Strict confidence was ensured to each respondent. In addition, a copy of the results of the study was offered to increase the response rate. The following section outlines the final sample attained by means of the described sampling procedure.

5.5.2. Sampling Frame and Size

A sampling frame is the list of sampling units from which the final sample will be reached (Kinnear et al., 1993). Thirty-eight universities operate in Australia, characterised by different sizes, age as well as focus. Despite the conduct of research in every university, not every university, faculty or school is involved in research-oriented UIRs. Hence, this research did not concentrate on a specific industry or research field to not limit the potential sampling frame, but targeted key informants regardless of their research area. The integration of several industries and research fields, reflected by the control variable 'industry type' in the questionnaire, enabled the identification of the spread of respondents but did not directly contribute to the understanding of differences between UIRs in certain research areas due to the limited sample achieved throughout the data collection phase.

Respondents on both sides of a UIR were expected to be involved in several partnerships. Based on the small number of universities in Australia, each respondent was therefore invited to answer several questionnaires if feasible; each questionnaire relating specifically to one partner. This approach implied the risk that the respondent did not focus on a specific relationship, but answered questions based on an overall experience base. This dilemma was solved by asking respondents to identify a specific relationship at the beginning of the questionnaire and focusing on this specific partner (Farrelly, 2002, Lee, 2000). While respondents were offered to get researcher support by means of face-to-face or telephone if completing several questionnaires (Farrelly, 2002), only two respondents used that offer, completing questionnaires via telephone. Overall, eight respondents completed more than one questionnaire.

Questionnaires were distributed to 938 academics engaged and experienced in UIRs, identified from publications of ARC linkage grants awarded between 2002

and 2003. Of these, 83 academics had to be eliminated from the sample due to incorrect addresses or retirement, leading to an effective sample of 855. In addition, questionnaires were sent out to 54 companies known through a previous study to be engaged in UIRs. One hundred and forty university and 17 industry questionnaires were returned, resulting in response rates of 16.4% and 31.5% respectively. These response rates reflect the time consuming nature of our respondents' jobs as well as possible concerns about confidentiality but compare well with similar studies of managers and academics (Hewett et al., 2002, Lapierre, 2000, Morgan and Hunt, 1994).

In order to gain data from both sides of the relationships, respondents were asked to indicate a contact person at their partner organisation or institution. After deleting those responses naming an international partner or not naming the partner at all, 138 questionnaires were sent out, including 123 to industry and 15 to university staff. Response rates in this second mail out were significantly higher than in the first round, with 61 and 4 responses, equalling 49.6% and 26.7%. This fact is likely to be due on the respondents' knowledge that their respective partner had already completed a questionnaire and provided the researcher with the partners' contact details. After eliminating those responses with systematically missing variables and those with more than 25% of variables randomly missing, the number of usable responses reached 207 responses for the generic model (including university and industry responses) and 62 dyads (matched pairs of university and industry responses) for the dyadic model. The final sample exhibits several characteristics that need to be considered for data analysis and discussion, with detail on the characteristics of respondents provided in Table 5.1.

While all Australian states and territories are represented in the sample, a large number of respondents were located in New South Wales and Victoria, followed by Queensland and Western Australia, reflecting the high research density in these states. Most of the dyads included in the overall sample comprised both parties from the same state, with only 30% of dyads crossing state borders. The length of relationships differed considerably, from 2 months to 30 years, with the mean length of 58.9 months, nearly 5 years. Interestingly, 54.5% of the respondents indicated a relationship length above the general ARC grant length of 3 years. This might indicate that some of these relationships existed prior to the grant application.

Table 5.1 Characteristics of Final Respondents - Quantitative Step

Position UNI	Management	Senior Researcher	Researcher	Management & Sen. Researcher	mv				
N	15	90	12	11	5				
%	11.3	67.7	9	8.3	3.8				
Position IND	Senior Management	Middle Management	Researcher/Staff	Management & Researcher	mv				
N	37	21	12	2	2				
%	50	28.4	16.2	2.7	2.7				
PEII* UNI	none	<2 years	2-5 years	>5 years	mv				
N	37	27	14	45	10				
%	27.8	20.3	10.5	33.8	7.5				
PEII* IND	none	<2 years	2-5 years	>5 years	mv				
N	42	12	6	7	7				
%	56.8	16.2	8.1	9.5	9.5				
State UNI	ACT	NSW	NT	QLD	SA	TAS	VIC	WA	mv
N	7	37	1	26	6	5	31	19	1
%	5.3	27.8	0.8	19.5	4.5	3.8	23.3	14.3	0.8
State IND	ACT	NSW	NT	QLD	SA	TAS	VIC	WA	mv
N	5	19	1	14	1	1	17	15	1
%	6.8	25.7	1.4	18.9	1.4	1.4	23	20.3	1.4
Research Type	research	consultancy	both	mv					
N	181	4	20	2					
%	87.4	1.9	9.7	1					
Relationship length	mean = 58.9 months		minimum = 2 mon	maximum = 360 mon					
Staff in Group UNI	mean = 36.37		minimum = 1 staff	maximum = 530 staff					
Staff in Group IND	mean = 52.83 staff		minimum = 2 staff	maximum = 2000 staff					
Staff in UIR UNI	mean = 4.85 staff		minimum = 1 staff	maximum = 25 staff					
Staff in UIR IND	mean = 4.70 staff		minimum = 1 staff	maximum = 30 staff					
Industry Type		N	%						
Agriculture, Forestry and Fishing		37	17.9						
Health and Community Services		24	11.6						
Government Administration and Defence		20	9.7						
Mining		20	9.7						
Manufacturing		16	7.7						
Cultural and Recreation Services		13	6.3						
Education		12	5.8						
Communication Services		11	5.3						
Electricity, Gas and Water Supply		7	3.4						
Construction		6	2.9						
Transport and Storage		4	1.9						
Finance and Insurance		1	0.5						
Accommodation, Cafes and Restaurants		1	0.5						
Personal and Other Services		1	0.5						
Others		34	16.4						

* PEII = Previous employment in industry/university

In terms of overall staff numbers, business units were found to have an average of 53 staff members, while university research groups reported an average of 36 staff members. An average of 5 people were engaged in the relationship on the industry and on the university side. Hence, while business units in our sample appeared larger than research groups, the same number of staff was engaged in the relationship on both sides. Interestingly, while only 25 (33.8%) industry respondents previously worked at a university, 86 (64.6%) university respondents indicated they had previously been employed in a private sector institution, with more than half of these respondents (33.9%) reporting industry experience of more than five years.

Based on the discussion of the final sample gained for the quantitative step of this research, the following section elaborates on the potential nonresponse bias.

5.5.3. Nonresponse Bias

Researchers using the survey method are faced with the potential problem of nonresponse bias. Nonresponse bias depends on two issues, namely 1 - the number of surveyed people not responding to the questionnaire, and 2 - the possibility that respondents differ considerably from nonrespondents (Pearl and Fairley, 1985). The higher the proportion of nonrespondents, the lower the likelihood of a sample's representation of the overall population. This representation additionally decreases if respondents differ from nonrespondents.

A very frequently used approach to reduce nonresponse bias is an increase in response rates and thus the reduction of nonresponse (Armstrong and Overton, 1977, Colombo, 2000, Pearl and Fairley, 1985). Efforts taken in this study to maximise the response rate included a personalised cover letter assuring confidentiality (see Appendices 4c and 4d), a follow-up letter, and a letter of support by Ruth Drinkwater, Product Development and Research Director at the Australian Institute for Commercialisation (see Appendix 4e).

While the response rate was seen as relatively low for the university site, it was suggested to reflect the time-consuming nature of academics' jobs and possible concerns about confidentiality, rather than introduce a specific non-response bias. Research commercialisation and UIRs are still relatively new to many academics, which are pressured to gain additional funds but may not yet be comfortable in

working with industry. The approach for obtaining dyadic data, however, may have brought about systematic bias in terms of the dependent variables. Given the lack of anonymity due to the provision of the partner's contact details, respondents were likely to report on "positive relationships" and name those contact partners they know well and with whom they have good relations (Homburg and Stock, 2004). While the data may lean towards positive and successful relationships, satisfaction ratings range from 1 to 7, suggesting that the sample provides a good cross-section of current UIRs in Australia.

Assuming similarities between nonrespondents and late respondents, early and late respondents were compared across the constructs under study as well as respondent and relationship characteristics to estimate nonresponse bias (Armstrong and Overton, 1977, Pace, 1939). A Levene's Test for the Equality of Variances was conducted to identify potential differences in variances between groups (Brosius, 2004), followed by an independent samples t-test (Coakes and Steed, 2003). No significant differences emerged from the data, neither in terms of demographics nor in terms of parameter values. Appendix 5 shows the results of a t-test, demonstrating the results for demographics, including previous employment in the other environment, current position, office location, number of staff, relationship length and research type as well as for parameters, including satisfaction, commitment, trust, integration, organisational compatibility and personal experience.

Based on the lack of significant differences in means between early and late respondents, it was suggested that a problem of nonresponse bias was unlikely and that the sample was adequate for further analysis.

5.6. Chapter Summary

The survey methodology chosen for this study was clarified in this chapter. The levels of measurement and differing levels of theory and statistical analysis were outlined. The data collection method and questionnaire design were then presented. An operationalisation of constructs as well as scaling and measurement were discussed, followed by an outline of the drafting and pre-test of the questionnaire. The final section elaborated on sampling issues, including the

sampling procedure, sampling frame and size as well as nonresponse bias. Survey results are presented in the following chapter.

Chapter Six – Results

6.1. Introduction

Data was analysed with AMOS 5 employing Structural Equation Modelling (SEM) principles. This chapter first outlines individual steps of data treatment and analysis, starting with the data preparation and the evaluation of data normality. Construct reliability and validity are assessed and reported for all multi-item constructs, followed by a discussion of the use and calculation of composite scores. Using one-factor congeneric measurement models for the calculation of composite scores, this chapter presents the measurement models for the generic and dyadic models. Furthermore, the calculation of dyadic scores for both difference and aggregated constructs is explained and justified. Important concerns for any SEM based data analysis are then described, including the model identification and the specification of goodness-of-fit indexes used to evaluate individual models.

The second and third sections of the chapter detail the results for the generic and dyadic model respectively. Data analysis was conducted, and is reported, in three steps. First, hypotheses were tested by means of analysing the path models conceptualised in chapter 4. The second analysis step describes a model re-specification, aimed at identifying highly parsimonious path models. This exploratory step was deemed valuable for future research in the emerging area of UIRs, especially considering the novelty of the OCD dimensions included in the dyadic model. Third, multi-group path analysis, also called invariance testing, was performed. While the generic model was tested comparing the university and industry sub-samples, the dyadic data was analysed in two steps. First, the dyadic sample was separated into two groups characterised by similar versus different intentions to renew the relationship. Second, the sample was divided into two groups with similar versus different levels of satisfaction. These groups were used to identify differences in parameters across groups in order to clarify the influence of relationship dynamics on parameter values.

While results are described and briefly discussed in this chapter, a detailed discussion of findings is provided in chapter 7.

6.2. Path Analysis using Structural Equation Modelling Method

Structural Equation Modelling (SEM) has taken the forefront for the analysis of complete models in recent times (Kline, 2005) by taking a confirmatory rather than exploratory or descriptive approach to data analysis (Byrne, 2001). SEM offers a more accurate analysis than other methods by accounting for measurement and structural error (Byrne, 2001, Diamantopoulos and Siguaw, 2000). Another reason for the popularity of SEM in a range of research fields is its ability to integrate latent and observed constructs. Latent, or unobservable, constructs are commonly found in marketing research and literature (Parasuraman et al., 1988) and are present in this research. These constructs are measured by means of a number of observable items, as single-item measures are essentially restricted in capturing an overall construct (Churchill, 1979). Consequently, SEM was chosen as a valuable method of data analysis for this research. The data preparation and analysis procedures undertaken in this research are detailed next.

6.2.1. Data Preparation and Normality

Prior to analysis, the data was prepared in three steps. First, all reverse-coded variables were recoded. Second, the software program SPSS 11.5 was utilised to deal with missing values in the final sample. Missing values were replaced with the maximum likelihood estimation, shown in previous research as a “valuable” method (Byrne, 2001). Estimation maximisation, a method that uses an iterative process (Hill, 1997), was selected as the appropriate means for this process, as it has been described as introducing the least bias (Hair, Anderson, Tatham and Black, 1998). Finally, data was tested for outliers (Kline, 2005).

The stable application of SEM and similar multivariate methods depends on a range of assumptions, such as independent observations, random sampling of respondents, linearity of all relationships as well as multivariate normality (Hair et al., 1998). Considering the common lack of multivariate normality in research practice (Byrne, 2001), univariate and multivariate normality was assessed by analysing skewness and kurtosis (DeCarlo, 1997). With values of skewness and kurtosis ranging between 0.292 and 1.351 as well as 0.030 and 3.218 respectively (see Appendix 6), slight to moderate univariate nonnormality was established (Lei

and Lomax, 2005). While it is suggested that only values exceeding a skew index of 3 and a kurtosis index of 10 may create a problem (Kline, 2005), multivariate nonnormality may be suggested, given the values of 22.987 for the generic and 9.801 for the dyadic model. Hence, a range of procedures was implemented to prevent the impact of nonnormality on the analysis.

First, due to the potential affect of nonnormality on the principal goodness-of-fit index (Chi-Square), a range of fit indexes was used for the analysis of models, including the recommended Normed Fit Index (NFI) and Comparative Fit Index (CFI) (Lei and Lomax, 2005). Furthermore, to eliminate the reliance on assumptions regarding the statistical distribution of the parameters (Hair et al., 1998), data analysis integrated the Bollen-Stine bootstrapping technique (Bollen and Long, 1993). Bootstrapping is a re-sampling procedure creating multiple sub-samples from the original sample from which the confidence estimates are derived (Byrne, 2001). The Bollen-Stine bootstrap enables an assessment of a hypothesized model by offering a “modified bootstrap method for the Chi-Square goodness-of-fit statistic” (Byrne, 2001, p. 284), and was thus chosen for this research.

Following the outline of data preparation and normality, the following section details an assessment of construct reliability and validity.

6.2.2. Construct Reliability and Validity

Prior to analysing any hypotheses, an assessment of the reliability and validity of constructs is required. This ascertains that the measuring instruments capture what they are intended to measure and that they are consistent and accurate.

Reliability. Reliability refers to the absence of random errors in the measurement (Kinnear et al., 1993, Zikmund, 2003). A reliable measurement process thus ensures consistent, accurate and predictable findings (Kinnear et al., 1993). Reliability was assessed by means of Cronbach’s alpha (α) and composite reliability. Cronbach’s (1951) method for calculating coefficient alpha (α) has been commonly accepted as a method for estimating the internal consistency of individual constructs (Cortina, 1993, Kline, 2005, Streiner, 2003). While no standard rule applies to the acceptance level of α scores, values around 0.7 are

considered adequate, improving the closer values get to 1 (Hair et al., 1998, Kline, 2005).

Composite reliability, also known as construct reliability, is estimated using information on item loadings and error variances (Diamantopoulos and Siguaw, 2000). Based on this estimation procedure (Diamantopoulos and Siguaw, 2000, Fornell and Larcker, 1981), where λ represents the i^{th} factor loading on its respective construct (Gerbing and Anderson, 1988), the reliability for the construct η is (Fornell and Larcker, 1981):

$$p_{\eta} = \frac{(\sum_{i=1}^p \lambda_{yi})^2}{(\sum_{i=1}^p \lambda_{yi})^2 + \sum_{i=1}^p \text{Var}(\epsilon_i)}$$

Composite reliability scores higher than 0.7 have been described as desirable (Fornell and Larcker, 1981). The results of α and p_{η} are reported in Table 6.1 for the generic model and in Table 6.2 for the dyadic model.

Table 6.1 Reliability Scores - Generic Model

Construct	No. items	α	p_{η}	Construct	No. items	α	p_{η}
Trust	3			Satisfaction	3		
Overall		.888	.8922	Overall		.925	.9536
Industry		.879	.8944	Industry		.937	.9378
University		.904	.8978	University		.919	.9235
Commitment	3			O. Compatibility	3		
Overall		.790	.8020	Overall		.817	.8160
Industry		.849	.8661	Industry		.821	.8181
University		.774	.7938	University		.819	.8206
Integration	2			P. Experience	3		
Overall		.851	.8580	Overall		.873	.8781
Industry		.844	.8620	Industry		.811	.8196
University		.857	.8634	University		.904	.9094

The results for the generic model report not only the scores for the overall data set but also scores of the university and industry sub-samples. A separation of the individual groups aggregated into the overall data set was deemed valuable to ensure the reliability of scores across sub-samples. The results for the dyadic model report

the university and industry scores. These samples were used to calculate overall dyadic scores, as outlined and justified in section 6.2.3.2.

Table 6.2 Reliability Scores - Dyadic Model

Construct	No. items	α	p_{η}	Construct	No. items	α	p_{η}
Trust	3			Time Orientation	3		
Industry		.8297	.8613	Industry		.5506	.6340
University		.7957	.8118	University		.6288	.5469
Commitment	3			Market Orientation	2		
Industry		.8540	.8848	Industry		.7076	.8381
University		.7448	.9628	University		.8345	.7082
Integration	3			Empowerment	3		
Industry		.8318	.8650	Industry		.9146	.9248
University		.7957	.8055	University		.8539	.8610
Satisfaction	3			Flexibility	3		
Industry		.9373	.9378	Industry		.8147	.8306
University		.8972	.9340	University		.8121	.8340

The majority of scales reported in Tables 6.1 and 6.2 showed a high degree of internal consistency and composite reliability, especially considering the small number of items used for each construct. However, time orientation difference was removed from the dyadic model due to its low reliability scores. While the industry data showed a low level of internal consistency ($\alpha=0.5506$), the university data demonstrated a low level of composite reliability ($p_{\eta}=0.5469$).

Based on our qualitative research findings (refer to section 4.5), the item measuring the importance of punctuality was employed for the further analysis of time orientation difference. This operationalisation departs from the current conceptual literature, such as Cyert and Goodman (1997), who described UIRs as characterised by a long-term focus at the university and a short-term focus at the industry side. Our qualitative research results suggested that this dimension of time-orientation difference existed but that it may depend on the size of an organisation, complicating its empirical analysis. The importance of punctuality, however, was understood as highly important on the industry side while not as imperative in a university environment and was thus chosen as the appropriate measure for further

analysis. Recent exploratory research has underlined the relevance of this choice, with Hayes and Fitzgerald (2005) reporting the meeting of deadlines and commitments as a central difference between the commercial and scientific cultures.

Validity. Due to the use of latent constructs, the measurement of construct validity, and thus the ability of scores to “measure what they are supposed to measure, but also *not* measure what they are not supposed to measure” (Kline, 2005, p. 60), was deemed crucial. Several ways of dealing with construct validity exist, including the basic approaches of face validity, convergent validity, discriminant validity and nomological validity (Lukas et al., 2004, Page and Meyer, 2000). Face or content validity involves the subjective expert agreement on the appropriateness of a measurement (Kinnear et al., 1993, Zikmund, 2003). It was achieved in this study by founding the measurement scales on previous research identified in the literature review and confirming them during the questionnaire pre-test.

Convergent validity, also described as criterion or concurrent validity, describes the correlation between different measurements for the same phenomenon (Kinnear et al., 1993, Zikmund, 2003). As shown in the one-factor congeneric models presented in section 6.2.3, factor loadings for all items met or exceeded the recommended mark of 0.5 (Steenkamp and van Trijp, 1991). Furthermore, convergent validity was determined by means of the Average Variance Extracted ($p_{vc(\eta)}$; AVE), calculated based on the following formula (Fornell and Larcker, 1981):

$$p_{vc(\eta)} = \frac{\sum_{i=1}^p \lambda_{yi}^2}{\sum_{i=1}^p \lambda_{yi}^2 + \sum_{i=1}^p \text{Var}(\varepsilon_i)}$$

Convergent validity is assured if $p_{vc(\eta)}$ scores exhibit values higher than 0.5. These scores indicate that the items account for a considerably larger degree of variance than the measurement error (Diamantopoulos and Siguaw, 2000, Fornell and Larcker, 1981). The results of $p_{vc(\eta)}$ are reported in Table 6.3 for the generic model and in Table 6.4 for the dyadic model. All $p_{vc(\eta)}$ scores lie above 0.5, demonstrating convergent validity for all constructs.

Table 6.3 Convergent and Discriminant Validity Scores - Generic Model

Construct	$p_{vc(\eta)}$	highest λ^2	Construct	$p_{vc(\eta)}$	highest λ^2
Trust			Satisfaction		
Overall	.7355	.6084	Overall	.7276	.6084
Industry	.7438	.4290	Industry	.8341	.6178
University	.7460	.7293	University	.8018	.7293
Commitment			Organisational Compatibility		
Overall	.5777	.5914	Overall	.5972	.4212
Industry	.6912	.6178	Industry	.6014	.3893
University	.5646	.5432	University	.6053	.4998
Integration			Personal Experience		
Overall	.7522	.5837	Overall	.7084	.1142
Industry	.7613	.5285	Industry	.6064	.2490
University	.7611	.6178	University	.7723	.0864

Table 6.4 Convergent and Discriminant Validity Scores - Dyadic Model

Construct	$p_{vc(\eta)}$	highest λ^2	Construct	$p_{vc(\eta)}$	highest λ^2
Trust			Market Orientation		
Industry	.6850	.4830	Industry	.7222	.5715
University	.5930	.5358	University	.5484	.4382
Commitment			Empowerment		
Industry	.7312	.4858	Industry	.8066	.5084
University	.5249	.4651	University	.6801	.4410
Integration			Flexibility		
Industry	.6929	.5625	Industry	.6264	.5715
University	.5871	.5791	University	.6501	.4410
Satisfaction					
Industry	.8342	.5625			
University	.7568	.5791			

Convergent validity confirms that theoretically anticipated correlations between certain measures are present, in this case between individual items and the construct they are supposed to measure. On the other hand, discriminant validity assesses the predicted distinctness between measures. Hence, it demonstrates that theoretically different and unrelated constructs do not correlate, and has thus been described as the opposite of convergent validity (Page and Meyer, 2000). As several

studies revealed potential multicollinearity problems due to intercorrelations among the constructs of trust, commitment and satisfaction (Anderson and Weitz, 1989, Moorman et al., 1992, Morgan and Hunt, 1994), the demonstration of discriminant validity was deemed extremely important for the validity of the findings. As expected and shown in Tables 6.5 and 6.6, correlations between trust, commitment, integration and satisfaction appeared high.

Table 6.5 Correlation Matrix of Final Constructs - Generic Model

	O_C	EXP	TRU	COM	INTEG	SATIS	ITR
Organ. Compatibility	1						
Personal Experience	.182**	1					
Trust	.555**	.118	1				
Commitment	.470**	.291**	.568**	1			
Integration	.452**	.226**	.576**	.524**	1		
Satisfaction	.493**	.258**	.704**	.654**	.686**	1	
Intention to Renew	.294**	.288**	.433**	.602**	.433**	.488**	1

** Correlation is significant at the 0.01 level (2-tailed).

Table 6.6 Correlation Matrix of Final Constructs - Dyadic Model

	EMP	FLEX	MO	TIME	TRU	COM	INTEG	SATIS	ITR
EMP	1								
FLEXI	.096	1							
MO	.042	.062	1						
TIME	-.171	-.074	.123	1					
TRUST	.133	-.141	-.106	-.063	1				
COM	-.079	-.259*	-.005	-.225	.573**	1			
INTEG	.077	-.166	-.086	-.126	.699**	.719**	1		
SATIS	.097	-.258*	-.195	-.030	.685**	.714**	.757**	1	
ITR	.038	-.039	-.244	-.326**	.344**	.471**	.329**	.397**	1

* Correlation is significant at the 0.05 level (2-tailed)

** Correlation is significant at the 0.01 level (2-tailed).

Given the high correlations, further assessment of the discriminant validity was deemed crucial and was conducted by relating the shared variance (λ^2) between constructs to the $p_{vc(\eta)}$ score calculated earlier (Fornell and Larcker, 1981, Rokkan, Heide and Wathne, 2003). If the shared variance, and thus the squared correlation between two constructs, is lower than the $p_{vc(\eta)}$ scores determined for each of the

constructs, discriminant validity is ascertained (Fornell and Larcker, 1981, Straub et al., 2004). The highest shared variance (highest λ^2) for each construct is shown in Tables 6.3 and 6.4. Except for a slightly higher λ^2 for commitment in the overall sample, all $p_{vc(\eta)}$ scores were found above their highest λ^2 . Given the closeness of the $p_{vc(\eta)}$ score and λ^2 for commitment in the overall sample and the established discriminant validity for the sub-samples, this construct was accepted for the further analysis. Discriminant validity was thus established for the generic and dyadic constructs (Fornell and Larcker, 1981, Rokkan et al., 2003).

Nomological validity refers to the degree to which theoretically related yet different constructs empirically relate to each other (Lukas et al., 2004). For example, a higher level of trust was expected and confirmed as associated with a higher level of commitment and satisfaction.

With construct reliability and validity ascertained, the following section describes and justifies the use of composite variables, including the presentation of one-factor congeneric measurement models.

6.2.3. Composite Variables

A powerful analytical technique for the evaluation of entire models, SEM requires a large sample size to ensure statistical stability. A rule of thumb is that the ratio of sample size to the number of model parameters should be at least 5:1, preferably 10:1 (Hair et al., 1998, Kline, 1998). An even greater ratio is required in situations where data does not conform to assumptions of multivariate normality (Hair et al., 1998), as is common in research practice (Byrne, 2001). Sample sizes for SEM or related procedures should exceed 100 to 150 to ensure accurate parameter estimates (Anderson and Gerbing, 1988, Lei and Lomax, 2005), with recommended sample sizes of 200 or more (Hair et al., 1998). The achieved sample sizes of 207 for the generic model and 62 for the dyadic model were thus not deemed sufficient for the analysis of the proposed complex models if latent and observed variables were to be included.

Composite variables have commonly been calculated as a means of data reduction (Rowe, 2002) and are utilised in this research for several reasons. First, while the usable sample size was sufficiently large for empirically testing simple

models, it did not support a true structural equation model (including latent and observed variables) due to multiple items measuring each latent construct. The development of composites, and thus the calculation of mathematical artefacts (Farris, Parry and Ailawadi, 1992), can reduce the number of parameters analysed. Hence, it enables stable parameter estimation and the evaluation of complicated models despite a small sample size (Hewett et al., 2002). Furthermore, the use of composites offers a greater stability, limiting the potential ambiguous effect of idiosyncrasies of individual components (Hulin, Cudeck, Netemeyer, Dillon, McDonald and Bearden, 2001).

A composite score was estimated for each multi-item construct based on a fitted one-factor congeneric measurement model, estimated with AMOS 5. While composites can be created in various ways, including the use of simple, unweighted, additive indexes or factor scores (Rowe, 2002), the latter was chosen for this research. The application of one-factor congeneric models and the use of resultant factor scores do not rely on averaging item scores but take into account the random measurement error and differing factor loadings. Hence, each indicator contributes to the final score in varying degrees, providing a high degree of realistic representation of the data (Fleishman and Benson, 1987).

The calculation of composite scores relied on a three-step approach (Rowe, 2002). First, a one-factor congeneric model, the simplest form of measurement models, was built for each construct. The acceptance of a one-factor congeneric model relied on the assumption that all measures loaded on the common variable (Hau, 1995) and were thus verified as valid measures of it. To identify whether all factor loadings were significant, the variance of the latent variable was set to 1. Maximum likelihood estimation was used in the estimation process due to its capacity to provide parameter estimates and its robust behaviour against violations of multivariate normality in medium-sized samples (Anderson and Gerbing, 1988, Hair et al., 1998, Hoyle and Panter, 1995). Goodness-of-fit indexes (refer to section 6.2.5.) were then used to test and determine the goodness-of-fit of each congeneric model. To ensure the computing of meaningful composite scores, convergent and discriminant validity were ascertained and reported in the previous section.

Factor score regression weights are provided by AMOS for each one-factor congeneric measurement model and were used for the second step of calculating

composite scores (Jöreskog and Sörbom, 1989). This step aimed at creating a proportionally weighted scale score for every item used in the final analysis. The factor score regression weights presented by AMOS for each congeneric model were transferred into EXCEL 97 and added to calculate a sum of weights for each construct. Then, the regression weight for each item was divided by the sum of weights calculated for the respective construct to produce a proportionally weighted scale score for each item.

In the third step, the final composite scores were computed in SPSS 11.5. Composing a new variable in SPSS involves calculating the final score for each individual item and at the same time combining the final scores of the items relating to a construct. Hence, each proportionally weighted scale score was multiplied by the data column of the respective item (Rowe, 2002), generating the final item scores. Furthermore, the final item scores relating to each construct were added to derive the final composite score for each construct.

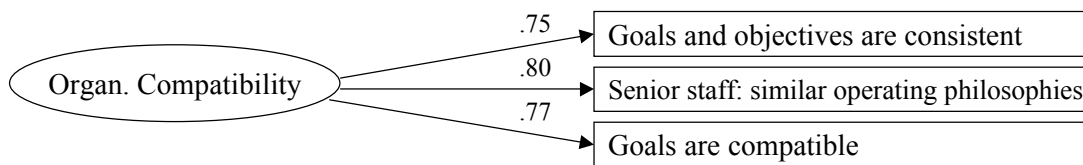
6.2.3.1. One-Factor Congeneric Models - Generic Model

The one-factor congeneric models used to compute composite scores are presented below. With the variance fixed to 1, these models were derived from a re-specification of the original set of items per construct. Theoretical as well as empirical factors were considered to achieve highly fitted, parsimonious measurement models (Kline, 2005) and, in turn, suitable composites for further analysis. Primarily, re-specification included the elimination of items with small factor loadings, with a minimum of 0.5 recommended to ensure convergent validity (Steenkamp and van Trijp, 1991). Goodness-of-fit and parsimony indexes (refer to section 6.2.5) were then considered in order to achieve well-fitted, yet parsimonious, measurement models. An estimation of measurement models requires degrees of freedom above 0 and thus a larger number of observations than free parameters (Kline, 2005). To enable the estimation of congeneric models with three items, the variance of two residuals was set equal, based on pair-wise parameter comparisons provided by AMOS.

Furthermore, the overall data set was segmented into a university and an industry sample, each used to validate the final one-factor congeneric models and

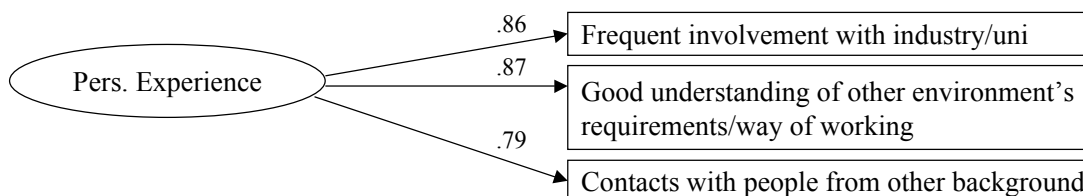
their overall fit. All models showed an acceptable fit for the overall, university and industry samples. While Appendices 7a and 7b provide the congeneric models for the university and industry samples, Figures 6.1 to 6.6 represent the models based on the combined data, which was used for hypotheses testing and the estimation of the path model. As previously described, a Bollen-Stine Bootstrap procedure with 500 bootstrap samples was performed and the respective p value provided.

Figure 6.1 Congeneric Model - Organisational Compatibility



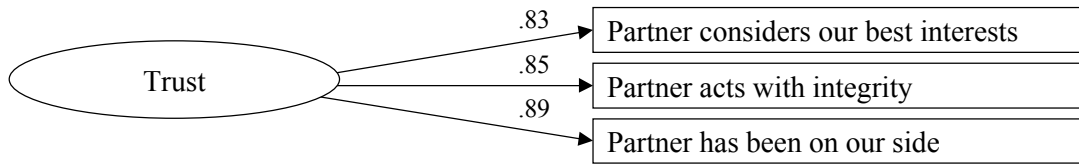
χ^2 value	.470	Adjusted Goodness-of-Fit (AGFI)	.991
Degrees of freedom	1	Root Mean-Square Error of Approximation (RMSEA)	.000
P value	.565	Tucker-Lewis Index (TLI)	1.007
χ^2/df value	.470	Comparative Fit Index (CFI)	1.000
Goodness-of-Fit (GFI)	.998	Normed Fit Index (NFI)	.998

Figure 6.2 Congeneric Model - Personal Experience



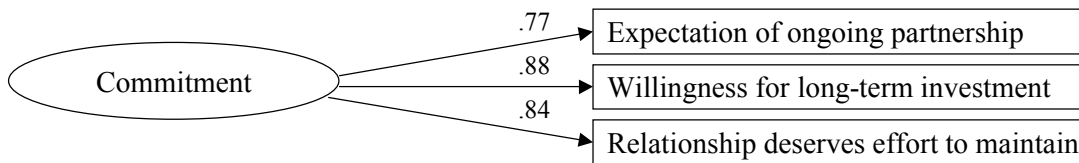
χ^2 value	.928	Adjusted Goodness-of-Fit (AGFI)	.982
Degrees of freedom	1	Root Mean-Square Error of Approximation (RMSEA)	.000
P value	.453	Tucker-Lewis Index (TLI)	1.001
χ^2/df value	.928	Comparative Fit Index (CFI)	1.000
Goodness-of-Fit (GFI)	.997	Normed Fit Index (NFI)	.997

Figure 6.3 Congeneric Model - Trust



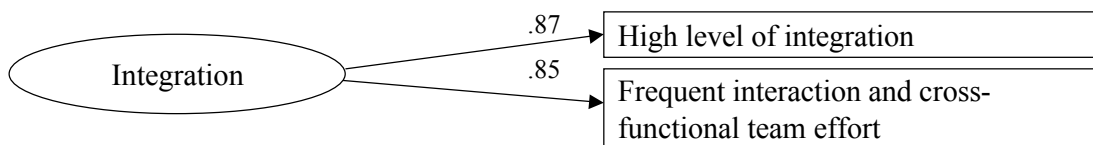
χ^2 value	1.715	Adjusted Goodness-of-Fit (AGFI)	.967
Degrees of freedom	1	Root Mean-Square Error of Approximation (RMSEA)	.059
P value	.261	Tucker-Lewis Index (TLI)	.994
χ^2/df value	1.715	Comparative Fit Index (CFI)	.998
Goodness-of-Fit (GFI)	.995	Normed Fit Index (NFI)	.995

Figure 6.4 Congeneric Model - Commitment



χ^2 value	.105	Adjusted Goodness-of-Fit (AGFI)	.998
Degrees of freedom	1	Root Mean-Square Error of Approximation (RMSEA)	.000
P value	.798	Tucker-Lewis Index (TLI)	1.014
χ^2/df value	.105	Comparative Fit Index (CFI)	1.000
Goodness-of-Fit (GFI)	1.000	Normed Fit Index (NFI)	.999

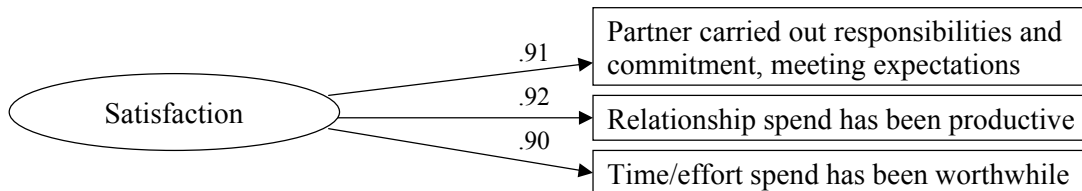
Figure 6.5 Congeneric Model - Integration



A minimum of 3 items for each construct has been recommended in the literature (Baumgartner and Homburg, 1996). The strong correlation between the items expected to measure integration and satisfaction, however, led to the elimination of all but two items based on the given data set. This ensured discriminant validity and thus a meaningful data analysis while retaining the construct of integration in the analysis. Goodness-of-fit indexes cannot be reported, as AMOS only provides index values for models with three or more items. Given

the strong reliability and convergent validity scores for the two-item measure (refer to section 6.2.2), its suitability for analysis was assumed.

Figure 6.6 Congeneric Model - Satisfaction



χ^2 value	0.039	Adjusted Goodness-of-Fit (AGFI)	.999
Degrees of freedom	1	Root Mean-Square Error of Approximation (RMSEA)	.000
p value	.878	Tucker-Lewis Index (TLI)	1.006
χ^2/df value	0.039	Comparative Fit Index (CFI)	1.000
Goodness-of-Fit (GFI)	1.000	Normed Fit Index (NFI)	1.000

As presented in Figures 6.1 to 6.6, all models show an acceptable fit based on the goodness-of-fit criteria set for this research (refer to section 6.2.5). Notably, while all observed χ^2/df values are situated below the acceptable value of 3 (Kline, 2005), several values also lie below the value of 1, reflecting a model overfit. A slight overfit of measurement models was accepted for this study due to the known effect of sample size on the χ^2 and χ^2/df statistics (Hair et al., 1998, Hoyle and Panter, 1995). While the small sample size might introduce instability to the analysis, the overall goodness-of-fit established by means of a variety of fit indexes, combined with high Cronbach alphas and composite reliabilities (refer to section 6.2.2.), support the notion that all models were suitable for the calculation of composite scores and further analysis.

6.2.3.2. One-Factor Congeneric Models - Dyadic Model

Based on the approach employed for the generic model, one-factor congeneric measurement models were analysed for the constructs to be included in the dyadic model. While there has been a call towards more dyadic research in the literature (e.g. Nicholson, Compeau and Sethi, 2001, Sigauw et al., 1998, Weitz and Jap, 1995), dyadic data analysis is still sparse, with most studies using “proxy-reports”

due to problems inherent in the dyadic data collection process (Lambe, Spekman and Hunt, 2002). Based on data from matched pairs, reflecting both sides of a relationship, dyadic research requires the acknowledgement of the reciprocal nature of relationships (Kim, 2000, Medlin, 2001, Straub et al., 2004). Authors have taken different approaches when dealing with dyadic data. While some have analysed the asymmetry and magnitude of constructs (Gundlach et al., 1995, Medlin, 2001), others have examined the influence of one party's characteristic on the partner's behaviour (Farrelly, 2002, Homburg and Stock, 2004, Siguaw et al., 1998, Wathne and Heide, 2004). More recently, Straub et al. (2004) developed ratio measures of degree, symmetry and degree of symmetry values, taking into account not only the actual score but also the overall potential score and enabling a detailed analysis of dyadic and network constructs.

This research does not focus on the discussion or advancement of dyadic data analysis. Rather, dyadic data was collected to allow the analysis of the effect of OCD on a number of dyadic relationship characteristics and outcomes. Since the aim was to capture and analyse relationship dynamics, both magnitude and symmetry between partners' scores had to be taken into account. Especially, a win-win situation not only entails a high magnitude of performance outcomes across partners but also a certain level of symmetry. Hence, a simple averaging or addition of scores from both sides of a dyad was found as restricted, as it would compensate for differences. For example, the dyadic score for a dyad with one highly satisfied and one highly dissatisfied party would be equal to that of a dyad with two moderately satisfied parties. A sole focus on symmetry would also restrict the analysis of performance. With the scope of the construct lost (Straub et al., 2004), the level of success or relationship intensity as perceived by the parties could not be reflected.

Overcoming this weakness common to a range of dyadic studies (e.g. Gundlach et al., 1995, Kim, 2000), composite scores for relationship characteristics and outcomes were first calculated for the university and the industry side separately and subsequently multiplied. Calculating ratios as proposed by Straub et al. (2004) was considered but ultimately rejected because this approach requires that individual parties report not only the actual but also the potential level for each construct, e.g. information sharing (Straub et al., 2004). Multiplication, as employed in this study,

takes into account both the magnitude and symmetry of partners' scores while avoiding the compensation of differences in the process.

Because multiplication considers the magnitude of scores, a dyad with highly satisfied parties receives a larger dyadic score than a dyad with low satisfaction scores. Furthermore, multiplication reflects symmetry. A dyad with moderately satisfied parties gains a higher dyadic score than a dyad characterised by one low and one high score for satisfaction. A comparison between dyads with the same magnitude of 7 but differing levels of symmetry may serve as an example. The dyadic score of the least symmetrical dyad ($6 = 6 \times 1$) would be lower than the score of a moderately symmetrical dyad ($10 = 2 \times 5$) and lower still than for the most symmetrical dyad ($12.25 = 3.5 \times 3.5$).

Therefore, dyadic scores for relationship characteristics and outcomes were calculated in two steps. First, composite scores were computed for multi-item measures for the university and industry side separately. Second, these composite scores were multiplied to obtain an aggregated score, reflecting the dyadic relationship value. Due to the 7-point Likert scales used for the majority of items in the questionnaire, aggregated scores ranged from 1 to 49. Only the scores for intention to renew ranged from 0 to 100.

By contrast, the constructs of time orientation, market orientation, employee empowerment and corporate flexibility were conceptualised as constructs of difference. A score reflecting this difference was computed as the absolute value of the difference between the university's and the industry's score (Gundlach et al., 1995, Kim, 2000). Thus, the range of values for the constructs of difference ranged from 0, indicating a dyad in which partners indicated the same score for an item, to 6, for a dyad with opposing scores.

While it was anticipated to operationalise all relationship characteristics and outcomes based on the same items in both models, the different data sets and use of the data in the generic and dyadic model required some changes to the operationalisation of relationship characteristics to ensure parsimonious measurement models and construct validity. The measurement of trust and commitment remained the same throughout the analysis, except for the change of one item in the dyadic analysis. While the item stating that the partner considers the

best interests of the group was used for the measurement of trust in the generic model, the statement that the group can trust the partner completely was used in the dyadic model. In regards to commitment, the item referring to the expected ongoing nature of the partnership in the generic model was exchanged against the item referring to a sense of loyalty to the partner.

The operationalisation of integration required more extensive changes. The two items used to measure integration in the generic model reflected the team-oriented interaction and involvement aspects of integration, with both items based on Song and Parry's (1997) operationalisation of integration. In comparison, integration was measured based on three items in the dyadic model, focusing more on participation as part of the concept of integration, including collaborative communication, involvement in the relationship and the reflection of the partner's input in programs and processes (Dwyer and Oh, 1987, 1988). Hence, while the overall operationalisation of the construct remained the same, capturing the level of involvement and participation in the relationship, the use of different items may lead to differing results for the generic and dyadic model. This will be taken into account throughout the analysis and discussion.

Dyad composites were computed by means of one-factor congeneric measurement models, following the same re-specification procedure as outlined for the generic model (Kline, 2005, Steenkamp and van Trijp, 1991). Figures 6.7 to 6.13 show measurement models for all multi-item constructs and the university and industry sides. Intention to renew was operationalised as a one-item measure. As noted before, time-orientation was measured based on the item of the importance of punctuality due to the lack of reliability of the original three-item scale (refer to section 6.2.2.). A Bollen-Stine Bootstrap procedure with 500 bootstrap samples was performed and the respective p value indicated for each measurement model.

Only two items remained for the construct of market orientation following the analysis of reliability, convergent and discriminant validity. Difficulties with the measurement of this construct may relate to the research field. Interviews and the questionnaire pre-test already indicated that university respondents were not familiar with the concept and the respective items. Despite changes in the wording of the individual statements, this unfamiliarity may have induced measurement difficulties. The remaining two items relate to the design and implementation of a response to

market information and were deemed to adequately reflect market orientation in the given context. Thus, they were retained for further analysis. Given that AMOS does not provide goodness-of-fit indexes for models with two items, they cannot be reported in this research. The strong reliability scores for the two-item measures (refer to section 6.2.2), however, suggest their suitability for further analysis.

Figure 6.7 Congeneric Models - Market Orientation

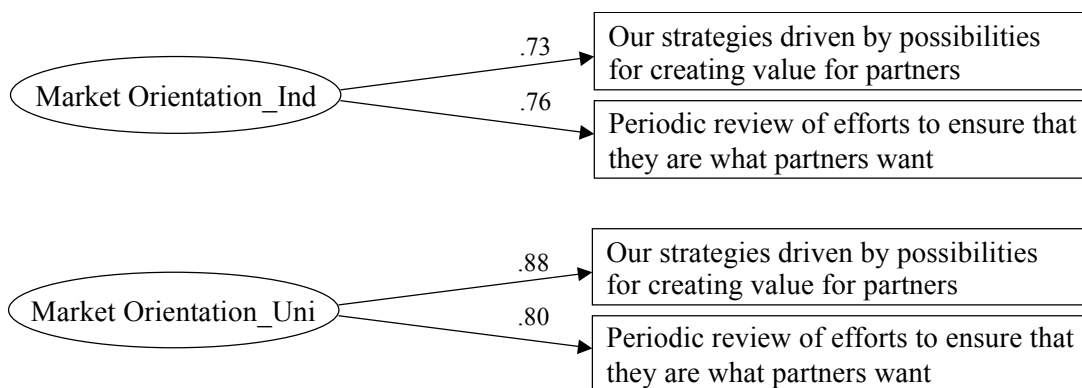
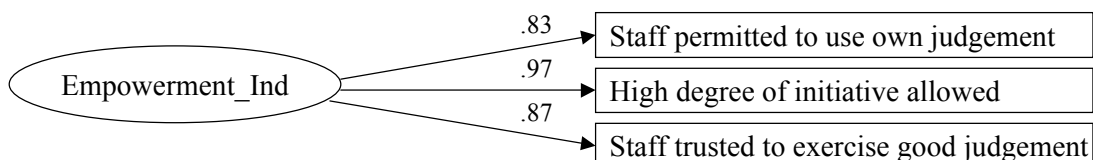
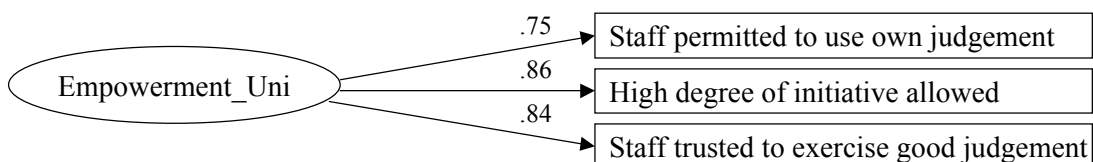


Figure 6.8 Congeneric Models - Empowerment

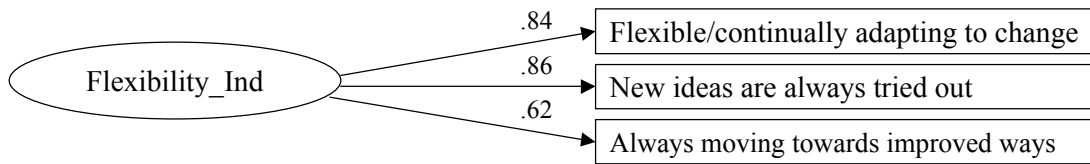


χ^2 value	.611	Adjusted Goodness-of-Fit (AGFI)	.960
Degrees of freedom	1	Root Mean-Square Error of Approximation (RMSEA)	.000
p value	.601	Tucker-Lewis Index (TLI)	1.009
χ^2/df value	.611	Comparative Fit Index (CFI)	1.000
Goodness-of-Fit (GFI)	.993	Normed Fit Index (NFI)	.996

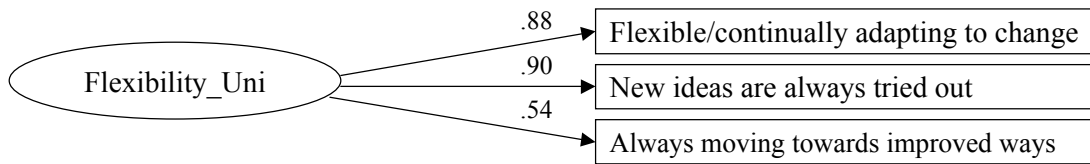


χ^2 value	.960	Adjusted Goodness-of-Fit (AGFI)	.938
Degrees of freedom	1	Root Mean-Square Error of Approximation (RMSEA)	.000
p value	.697	Tucker-Lewis Index (TLI)	1.001
χ^2/df value	.960	Comparative Fit Index (CFI)	1.000
Goodness-of-Fit (GFI)	.990	Normed Fit Index (NFI)	.989

Figure 6.9 Congeneric Models - Flexibility

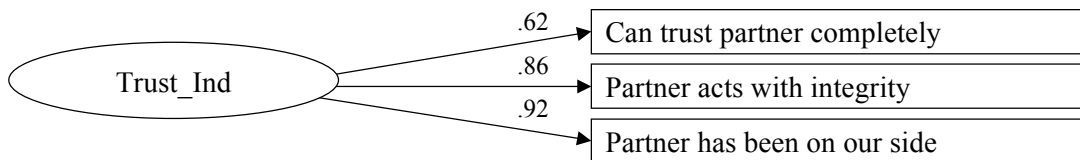


χ^2 value	.174	Adjusted Goodness-of-Fit (AGFI)	.989
Degrees of freedom	1	Root Mean-Square Error of Approximation (RMSEA)	.000
p value	.685	Tucker-Lewis Index (TLI)	1.038
χ^2/df value	.174	Comparative Fit Index (CFI)	1.000
Goodness-of-Fit (GFI)	.998	Normed Fit Index (NFI)	.997

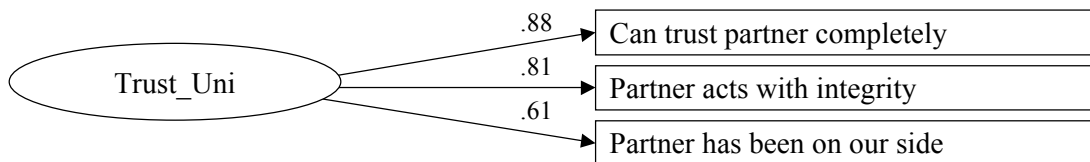


χ^2 value	.425	Adjusted Goodness-of-Fit (AGFI)	.972
Degrees of freedom	1	Root Mean-Square Error of Approximation (RMSEA)	.000
p value	.523	Tucker-Lewis Index (TLI)	1.023
χ^2/df value	.174	Comparative Fit Index (CFI)	1.000
Goodness-of-Fit (GFI)	.995	Normed Fit Index (NFI)	.995

Figure 6.10 Congeneric Models - Trust (Dyadic Model)

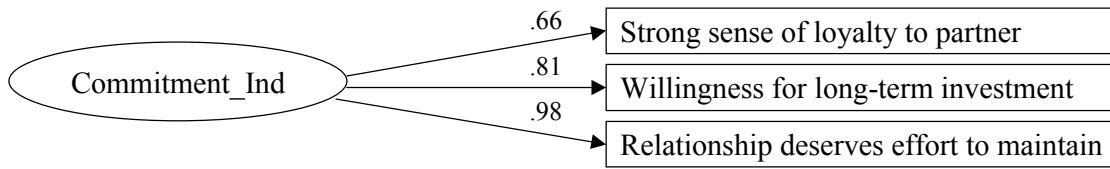


χ^2 value	.408	Adjusted Goodness-of-Fit (AGFI)	.973
Degrees of freedom	1	Root Mean-Square Error of Approximation (RMSEA)	.000
p value	.717	Tucker-Lewis Index (TLI)	1.022
χ^2/df value	.408	Comparative Fit Index (CFI)	1.000
Goodness-of-Fit (GFI)	.996	Normed Fit Index (NFI)	.995

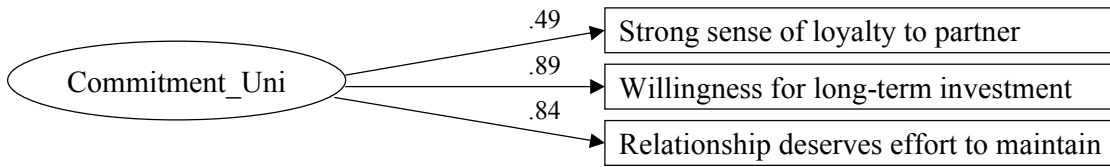


χ^2 value	.541	Adjusted Goodness-of-Fit (AGFI)	.965
Degrees of freedom	1	Root Mean-Square Error of Approximation (RMSEA)	.000
p value	.435	Tucker-Lewis Index (TLI)	1.022
χ^2/df value	.541	Comparative Fit Index (CFI)	1.000
Goodness-of-Fit (GFI)	.994	Normed Fit Index (NFI)	.992

Figure 6.11 Congeneric Models - Commitment (Dyadic Model)

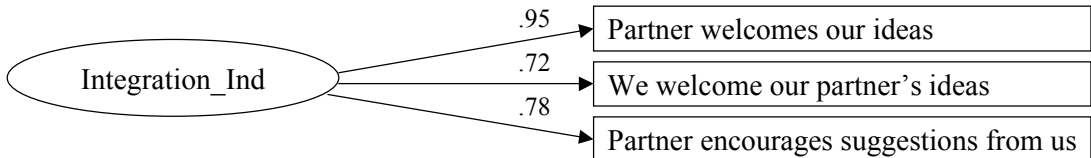


χ^2 value	.843	Adjusted Goodness-of-Fit (AGFI)	.946
Degrees of freedom	1	Root Mean-Square Error of Approximation (RMSEA)	.000
p value	.389	Tucker-Lewis Index (TLI)	1.005
χ^2/df value	.843	Comparative Fit Index (CFI)	1.000
Goodness-of-Fit (GFI)	.991	Normed Fit Index (NFI)	.992

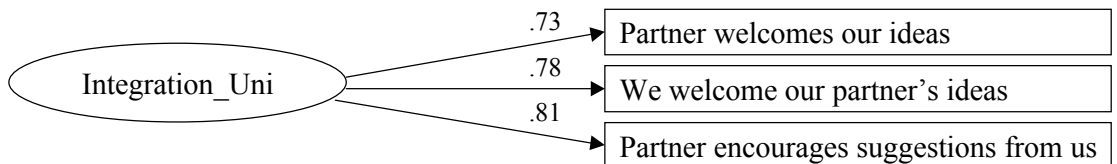


χ^2 value	.793	Adjusted Goodness-of-Fit (AGFI)	.949
Degrees of freedom	1	Root Mean-Square Error of Approximation (RMSEA)	.000
p value	.531	Tucker-Lewis Index (TLI)	1.010
χ^2/df value	.793	Comparative Fit Index (CFI)	1.000
Goodness-of-Fit (GFI)	.991	Normed Fit Index (NFI)	.988

Figure 6.12 Congeneric Models - Integration (Dyadic Model)

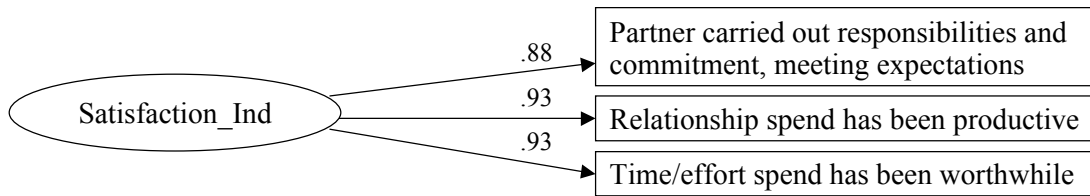


χ^2 value	.212	Adjusted Goodness-of-Fit (AGFI)	.986
Degrees of freedom	1	Root Mean-Square Error of Approximation (RMSEA)	.000
p value	.685	Tucker-Lewis Index (TLI)	1.029
χ^2/df value	.212	Comparative Fit Index (CFI)	1.000
Goodness-of-Fit (GFI)	.998	Normed Fit Index (NFI)	.997

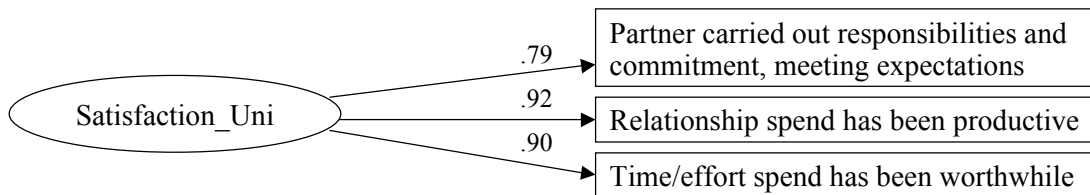


χ^2 value	.049	Adjusted Goodness-of-Fit (AGFI)	.997
Degrees of freedom	1	Root Mean-Square Error of Approximation (RMSEA)	.000
p value	.852	Tucker-Lewis Index (TLI)	1.048
χ^2/df value	.049	Comparative Fit Index (CFI)	1.000
Goodness-of-Fit (GFI)	.999	Normed Fit Index (NFI)	.999

Figure 6.13 Congeneric Models - Satisfaction (Dyadic Model)



χ^2 value	.087	Adjusted Goodness-of-Fit (AGFI)	.994
Degrees of freedom	1	Root Mean-Square Error of Approximation (RMSEA)	.000
p value	.780	Tucker-Lewis Index (TLI)	1.017
χ^2/df value	.087	Comparative Fit Index (CFI)	1.000
Goodness-of-Fit (GFI)	.999	Normed Fit Index (NFI)	.999



χ^2 value	.771	Adjusted Goodness-of-Fit (AGFI)	.950
Degrees of freedom	1	Root Mean-Square Error of Approximation (RMSEA)	.000
p value	.459	Tucker-Lewis Index (TLI)	1.006
χ^2/df value	.771	Comparative Fit Index (CFI)	1.000
Goodness-of-Fit (GFI)	.992	Normed Fit Index (NFI)	.994

All dyadic measurement models showed an acceptable fit based on the given goodness-of-fit criteria. The acceptance of measurement models with an overfit was justified for the generic model, applying in the same way to the dyadic data. The very small sample size associated with the dyadic use of the data further underlines the previous discussion. The final composites included difference constructs, namely time orientation, market orientation, empowerment and flexibility, as well as aggregated, dyadic constructs, namely trust, commitment, integration, satisfaction and intention to renew.

6.2.4. Model Identification

Prior to estimating a path model, it has to be identified. A model is considered identified if “it is impossible for two distinct sets of parameter values to yield the same population variance-covariance matrix” (Baumgartner and Homburg, 1996, p. 146). Identification thus requires the overall model to have a unique solution

(Breckler, 1990, Diamantopoulos and Siguaw, 2000), entailing the fulfilment of two requirements: 1 - the number of observations is equal or more than free model parameters, and 2 - every unobserved construct is assigned a scale (Kline, 2005).

Three forms of identification may occur, including empirical under-identification, just-identification and over-identification. If a unique solution is theoretically impossible due to the violation of the first requirement, the model is said to be under-identified or not identified (Kline, 2005). While both just-identified and over-identified models are identified, the former is characterised by an equal number of parameters and observations. The latter includes more observations than parameters (Kline, 2005). In this study, all models fulfil the basic requirements of identification. Furthermore, the over-identification of the models, and thus the existence of positive degrees of freedom, allow their scientific use (Byrne, 2001).

6.2.5. Goodness-of-Fit Indexes

Following the identification of a model, the overall model fit is assessed. A variety of alternative fit indexes have been developed in the literature, with a constant change in knowledge about the perceived effectiveness of individual indicators (Kline, 2005). In order to substantiate a thorough assessment and a reflection of the overall model fit, a variety of measures were employed in this research. The Chi-Square (χ^2) statistic was supported by absolute, incremental and parsimony fit indexes (Hu and Bentler, 1995). Fit indexes, their abbreviations and acceptable levels for this research are shown in Table 6.7, some of which are discussed in more detail below.

The only statistically based measure of model fit is the Chi-Square (χ^2) (Hair et al., 1998). If the required non-significance is met, it indicates that the proposed model fits the observed covariances and correlations, as “the actual and predicted input matrices are not statistically different” (Hair et al., 1998, p. 654). Due to the effect of different factors, such as sample size, non-normality and missing data, on the χ^2 statistic (Hair et al., 1998, Hu and Bentler, 1995, Kaplan, 1990, Marsh, Balla and McDonald, 1988), additional indexes of the goodness-of-fit were also employed. While the sample for the generic model exceeds the required sample size of 100 to 200 (Hair et al., 1998), further assessment was deemed crucial for the

dyadic model, which is based on a sample size of 62. The Normed Chi-Square (χ^2/df) reflects the Chi-Square (χ^2) adjusted by the degrees of freedom (Hair et al., 1998). The accepted levels shown in Table 6.7 only include values between 1 and 3, with values below 1 representing an overfit of the model (Hair et al., 1998).

Table 6.7 Summary of Fit Indexes Used to Assess Model Fit

Name	Abbreviation	Type	Acceptable level
Chi-Square	χ^2	Model Fit	$p > 0.05$
Normed Chi-Square	χ^2 / df	Absolute Fit Model Parsimony	$1.0 < \chi^2 / df < 3.0$
Goodness-of-Fit	GFI	Absolute Fit	$GFI > 0.90$
Adjusted Goodness-of-Fit	AGFI	Absolute Fit	$AGFI > 0.90$
Root Mean-Square Error of Approximation	RMSEA	Absolute Fit	$RMSEA < 0.05$
Tucker-Lewis Index	TLI	Incremental Fit	$TLI > 0.95$
Comparative Fit Index	CFI	Incremental Fit	$CFI > 0.95$
Normed Fit Index	NFI	Incremental Fit	$NFI > 0.95$
Consistent Akaike Information Criterion	CAIC	Model Parsimony	No defined level

Sources: (Byrne, 2001, Diamantopoulos and Siguaw, 2000, Hair et al., 1998, Hu and Bentler, 1995, Kline, 2005)

Much attention has been given to the Root Mean-Square Error of Approximation (RMSEA), also called the “badness-of-fit index” (Kline, 2005). While values between 0.05 and 0.08 have been described as acceptable (Hair et al., 1998), zero indicates the best fit, worsening the higher the value. The Tucker-Lewis Index (TLI) also requires further definition. The TLI, also known as the nonnormed fit index, reflects a comparison between the model and the baseline or null model (Diamantopoulos and Siguaw, 2000, Hair et al., 1998). In comparison to similar measures, such as the Comparative Fit Index (CFI) and the Normed Fit Index (NFI), which can only take on values between zero and one, the TLI can show values greater than one (Diamantopoulos and Siguaw, 2000). All three indexes were employed in this research to account for their respective strengths, such as their appropriateness for research with a smaller sample and in nonnormality conditions in the case of the CFI and NFI (Lei and Lomax, 2005, Hair et al., 1998).

Table 6.7 does not provide an acceptance level for the Consistent Akaike Information Criterion (CAIC), an index for model parsimony. The CAIC is a comparative measure between models and therefore does not allow the specification of a value range. Rather, model parsimony increases with decreasing CAIC values (Diamantopoulos and Siguaw, 2000, Hair et al., 1998). Hence, the closer the CAIC value is to zero, the higher the model parsimony. The CAIC was chosen instead of the Akaike Information Criterion, as it accounts for the effects of sample size (Diamantopoulos and Siguaw, 2000, Kline, 2005).

The assessment of the goodness-of-fit in this research was determined by balancing absolute and incremental fit indexes with the parsimony of the model. The consideration of parsimony was deemed extremely valuable for the assessment of one-factor congeneric models and the determination of the number of indicators for each construct, as well as for model re-specification.

6.3. The Generic Model

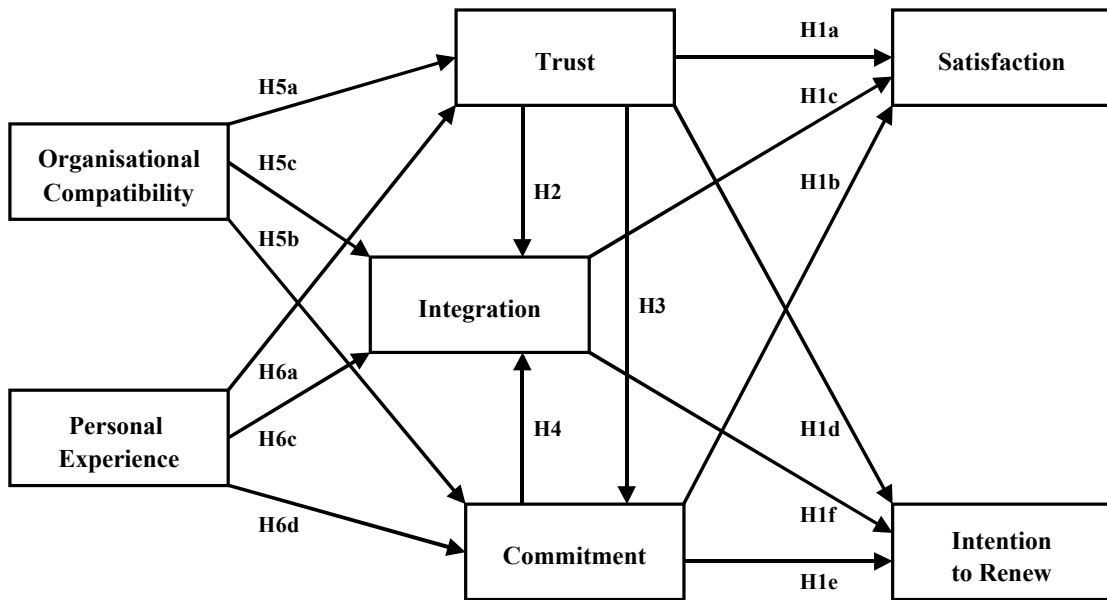
This section elaborates on the analysis of the generic model, including hypotheses testing, model re-specification and a multi-group analysis.

6.3.1. Hypotheses Support

The conceptual generic model and related hypotheses, developed based on the literature review and the preliminary qualitative research, were tested using AMOS 5. Figure 6.14 shows the model, detailing hypotheses H1 to H6.

While the conceptual model was founded on a thorough review of the RM and technology transfer literature and refined by qualitative research, not all goodness-of-fit indexes showed an acceptable model fit. While the χ^2/df (=2.529), GFI (=0.980), AGFI (=0.907), TLI (=0.982), CFI (=0.985) and NFI (=0.976) indicated a satisfactory fit, this was not supported by a significant χ^2 ($p < 0.05$) and an RMSEA value of 0.086. The RMSEA value is considerably higher than the accepted level for this research (0.05), reflecting a mediocre fit by falling in the value range of 0.08 to 0.10 (Byrne, 2001). Despite this, given that many other indicators point to a good model fit, a test of hypotheses appears legitimate.

Figure 6.14 Conceptual Generic Model and Hypotheses



χ^2 value	15.174	Adjusted Goodness-of-Fit (AGFI)	.907
Degrees of freedom	6	Root Mean-Square Error of Approximation (RMSEA)	.086
P value	.028	Tucker-Lewis Index (TLI)	.947
χ^2/df value	2.529	Comparative Fit Index (CFI)	.985
Goodness-of-Fit (GFI)	.980	Normed Fit Index (NFI)	.976

Findings regarding beta coefficients and the support of hypotheses are provided in Table 6.8. Analysis controlled for a potential effect of relationship length on relationship satisfaction, described by Lee (2000) in a study on university-industry collaboration. While no significant correlation between relationship length and satisfaction was established in this study (see Appendix 8a), a significant correlation between length and integration emerged ($p < .05$). A Pearson correlation of -0.161 indicated a slight decrease of integration over time. Based on Anderson and Weitz (1989), the lower levels of integration in long-term relationships were suggested to result from higher interaction effectiveness based on increased experience and familiarity with the other party's customs.

As shown in Table 6.8, the results of the path analysis provided support for ten hypotheses. Only five hypotheses had to be rejected due to non-significant associations. Strong support appeared for the impact of relationship characteristics on the outcome variable satisfaction. Trust, commitment and integration were all found to positively influence satisfaction, significantly on a 0.001 level. Notably,

neither trust nor integration significantly influenced the intention to renew the relationship. Commitment was shown as the only variable with a significant positive impact ($p < 0.001$). As expected, trust was found to strongly and positively influence commitment and integration, confirming literature review findings. Furthermore, the significant association between commitment and integration was confirmed ($p < 0.001$).

Table 6.8 Effects, Critical Ratios and Hypotheses Test - Generic Model

Hyp.	Independent variable	Dependent variable	Standardized Effects		Critical Ratio	Support
			Direct	Total		
H1a	Trust	Satisfaction	0.355	0.636	6.610***	YES
H1b	Commitment	Satisfaction	0.275	0.353	5.358***	YES
H1c	Integration	Satisfaction	0.337	0.337	6.497***	YES
H1d	Trust	Intention to Renew	0.082	0.358	1.131	NO
H1e	Commitment	Intention to Renew	0.483	0.513	6.997***	YES
H1f	Integration	Intention to Renew	0.130	0.130	1.869	NO
H2	Trust	Integration	0.369	0.472	5.134***	YES
H3	Trust	Commitment	0.445	0.445	6.750***	YES
H4	Commitment	Integration	0.231	0.231	3.360***	YES
H5a	Organ. Compatibility	Trust	0.552	0.552	9.511***	YES
H5b	Organ. Compatibility	Commitment	0.193	0.439	2.920**	YES
H5c	Organ. Compatibility	Integration	0.125	0.430	1.880	NO
H6a	Personal Experience	Trust	0.107	0.017	0.301	NO
H6b	Personal Experience	Commitment	0.208	0.216	3.784***	YES
H6c	Personal Experience	Integration	0.094	0.150	1.671	NO

*** $p < 0.001$; ** $p < 0.01$; * $p < 0.05$

Results are based on Bootstrap = 500, 95% confidence level

The support for hypotheses regarding the impact of organisational compatibility and personal experience on relationship characteristics was mixed. Organisational compatibility showed the strongest direct and total effect on trust. Furthermore, a weak direct link to commitment was confirmed. No support, however, was established for the paths between organisational compatibility or personal experience and integration. Personal experience was only found to relate to commitment ($p < 0.001$). No significant link was established between personal experience and trust.

The following sections further elaborate on these findings and the support, or lack thereof, for individual hypotheses.

H1a-c: Trust, commitment and integration positively influence satisfaction with the relationship

The results indicated a strong positive influence of trust on satisfaction ($p < 0.001$), providing support for H1a. Coefficients showed a direct effect of 0.355, with a total effect rising to 0.636. These strong associations confirmed trust as a key driver for satisfactory relationships between universities and industry partners. Commitment was also found to significantly and positively influence satisfaction ($p < 0.001$), confirming not only H1b but also the relevance placed on commitment in the RM literature. The third and final relationship variable of integration was also shown to significantly affect satisfaction ($p < 0.001$), providing support for H1c. Interestingly, the direct effect of integration on satisfaction was found to be stronger than the direct effect of commitment on satisfaction, exhibiting coefficients of 0.337 and 0.275 respectively. This result may indicate that the strong focus on trust and commitment in the RM literature may be restricted, suggesting the need for a greater consideration of interaction and communication variables, such as integration.

H1d-f: Trust, commitment and integration positively influence the intention to renew the relationship

Our results did not reveal a significant association between trust and the intention to renew the relationship, leading to the rejection of Hypothesis H1d. This finding is somewhat surprising, given the fundamental influence of trust on satisfaction. The psychological state of trust thus influenced the affective outcome measure used in this research but did not significantly affect the more cognitive decision about the future of the relationship. A positive influence of commitment on the intention to renew, however, was established ($p < 0.001$), offering support for H1e. In comparison to a relatively weak association with satisfaction, commitment emerged as the only variable influencing the intention to renew, with a large coefficient of 0.483. No significant impact of integration on intention to renew was revealed, rejecting H1f.

H2: Trust positively influences integration

The proposed association between trust and integration was confirmed by the results ($p < 0.001$), providing support for H2. Trust was found to influence integration directly with a coefficient of 0.369, substantiating the relevance of trust for integrative and participative behaviour in UIRs.

H3: Trust positively influences commitment

Confirming the RM literature, results revealed trust to significantly and positively affect commitment with a coefficient of 0.445 ($p < 0.001$), confirming H3. The strong support for this link was expected, given the evidence of the interrelationship between trust and commitment in previous studies (Grayson and Ambler, 1999, Moorman et al., 1992, Morgan and Hunt, 1994, Gounaris, 2005). The confirmation of the link between these two constructs in the context of UIRs thus adds to the knowledge developed in various other research fields.

H4: Commitment positively influences integration

Support was also found for hypothesis H4, that commitment significantly impacts integration ($p < 0.001$). While the interrelationship between these two constructs has not received as much attention as the association between trust and commitment in the literature, the positive path coefficient of 0.231 may warrant increased focus in this area. Perceiving a relationship as important and devoting time and effort to maintain it is likely to influence the active involvement and participation in the process, justifying the positive link between commitment and integration.

H5a-c: Organisational compatibility positively influences trust, commitment and integration

The results indicated that organisational compatibility significantly affects trust in the relationship ($p < 0.001$), confirming H5a. A strong association appeared to exist, exhibiting a coefficient of 0.552. H5b was also confirmed on a $p < 0.01$ level, revealing a significant influence of organisational compatibility on commitment.

Notably, while the direct path between compatibility and commitment only revealed a coefficient of 0.193, a total effect of 0.439 emerged. Hence, indirect effects by means of trust have to be taken into account in the discussion of results. No significant association between compatibility and integration, however, was found and H5c had to be rejected.

H6a-c: Personal experience positively influences trust, commitment and integration

Similar to organisational compatibility, not all hypotheses regarding the second antecedent, personal experience, were confirmed. Personal experience only influenced one relationship variable on a significant level, namely commitment (H6b; $p < 0.001$). A coefficient of 0.208 emerged for this direct path, with the total effect only slightly larger. As personal experience was not found to significantly affect trust or integration, hypotheses H6a and H6c were rejected.

With the novelty of UIRs apparent, a slight re-specification with the aim of achieving a highly parsimonious model was deemed a beneficial exploratory step to guide future research in this area and is presented in the following section.

6.3.2. Final Path Model

The conceptual model was re-specified with the aim of achieving a more parsimonious model. Several authors have commented on the unlikelihood of the conceptual model representing the most parsimonious account of the data, requiring a re-specification, also labelled model modification (Anderson and Gerbing, 1988, Baumgartner and Homburg, 1996, Hoyle and Panter, 1995). A stepwise approach for the model re-specification was chosen to identify the most parsimonious model (Kaplan, 1990, Medlin, 2001), commencing with the elimination of paths with non-significant t-values (Martin, 2004). Notably, model re-specification is not confirmatory but exploratory in nature (Byrne, 2001, Diamantopoulos, 1994). Hence, the final generic path model should be validated with a second, independent sample in the future (Diamantopoulos, 1994, Hoyle and Panter, 1995).

Following the elimination of paths with non-significant t-values, modification indexes and expected parameter changes, provided by AMOS, indicated the value of adding an additional path between the antecedents, namely organisational

compatibility and personal experience. A modification index “shows the minimum decrease in the model’s Chi-squared value if a previously fixed parameter is set free and the model re-estimated” (Diamantopoulos and Siguaw, 2000, p. 108). Hence, the greater the value of a modification index, the higher the improvement of model fit if the respective path is included in the model (Kline, 2005).

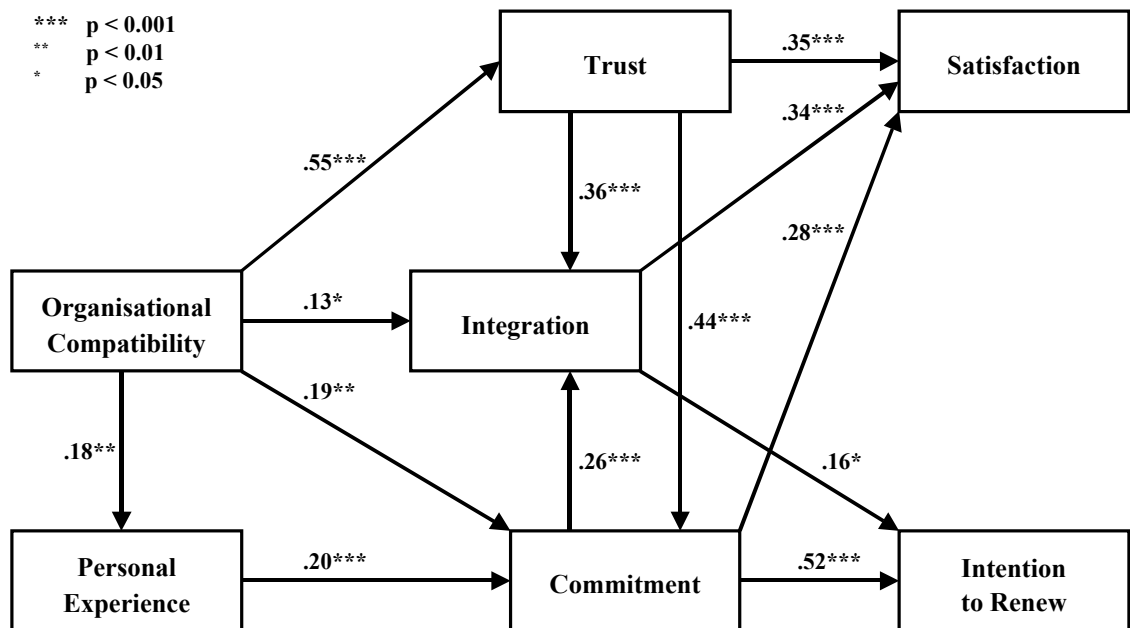
Modification indexes were used in connection with expected parameter changes, which indicate the estimated positive or negative change for the parameter in the model (Byrne, 2001). It was deemed essential that modification decisions be based not solely on statistical considerations, such as non-significant t-values, modification indexes and expected parameter change statistics, but also on existing theory and considerations of content (Anderson and Gerbing, 1988, Diamantopoulos and Siguaw, 2000). The significant direct influence of organisational compatibility on personal experience ($p < 0.01$) and the potential integration of the path to the final model were thus assessed based on theory and content.

The identified path is likely to relate to the influence of organisational or group dynamics on employment procedures and the behaviour of individual people in the group. A large research stream has dealt with the concept of person-organisation-fit (Autry and Wheeler, 2005, Billsberry, Ambrosini, Moss-Jones and Marsh, 2005) and more specifically person-group-fit (Kristof, 1996, Werbel and Johnson, 2001). Given that people are selected into, and remain in, a group depending on their match to the group (Werbel and Johnson, 2001), it is likely that group values and norms are shared among group members. A high level of organisational compatibility signals a strong similarity in terms of goals, objectives and operating philosophies on a group level. As groups are likely to consist of people with similar values and norms, compatibility of groups should imply that members of these groups are also alike. It is thus not surprising that group compatibility was significantly related to the experience of group members, measured as an understanding of the partner’s requirements and customs, in this study.

In a UIR, groups from fundamentally different backgrounds are united. A high level of compatibility may thus relate to certain closeness with the other environment. For example, if a university research group has similar goals and objectives as the industry partner, it probably places a high relevance on applied

research or the practical application of its research. Such research group is likely to attract and keep researchers that strive to apply research outcomes practically and take pleasure in seeing their discoveries developed into products. In turn, these researchers are likely to have some understanding of, and involvement with, industry. Likewise, if the business unit shares aims and aspirations with the university partner, group members are likely to be interested in, and involved with, academic research. Given this explanation of the significant path between organisational compatibility and personal experience, the path was added to the final generic model, provided in Figure 6.15.

Figure 6.15 Final Generic Model



χ^2 value	12.248	Adjusted Goodness-of-Fit (AGFI)	.942
Degrees of freedom	8	Root Mean-Square Error of Approximation (RMSEA)	.051
P value	.194	Tucker-Lewis Index (TLI)	.982
χ^2/df value	1.531	Comparative Fit Index (CFI)	.993
Goodness-of-Fit (GFI)	.983	Normed Fit Index (NFI)	.980

A good fit of the model to the data and a high level of parsimony were established based on only slight modifications, leading to a non-significant χ^2 ($p > 0.05$), an RMSEA value (=0.051) close to 0.05, as well as other fit indexes indicating a high degree of goodness-of-fit ($\chi^2/df=1.531$, $GFI=0.983$, $AGFI=0.942$, $TLI=0.982$, $CFI=0.993$, $NFI=0.980$). Also, the CAIC value improved from 154.494

for the conceptual to 138.902 for the final model, indicating an enhanced level of parsimony. Following the call to report on the re-specification in terms of predicted and “discovered” paths (Hoyle and Panter, 1995), Table 6.9 shows the remaining original and added paths, allowing a comparison to the conceptual model.

Table 6.9 Final Paths - Generic Model

Hyp.	Independent variable	Dependent variable	Standardized Effects		Critical Ratio
			Direct	Total	
H1a	Trust	Satisfaction	0.352	0.633	6.566***
H1b	Commitment	Satisfaction	0.277	0.365	5.384***
H1c	Integration	Satisfaction	0.338	0.338	6.508***
H1e	Commitment	Intention to Renew	0.517	0.559	8.036***
H1f	Integration	Intention to Renew	0.162	0.162	2.519*
H2	Trust	Integration	0.355	0.469	4.985***
H3	Trust	Commitment	0.439	0.439	6.751***
H4	Commitment	Integration	0.260	0.260	3.872***
H5a	Organ. Compatibility	Trust	0.555	0.555	9.564***
H5c	Organ. Compatibility	Commitment	0.190	0.471	2.881**
H5c	Organ. Compatibility	Integration	0.133	0.452	1.991*
H6b	Personal Experience	Commitment	0.205	0.205	3.722***
Add	Organ. Compatibility	Personal Experience	0.182	0.182	2.660**

*** p<0.001; ** p<0.01; * p<0.05

Results are based on Bootstrap = 500; 95% confidence level

Comparing the conceptual and the final model, the added path between organisational compatibility and personal experience is apparent. Furthermore, during the process of re-specification and the deletion of non-significant paths, the link between organisational compatibility and integration, shown as insignificant in the conceptual model, emerged as significant on a 0.05 level in the final model with a direct coefficient of 0.133. This weak direct effect increased considerably to 0.452 when taking indirect effects through trust and commitment into account. Congruity in goals, objectives and operating philosophies, characteristics associated with high levels of compatibility, are likely to ease understanding and empathy among partners (Johnson and Cullen, 1996). Therefore, compatibility appears to enable and facilitate frequent interaction and participation of both parties in the relationship processes, in turn fostering integration.

In brief, the conceptual generic model was re-specified by means of statistical and theoretical considerations with the aim of achieving a more parsimonious model. One path was added between the antecedents of organisational compatibility and personal experience. Removing the paths with insignificant t-values in the conceptual model also led to one originally insignificant path becoming significant on a 0.05 level. This path, leading from organisational compatibility to integration, thus remained in the final model. A rationalisation for these paths was given.

Following the re-specification, a multi-group path analysis was conducted to test whether model parameters vary between university and industry sub-samples. The results are outlined in the following section.

6.3.3. Multi-Group Path Analysis

The previous analysis focused on a single sample, using the combined data set of usable responses. Due to the inclusion of responses from both the university and industry environment, a multi-group analysis was deemed valuable to identify whether the final model replicated well for each sub-sample. By means of a Chi-Square Difference ($\Delta\chi^2$) test, multiple-group path analysis allows testing whether values of model parameters vary across groups (Diamantopoulos and Siguaw, 2000, Kline, 2005). It involves the estimation and comparison of three models. First, a baseline model is calculated by simultaneously estimating the final generic path model across both groups (Byrne, 2001). Structural regression weights are then constrained and set equal across the groups, followed by a re-estimation of the model. Finally, residuals are constrained and the model re-estimated.

The significance of a $\Delta\chi^2$ is analysed with degrees of freedom equal to the differences in degrees of freedom (Δdf) between models (Byrne, 1994). Hence, the χ^2 and df of the baseline model are compared to the χ^2 and df of the remaining models to identify significant $\Delta\chi^2$. The estimation of the baseline model showed a satisfactory fit (insignificant χ^2 [$p>0.05$], $df=16$, $\chi^2/df=1.415$, $RMSEA=0.045$, $GFI=0.970$, $AGFI=0.895$, $TLI=0.972$, $CFI=0.989$, $NFI=0.966$). Using the group analysis feature in AMOS 5, parameters were then constrained and the model re-estimated. The results of the $\Delta\chi^2$ tests are shown in Table 6.10.

Table 6.10 $\Delta\chi^2$ Test - University and Industry Groups

	χ^2	df	$\Delta\chi^2$	Δ df	Sign.
Hypothesized Model (unconstrained)	22.645	16	-	-	-
Structural Weights equal	40.808	29	18.162	13	NS
Structural Residuals equal	32.090	23	9.445	7	NS

Note: significance tested at the 0.05 level

Using a significance level of 0.05, the results showed non-significant $\Delta\chi^2$ for both constrained models. Hence, invariance was established across the university and industry groups (Byrne, 2001). On this basis, it can be assumed that the model replicates well across the two groups (Diamantopoulos and Siguaw, 2000).

Following the analysis of the generic model, the same procedure and analysis was applied to the dyadic model, as discussed in the following section.

6.4. The Dyadic Model

This section details the results of the dyadic data analysis, including hypotheses testing, model re-specification and multi-group analyses.

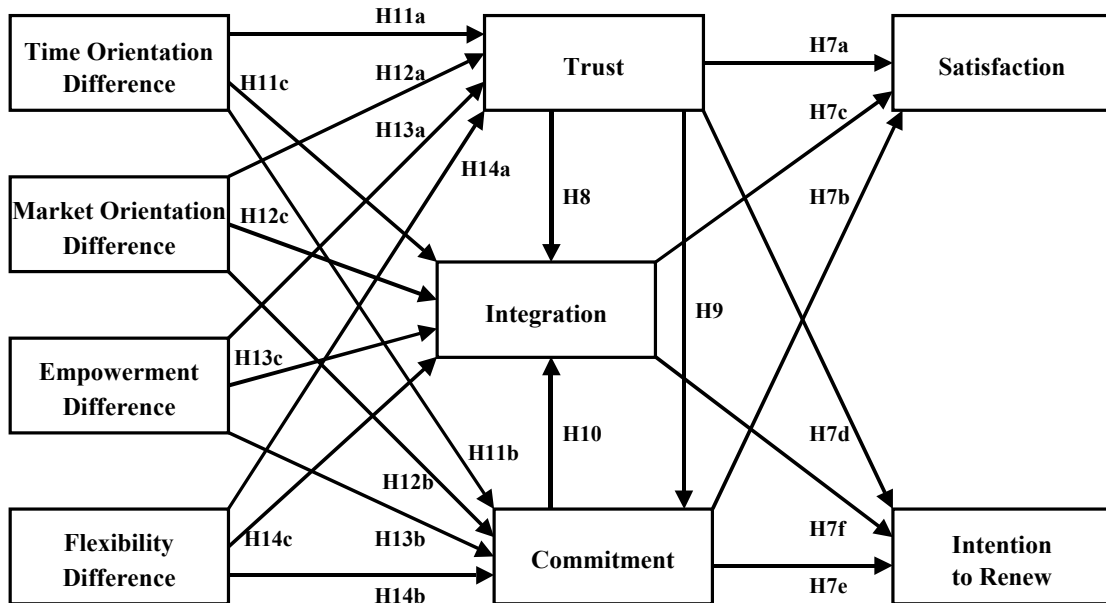
6.4.1. Hypotheses Support

Prior to analysing the effect of OCD dimensions on relationship characteristics, it was deemed valuable to identify whether the organisational cultures of the university and industry groups differed significantly. Based on a Levene's Test for the Equality of Variances, an independent samples t-test was conducted, assessing differences in means between relationship partners for every OCD dimension included in the dyadic model. As shown in Appendix 9, significant differences in means were established for three OCD dimensions, namely market orientation, empowerment and time orientation. No significant difference was found in relation to flexibility. Nevertheless, a mean difference of 0.295 was deemed sufficient for the further testing of the effect of flexibility difference on relationship characteristics.

Interestingly, while the industry side revealed a higher level of market orientation and time orientation, as proposed by the qualitative research step, the university showed a significantly higher level of empowerment than the industry partner. This finding might be explained by the highly individualistic nature of academic staff. It might suggest, however, that the construct of employee empowerment does not accurately capture the proposed level of bureaucracy and red tape in universities, which was unearthed in the qualitative research step.

Figure 6.16 shows the conceptual dyadic model, detailing hypotheses H7 to H14. Path analysis results are provided in Table 6.11.

Figure 6.16 Conceptual Dyadic Model and Hypotheses



χ^2 value	23.043	Adjusted Goodness-of-Fit (AGFI)	.781
Degrees of freedom	15	Root Mean-Square Error of Approximation (RMSEA)	.094
P value	.206	Tucker-Lewis Index (TLI)	.888
χ^2/df value	1.562	Comparative Fit Index (CFI)	.953
Goodness-of-Fit (GFI)	.927	Normed Fit Index (NFI)	.890

Not all goodness-of-fit indexes showed an acceptable model fit. While the non-significant χ^2 ($p > 0.05$), χ^2/df ($= 1.562$), GFI ($= 0.927$) and CFI ($= 0.953$) indicated a satisfactory fit, other indexes, such as the AGFI ($= 0.781$), RMSEA ($= 0.094$), TLI ($= 0.888$) and NFI ($= 0.890$), were less supportive. Given the small dyadic sample size, the novelty of the analysis of individual OCD dimensions and

the number of indicators pointing towards a reasonable model fit, hypotheses were tested and the model re-specified subsequently. Analysis controlled for the effect of relationship length, finding no significant impact on any variable included in the dyadic model (see Appendix 8b).

Table 6.11 Effects, Critical Ratios and Hypotheses Tests - Dyadic Model

Hyp.	Independent variable	Dependent variable	Standardized Effects		Critical Ratio	Support
			Direct	Total		
H7a	Trust	Satisfaction	0.260	0.678	2.505*	YES
H7b	Commitment	Satisfaction	0.316	0.496	2.971**	YES
H7c	Integration	Satisfaction	0.350	0.350	2.846**	YES
H7d	Trust	Intention to renew	0.159	0.342	1.009	NO
H7e	Commitment	Intention to renew	0.466	0.407	2.891**	YES
H7f	Integration	Intention to renew	-0.114	-0.114	-0.613	NO
H8	Trust	Integration	0.398	0.687	4.085***	YES
H9	Trust	Commitment	0.562	0.562	5.772***	YES
H10	Commitment	Integration	0.515	0.515	4.998***	YES
H11a	Time orientation diff.	Trust	-0.037	-0.037	-0.300	NO
H11b	Time orientation diff.	Commitment	-0.245	-0.266	-2.583*	YES
H11c	Time orientation diff.	Integration	0.034	-0.118	0.418	NO
H12a	Market orientation diff.	Trust	-0.098	-0.098	-0.790	NO
H12b	Market orientation diff.	Commitment	0.104	0.048	1.091	NO
H12c	Market orientation diff.	Integration	-0.049	-0.063	-0.634	NO
H13a	Empowerment diff.	Trust	0.145	0.145	1.167	NO
H13b	Empowerment diff.	Commitment	-0.181	-0.100	-1.895	NO
H13c	Empowerment diff.	Integration	0.070	0.077	0.888	NO
H14a	Flexibility difference	Trust	-0.152	-0.152	-1.218	NO
H14b	Flexibility difference	Commitment	-0.185	-0.270	-1.929	NO
H14c	Flexibility difference	Integration	0.021	-0.178	0.279	NO

*** p<0.001; ** p<0.01; * p<0.05

Results are based on Bootstrap = 500, 95% confidence level

Results of the path analysis provided support for eight hypotheses. Thirteen hypotheses, however, had to be rejected due to a lack of significant relationships between constructs. The majority of linkages proposed between relationship characteristics and outcome variables were confirmed. Satisfaction was found to be significantly influenced by trust, commitment and integration. Interestingly, integration rather than trust appeared to have the strongest direct impact on satisfaction when analysed by means of dyadic data. The lack of impact of trust and

integration on intention to renew confirms our previous findings in relation to the generic model. Commitment was verified as the only relationship variable significantly influencing the overall intention to renew.

Hypotheses relating to the interrelationships between relationship characteristics were all supported. Trust appeared to positively influence integration and commitment and commitment strongly impacted on integration. However, the results only confirmed one hypothesis relating to the influence of OCD dimensions on relationship characteristics. Only time orientation difference, conceptualised as the difference in the perceived importance of punctuality, was found to significantly and negatively influence commitment. The path analysis revealed all remaining associations between antecedents and relationship variables in the conceptual model as non-significant.

The following sections further elaborate on the findings. Hypotheses H7a-f and H8-10 reflect the hypotheses H1a-f and H2-4, previously tested for the generic model (refer to section 6.3.1.). While the generic model was analysed based on one-sided appraisals, the nature of the dyadic data allowed testing the associations between constructs based on dyadic relationship scores. Hence, while similarities between the findings were expected, the different levels of analysis might explain variations in findings. A detailed discussion of results, including an elaboration on similarities and differences, is provided in chapter 7.

H7a-c: Dyadic trust, commitment and integration positively influence dyadic satisfaction with the relationship

The results showed trust to significantly influence the satisfaction with the relationship ($p < 0.05$), providing support for H7a. While the direct effect of trust revealed a weak coefficient of 0.260, a strong total effect, supported by indirect effects through commitment and integration, emerged. Hypothesis H7b was also supported, as commitment was found to significantly affect satisfaction ($p < 0.01$). The strongest direct association between a relationship characteristic and satisfaction appeared for integration. This direct path revealed a coefficient of 0.350 ($p < 0.01$), confirming H7c.

H7d-f: Dyadic trust, commitment and integration positively influence dyadic intention to renew the relationship

The results did not show trust to significantly affect the intention to renew the relationship, leading to the rejection of H7d. By contrast, H7e was supported, with a strong impact of commitment on intention to renew ($p < 0.01$), with a coefficient of 0.466. The importance of commitment for relationship continuation was further underlined by the lack of support for hypothesis H7f. Integration was not significantly related to intention to renew, leaving commitment as the only relationship variable affecting the intention to remain in the relationship.

H8: Dyadic trust positively influences dyadic integration

The results showed a positive influence of trust on integration ($p < 0.001$). The direct path coefficient of 0.398 was enhanced by means of an indirect effect through commitment to a strong total effect of 0.687, supporting H8.

H9: Dyadic trust positively influences dyadic commitment

Trust was also found to strongly influence the dyadic commitment in the relationship ($p < 0.001$), confirming H9. The strong coefficient of 0.562 for the path between trust and commitment confirms previous findings regarding this association in the RM literature (Moorman et al., 1992, Morgan and Hunt, 1994).

H10: Dyadic commitment positively influences dyadic integration

Supporting H10, commitment was found to positively influence integration ($p < 0.001$). Notably, hypothesis testing for the generic model only revealed a weak link between these two constructs. Based on dyadic constructs, however, a strong link between dyadic commitment and dyadic integration was established (with a coefficient of 0.515). Commitment thus emerged as the strongest influence factor for integration in the dyadic data analysis. Differences between the results for the models may be explained by the items used to measure integration.

While the researcher anticipated to operationalise integration based on the same items in both models, the preparation of composites, including the calculation

of one-factor congeneric measurement models and the assessment of construct validity, led to the use of items of integration reflecting the team-oriented interaction and involvement in the generic model and the participation and collaborative communication in the dyadic model. It may thus be suggested that commitment has a stronger effect on the participative and communication-oriented aspects of integration than on the involvement and team-oriented items.

H11a-c: Time orientation difference negatively influences dyadic trust, commitment and integration

The results led to the rejection of the majority of hypotheses relating to the OCD dimension of time orientation difference. Recapitulating the previous discussion, this construct was operationalised as a one-item measure, reflecting the level of importance placed on punctuality within a group. Differences in this dimension were found to significantly influence neither trust (H11a) nor integration (H11c). However, results showed a significant negative impact of time orientation difference on commitment ($p < 0.05$). This finding contributes to relationship research, as the construct of time orientation difference, as conceptualised in this research, has never been studied in a RM or technology transfer context.

Dissimilar perspectives on time are likely to result in uncomfortable feelings about the partner and the relationship and hence lower the commitment of parties to the relationship. If a group perceives punctuality as highly important, it may be irritated by the other group's lack of timeliness and reliability. Moreover, this group may view punctuality as an indication of the importance and value a party places on a relationship. By not being punctual, the partner may be perceived as not valuing the relationship. Uncertainty regarding the importance the partner places on the relationship is likely to limit the commitment of the more punctual group. Similarly, the party placing less importance on punctuality may feel irritated by the other party's insistence on timeliness. If an inflexible group is irritated by its partner, its investment in, and effort towards, the relationship may be limited. A negative sentiment resulting from different perspectives on the importance of punctuality thus restricts dyadic commitment.

H12a-c: Market orientation difference negatively influences dyadic trust, commitment and integration

All hypotheses relating to the influence of market orientation difference on relationship characteristics had to be rejected (H12a-c), as no significant relationship emerged from the data. This lack of support may reflect the difficulties inherent to the measurement of market orientation in this research. It could, however, also reflect the absence of an impact of market orientation difference on UIRs. No direct comparison can be drawn with other studies, as market orientation difference as measured in this study has never been examined in the literature before. However, the lack of association between market orientation difference and relationship characteristics confirms some previous research. For example, Steinman et al. (2000) analysed the perception of both parties regarding the supplier's market orientation, finding no significant correlation between the actual market orientation gap and relationship importance and length. Farrelly and Quester's (2003a) study integrated a sponsor's perception of their own and their property's market orientation. While finding a significant influence on trust, its association with commitment was also not confirmed.

H13a-c: Employee empowerment difference negatively influences dyadic trust, commitment and integration

The results indicated no significant influence of the difference in employee empowerment on relationship characteristics. Hence, hypotheses H13a, H13b and H13c had to be rejected. Based on our data, UIRs are not influenced by differences in the degree of authority individual employees have in solving problems and taking initiative or the degree to which employees are trusted to exercise good judgement. Employee empowerment was added as an OCD variable on the basis of the qualitative research step. As suggested previously, while this construct emerged from the discussion of rules and regulations prevalent in the partners' organisational cultures, the significantly higher means of empowerment at the university side and the lack of influence of empowerment difference on relationship characteristics might suggest that the construct of employee empowerment does not accurately capture the proposed level of regulations and red tape. Future research should thus

seek to analyse other measures relating to differences in bureaucracy, governance or administration.

H14a-c: Corporate flexibility difference negatively influences dyadic trust, commitment and integration

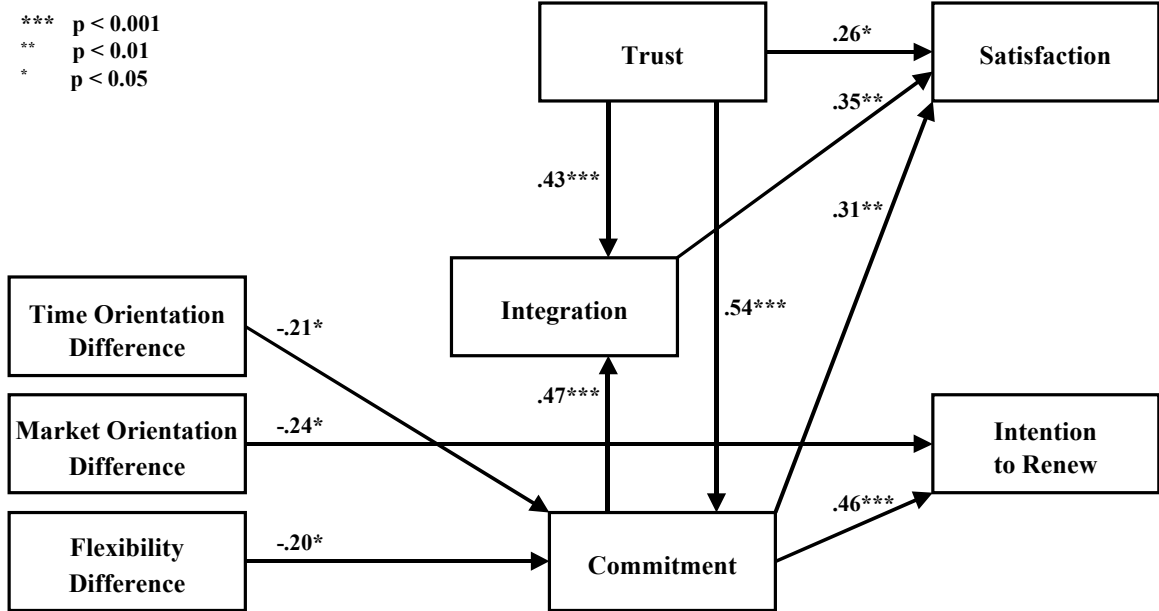
Similar to the construct of market orientation difference and employee empowerment difference, corporate flexibility difference failed to significantly influence any of the relationship characteristics. Therefore, the hypotheses regarding its influence on trust (H14a), commitment (H14b) and integration (H14c) were rejected. While difference in the corporate flexibility of relationship partners has not yet been studied, the concept of flexibility has been described as an important and desirable component in inter-organisational relationships (Johnson, 1999, Lusch and Brown, 1996). Young et al. (2003), for example, reported flexibility as an antecedent of the productivity of knowledge in a relationship, indicating its relevance for research-oriented UIRs. Further research is required to verify the lack of association between flexibility difference and UIR characteristics.

Despite the rejection of the hypotheses relating to market orientation, employee empowerment and corporate flexibility, the OCD dimensions remained in the re-specification of the dyadic path model for further testing, described in the following section.

6.4.2. Final Path Model

As previously discussed, dyadic research has been sparse, primarily due to difficulties associated with the collection of dyadic data. Furthermore, the analysis of individual dimensions of organisational culture and of the effect of these OCD dimensions within a relationship has never been conducted. This adds to the novelty of UIRs as an area of research, justifying model re-specification with the aim of providing a basis for future research. The conceptual dyadic model was re-specified with the aim of achieving a more parsimonious model, following the same strategy described for the generic model. The final dyadic path model is shown in Figure 6.17, followed by Table 6.12, which provides original and added paths, enabling a comparison between the conceptual and final model.

Figure 6.17 Final Dyadic Model



χ^2 value	19.192	Adjusted Goodness-of-Fit (AGFI)	.878
Degrees of freedom	22	Root Mean-Square Error of Approximation (RMSEA)	.000
p value	.657	Tucker-Lewis Index (TLI)	1.016
χ^2/df value	.872	Comparative Fit Index (CFI)	1.000
Goodness-of-Fit (GFI)	.940	Normed Fit Index (NFI)	.942

Table 6.12 Final Paths - Dyadic Model

Hyp.	Independent variable	Dependent variable	Standardized Effects		Critical Ratio
			Direct	Total	
H7a	Trust	Satisfaction	0.264	0.673	2.540*
H7b	Commitment	Satisfaction	0.311	0.476	2.297**
H7c	Integration	Satisfaction	0.350	0.350	2.842**
H7h	Commitment	Intention to Renew	0.463	0.463	4.240***
H8	Trust	Integration	0.433	0.688	4.671***
H9	Trust	Commitment	0.543	0.543	5.381***
H10	Commitment	Integration	0.471	0.471	5.087***
H11b	Time Orientation Difference	Commitment	-0.210	-0.210	-2.084*
H14b	Flexibility Difference	Commitment	-0.203	-0.203	-2.016*
Add	Market Orientation Diff.	Intention to Renew	-0.242	-0.242	-2.219*

*** p<0.001; ** p<0.01; * p<0.05

Results are based on Bootstrap = 500, 95% confidence level

An acceptable fit of the model to the data was established, with a non-significant χ^2 ($p>0.05$). Other goodness-of-fit indexes also indicated a good fit,

including RMSEA (=0.000), GFI (=0.940), AGFI (=0.878), TLI (=1.016), CFI (=1.000) and NFI (=0.942). Results showed the χ^2/df value of 0.872 below 1, pointing towards a slight overfit of the model. As argued in regards to the one-factor congeneric measurement models, the small sample size (62 dyads) is likely to affect the values critical to sample size, such as χ^2/df statistics (Hair et al., 1998, Hoyle and Panter, 1995). Based on the overall goodness-of-fit established by means of the fit indexes named above, a good fit of the model is proposed. Also, parsimony was enhanced from a CAIC value of 175.857 in the conceptual model to 109.967 in the final re-specified model.

The results of the final dyadic path model showed few changes to the conceptual model. While the lack of a significant influence of employee empowerment difference on any constructs was confirmed, flexibility difference and market orientation difference appeared to play a significant role in the final model. The elimination of the remaining non-significant paths between OCD dimensions and relationship characteristics revealed a significant and negative influence of flexibility difference on commitment ($p < 0.05$). Furthermore, a significant, negative effect of market orientation difference on the outcome variable intention to renew was shown ($p < 0.05$) and the respective path added to the model.

The negative influence of flexibility difference on commitment can be explained with the behaviour of both relationship parties. First, low levels of flexibility reflect a lack of willingness to change if need arises (Johnson, 1999). Hence, an inflexible party is unlikely to attend to changing partner's needs. While this is likely to decrease the partner's effort and investment in the relationship, the effect may be even stronger if the partner itself places a high importance on sustaining a prominent degree of corporate flexibility. Hence, the greater the difference in flexibility, the lower the commitment of the highly flexible party.

Second, research on organic processes comprising flexibility and spontaneity as characteristics of organisational culture has described control and mechanistic processes as opposites to flexibility (Desphandé et al., 1993, Parker and Bradley, 2000). A party with a low degree of flexibility thus operates with a strong focus on control and commitment to rules (Parker and Bradley, 2000). Such group may perceive a highly flexible partner as unpredictable and may find it difficult to commit to that partner. Consequently, it can be argued that the greater the imbalance

in flexibility, the lower the commitment of the inflexible party. The lower the commitment of both parties, the lower the dyadic commitment.

Notably, re-specification indicated a statistically significant, direct and negative influence of market orientation difference on intention to renew. While this path only possesses a coefficient of 0.242, its elimination from the model decreased the overall goodness-of-fit considerably. Universities have often been criticized by industry for their lack of market orientation, an established construct in the industry environment (Desphandé et al., 1993). Few studies have examined the imbalance in market orientation between relationship partners and its effect on relationship variables, with the notable exceptions of Farrelly and Quester (2003a) and Steinman et al. (2000), described previously. In comparison to these studies, respondents in this research were not asked to comment on the other party's market orientation. Rather, market orientation difference was operationalised as the absolute value of the difference between the university's and the industry's perceptions of their own market orientation.

Based on the definition of market orientation adopted for this study, market orientated groups actively monitor the market, learn from the information gathered and use the knowledge to create value for the customer or partner (Cannon and Homburg, 2001, Hurley and Hult, 1998, Ravald and Grönroos, 1996). More specifically, the final measurement of market orientation included statements regarding whether the group's strategies are driven by opportunities for creating value for the partner and whether a periodic review of efforts is undertaken to ensure that efforts are in line with what the partner wants. Hence, if one side of a dyad does not exhibit market-oriented behaviour, it does not actively try to create value for its partner. In turn, the partner is unlikely to have a desire to stay in the relationship. This effect is expected to be even stronger if the partner itself is market-oriented, explaining the negative link between market orientation difference and intention to renew.

In brief, re-specification led to the addition of one new path. Furthermore, the path between flexibility difference and commitment was found as significant, despite a rejection of the relevant hypothesis in the conceptual model.

6.4.3. Multi-Group Path Analysis

Discussion about the analysis of dyads and relationship dynamics is increasing (Berghäll, 2003, Medlin et al., 2005). To more strongly reflect relationship dynamics in the dyadic analysis, it was deemed valuable to identify whether values of model parameters varied across those dyads that have a similar perception of the future of the relationship and those that don't. Therefore, the dyadic sample was split into two groups based on the construct of intention to renew the relationship. Adding to this investigation, a second multi-group analysis was conducted, comparing two groups of dyads based on the construct of satisfaction.

6.4.3.1. Intention to Renew

As previously discussed, respondents were asked to indicate the likelihood that the relationship with the partner would be renewed at the end of the current contract. While zero indicated no chance that the relationship was to be renewed, 100% indicated that the relationship would definitely be renewed at the end of the current contract (if a suitable project arose). After an examination of the respondents' answers to this statement, dyads showing a difference of 3 or more points were clustered into the group labelled as having different intentions regarding renewal (N=19). The remaining dyads were aggregated into a group with similar intentions, indicated by two or less points of difference between the partners' scores (N=43). A $\Delta\chi^2$ test was performed for these groups, following the procedure described for the multiple-group analysis of the generic model (refer to section 6.3.3.). The results are provided in Table 6.13.

Table 6.13 $\Delta\chi^2$ Test - Intention to Renew

	χ^2	df	$\Delta\chi^2$	Δ df	Sign.
Hypothesized Model	49.087	36	-	-	-
Structural Weights equal	75.544	46	26.457	10	p<.05
Structural Residuals equal	57.331	44	8.244	8	NS

Note: significance tested at the 0.05 level

Invariance was tested in two steps, including first the constraint of structural weights and second the constraint of residuals. The results showed a significant $\Delta\chi^2$ for the model constraining structural regression weights at a 0.05 level. Hence, equality constraints do not hold for the groups in this model (Byrne, 2001) and it can be concluded that not all regression weights are equal across the groups (Kline, 2005). To identify the sources of noninvariance, a stepwise estimation of the model was conducted. Table 6.14 shows the results of the model estimation, constraining one regression weight at a time.

Table 6.14 Stepwise $\Delta\chi^2$ Test - Intention to Renew

		χ^2	df	$\Delta\chi^2$	Δ df	Sign.
Hypothesized Model		49.087	36	-	-	-
Struct. Weights equal	INTEG -> SATISF	50.081	37	.994	1	NS
Struct. Weights equal	COMMIT -> SATISF	49.343	37	.256	1	NS
Struct. Weights equal	TRUST -> SATISF	39.100	37	.012	1	NS
Struct. Weights equal	COMMIT -> INTEG	53.168	37	4.080	1	p<.05
Struct. Weights equal	TRUST -> COMMIT	49.436	37	.349	1	NS
Struct. Weights equal	TRUST -> INTEG	54.304	37	5.217	1	p<.05
Struct. Weights equal	MARKET OR -> ITR	49.545	37	.457	1	NS
Struct. Weights equal	COMMIT -> ITR	59.703	37	10.616	1	p<.05
Struct. Weights equal	TIME OR -> COMMIT	49.200	37	.113	1	NS
Struct. Weights equal	FLEXI -> COMMIT	55.057	37	5.970	1	p<.05

Note: significance tested at the 0.05 level

Four sources of noninvariance were identified in the model, assuming a partial invariance (Byrne, 2001). Paths between commitment and integration, trust and integration, commitment and intention to renew, as well as flexibility difference and commitment showed a significant $\Delta\chi^2$. At this point, the low statistical power due to the extremely small sample sizes of the groups should be noted (Diamantopoulos and Siguaw, 2000). Our results should be considered with caution until further research confirms these findings with an independent, and preferably larger, sample. Nevertheless, these findings warrant a more detailed discussion. To elaborate further on the differences between groups, the model was estimated for each group separately and the respective regression weights compared. Table 6.15 summarises the findings.

Table 6.15 Comparison of Regression Weights - Intention to Renew

Paths	Dyads - different ITR		Dyads - similar ITR	
	St. regression weight	p	St. regression weight	p
COMMIT -> INTEG	0.256	0.052	0.581	***
TRUST -> INTEG	0.717	***	0.272	0.034*
COMMIT -> ITR	-0.208	0.358	0.629	***
FLEXI -> COMMIT	-0.539	***	-0.034	0.763

*** p<0.001; * p<0.05

Estimating the model for each group separately, two paths were found as significant only for the dyads characterised by similar intentions to renew, namely the paths linking commitment and integration and commitment and intention to renew. These results indicate that commitment has a stronger consequence for UIRs with a certain future. More specifically, commitment only influenced integration and intention to renew if the relationship parties in the dyad shared their intentions regarding relationship renewal and continuation.

Consequently, agreement regarding the renewal of contracts appears paramount. In this situation, the effort and investment provided for a relationship has a strong influence on relationship integration. Hence, both parties become more cooperative and involved in the process. The temporal dimensions of commitment and integration may explain this finding. While commitment becomes substantive only in the longer-term (Dwyer and Oh, 1987, Gundlach et al., 1995), the level of integration is a short-term perception and may vary considerably throughout different periods of a relationship. It may thus be argued that long-term investment is not enough for both parties to actively participate in the process at a given point in time. Rather, both parties have to share their long-term intentions of renewal and commit themselves to the relationship. The relationship becomes more definite and the parties participate more heavily and consistently in the process and communicate more collaboratively.

Similarly, even if the commitment of both parties is high, it does not affect the intentions to renew if the partners do not agree on the long-term future of the relationship. Only if both partners have similar intentions to renew does the dyadic commitment, in the form of long-term planning, investment and loyalty, influence relationship renewal. This finding is consistent with action research in the area of

collaborative improvement (Kaltoft, Chapman, Boer, Gertsen and Nielsen, 2005). Grounded in a manufacturing context, Kaltoft et al. (2005) reported a lack of joint vision in a partnership to create reluctance towards enhancing collaborative behaviour to achieve 'a true collaboration'. Therefore, shared intentions or a joint vision appear critical for relationship maintenance and evolution.

Besides the paths between commitment and integration and intention to renew, two additional paths were analysed. Importantly, the paths between trust and integration and between flexibility difference and commitment appeared stronger for those dyads characterised by different intentions to renew. Estimating the model for each group separately, a significant link between trust and integration emerged for both groups, including dyads with similar and those with different intentions to renew. However, dyads with similar intentions to renew showed a much weaker coefficient of 0.272 ($p < 0.05$) compared to a coefficient of 0.717 ($p < 0.001$) for dyads with dissimilar intentions to renew.

The justification of this finding follows from the previous discussion, which described the significant effect of commitment on integration for dyads that are in agreement about the relationship future. Trust, on the other hand, is of higher relevance in relationships characterised by different intentions to renew. Given that neither party can predict the long-term future of the relationship, this situation implies a high degree of risk. In a UIR, uncertainty about the future is likely to increase confidentiality concerns, in turn inhibiting groups from freely sharing information. This finding confirms the current literature, which has often highlighted trust as critical in high-risk situations (Frost et al., 1978, Grönroos, 1994a, Rousseau et al., 1998, Young and Wilkinson, 1989), due to its ability to reduce perceived risk in a relationship (Bendapudi and Berry, 1997, Johnston et al., 1999). The strong effect of trust weakens when partners agree on the future of the relationship. With a decrease in perceived uncertainty and risk, the dyadic commitment becomes a stronger driver of integration.

The path between flexibility difference and commitment was also analysed for both groups separately. The results of the model estimation showed a significant and negative link for dyads with different intentions to renew ($p < 0.001$). However, flexibility difference did not affect commitment when parties shared their intentions. In section 6.4.2, the negative influence of flexibility difference on commitment was

justified by the perception and behaviour of both relationship parties. While the flexible party is likely to limit its commitment to the relationship if the other party does not respond to changing conditions or needs, the inflexible party may find it hard to commit to a highly flexible, and thus unpredictable, partner.

The results showed that this rationalisation only holds for dyads with different intentions of renewal. This finding may again be explained by the uncertainty and risk inherent in a situation where the future of a relationship is unsure. In a doubtful situation, differences between parties may be exaggerated and perceived as extremely irritating. In turn, cultural differences, such as flexibility difference, have a stronger effect on the relationship. In a situation in which the future is certain, flexibility difference may not be perceived as a barrier. If both parties agree that the relationship will be continued, both parties are likely to invest in the relationship and put effort into making the relationship work despite differences. Also, if both parties agree that the relationship will be terminated at a certain date, both parties commit to the relationship up to that date despite the existence of differences. Therefore, flexibility difference only affects commitment significantly in UIRs characterised by different intentions to renew.

Given the variations of parameter values between groups with similar and different intentions to renew, further $\Delta\chi^2$ tests were conducted comparing groups with similar and different levels of satisfaction. The results are discussed in the following section.

6.4.3.2. Satisfaction

Further analysis was also conducted to identify whether differences would apply if dyads were separated based on their level of satisfaction. Given that the intention to renew was added as an outcome variable based on the qualitative research step, and given that only commitment was shown to significantly influence this construct, a separation of the sample based on the original outcome variable of satisfaction appeared desirable. Satisfaction was included in the study because of its ability to account for different motivations and benefits sought by university and industry groups. Furthermore, results showed all relationship characteristics to significantly influence satisfaction in this research.

Hence, the dyadic sample was separated into two groups based on differences or similarities in satisfaction scores. Dyads with a difference in satisfaction scores equal or greater than two were clustered into the group with different satisfaction levels (N=12), while the remaining dyads were included in the group with similar satisfaction levels (N=50). While dyadic data was examined to identify a cut-off point leading to a more equal distribution of dyads among groups, satisfaction scores did not allow this. The large number of similar satisfaction scores in the dyads did not support a more even separation into groups, as scores differing by one point or less could not appropriately be labelled as “different”. The results of $\Delta\chi^2$ tests are shown in Table 6.16.

Table 6.16 $\Delta\chi^2$ Test - Satisfaction

	χ^2	Df	$\Delta\chi^2$	Δdf	Sign.
Hypothesized Model	55.828	36	-	-	-
Structural Weights equal	72.149	46	16.321	10	NS
Structural Residuals equal	63.074	44	7.247	8	NS

Note: significance tested at the 0.05 level

Based on a significance level of 0.05, results show non-significant $\Delta\chi^2$ and thus invariance across dyads with similar and dissimilar levels of satisfaction. As neither the regression weights nor the residuals show a significant $\Delta\chi^2$, the dyadic model is seen to replicate well for both groups under the given conditions (Diamantopoulos and Siguaw, 2000, Kline, 2005). Hence, only the uncertainty caused by different intentions of relationship renewal significantly changed the relevance of individual key drivers for UIRs; whereas differences in satisfaction did not.

In brief, to capture the dynamics of relationships more closely, multi-group analyses were conducted. Parameters in the final dyadic path model were compared between groups differentiated based on similarity and difference in their intentions to renew and satisfaction levels. The findings were discussed.

6.5. Chapter Summary

The results of the quantitative research phase were outlined in this chapter and discussed separately for the generic and dyadic model. First, the process of data preparation and analysis was described, including the assessment of normality, construct reliability and validity, and the justification for the calculation of composite variables. One-factor congeneric models were presented for all multi-item constructs and the treatment of dyadic data was explained. Also, model identification and goodness-of-fit indexes were specified.

The second section of the chapter outlined the analysis and respective results of the generic model. First, the hypotheses conceptualised in chapter 4 were analysed. While the data provided support for ten hypotheses, five hypotheses had to be rejected due to non-significant t-values. With the aim of achieving a higher level of parsimony, the conceptual model was re-specified based on empirical and theoretical considerations. The final model, its goodness-of-fit and individual paths were presented. Finally, a two-group analysis was conducted by means of a $\Delta\chi^2$ test to compare university and industry sub-samples. The results indicated that the model parameters replicated well across both groups.

Similarly, the third section of this chapter described the analysis of the dyadic model. Only eight hypotheses found support, with the remaining thirteen hypotheses rejected due to non-significant effects. Model re-specification led to a final dyadic model with an acceptable fit and level of parsimony. Two-group analyses were then conducted in two steps. First, dyads were separated into two groups based on their similarity or difference in the intention to renew. Significant $\Delta\chi^2$ were identified and locations for noninvariance examined. The discussion suggested that commitment has a stronger consequence if partners have similar intentions to renew. On the other hand, trust and flexibility difference emerged as highly influential in relationships with an uncertain future. Second, dyads were separated based on the similarity or difference regarding satisfaction. The dyadic model was seen to replicate well for both groups in this context.

A detailed discussion of the presented results is provided in the following chapter.

Chapter Seven – Discussion, Management Implications and Directions for Future Research

7.1. Introduction

The prominence of RM theory and practice has led to prolific discussions and plentiful publications throughout the previous two decades (Ballantyne et al., 2003, Berry, 2000, Grönroos, 1994b, Gummesson, 2002, Palmer, 2000b, Sheth and Parvatiyar, 2000, Wilkinson and Young, 2002a). It has not yet, however, informed the increasingly relevant area of technology transfer and commercialisation, despite some discussion of relationships between research institutions and private sector organisations (Barnes et al., 2002, Irwin et al., 1998, Lee, 2000, Santoro and Gopalakrishnan, 2001). This research aimed at developing a better understanding of UIRs and at exploring relationships crossing fundamentally different environments and cultures. Besides examining the relevance of trust, commitment and integration for UIRs, the influence of organisational compatibility and personal experience on relationships was studied. Furthermore, individual dimensions of OCD between relationship partners were identified and tested.

Based on a thorough literature review of the RM and technology transfer areas, a conceptual framework was developed. Preliminary, qualitative research was then conducted to explore the accuracy of the framework and to refine it for further analysis. This led to the development of two conceptual models and a number of respective propositions and hypotheses. While the generic model remained closely related to the conceptual framework, a second dyadic model was presented, focusing on the influence of individual OCD dimensions on UIRs. Results of the path analyses, model re-specifications and multi-group analyses for both models were reported in the previous chapter. In this chapter, the findings are discussed in more detail and managerial implications are given. Direct and total effects as well as differences between the generic and dyadic models are highlighted where appropriate. Before concluding, limitations of the study, contributions to the literature and directions for future research are outlined.

7.2. Key Drivers of UIRs

The RM literature has highlighted the interactivity and emotional content of relationships (Harker, 1999, Tikkanen and Tuominen, 2000, Wilkinson, Young, Welch and Welch, 1998, Hennig-Thurau and Hansen, 2000), underlining the importance of trust, commitment and communication, or integration, for relationship success. The influence of these variables on satisfaction and intention to renew were tested in this research based on a one-sided and dyadic appraisal. The individual results outlined in the previous chapter are fully discussed in this section.

7.2.1. The Influence of Relationship Characteristics on Outcomes

The results confirmed trust, commitment and integration as key drivers of UIRs. Remarkably, the significant influence of all relationship characteristics on satisfaction was established for every model analysed in this research. Overall, four models were presented in the previous chapter, including the conceptual generic and dyadic models as well as the final, re-specified generic and dyadic models. Several findings emerged regarding the key drivers of intention to renew.

7.2.1.1. Trust and Relationship Outcomes

Trust was confirmed as the overall strongest predictor of satisfaction. While integration emerged as the strongest direct predictor of satisfaction in the dyadic data, trust exhibited the most intense total effects throughout the data analysis. These results validate the significant focus of the RM literature on the concept of trust (Morgan and Hunt, 1994, Lewin and Johnston, 1997, Moorman et al., 1992, Farrelly, 2002,). Furthermore, the support for trust as a critical factor for satisfaction in UIRs supports previous reports in the technology transfer literature (Barnes et al., 2002, Irwin et al., 1998, Santoro and Chakrabarti, 2002) as well as government and working group reports (ARC, 2001, Knowledge Commercialisation Australasia, 2003). The high uncertainty and risk inherent to research and research collaborations (Harman and Sherwell, 2002) may explain the significance of trust as a key driver of UIRs.

Based on our preliminary qualitative data, confidentiality concerns emerged as the primary factor of risk in UIRs, increasing the inherent uncertainty of research. Risk may be reduced by detailed contracts, which aim at establishing a common ground for operations and deal with intellectual property in collaborations. However, besides reducing risk, detailed contracts have been reported to also restrict the development of new knowledge (Blomquist et al., 2005), in turn decreasing the level of satisfaction with the relationship. The building of close, trusting relationships also reduces perceived risk (Bendapudi and Berry, 1997, Feller, Parhankangas and Smeds, 2004), additionally offering flexibility in operations and information exchange and providing a basis for discovery and successful research. Without relying on detailed procedures restricting the discovery process, a higher level of satisfaction is probable. Findings of the qualitative research step supported this argument. Interviewees reported that satisfactory relationships were characterised by a large degree of freedom in the interaction process, enabled by trust between partners.

Given the strong impact of trust on the outcome variable of satisfaction, the complete lack of a significant link between trust and intention to renew was somewhat surprising. This result contrasts with previous RM literature, which consistently reported the significant influence of trust on a number of related variables such as retention (Farrelly and Quester, 2003b), the expected continuity of a relationship (Anderson and Weitz, 1989), long-term orientation (Ganesan, 1994), and anticipated future interactions with a partner (Doney and Cannon, 1997). Intention to renew was measured in this study as the likelihood that the relationship with the partner would be renewed at the end of the current contract, if a suitable project arises. It might have been argued that trust may be an insufficient reason for staying in a UIR if an appropriate research task does not exist. The addendum “if a suitable project arises”, however, eliminates this rationale and the lack of a future project can be excluded as the reason for the lack of a significant association between trust and intention to renew in this research.

Trust was conceptualised in this study as a psychological, affective condition rather than a behaviour. Given that neither trust nor the second affective variable in the model, satisfaction, were shown to significantly influence intention to renew, it would appear that the intended decision about the future does not significantly

depend on affective conditions. Rather, behavioural factors such as commitment and integration affected the intention to stay in the relationship. The psychological state of trust solely influenced the affective outcome measure of satisfaction.

Overall, while a strong association between trust and satisfaction provided support for the primary significance of trust as a key driver for UIRs, its influence was limited to the affective outcome measure. No significant impact on the intention to renew the relationship was established.

7.2.1.2. Commitment and Relationship Outcomes

The results showed commitment as consistently influencing satisfaction with the relationship, based on both the one-sided and dyadic analysis. Its relevance in a relationship context was not surprising given that commitment has been established as a characteristic of successful relationships in both the RM literature (Jap and Ganesan, 2000, Morgan and Hunt, 1994) and the literature on UIRs (Barnes et al., 2002, Irwin et al., 1998). The measurement of commitment in this research entailed statements based on an expectation of durability, loyalty, a long-term investment and an effort towards maintaining the relationship. Investment and effort are likely to provide a basis for an effective relationship process and high-quality relationship outcomes, explaining the logical connection between commitment and satisfaction.

The most prominent effect of commitment in the relationship, however, emerged in its strong impact on intention to renew. While the final generic model showed a significant but weak link between integration and intention to renew, commitment was found as the only significant predictor of renewal in the remaining data analysis. With coefficients ranging from 0.407 in the conceptualised dyadic model to 0.559 in the final generic model, the fundamental influence of commitment on intention to renew was clearly established. The slight difference in coefficients may be explained by means of the items used to measure commitment. While two items remained the same throughout the analysis, the third item used to operationalise commitment measured 'expectations of an ongoing partnership' in the generic model and 'a feeling of loyalty' in the dyadic model.

Notably, multi-group analysis of the dyadic data showed commitment to only positively influence intention to renew when both relationship parties indicated

similar intentions to renew the relationship. Hence, while commitment reflects a sense of loyalty and effort into maintaining a relationship, it is not sufficient for relationship continuation. Rather, an agreement on the long-term future of the relationship may be a prerequisite for the effect of commitment on relationship renewal to be felt.

To summarise, commitment was found to significantly influence satisfaction. Moreover, its significance as a key driver of UIRs was confirmed by its strong impact on the intention to renew. As the only relationship variable significantly and consistently influencing renewal intentions, commitment clearly emerged as a variable central to the long-term continuation of UIRs, especially when supplemented by an overall agreement on the long-term future of the relationship.

7.2.1.3. Integration and Relationship Outcomes

The third and final relationship characteristic, integration, was also shown to significantly affect satisfaction in all path models. While trust appeared as the strongest direct predictor of satisfaction based on one-sided appraisal, integration showed the strongest direct effect based on dyadic data. Since the commitment-trust theory by Morgan and Hunt (1994), many authors have focused on trust and commitment as the relationship variables central to RM theory (Martín et al., 2004, Grayson and Ambler, 1999, Medlin, 2001, Moorman et al., 1992). This focus was based in the majority of studies on a one-sided data collection and analysis (Morgan and Hunt, 1994).

While this research supports the significance of trust and commitment for UIRs, especially in the generic model, the relevance of integration in the dyadic data analysis suggests that more recognition should be given to the concept of integration in relationship research. In particular, a dyadic composition may be required to highlight the relevance of this concept as a key driver of UIRs and potentially other relationships. Furthermore, the focus on collaborative communication, participation and the reflection of the partner's input in programs and processes in the measurement of integration in the dyadic data suggests the need for research on different interaction and communication concepts, such as bi-directionality of

communication (Fisher et al., 1997), participation in the relationship (Dwyer and Oh, 1987, 1988) and integration (Song and Parry, 1997).

The importance of integration is anchored in the relevance of knowledge transfer in research-oriented relationships, complicated by obstacles and misunderstandings presented by different cultures and backgrounds (Kaltoft et al., 2005, Mowery et al., 1996, Nieminen, 2005). Knowledge transferred from the relationship partner not only influences a firm's innovation capability (Cavusgil, Calantone and Zhao, 2003), it is also more generally required to ensure the firm's ability to comprehend complex research outcomes (Athaide et al., 1996). The R&D literature has stressed a need for mutual understanding (Gupta et al., 1986), possibly because of the difficulties experienced by research clients in using all features of a transferred technology (Athaide et al., 1996).

Integration, and the participation of both relationship parties in the overall process, enables the research group to develop a relationship outcome that meets industry needs, may it be a technology or other desired outcomes. Therefore, it is likely to enhance the technical quality (the actual outcome) of the relationship. This suggestion substantiates Kahn's (2001) report that integration between departments enhances product development performance. Furthermore, integration ensures the transfer of knowledge that industry staff needs to utilise the technology within the organisation (see Plewa et al., 2005, in Appendix 1a), increasing its benefit for the business unit and, in turn, the perceived technical quality.

Besides enhancing technical quality, integration improves the perceived functional quality and thus the quality of the interaction process necessary to receive technical quality (Grönroos, 1984, 1997b). Collaborative communication and mutual participation in the research process are likely to increase the shared meaning and understanding between the groups. Considering the two-way knowledge flow enabled by frequent interaction and the sharing of information between partners, both sides of a UIR benefit from a high level of integration (Schmoch, 2002). In our study, integration was shown to positively influence satisfaction. Its two-sided nature and effect as well as the focus on collaborative communication and involvement may explain the stronger link observed between integration and satisfaction in the dyadic data.

Integration was shown to have little impact on the intention to renew when tested in the final generic model. In the remaining analysis, no significant connection was shown. Considering the communication literature in light of a lack of studies dealing specifically with the construct of integration, this finding supports Anderson and Weitz's (1989) results. In their study on industrial channel dyads, Anderson and Weitz (1989) did not find a statistically significant influence of communication on the expected continuation of the dyad. Hence, it may be that communication, or integration, supports the present, short-term relationship processes and outcomes. The present state of participation and frequency of interactions, however, appear to be of no consequence for long-term planning.

The overall results demonstrated the importance of integration for UIRs. Especially in the dyadic data analysis, integration emerged as the strongest direct predictor for satisfaction. However, less support was found for its effect on the intention to renew the relationship.

7.2.2. The Interrelationships of Trust, Commitment and Integration

This section discusses findings regarding the interrelationships of trust, commitment and integration. As interrelationships were analysed for both models, similarities and differences in the findings are highlighted where appropriate.

The proposed influence of trust on commitment and integration was established for all estimated path models. Following Morgan and Hunt (1994), a significant relationship between trust and commitment has been confirmed in a large number of studies (e.g. Friman et al., 2002, Moorman et al., 1992, Morgan and Hunt, 1994). While the causality between these constructs is disputed (Medlin et al., 2005), this research confirms the majority of previous research, finding trust to precede commitment (Farrelly, 2002, Grayson and Ambler, 1999, Moorman et al., 1992, Morgan and Hunt, 1994). Universities and industry entities operate in different environments, suggesting a high level of unfamiliarity and uncertainty in a developing UIR. The vulnerability involved in committing to another party, especially to one with an unfamiliar organisational culture, implies a need for trust. The development of trust reduces perceived risk, facilitating commitment by overcoming vulnerability barriers (Morgan and Hunt, 1994).

Our results also supported the proposed link between trust and integration, showing trust to strongly and significantly influence the interaction and active participation in the relationship. While research on the concept of integration is missing from the RM literature, a strong association between trust and communication has previously been established. Some authors reported communication to precede trust, as it was seen as necessary for trust to develop (Anderson and Weitz, 1989, Grönroos, 2000, Lynch and O'Toole, 2003, Morgan and Hunt, 1994). Others, however, have deemed trust a prerequisite for communication activities due to the risk of opportunistic behaviour by the relationship partner (Das and Teng, 1998, Jordan, 2004). The research field of UIRs and the conceptualisation of integration as a measure of two-way collaborative communication, involvement and participation explain the influence of trust on integration observed in this research.

Confidentiality and the sharing of intellectual property emerged as central concerns for participants in the preliminary qualitative research step. The high risk of opportunistic behaviour, combined with the general unfamiliarity in cross-sector partnering, inhibits UIR partners from freely interacting and sharing information unless a certain level of trust exists. Trust was therefore shown to precede and facilitate integration, confirming reports in the services area (Grayson and Ambler, 1999, Irwin et al., 1998, Moorman et al., 1992). Underlining this justification, a comparison of dyads with similar versus different intentions to renew showed a much stronger influence of trust on integration in dyads where intentions to renew differed. A disagreement between partners regarding the future of a relationship implies a high uncertainty and risk. Increased uncertainty, in turn, enhances the significance of trust for integration processes and relationship management.

Relationships characterised by similar intentions to renew, on the other hand, showed an increasing effect of commitment on integration. The proposed influence of commitment on integration in a UIR was confirmed for all path models. However, while the results of the final generic model showed a relatively weak path coefficient (0.260), the results of the final dyadic model indicated a strong coefficient of 0.471. Underlining this finding, the path of trust on integration in the final dyadic model exhibited a direct coefficient of 0.433, increasing to a total of 0.688 by means of an indirect effect through commitment. This indirect effect was

only weak in the one-sided data analysis, with the direct effect of trust on integration only increasing marginally. The difference in findings may be explained by the underlying data and the items used to measure integration.

The generic model analysed the perspective of one relationship side. It may be argued that a party's commitment to the relationship may not directly influence its active participation in the relationship process. For example, even though a business unit may provide long-term investment to a relationship, it may not actively participate in the day-to-day research and relationship processes. While one-sided data cannot account for reciprocity, a dyadic perspective can represent joint effects and might reveal the effects of one party's behaviour on the other. For example, if a research group puts a lot of effort into a relationship and its development, its commitment may encourage the business unit to become more actively involved in the day-to-day processes. Hence, it may be suggested that the more committed both parties in a dyadic relationship are, the stronger the reciprocal effect and the stronger the integration of both parties. Adding to differences in the underlying data, items used to measure integration differed between the generic and dyadic model. Hence, commitment may be proposed to more strongly influence the collaborative communication and participation aspects of integration, measured in the dyadic model, than the interaction and team-oriented items, considered in the generic model.

The overall results demonstrated the influence of trust on the other key drivers of UIRs. Furthermore, the positive influence of commitment on integration was described and explained. Differences in regards to the path coefficients between the generic and dyadic model may suggest that dyadic data is required to clarify links between individual relationship variables established in the current literature. Further research should verify this notion.

7.3. Organisational Compatibility and Personal Experience

The antecedents of organisational compatibility and personal experience were proposed to influence trust, commitment and integration in the generic model. Results are discussed below.

7.3.1. Organisational Compatibility

The concepts of similarity and compatibility have received some recognition in the strategic alliances literature (Bucklin and Sengupta, 1993, Johnson and Cullen, 1996, Parkhe, 1991), reporting positive effects of organisational compatibility on alliances success (Kale et al., 2000, Sarkar et al., 2001). RM has so far largely ignored the influence of diversity or compatibility on relationships, possibly because of its focus on relationships between private sector enterprises, believed to be reasonably similar. The research field of UIRs was deemed beneficial for analysing compatibility in a RM context, due to the diversity of parties united in UIRs.

The results showed a significant influence of compatibility on trust, confirming the alliance literature, such as Sarkar et al.'s (2001) research on manufacturing alliances. A strong impact emerged in both conceptual and final models, with path coefficients of 0.552 and 0.555 respectively. A high level of organisational compatibility, and thus a strong congruity in goals, objectives and senior management operating philosophies, is likely to facilitate understanding and empathy (Johnson and Cullen, 1996), in turn facilitating the trust building process. A lack of compatibility, or the clash of dissimilar organisational cultures, on the other hand, can lead to discomfort and hostility among groups (Chatterje et al., 1992), inhibiting the development of trust.

The interrelationships between compatibility and the remaining relationship characteristics further highlighted the strong association between compatibility and trust. While the direct paths from compatibility to commitment and integration only exhibited weak coefficients, a strong total effect emerged. Hence, the weak direct effect on commitment and integration was considerably increased by means of an indirect effect through trust. Following from the earlier differentiation between the psychological variable of trust and the behavioural variables of commitment and integration, it may be argued that perceived organisational compatibility has a stronger effect on psychological than on behavioural relationship characteristics. Congruity and similarity affected the actual behaviour in terms of commitment and integration primarily through the development of trust rather than directly.

The results also showed organisational compatibility to positively influence the construct of personal experience in the final path model, with a weak path coefficient of 0.182. As previously discussed, this finding is likely to relate to organisational or group dynamics and their influence on employment approaches and group behaviour. In brief, groups are likely to consist of people with similar values and norms. If the groups within a relationship are similar, the individuals within these groups are likely to also be alike. This suggests that they have a better understanding of, and involvement with, individuals from the other group than individuals in dissimilar groups.

In summary, the results showed organisational compatibility as a highly influential variable for a UIR. While influencing all relationship characteristics in this research as well as personal experience, its link to trust was clearly most prominent.

7.3.2. Personal Experience

Many authors have reported on the relevance of individuals for relationship development and success, primarily in the areas of services marketing (Bendapudi and Leone, 2002, Gummesson, 1991), innovation (Howell et al., 2005, Shane, 1994) and UIRs (Santoro and Chakrabarti, 2002). Despite the assumed relevance of individuals, much of the business-to-business RM research has failed to examine it empirically. Based on the preliminary, qualitative research step, the willingness and ability of individuals to build relationships with the respective other environment appeared paramount. Research has already focused on the highly important facets of a champion, such as enthusiasm and intrinsic motivation to succeed (Irwin et al., 1998) or the talent to promote and to influence an idea, project or relationship (Santoro and Chakrabarti, 2002).

An understanding of the other environment can enable a person to take on the role of a champion in a UIR and is often developed by means of experience (Irwin et al., 1998). Sparse knowledge on the concept of personal experience and its influence in a relationship setting suggested a potential contribution of its analysis to the literature and more specifically to our theoretical and practical understanding of championship in UIRs. Our results, however, showed a surprisingly weak influence

of personal experience on UIRs, as no statistically significant effect of experience on trust or integration was established. The only significant link between personal experience and a relationship characteristic emerged for commitment, with direct path coefficients of 0.208 in the conceptual and 0.205 in the final path model.

These findings may relate to the construct of personal experience. The understanding of the other environment and involvement in UIRs enable an individual to take on the role of a champion. Furthermore, the current involvement and developed contacts with the other environment imply a certain degree of willingness to be involved in UIRs. However, experience does not reflect the actual championship behaviour exhibited by the individual in a specific relationship. If the actual behaviour is missing, a person's ability and willingness is insufficient to affect the development of trust or the active integration and participation in the relationship. However, personal experience in UIRs may positively relate to the expectation of relationship continuity and the investment in the relationship, which does not require active championship behaviour of the individual. Hence, the link between personal experience and commitment may be justified.

It may also be that experience is relevant for relationship initiation rather than for the maintenance and enhancement of established relationships, and thus of the relationship type analysed in this research. The qualitative research step suggested that personal experience, and the reputation of an academic regarding previous or current relationships, served as a foundation for trust in the UIR initiation stage and as a starting point for relationships (see Plewa et al., 2005, in Appendix 1a). Interviews showed that industry entities sought academics with previous engagement in UIRs, as these academics were believed to understand the different environment in which a business operates and to appreciate industry needs and requirements. Moreover, academics with personal experience in UIRs are believed to have stronger links to the business community than those without experience. Well-developed contacts with people from the other environment, in turn, increase the likelihood of being approached by potential partners. Hence, it is likely that personal experience provides a stronger effect in the initiation stage of a relationship rather than in the later stages of its evolution.

To summarise, our results only revealed a weak impact of personal experience on commitment, and none on trust or integration. These findings were explained by

the nature of the construct and the type of relationship studied in this research. Future research should further investigate the given propositions.

7.4. Organisational Culture Difference

A principal aim of this research was to assess OCD dimensions in UIRs and their effect on relationship management. With distinct organisational cultures apparent in individual organisations or groups (Buono et al., 1985), all relationships essentially imply a meeting of different cultures. The mergers and acquisitions literature has long recognized the relevance of organisational culture fit (Chatterje et al., 1992, Fralicx and Bolster, 1997, Weber, 1996). Furthermore, OCD has been assumed for UIRs due to the significantly different environments in which universities and private sector organisations operate. Neither the UIR nor the broader RM literature have yet attempted to empirically test the influence of such difference on relationship characteristics and outcomes, possibly because of the limitations of the one-sided data employed in the majority of studies.

Rather than using typologies of organisational culture (Desphandé et al., 1993), individual dimensions of OCD specific to UIRs were identified based on the literature review and qualitative data analysis. Differences in regards to time orientation, market orientation, employee empowerment and corporate flexibility were determined as relevant in this context. Due to the novelty of these constructs, the findings regarding their influence on UIRs have already been discussed and justified in the previous chapter (refer to section 6.4). Therefore, this section provides merely a brief review and integration of the previous discussion.

Commitment emerged as the relationship characteristic most strongly shaped by OCD dimensions. Both time orientation and flexibility difference were shown to negatively influence commitment. Path coefficients of -0.245 in the conceptual and -0.210 in the final path model were found for the time orientation-commitment path. Furthermore, the final re-specified model showed a coefficient of -0.203 for the flexibility-commitment link. These results support Weber's (1996) findings in the mergers and acquisitions literature. Weber (1996) measured the perceived overall cultural difference, incorporating seven OCD dimensions based on one-sided data. This comprehensive measure emerged as negatively associated with top

management commitment. Hence, while differences in the research field and measurement are apparent between Weber's (1996) and this research, commitment appears vulnerable to differences in organisational cultures. However, while Weber (1996) identified a negative link between difference and integration, our results did not confirm this finding. Neither integration nor trust were significantly influenced by any one OCD dimension.

The vulnerability of commitment can be explained by its conceptualisation and measurement. In this research, commitment was measured as the importance of the relationship for the respondent, including the sense of loyalty to the partner and the readiness to invest and put effort into maintaining and developing the relationship. High levels of punctuality may indicate that the group places a high importance on the relationship and relationship partner, as it works in a timely and reliable manner. Similarly, high levels of flexibility enable a group to respond to the partner's changing needs, in turn also reflecting that the relationship is important for the group. Hence, highly punctual and/or flexible groups may be seen as valuing the relationship more, as reflected in their behaviour. Moreover, it may be argued that a group placing a high degree of importance on punctuality and/or flexibility is likely to perceive the unpunctual, inflexible partner as not valuing the relationship as much as they do. In this situation, the punctual and/or flexible group is likely to limit its commitment to the relationship, as the partner is not believed to reciprocate the importance placed on the relationship. A negative sentiment is also likely to originate in the unpunctual and/or inflexible group. Such group may be irritated by the partner's insistence on timeliness and by the unpredictability caused by high levels of flexibility.

As previously discussed, flexibility difference had a significant and negative influence on commitment only in the group consisting of dyads with different intentions to renew. Following the discussion in section 6.4.3.1, it is proposed that the insecurity inherent to relationships with an uncertain future is likely to enhance the perceived difference due to an overall apprehension. In relationships characterised by similar intentions to renew, on the other hand, such cultural difference may not be perceived as strongly, or partners may exhibit a stronger will to work towards eliminating the negative effect that might arise from it.

During re-specification, market orientation difference emerged as directly and negatively influencing intention to renew. Hence, while market orientation difference did not significantly affect any relationship characteristic, it was shown to have a direct effect on UIR outcomes by negatively influencing considerations regarding the long-term future of the relationship. This finding may reflect the conceptualisation of market orientation in this study, as its final measurement related to the responsiveness of a party to market information and its focus on implementing positive responses. A dyad characterised by a strong market orientation difference thus incorporates partners with different motivations in regards to creating value for their customers. One party's lack of aspiration to create value for its partner would likely decrease the partner's intention to remain in the relationship after the end of the current contract. This effect may be even stronger if the partner itself places a high importance and effort on being market-oriented.

Based on the findings and related discussion, several managerial implications arose and are discussed in the following section.

7.5. Managerial Implications

A number of managerial implications follow from the results. The majority of implications discussed below are aimed at the UIR parties examined in this research, namely research groups and business units. This focus, however, does not diminish the relevance of these implications for other parties involved in the UIR development process, such as university and industry top management or government departments trying to foster university-industry linkages. Also, technology transfer offices and research centres, industry liaison offices, technology transfer consultants, government and other bodies aiming at supporting research commercialisation may benefit from the following discussion. While these bodies were defined in this research as the network in which a UIR operates and were thus excluded from the direct analysis of the UIR dyad, the discussion of managerial implications offers insight into the key drivers of UIRs, central to these parties. Furthermore, despite a focus on universities, other research institutions may benefit from the managerial implications developed. While the implications may be relatively limited for marketers in relationships between enterprises operating in

similar organisational environments, they should enhance UIRs and other relationships characterised by strong OCD.

Before dealing with individual implications for UIR management arising from the discussion of key drivers and antecedents, a broad perspective of the organisational and group focus towards relationships should be established. Developing any interactive, trusting and long-lasting relationship is not possible if the organisational structure, culture or senior management oppose the idea of relationship building. Following from the literature on continuous improvement within firms, a strategic focus and senior management initiative is required to ensure an overall motivation and application (Chapman and Hyland, 2000, Savolainen, 1998). Hence, management aiming at developing UIRs should be confident of their and their groups' ability and willingness towards building relationships with the respective other environment. Expectations, fears and goals should be clarified internally before approaching potential relationship partners. Furthermore, considering opposing incentive and promotion systems at universities and private sector organisations (Hayes and Fitzgerald, 2005), processes and incentive systems fostering rather than restricting relational development should be implemented.

Uncertainty is inherent to research and increased by confidentiality concerns and by collaborating with another party embedded in an unfamiliar environment (Harman and Sherwell, 2002). The risk involved in research-oriented UIRs was proposed as the major reason underlying the importance of trust in UIRs, continuously highlighted in the results. This has a number of direct managerial implications for organisations and staff engaged in UIRs. First, as trust develops over time (Walter, Mueller and Helfert, 2000, Knowledge Commercialisation Australasia, 2003), UIR development requires a long-term focus of the groups and individuals involved.

Furthermore, inter-firm partnering competence (Johnson and Sohi, 2003) emerged in our qualitative research as extremely relevant in the relationship formation stage. Industry entities appeared to approach, and collaborate with, those research groups and academics that had previously demonstrated their ability and willingness to build relationships with industry entities. The existence of UIR success stories appeared to offer a basis for trust to develop. A research group

aiming at attracting industry partners may thus position itself based on previous relationship experience and success.

Following the attraction of a potential partner, trust should be allowed to develop first rather than directly considering high-risk projects. For example, parties may choose to start with small-scale projects when initiating a relationship with a new partner. If the opportunity of close contact is utilised (Barnes et al., 2002), this strategy enables the development of trust in a lower-risk environment. Furthermore, it allows the initiation and advance of relationship mechanisms aiming to foster trust, commitment and integration. Given the direct and indirect influence of trust on the remaining relationship characteristics and outcomes, the positive consequences of this strategy identified in the preliminary qualitative research is not surprising. Findings revealed small-scale projects to result in larger-scale projects and, in turn, long-term, trusting and successful relationships.

Compatibility of organisational cultures was strongly related to trust and was seen to also influence commitment and integration. Its strong positive impact on the psychological relationship variable of trust indicates the importance of compatibility for relationship development and management. Organisational compatibility can be achieved by means of matching goals, objectives and the operating philosophies of senior management of both parties in the relationship. A deliberation of these factors in the relationship initiation phase is required and should be repeated throughout the relationship, as goals and objectives may vary depending on changes in the parties' environments and circumstances. Furthermore, senior management turnover should motivate a discussion amongst partners to ascertain ongoing compatibility or to determine the consequences if compatibility may not be established.

Notably, while trust remained prominent throughout the analysis, integration emerged as the strongest direct predictor of satisfaction in the dyadic data. The importance of integration is anchored in the relevance of knowledge transfer in research-oriented relationships (Athaide et al., 1996, Cavusgil et al., 2003). Processes for the transfer of knowledge between partners thus need to be established and enabled. Managers should develop a supportive organisational culture and foster group mechanisms that enable and encourage staff to seek information from, and create involvement with, external markets and, more specifically, the relationship partner. Based on our qualitative findings, communication and integration processes

appeared highly problematic in a university-industry context, due to confidentiality concerns and difficulties in controlling and planning contacts in the university environment (see Plewa et al., 2005, in Appendix 1a). Strong senior management support for integration may thus be necessary to foster intra- and inter-group integration and communication.

Different groups are motivated to enter UIRs based on a variety of potential benefits. The retention of the partner emerged from the qualitative interviews as relevant to a number of respondents. The results clearly identified commitment as the driver of intention to renew, antagonised by the negative effect of market orientation difference. Groups aiming at a long-term continuation of a relationship should thus focus primarily on increasing the level of commitment in the relationship while limiting market orientation difference. Besides valuing the relationship, they have to actively contribute and put effort into maintaining the relationship in order to achieve an ongoing affiliation. As the time and financial effort provided to a specific relationship may depend on the overall university or corporate strategy, processes should be put in place to determine the relationships that the organisation wants to retain and to empower groups to contribute to these relationship in their best possible way.

Furthermore, groups seeking relationship continuation should not only consider the negative direct effect of market orientation difference on intention to renew but also the indirect effects of time orientation and flexibility difference through commitment. Negative effects of market orientation difference are easily eliminated if both sides aim at, and work towards, creating value for their customers and partners. Dealing with a partner whose approach towards punctuality and flexibility is fundamentally different, however, may require specific arrangements. During the relationship formation process, parties should aim at developing an understanding of each other's competences and technologies, but also of their organisational cultures and customs. While commitment is certainly influenced by a range of other antecedents, such as shared values (Morgan and Hunt, 1994) and interdependence (Jap and Ganesan, 2000), time orientation and flexibility difference appeared to have a negative impact on commitment, and in turn, on relationship longevity. The choice of a partner may thus be based partly on the easy

identification of these similarities or differences and the elimination of their negative effects.

Mechanisms to improve the sentiments of parties in existing relationships should also be implemented. These may include formal discussions of issues faced when dealing with the other party. Informal events and functions should enable the development of a good understanding among university and industry staff members. Such understanding and shared informal experiences are likely to ease the acceptance of, and adaptation to, the other party's customs. The fact that corporate flexibility is controllable by management (Barrett and Weinstein, 1998) highlights the opportunity to grow closer during a relationship. Senior management is responsible for creating an organisation or group capable of creating committed and successful UIRs with their chosen relationship partner. Management must thus acknowledge, and act towards, creating an organisational culture supportive of relationships.

Importantly, as multi-group analysis showed a significant negative effect of flexibility difference on commitment for those relationships with different intentions to renew, an agreement regarding relationship renewal appears paramount. Continuous discussions among relationship partners about their expectations and intentions regarding the relationship future appear vital. They not only increase the understanding of the other party's long-term planning but also eliminate the potential negative effect of corporate flexibility difference on the relationship and its future.

Furthermore, achieving relationship longevity may depend on the ability of both parties in a relationship to identify, and deal with, the specific relationship dynamics. In an uncertain situation, the primary concern should be to increase trust and actively decrease differences among partners. In a situation in which a clear future of the relationship is outlined, processes may focus more strongly onto developing commitment and, in turn, relationship longevity. Table 7.1 outlines implications for relationships, and specifically UIR management, developed based on qualitative and quantitative results.

Table 7.1 Managerial Implications for Relationship and UIR Management

Relationship Management	Specifically related to UIR Management
Implement an organisational structure and culture that support the building of relationships	<ul style="list-style-type: none"> ○ Create an organisational culture supportive of relationships ○ Hire people passionate about, and experienced in, both environments to ease relationship development ○ Offer staff training, mentoring, support and appropriate incentive systems ○ Every relationship is different: Ensure different handling and be dedicated to what you do ○ Aim at, and work towards, creating value for customers and partners
Foster the development of trust in the relationship	<ul style="list-style-type: none"> ○ Start slowly with small, low-risk projects to allow trust to develop over time ○ Position a research group by means of UIR success stories ○ Discuss goals, objectives and leadership styles of all partners in the relationship continuously throughout the relationship to ensure understanding and to enhance the level of compatibility ○ Allow an extensive amount of time, training and rewards to overcome unfamiliarity and potential prejudices ○ Portray consistency and honesty to allow trust to develop
Encourage integration of all involved parties	<ul style="list-style-type: none"> ○ Develop an organisational culture and group mechanisms that enable and encourage staff to engage in dialogues, become involved, and participate in the process ○ Foster intra- and inter-group multi-dimensional knowledge diffusion ○ Foster informal communication, staff exchange and mixed teams ○ Encourage personal networking of academics and industry staff
Develop high levels of commitment to achieve relationship continuity	<ul style="list-style-type: none"> ○ Value, and actively contribute to, the relationship in order to achieve continuity ○ Develop corporate strategies empowering groups to contribute to the relationships the organisation wants to retain ○ Continuously aim at understanding each party's expectations and intentions regarding relationship continuity ○ Aim at an agreement regarding the future continuation of the relationship ○ Implement mechanisms to overcome negative effects of time orientation difference and flexibility difference ○ Hold not only formal discussions but also informal events and functions to develop a common understanding and shared experiences

Following the discussion of managerial implications, the limitations of this research are discussed next.

7.6. Limitations of the Research

While this research contributes to marketing theory and practice, its results should be interpreted in view of its limitations. First, while a medium sample size was achieved for the estimation of the generic model, a very small sample size of 62 dyads was accepted for the dyadic model. This is coherent with previous dyadic research, in which the requirement of corresponding responses led to small sample sizes suitable for use despite large samples at the beginning of the fieldwork (John and Reve, 1982, Medlin et al., 2005). The lack of respondent anonymity might have added to the difficulty of gaining matching responses from both sides of a dyad (Medlin et al., 2005). Parties involved in a UIR may have been less willing to participate due to the fact that they could not remain anonymous.

The second limitation of this research is also related to the dyadic approach for obtaining data. As respondents are likely to report on relationships, and nominate contact partners, with whom they have a good relationship, systematic bias in terms of the dependent variable satisfaction may exist (Hewett et al., 2002, Homburg and Stock, 2004). While the population of UIRs in Australia may not have been fully represented, the broad characteristics of the final sample and satisfaction ratings ranging from 1 to 7 suggest a good cross-section of current UIRs in Australia in this study.

The final measurement of time orientation and market orientation introduced further limitations for this research. The lack of reliability for the three-item measure intended to capture the time orientation of groups resulted in the use of a single-item measure in the final analysis. While difference in the importance of punctuality was deemed highly relevant in a UIR context, it was limited in capturing the overall construct of time orientation difference between research groups and business units. Furthermore, the final one-factor congeneric model of market orientation only incorporated two items. Difficulties with the measurement of this construct may relate to the unfamiliarity of university respondents with the concept and the respective statements. While the remaining two items were believed to appropriately reflect market orientation in this research, they did not encapsulate all components of market orientation as discussed in the literature, namely intelligence generation, dissemination and response. The relationship characteristic of integration was also operationalised as a two-item measure in the generic model.

However, integration as defined in this research was clearly reflected by the remaining items.

The conceptualised path models were re-specified to improve parsimony. The exploratory nature of re-specifications was noted (Byrne, 2001, Diamantopoulos and Siguaw, 2000) and interpretations and justifications of changes were discussed (Diamantopoulos and Siguaw, 2000). Nevertheless, re-specification may rely on the characteristics of the specific sample, especially considering the small sample size used for the estimation of the dyadic model. The final path models are thus limited to the given sample until verified by means of an independent and preferably larger sample.

Lastly, as the research focused on relationships between Australian universities and companies to eliminate the impact of national culture issues, the generalisability of our findings to other countries may be limited. Based on the restricted number of universities and UIRs in Australia, cross-sectional data was used, incorporating a range of research areas and industry types. While it is acknowledged that a degree of heterogeneity in cross-sectional responses exists and that relationships are likely to differ between faculties, departments and even research groups, the limited number of respondents did not allow a more differentiated analysis per industry or research field.

Despite the obvious limitations of this research, its contribution to theory and practice is apparent. While managerial implications were discussed previously, contributions to the literature are specified in the following section.

7.7. Contributions to the Literature

This research contributes to its two parent theories, namely RM and technology transfer, including the evolving area of UIRs.

7.7.1. Contributions to the Literature - Relationship Marketing

The RM literature has continued to mature throughout the last decade, with a large number and variety of studies examining relationships from a marketing perspective. Considering the breadth and depth of research in this area, its exclusive

focus on relationships in the private sector is surprising. While related research streams, such as those dealing with mergers and acquisitions (Buono et al., 1985, Chatterje et al., 1992) and strategic alliances (Leisen et al., 2002, Lewis, 2002) have recognized the potential impact of organisational imbalance on relationships, such empirical research is still missing in the RM area.

This study contributes towards a better understanding of relationships between organisations based in fundamentally different organisational environments and cultures. Examined both in terms of organisational compatibility and in terms of individual dimensions of OCD, a significant influence of organisational difference on relationship management was revealed in a RM context. While relationships between organisations in the university and private sector were chosen for this study, the results are likely to apply to other relationships uniting partners from different backgrounds, such as those between profit and non-profit organisations or between government departments and private sector entities.

The dyadic data collection and analysis further contributed to the current RM literature. While an increasing relevance is placed on capturing relationship dynamics in RM research, only few dyadic studies have been reported (Hewett et al., 2002, Kim, 2000, Medlin et al., 2005, Smith and Barclay, 1997). Dyadic data enabled the researcher to analyse constructs reflecting the perspectives of both parties and to confirm the relevance of relationship key drivers reported in previous research on the basis of one-sided data.

Adding to the calculation of dyad scores, the group analysis conducted for the dyadic data considerably advanced our understanding of relationship dynamics. Comparing dyads that differed regarding their similarity in terms of intention to renew and satisfaction allowed a more detailed analysis of individual parameters. For example, while trust emerged as the strongest driver of uncertain relationships, the importance of commitment was apparent in relationships characterised by a certain security provided by shared intentions regarding the future of the relationship. Furthermore, difference in organisational cultures appeared to have a stronger negative impact on doubtful relationships.

From a methodological perspective, the multiplication of university and industry scores for dyadic constructs improved on the averaging of data across

dyads, common in previous research (e.g. Gundlach et al., 1995, Kim, 2000). Averaging scores from both sides of a dyad compensates for differences, as it presents the same overall dyadic score for a dyad with one low and one high score as a dyad with two average scores. Multiplication overcomes this weakness, as it reflects relationship dynamics by taking into account the perceptions of both relationship parties yet avoiding the compensation of differences. Hence, different dyadic scores are computed for a dyad with one low and one high score and a dyad with two average scores. In regards to constructs of organisational difference, dyadic research allowed conceptualising these constructs based on perceptions from both sides of a relationship dyad. Rather than measuring the perceived difference, respondents were asked to report on their own perceived group culture with scores subsequently incorporated into a dyadic score. This approach enabled a more accurate representation of difference.

In brief, three primary reasons were given for the contribution of this research to RM theory: 1 - the extension of current research to relationships crossing fundamentally different cultures, 2 - the enhancement of our understanding of relationship dynamics based on the calculation of dyadic scores and a multi-group analysis, and 3 – the methodological advancement of multiplying rather than averaging dyadic scores.

7.7.2. Contributions to the Literature - Technology Transfer

To date, the technology transfer and research commercialisation literature has taken a largely transactional view, overlooking interactive longer-term relationships between universities and industry entities (Harman, 2001, Lee et al., 2003). Despite an increasing recognition of the relevance of cooperation and the development of partnerships to enhance technology transfer and innovation performance (ARC, 2001, EUA et al., 2005, Mora-Valentín et al., 2004), sparse empirical substantiation exists. This research thus contributes considerably to the current literature. First, it provides an empirical validation of previous conceptualisations and anecdotal reports on UIRs. Second, the application of the extensive knowledge, models and concepts developed in RM theory during the last two decades allowed the

development of a holistic and well-founded understanding of relationships in a university-industry context.

Mirroring the contributions to the RM literature, the empirical analysis of organisational compatibility and individual dimensions of OCD represents a contribution also in a UIR context. The identified negative effect of time orientation, market orientation and flexibility differences on commitment and renewal intentions should not only provide strong guidance for management, it also presents a new dimension to the current literature, encouraging researchers to examine the influence of individual environmental and cultural dimensions on relationships rather than merely proposing the existence of OCD.

This study used satisfaction as a relationship outcome measure, supplemented by the intention to renew. This approach contrasts with the majority of the technology transfer and commercialisation literature, which focused primarily on measurable outcomes such as patents and intellectual property (Coupé, 2003, Dietz and Bozeman, 2005, Ernst, 1998). Considering the variety of benefits organisations seek from UIRs (see Plewa et al., 2005, in Appendix 1a), a narrow focus on quantifiable outcomes was deemed overly restrictive. Using satisfaction as a relationship outcome measure, on the other hand, enabled an overall assessment of the relationship performance as perceived by both relationship parties. It contributes to a better understanding of the key drivers of overall relationship success. The transactional focus of the technology transfer literature may explain the lack of research on relationship renewal in a university-industry context. The analysis of intention to renew thus advances the current UIR literature, offering a first empirical examination of the predictors of relationship renewal in this context.

Furthermore, the integration of personal experience in the generic model contributed to the current UIR literature. Given that UIRs cross fundamentally different organisational environments and cultures, the skills of individuals to understand, and work with, the other environment appeared crucial. However, much of the RM and technology transfer literature has assumed the relevance of individuals and has failed to empirically investigate their influence. Hence, authors have increasingly called for further empirical validation (Howell et al., 2005, Markham and Aiman-Smith, 2001). Based on the qualitative research step, a measure of personal experience was operationalised and analysed in the quantitative

research step. The analysis of this construct is new in a UIR context, contributing to the development of this area.

In brief, the contribution to the technology transfer literature entailed 1- a shift to a relationship-focus, including the introduction of the established RM theory to the emerging technology transfer literature, 2 - the empirical analysis of organisational compatibility and individual dimensions of OCD, and 3 - the empirical investigation of satisfaction, intention to renew and personal experience in a UIR context.

In summary, this research contributed to the RM and technology transfer literature. The analysis of the impact of differences in organisational cultures on relationships as well as the dyadic research approach were reported as the primary factors advancing the current literature. The application of RM theory in a technology transfer context provided a thorough basis for future UIR research and it is anticipated that this thesis will encourage the development of a comprehensive UIR research stream. Directions for future research are outlined next.

7.8. Directions for Future Research

The number and relevance of research-oriented university-industry linkages is increasing rapidly, with a large number of relationships failing (Cyert and Goodman, 1997), indicating the relevance of further research in this area. While this thesis offers a foundation for the evolution of a comprehensive UIR research stream, future research is required to verify and extend its findings. As demonstrated by the results, the broad knowledge base developed in the RM area applies to the field of UIRs. The opportunity of combining technology transfer and RM concepts, and thus learning from the research in both areas, should not be missed.

Primarily, further research is required on UIRs and other relationships spanning dissimilar organisational environments and cultures. While the RM literature has so far ignored these relationships, the technology transfer literature has noted differences and their effects on relationships but has based these discussions largely on non-empirical reports. Hence, future research should aim at enhancing our understanding of the potential effect of difference on relationships and relationship success. While this study focused on differences at a group level, an

empirical examination of differences may be extended to a broader measurement of organisational and environmental difference.

Considering the different effects of individual OCD dimensions on UIRs in this research, future studies may benefit from the identification of a range of OCD dimensions and the analysis of their specific effects in a relationship environment. For example, employee empowerment difference was not shown to have a significant influence on the UIR. As empowerment was chosen based on the discussion of bureaucracy, rules and regulations in the qualitative research step, future research may not only investigate the influence of empowerment based on a larger sample but also use other measures of difference in regards to the government or administration of UIRs and other relationships. Moreover, future research should focus on the influence of market orientation difference on UIRs. Measurement difficulties might be addressed, allowing a better understanding of the effect of market orientation difference on relationships and relationship success.

Importantly, the re-specified path models developed in this thesis must now be validated with independent samples. Model re-specification is exploratory in nature and may rely on the characteristics of the specific sample, thereby capitalising on chance (Byrne, 2001, Diamantopoulos and Siguaw, 2000). Hence, future research is required to validate the findings by estimating the final path models as a-priori specified models. A cross-validation analysis is thus proposed as a valuable future research direction.

The results of this research highlighted the benefits of dyadic research. Not only did dyadic data allow the analysis of difference and aggregated, dyadic variables, it also allowed the comparison of different groups of dyads in a multi-group analysis. This analysis identified differences in parameter values between dyads with similar intentions to renew versus dyads with different intentions to renew. Relationship dynamics therefore appear to have a significant influence on the interrelationships between parameters in a relationship. The RM literature is only just beginning to examine relationship dynamics and the changes they generate, and more research is needed on this issue in the future. A variety of ways in dealing with dyadic data, such as segmentation analysis methods (Aurifeille and Medlin, 2005) and the calculation of symmetry, degree and degree of symmetry ratios (Straub et al., 2004), should also be explored. Much remains to be done in this area.

The findings were explained to a large degree by a high level of perceived risk and uncertainty in UIRs. While previous literature has highlighted the role of risk for the relevance of trust (Frost et al., 1978, Grönroos, 1994a, Rousseau et al., 1998, Young and Wilkinson, 1989), it should be integrated as an explicit control variable in future research. Empirical research on UIRs may also analyse the sources of perceived risk for the university and industry side. Differences between parties are likely to not only exist in their potential benefits or organisational cultures but also in their sources of perceived uncertainty and risk.

Following from the limitations of this research, future research would benefit from a larger sample size, especially in the dyadic data analysis. While the difficulties of data gathering encountered in this research apply for all dyadic research projects, they should not deter researchers from undertaking dyadic research. Furthermore, considering the potential bias towards positive relationships due to the lack of anonymity in the data collection process, future research is required to specifically examine high and low performing UIR dyads. Such research may help to further clarify differences in the key drivers as well as the influence of OCD dimensions. Future studies would also benefit from a more fundamental analysis of non-response bias, potentially by examining a sample of non-respondents. The country-specific nature of this research further suggests that a replication in other countries be undertaken to identify its broader applicability. Also, studies specific to one industry or research area may be suggested for future research, as this may give a closer insight into industry-specific relationship dynamics and allow for more precise implications for management.

Considering the relevance of individuals suggested in the RM, services and technology transfer literature, the weak influence of experience on relationship variables was surprising. It was proposed that experience implies an ability to take on the role of a champion and the willingness to be involved in UIRs. However, it does not measure the actual championship behaviour. Considering the interrelationship between experience and trust identified in earlier studies (Feller et al., 2004), further research is required. This should include a range of championship aspects, such as experience, engagement or enthusiasm and actual behaviour. A comprehensive analysis of several characteristics of champions may enable researchers to gain a more comprehensive understanding of their influence on

relationships and relationship success. Furthermore, experience was suggested as relevant for relationship initiation rather than for the maintenance and enhancement of established relationships. This proposition may be analysed by focusing on the initiation stage of UIRs rather than on established relationships.

Following from the earlier discussion of integration and the different items used to measure this concept in the generic and dyadic model, the need for research on different interaction and communication concepts was established. Future research should analyse differences between concepts such as bi-directionality of communication (Fisher et al., 1997), participation in the relationship (Dwyer and Oh, 1987, 1988) and integration (Song and Parry, 1997) in regards to their influence on UIR success.

In brief, while this research contributes substantially to both the RM and technology transfer literature, a number of questions remain. Future research is now required to confirm and expand our understanding of research-oriented UIRs, their key drivers, relationship dynamics and the impact of culture difference on RM.

7.9. Chapter Summary

This chapter elaborated on the research results presented previously. A detailed discussion of results integrated the overall findings across all parts of the qualitative and quantitative data analysis, with the latter including hypotheses testing and the re-specification of generic and dyadic models as well as multi-group analyses. Beginning with the influence of relationship characteristics in a UIR context, the effect of trust, commitment and integration on the outcome variables and their interrelationships were discussed. Results regarding the antecedents of the generic model were then analysed, followed by a discussion of the impact of OCD dimensions on UIR relationship characteristics and outcomes.

Leading from the discussion of findings, managerial implications were outlined, providing recommendations not only for university and industry staff engaged in UIRs but also for third parties involved in the technology transfer process. An account of the limitations of this research followed. Importantly, the contribution of this research to the literature, including the parent theories of RM and technology transfer, was detailed. Finally, based on the discussion of the

contribution and limitations of this research, some directions for future research were given. The chapter concludes with the following section, the final conclusion of this thesis.

7.10. Conclusion

Incorporating the established research area of RM and the emerging area of technology transfer has created a unique opportunity for this research. The qualitative and quantitative analyses of UIRs outlined in this thesis have provided a framework for understanding research-oriented relationships between university research groups and industry partners. The use and further development of this framework requires a shift in the mindset of university staff from a transactional to a relational perspective regarding the transfer of technology to the private sector. While working groups and government reports have encouraged a relational focus for some time, an empirical understanding of UIRs and the acceptance of the benefits of a relational approach now need to be developed. The thorough foundation of UIRs on RM principles in this research provides a basis for future UIR research and the development of a comprehensive UIR research stream.

The development of successful relationships clearly requires a thorough investigation of the underlying organisational cultures of the potential or current partners and the identification of the relevant levels of similarity or difference. Identifying the individual dimensions of difference and their influence on relationship management and success appears to have a considerable benefit for all involved parties, given the large amount of resources flowing into UIRs not only from the industry and university sides but also from government and potentially other involved parties. While an investigation of organisational compatibility and OCD may be performed at the initiation stage, environmental and organisational changes throughout a relationship lifecycle warrant continuous discussion, evaluation and modification. Furthermore, given the effect of compatibility and difference on UIRs established in this research, other relationships are likely to benefit from a consideration of these findings. As an organisational culture is unique to an organisation or organisational unit (Buono et al., 1985), even relationships between private sector organisations imply a meeting of different cultures.

In general, achieving relationship success depends on the ability of both relationship parties to identify, and deal with, specific dynamics of each partner and relationship. Relationships are dynamic by nature (Hennig-Thurau and Hansen, 2000), due to constant changes in working conditions, environments, goals and relationship processes over time (Medlin, 2003). Depending on the specific relationship conditions and dynamics at one point in time, certain key drivers should be fostered. For example, if faced by an uncertain relationship future, the primary concerns should be to foster the development of trust and to achieve an agreement in terms of continuity as well as overall goals and objectives. Furthermore, parties in such situations should establish ways of dealing with the increasing negative impact of OCD. If the future of the relationship is certain, however, parties might choose to foster commitment by both parties in the relationship, in turn encouraging relationship renewal.

The relationships perceived as most satisfying by both parties are characterised primarily by a high level of mutual trust and the creation of a mutual understanding by means of integration. This not only overcomes the barriers of different environments but also capitalises on the different strengths of universities and private sector organisations and their respective staff. Relationships exhibiting a high degree of reciprocal commitment by both parties should enjoy continuing success, creating opportunities for a bright future.

Plewa, C., Quester, P. & Baaken, T. (2005) Relationship marketing and university-industry linkages: a conceptual framework.
Marketing theory v.5 (4) pp. 433-456

NOTE: This publication is included on pages 207-230 in the print copy of the thesis held in the University of Adelaide Library.

It is also available online to authorised users at:

<http://dx.doi.org/10.1177/1470593105058824>

Plewa, C., & Quester, P. (2006) Satisfaction with university-industry relationships: the impact of commitment, trust and championship.
International Journal of Technology Transfer and Commercialisation
v. 5 (1/2) pp. 79-101

NOTE: This publication is included on pages 231-253 in the print copy of the thesis held in the University of Adelaide Library.

Appendix 2. Characteristics of Final Respondents - Qualitative Step

No.	Experience in UIRs	PEII*	Title	Position
U#1	Extensive	No	Professor	Director Research Centre
U#2	Extensive overseas, some in AUS	No	PhD	Research Fellow
U#3	Extensive	Yes	Professor	Chairman CRC Board
U#4	Some	No	No	Researcher
U#5	Extensive	No	Professor	Head of School
U#6	Extensive	No	A/Prof.	Director, Research Centre
U#7	Extensive	Yes	No	Business Manager, Industrial Research Institute
U#8	Extensive	Yes	Professor	Associate Dean Faculty
U#9	Extensive	No	Professor	Head of School + Director Research Centre
U#10	Extensive	No	No	Leader, Industrial Research Group
I#1	Some	No	No	CEO
I#2	Extensive	No	No	Management
I#3	Extensive	Yes	No	Member CRC Board
I#4	Extensive	Yes	PhD	Chief Scientific Officer

* PEII = Previous employment in industry/university

Appendix 3. Interview Protocol Themes and List of Nodes

Interview Clusters	Individual Criteria
General	Details of respondent Demographics of research group/business unit Details of relationships
Performance Criteria	General outcomes Satisfaction Retention and loyalty Recommendation and word of mouth Gain and the usage of research
Relationship Characteristics	Definition of relationship Communication and its characteristics Integration Relationship Duration Functional conflict Trust and commitment
Organisational Culture Difference	Existence of OCD / differences in organisational cultures Institutional cultures and functions Imbalance in expertise Market orientation imbalance Language dissimilarities Time Orientation differences
Others	Existence of Champion Third Parties

Tree Nodes	Nodes
General Characteristics / Individuals	Personal engagement Personal experience Hierarchy level Industry type Institution size
Relationship Outcomes	Performance / satisfaction Continuation Word of mouth / strategic
Relationship Characteristics	Communication Involvement / integration / participation Trust Commitment Understanding Duration
Organisational Culture Difference	Time orientation Market orientation Language dissimilarities Flexibility / bureaucracy / teamwork Motivations / priorities / expectations

Appendix 4. Survey

Appendix 4a. Final Questionnaire University



University-Industry Relationships

Questions relate to the relationship with **ONE** nominated partner firm/business unit.

DETAILS	
Your Details	
Name _____	
University / Research Group _____	
Current Position <input type="radio"/> Management <input type="radio"/> Senior Researcher <input type="radio"/> Researcher	
Previous employment in industry <input type="radio"/> none <input type="radio"/> <2 years <input type="radio"/> 2-5 years <input type="radio"/> >5 years	
Details of Industry Partner (the relationship this questionnaire relates to)	
Organisation / Business Unit _____	
Contact Person (in business unit) _____	
(The contact person will also be approached with the request to fill out a questionnaire. Therefore, please name the person you believe to be most knowledgeable about your relationship)	

RELATIONSHIP CHARACTERISTICS	
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The following statements relate to the **characteristics of your relationship**. Keeping in mind the **relationship you chose for this questionnaire**, please indicate to what extent you agree or disagree with the following statements. Please circle only **one response per statement**.

	Strongly disagree						Strongly agree
A1 I feel that I can trust this business unit completely (incl. trust in people, work etc.).	1	2	3	4	5	6	7
A2 Promises made by this business unit are kept.	1	2	3	4	5	6	7
A3 This business unit is knowledgeable about our relationship (in general; incl. relationship terms and subject).	1	2	3	4	5	6	7
A4 We believe the information that this business unit provides us.	1	2	3	4	5	6	7
A5 This business unit is not open in dealing with us.	1	2	3	4	5	6	7
A6 If problems arise, this business unit is (or would be) honest about the problems.	1	2	3	4	5	6	7
A7 This business unit has made compromises for us in the past.	1	2	3	4	5	6	7
A8 We trust this business unit to consider our best interests.	1	2	3	4	5	6	7
A9 This business unit can be counted on to act with integrity.	1	2	3	4	5	6	7
A10 We feel this business unit has been on our side.	1	2	3	4	5	6	7
A11 We provide information to the business unit solely on the basis of a confidentiality agreement.	1	2	3	4	5	6	7
B1 We defend this business unit when others criticize it.	1	2	3	4	5	6	7
B2 We have a strong sense of loyalty to this business unit.	1	2	3	4	5	6	7
B4 We expect to work with this business unit for some time.	1	2	3	4	5	6	7

		Strongly disagree					Strongly agree	
		1	2	3	4	5	6	7
B5	If another business unit offered us better terms, we would most certainly take them on, even if it meant dropping this business unit after the legally bound time.	1	2	3	4	5	6	7
B6	We are not very committed to this business unit.	1	2	3	4	5	6	7
B7	We are quite willing to make long-term (≥ 5 years) investment in our relationship to this business unit.	1	2	3	4	5	6	7
B8	The relationship with this business unit deserves our research group's effort to maintain.	1	2	3	4	5	6	7
B9	We are patient with this business unit when they (or if they would) make mistakes that cause us trouble.	1	2	3	4	5	6	7
C1	The degree of integration between us and the business unit is high during the entire research process.	1	2	3	4	5	6	7
C2	The research is stimulated by frequent interactions between us and the business unit and our cross-functional team effort.	1	2	3	4	5	6	7
C3	Our ideas are welcomed by the business unit.	1	2	3	4	5	6	7
C4	We welcome ideas from the business unit.	1	2	3	4	5	6	7
C5	This business unit encourages suggestions from us for improving programs and processes related to our relationship.	1	2	3	4	5	6	7
C6	Many of this business unit's programs and processes seem to reflect very little input and appreciation of our concerns.	1	2	3	4	5	6	7

The following questions relate to how you **typically communicate** with the business unit.

		Daily	Weekly	Monthly	Every 2-3 months	Less than every 2-3 months
D11	Written information, reports	1	2	3	4	5
D12	Email	1	2	3	4	5
D13	Face-to-face communication with partner staff	1	2	3	4	5
D14	Telephone interaction with partner staff	1	2	3	4	5
D15	Group meetings with members of the business unit	1	2	3	4	5
D16	Communication at informal events	1	2	3	4	5

		Strongly disagree					Strongly agree	
		1	2	3	4	5	6	7
D21	We share proprietary information with this business unit.	1	2	3	4	5	6	7
D22	Our research group provides this business unit with any information, which might help the business unit.	1	2	3	4	5	6	7
D23	We keep each other informed about events or changes that may affect the other.	1	2	3	4	5	6	7
D24	Our research group believes that sharing information in the relationship is important.	1	2	3	4	5	6	7
D31	We always respond to communication from the business unit.	1	2	3	4	5	6	7
D32	This business unit always responds to our communication.	1	2	3	4	5	6	7
D33	We have great dialogues.	1	2	3	4	5	6	7
D35	The business unit provides a lot of feedback.	1	2	3	4	5	6	7

		Strongly disagree				Strongly agree		
		1	2	3	4	5	6	7
D36	There's a lot of two-way communication between us and the business unit.	1	2	3	4	5	6	7
D42	The terms of our relationship have been written down in detail.	1	2	3	4	5	6	7
D44	The terms of our relationship have been explicitly verbalized and discussed with the business unit.	1	2	3	4	5	6	7
D41	In coordinating our day-to-day activities with this business unit, formal communication channels (e.g. formal scheduled meetings) are predominantly followed.	1	2	3	4	5	6	7
D43	Our expectations of the business unit are communicated in detail.	1	2	3	4	5	6	7

RELATIONSHIP OUTCOMES

The following statements relate to your evaluation of **your chosen relationship** (to this date).

		Strongly disagree				Strongly agree		
		1	2	3	4	5	6	7
E1	The business unit carried out its responsibilities and commitments with respect to the relationship so far, meeting my expectations.	1	2	3	4	5	6	7
E2	Our relationship with them has been productive.	1	2	3	4	5	6	7
E3	The time and effort we spent in the relationship has been worthwhile.	1	2	3	4	5	6	7
E4	The relationship with them has been satisfactory.	1	2	3	4	5	6	7
E5	Our choice to work with this business unit was a wise one.	1	2	3	4	5	6	7
E6	We think we did the right thing when we decided to work with this business unit.	1	2	3	4	5	6	7
E7	We are always delighted with this business unit's performance in the relationship.	1	2	3	4	5	6	7
F1	I would propose this business unit to someone who seeks my advice.	1	2	3	4	5	6	7
F2	I say positive things about this business unit to other people.	1	2	3	4	5	6	7
F3	I would recommend this business unit to others.	1	2	3	4	5	6	7
F4	I would encourage colleagues and partners to do business with this business unit.	1	2	3	4	5	6	7

Using the following scale, in your view please indicate **the likelihood that the relationship with this business unit will be renewed at the end of the current contract**. Please circle one % figure. **Zero** indicates no chance that the relationship with this business unit will be renewed at the end of the current contract period and **100%** indicates that this relationship will definitely be renewed at the end of current contract (if a suitable project arises).

0 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%

DIFFERENCES BETWEEN YOU AND THE BUSINESS UNIT

The following statements relate to potential differences between your research group and **your chosen business unit**.

		Strongly disagree					Strongly agree	
G1	We share similar interests with the people in the business unit.	1	2	3	4	5	6	7
G2	We have values similar to people in the business unit.	1	2	3	4	5	6	7
G3	We are very similar to people in the business unit.	1	2	3	4	5	6	7
H1	Our goals and objectives are consistent with those of the business unit.	1	2	3	4	5	6	7
H2	Our senior staff and the senior staff of the business unit have similar operating philosophies.	1	2	3	4	5	6	7
H3	The senior staff of our research group has a management style different from that of senior staff in the business unit.	1	2	3	4	5	6	7
I1	In this relationship, incompatible reward systems exist, i.e. staff is rewarded for publications versus creation of company benefit, research quality versus timeliness.	1	2	3	4	5	6	7
I2	Differences in reward systems create tension and get in the way of us working together.	1	2	3	4	5	6	7
I3	Meeting our research group's objectives does not impair this business unit's ability to meet their objectives.	1	2	3	4	5	6	7
I4	The goals of our groups are consistent and compatible.	1	2	3	4	5	6	7

CHARACTERISTICS OF YOUR RESEARCH GROUP

The following statements **relate to your research group** (i.e. beyond chosen relationship).

		Strongly disagree					Strongly agree	
J1	To succeed in this business, it is often necessary to compromise one's ethics.	1	2	3	4	5	6	7
J2	If a member of the research group is discovered to have engaged in unethical behaviour, he or she should be promptly reprimanded.	1	2	3	4	5	6	7
K1	Punctuality is important to everyone in this research group.	1	2	3	4	5	6	7
K2	Time is money.	1	2	3	4	5	6	7
K3	This research group goes to any lengths to meet deadlines.	1	2	3	4	5	6	7
L1	In your research group, there is little action taken until a superior approves a decision.	1	2	3	4	5	6	7
L2	If individual researchers wished to make their own decisions, they would be quickly discouraged.	1	2	3	4	5	6	7
L3	In your research group, going through formal channels in getting a job done is constantly emphasised.	1	2	3	4	5	6	7
L4	In your research group, any decision individual researchers make has to have their superior's approval.	1	2	3	4	5	6	7
L5	There are no specific instructions (e.g. in form of a rule manual) detailing what individual researchers should do.	1	2	3	4	5	6	7

		Strongly disagree					Strongly agree	
M1	This research group can be described as flexible and continually adapting to change.	1	2	3	4	5	6	7
M2	New ideas are always being tried out here.	1	2	3	4	5	6	7
M3	Senior staff in this research group unit can be described as set in their ways.	1	2	3	4	5	6	7
M4	The research group is always moving toward improved ways of doing things.	1	2	3	4	5	6	7
N1	Individual researchers are permitted to use their own judgment in solving problems.	1	2	3	4	5	6	7
N2	Initiatives are encouraged and/or rewarded in individual researchers.	1	2	3	4	5	6	7
N3	Individual researchers are allowed a high degree of initiative.	1	2	3	4	5	6	7
N4	Individual researchers are trusted to exercise good judgment.	1	2	3	4	5	6	7

The following questions relate to **the market orientation** of your research group.

		Strongly disagree					Strongly agree	
O1	In this research group, we meet with our industry partners at least once a year to find out what technologies or services they will need in the future.	1	2	3	4	5	6	7
O2	Individuals from our research group interact directly with industry partners to learn how to serve them better.	1	2	3	4	5	6	7
O3	We are slow to detect changes in our industry partners' preferences regarding the direction of research.	1	2	3	4	5	6	7
O4	We poll our industry partners at least once a year to assess the quality of our research and services (i.e. formal survey)	1	2	3	4	5	6	7
O5	We periodically review the likely effect of changes in our university environment (e.g. regulation) on industry groups	1	2	3	4	5	6	7
O6	Information on industry partners, as well as success and failures of industry linkages are communicated across functions in the department.	1	2	3	4	5	6	7
O7	To my knowledge, trends and developments of industry-related research are discussed at a faculty level at least once a quarter.	1	2	3	4	5	6	7
O8	When something important happens to a major industry partner or market, the whole research group knows about it in a short period (provided it is not confidential).	1	2	3	4	5	6	7
O9	Data on the satisfaction of industry partners is disseminated at all levels in this faculty on a regular basis.	1	2	3	4	5	6	7
O10	Our research group's strategies are driven by our understanding of possibilities for creating value for industry partners.	1	2	3	4	5	6	7
O11	We periodically review our efforts to ensure that they are in line with what industry partners want.	1	2	3	4	5	6	7
O12	Our research plans are driven more by knowledge and/or technological advances than by identified industry needs.	1	2	3	4	5	6	7
O13	The activities of all staff in this research group are well coordinated.	1	2	3	4	5	6	7

		Strongly disagree					Strongly agree
O14	For one reason or another we tend to ignore changes in our industry partners' technology and/or service needs.	1	2	3	4	5	6 7
O15	Comments and/or complaints from industry partners fall on deaf ears in this research group.	1	2	3	4	5	6 7
O16	When/if we find out that industry partners are unhappy with the quality of our service, we take corrective action immediately.	1	2	3	4	5	6 7
O17	When/if we find that industry partners would like us to modify a product or service, the research group makes concerted efforts to do so.	1	2	3	4	5	6 7

The following statements relate to **factors that motivate your research group**.

		Strongly disagree					Strongly agree
P1	Development of technology	1	2	3	4	5	6 7
P2	Generation of knowledge	1	2	3	4	5	6 7
P3	Publications	1	2	3	4	5	6 7
P4	Patents, Licenses	1	2	3	4	5	6 7
P5	Human resource issues (e.g. graduate employment)	1	2	3	4	5	6 7
P6	Profit making	1	2	3	4	5	6 7
P7	Funding for future research	1	2	3	4	5	6 7
P8	Access to Government funding	1	2	3	4	5	6 7
P9	Basic Research	1	2	3	4	5	6 7
P10	Applied research	1	2	3	4	5	6 7
P11	Taking new knowledge to practical application	1	2	3	4	5	6 7
P12	Others:	1	2	3	4	5	6 7

INDIVIDUALS

The following statements relate to **you as an individual** being part of your research group.

		Strongly disagree					Strongly agree
Q1	I feel a real sense of accomplishment when working with industry.	1	2	3	4	5	6 7
Q2	Working with industry is challenging.	1	2	3	4	5	6 7
Q3	I devote a lot of time and energy to making relationships with industry work.	1	2	3	4	5	6 7
Q4	When I start a project with industry, I see it through to the end.	1	2	3	4	5	6 7
Q5	When I start a project with industry, I focus on long-term goals.	1	2	3	4	5	6 7
Q6	Working with industry is one of my least favourite tasks.	1	2	3	4	5	6 7
R2	I am experienced in both the university and industry environment.	1	2	3	4	5	6 7
R3	I did not have much knowledge about industry customs prior to the relationship with this business unit.	1	2	3	4	5	6 7

		Strongly disagree					Strongly agree	
R4	I am often involved in relationships between my research group and industry.	1	2	3	4	5	6	7
R5	I have a good understanding of the industry's requirements and way of working.	1	2	3	4	5	6	7
R6	I have well-developed contacts with people from an industry background.	1	2	3	4	5	6	7

DETAILS OF RESEARCH GROUP AND RELATIONSHIP

The following statements relate to **details of your relationship and research group.**

Details of Your Research Group

Number of staff (members of research group, incl. postgraduate students) _____

Number of staff in the research group working on the chosen relationship _____

Location of your office

- | | | |
|--|---|--|
| <input type="radio"/> Australian Capital Territory | <input type="radio"/> New South Wales | <input type="radio"/> Northern Territory |
| <input type="radio"/> Queensland | <input type="radio"/> Tasmania | <input type="radio"/> South Australia |
| <input type="radio"/> Victoria | <input type="radio"/> Western Australia | |

Details of Your Relationship

Length (date of the partnership agreement until today) _____

Type of Relationship Research Consultancy

Industrial Sector (multiple answers possible)

- | | |
|---|--|
| <input type="radio"/> Accommodation, Cafes and Restaurants | <input type="radio"/> Health and Community Services |
| <input type="radio"/> Agriculture, Forestry and Fishing | <input type="radio"/> Manufacturing |
| <input type="radio"/> Communication Services | <input type="radio"/> Mining |
| <input type="radio"/> Construction | <input type="radio"/> Personal and Other Services |
| <input type="radio"/> Cultural and Recreational Services | <input type="radio"/> Property and Business Services |
| <input type="radio"/> Education | <input type="radio"/> Retail Trade |
| <input type="radio"/> Electricity, Gas and Water Supply | <input type="radio"/> Transport and Storage |
| <input type="radio"/> Finance and Insurance | <input type="radio"/> Wholesale Trade |
| <input type="radio"/> Government Administration and Defence | <input type="radio"/> Others _____ |

AGAIN, THANK YOU VERY MUCH FOR YOUR TIME.

Please return the completed questionnaire using the prepaid reply envelope or faxing it to Carolin Plewa: 08 8303 4368

Appendix 4b. Final Questionnaire Industry



University-Industry Relationships

Questions relate to the relationship with **ONE** nominated university/research group.

DETAILS	
Your Details	
Name _____	
Organisation / Business Unit _____	
Position	<input type="radio"/> Senior Management <input type="radio"/> Middle Management <input type="radio"/> Researcher/Staff
Previous employment at university	<input type="radio"/> none <input type="radio"/> <2 years <input type="radio"/> 2-5 years <input type="radio"/> >5 years
Details of Partner University (the relationship this questionnaire relates to)	
University / Research Group _____	
Contact Person (in research group) _____	
(The contact person will also be approached with the request to fill out a questionnaire. Therefore, please name the person you believe to be most knowledgeable about your relationship)	

RELATIONSHIP CHARACTERISTICS	
------------------------------	--

The following statements relate to the characteristics of your chosen relationship. Keeping in mind the **relationship you chose for this questionnaire**, please indicate to what extent you agree or disagree with the following statements. Please circle only **one response per statement**.

	Strongly disagree						Strongly agree
A1 I feel that I can trust this research group completely (incl. trust in people, work etc.).	1	2	3	4	5	6	7
A2 Promises made by this research group are kept.	1	2	3	4	5	6	7
A3 This research group is knowledgeable about our relationship (in general; incl. relationship terms and subject).	1	2	3	4	5	6	7
A4 We believe the information that this research group provides us.	1	2	3	4	5	6	7
A5 This research group is not open in dealing with us.	1	2	3	4	5	6	7
A6 If problems arise, this research group is (or would be) honest about the problems.	1	2	3	4	5	6	7
A7 This research group has made compromises for us in the past.	1	2	3	4	5	6	7
A8 We trust this research group to consider our best interests.	1	2	3	4	5	6	7
A9 This research group can be counted on to act with integrity.	1	2	3	4	5	6	7
A10 We feel this research group has been on our side.	1	2	3	4	5	6	7
A11 We provide information to the research group solely on the basis of a confidentiality agreement.	1	2	3	4	5	6	7
B1 We defend this research group when others criticize it.	1	2	3	4	5	6	7
B2 We have a strong sense of loyalty to this research group.	1	2	3	4	5	6	7
B4 We expect to work with this research group for some time.	1	2	3	4	5	6	7

		Strongly disagree					Strongly agree	
		1	2	3	4	5	6	7
B5	If another research group offered us better terms, we would most certainly take them on, even if it meant dropping this research group after the legally bound time.							
B6	We are not very committed to this research group.							
B7	We are quite willing to make long-term (≥ 5 years) investment in our relationship to this research group.							
B8	The relationship with this research group deserves our business unit's effort to maintain.							
B9	We are patient with this research group when they (or if they would) make mistakes that cause us trouble.							
C1	The degree of integration between us and the research group is high during the entire research process.							
C2	The research is stimulated by frequent interactions between us and the research group and our cross-functional team effort.							
C3	Our ideas are welcomed by the research group.							
C4	We welcome ideas from the research group.							
C5	This research group encourages suggestions from us for improving programs and processes related to our relationship.							
C6	Many of this research group's programs and processes seem to reflect very little input and appreciation of our concerns.							

The following questions relate to how you typically **communicate** with the business unit.

		Daily	Weekly	Monthly	Every 2-3 months	Less than every 2-3 months
D11	Written information, reports	1	2	3	4	5
D12	Email	1	2	3	4	5
D13	Face-to-face communication with partner staff	1	2	3	4	5
D14	Telephone interaction with partner staff	1	2	3	4	5
D15	Group meetings with members of the research group	1	2	3	4	5
D16	Communication at informal events	1	2	3	4	5

		Strongly disagree					Strongly agree	
		1	2	3	4	5	6	7
D21	We share proprietary information with this research group.							
D22	Our business unit provides this research group with any information, which might help the research group.							
D23	We keep each other informed about events or changes that may affect the other.							
D24	Our business unit believes that sharing information in the relationship is important.							
D31	We always respond to communication from the research group.							
D32	This research group always responds to our communication.							
D33	We have great dialogues.							

		Strongly disagree						Strongly agree
D35	The research group provides a lot of feedback.	1	2	3	4	5	6	7
D36	There's a lot of two-way communication between us and the research group.	1	2	3	4	5	6	7
D42	The terms of our relationship have been written down in detail.	1	2	3	4	5	6	7
D44	The terms of our relationship have been explicitly verbalized and discussed with the research group.	1	2	3	4	5	6	7
D41	In coordinating our day-to-day activities with this research group, formal communication channels (e.g. formal scheduled meetings) are predominantly followed.	1	2	3	4	5	6	7
D43	Our expectations of the research group are communicated in detail.	1	2	3	4	5	6	7

RELATIONSHIP OUTCOMES

The following statements relate to **your evaluation of your chosen relationship** (to this date).

		Strongly disagree						Strongly agree
E1	The research group carried out its responsibilities and commitments with respect to the relationship so far, meeting my expectations.	1	2	3	4	5	6	7
E2	Our relationship with them has been productive.	1	2	3	4	5	6	7
E3	The time and effort we spent in the relationship has been worthwhile.	1	2	3	4	5	6	7
E4	The relationship with them has been satisfactory.	1	2	3	4	5	6	7
E5	Our choice to work with this research group was a wise one.	1	2	3	4	5	6	7
E6	We think we did the right thing when we decided to work with this research group.	1	2	3	4	5	6	7
E7	We are always delighted with this research group's performance in the relationship.	1	2	3	4	5	6	7
F1	I would propose this research group to someone who seeks my advice.	1	2	3	4	5	6	7
F2	I say positive things about this research group to other people.	1	2	3	4	5	6	7
F3	I would recommend this research group to others.	1	2	3	4	5	6	7
F4	I would encourage colleagues and partners to do business with this research group.	1	2	3	4	5	6	7

Using the following scale, in your view please indicate **the likelihood that the relationship with this research group will be renewed at the end of the current contract**. Please circle one % figure. **Zero** indicates no chance that the relationship with this business unit will be renewed at the end of the current contract period and **100%** indicates that this relationship will definitely be renewed at the end of current contract (if a suitable project arises).

0 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%

DIFFERENCES BETWEEN YOU AND THE RESEARCH GROUP

The following statements relate to potential differences between you and your chosen organisation.

		Strongly disagree					Strongly agree	
G1	We share similar interests with the people in the research group.	1	2	3	4	5	6	7
G2	We have values similar to people in the research group.	1	2	3	4	5	6	7
G3	We are very similar to people in the research group.	1	2	3	4	5	6	7
H1	Our goals and objectives are consistent with those of the research group.	1	2	3	4	5	6	7
H2	Our senior staff and the senior staff of the research group have similar operating philosophies.	1	2	3	4	5	6	7
H3	The senior staff of our business unit has a management style different from that of senior staff in the research group.	1	2	3	4	5	6	7
I1	In this relationship, incompatible reward/incentive systems exist, i.e. staff is rewarded for creation of company benefit versus publications, timeliness versus research quality.	1	2	3	4	5	6	7
I2	Differences in reward systems create tension and get in the way of us working together.	1	2	3	4	5	6	7
I3	Meeting our business unit's objectives does not impair this research group's ability to meet their objectives.	1	2	3	4	5	6	7
I4	The goals of our groups are consistent and compatible.	1	2	3	4	5	6	7

CHARACTERISTICS OF YOUR BUSINESS UNIT

The following statements **relate to your business unit** (i.e. beyond chosen relationship).

		Strongly disagree					Strongly agree	
J1	To succeed in this business, it is often necessary to compromise one's ethics.	1	2	3	4	5	6	7
J2	If a member of the business unit is discovered to have engaged in unethical behaviour, he or she should be promptly reprimanded.	1	2	3	4	5	6	7
K1	Punctuality is important to everyone in this business unit.	1	2	3	4	5	6	7
K2	Time is money.	1	2	3	4	5	6	7
K3	This business unit goes to any lengths to meet deadlines.	1	2	3	4	5	6	7
L1	In your business unit, there is little action taken until a superior approves a decision.	1	2	3	4	5	6	7
L2	If employees wished to make their own decisions, they would be quickly discouraged.	1	2	3	4	5	6	7
L3	In your business unit, going through formal channels in getting a job done is constantly stressed.	1	2	3	4	5	6	7
L4	In your business unit, any decision employees make has to have their superior's approval.	1	2	3	4	5	6	7
L5	There are no specific instructions (e.g. in form of a rule manual) detailing what employees should do.	1	2	3	4	5	6	7

		Strongly disagree					Strongly agree	
		1	2	3	4	5	6	7
M1	This business unit can be described as flexible and continually adapting to change.	1	2	3	4	5	6	7
M2	New ideas are always being tried out here.	1	2	3	4	5	6	7
M3	Senior staff in this business unit can be described as set in their ways.	1	2	3	4	5	6	7
M4	This business unit is always moving toward improved ways of doing things.	1	2	3	4	5	6	7
N1	Employees are permitted to use their own judgment in solving problems.	1	2	3	4	5	6	7
N2	Initiatives are encouraged and/or rewarded in employees.	1	2	3	4	5	6	7
N3	Employees are allowed a high degree of initiative.	1	2	3	4	5	6	7
N4	Employees are trusted to exercise good judgment.	1	2	3	4	5	6	7

The following questions relate to **the market orientation** of your business unit.

		Strongly disagree					Strongly agree	
		1	2	3	4	5	6	7
O1	In this business unit, we meet with our customers at least once a year to find out what products or services they will need in the future.	1	2	3	4	5	6	7
O2	Individuals from our business unit interact directly with customers to learn how to serve them better.	1	2	3	4	5	6	7
O3	We are slow to detect changes in our customers' preferences regarding our products.	1	2	3	4	5	6	7
O4	We poll our customers at least once a year to assess the quality of our products and services (i.e. formal survey).	1	2	3	4	5	6	7
O5	We periodically review the likely effect of changes in our business environment (e.g. regulation) on customers.	1	2	3	4	5	6	7
O6	Information on customers, as well as marketing success and marketing failures are communicated across functions in the firm.	1	2	3	4	5	6	7
O7	To my knowledge, market trends and developments are discussed in interdepartmental meetings at least once a quarter.	1	2	3	4	5	6	7
O8	When something important happens to a major customer or market, the whole business unit knows about it in a short period (provided it is not confidential).	1	2	3	4	5	6	7
O9	Data on customer satisfaction is disseminated at all levels in this firm on a regular basis.	1	2	3	4	5	6	7
O10	Our firm's strategies are driven by our understanding of possibilities for creating value for customers.	1	2	3	4	5	6	7
O11	We periodically review our efforts to ensure that they are in line with what customers want.	1	2	3	4	5	6	7
O12	Our business plans are driven more by knowledge and/or technological advances than by identified customer needs.	1	2	3	4	5	6	7
O13	The activities of all staff in this business unit are well coordinated.	1	2	3	4	5	6	7
O14	For one reason or another we tend to ignore changes in our customers' product and/or service needs.	1	2	3	4	5	6	7

		Strongly disagree					Strongly agree
		1	2	3	4	5	6 7
O15	Comments and/or complaints from customers fall on deaf ears in this business unit.	1	2	3	4	5	6 7
O16	When we find out that customers are unhappy with the quality of our service, we take corrective action immediately.	1	2	3	4	5	6 7
O17	When we find that customers would like us to modify a product or service, the departments involved make concerted efforts to do so.	1	2	3	4	5	6 7

The following statements relate to **factors that motivate your business unit.**

		Strongly disagree					Strongly agree
		1	2	3	4	5	6 7
P1	Development of technology	1	2	3	4	5	6 7
P2	Generation of knowledge	1	2	3	4	5	6 7
P3	Publications	1	2	3	4	5	6 7
P4	Patents, Licenses	1	2	3	4	5	6 7
P5	Human resource issues (e.g. graduate employment)	1	2	3	4	5	6 7
P6	Profit making	1	2	3	4	5	6 7
P7	Funding for future research	1	2	3	4	5	6 7
P8	Access to Government funding	1	2	3	4	5	6 7
P9	Basic Research	1	2	3	4	5	6 7
P10	Applied research	1	2	3	4	5	6 7
P11	Taking new knowledge to practical application	1	2	3	4	5	6 7
P12	Others:	1	2	3	4	5	6 7

INDIVIDUALS

The following statements relate to **you as an individual** being part of your business unit.

		Strongly disagree					Strongly agree
		1	2	3	4	5	6 7
Q1	I feel a real sense of accomplishment when working with university.	1	2	3	4	5	6 7
Q2	Working with university is challenging.	1	2	3	4	5	6 7
Q3	I devote a lot of time and energy to making relationships with university work.	1	2	3	4	5	6 7
Q4	When I start a project with university, I see it through to the end.	1	2	3	4	5	6 7
Q5	When I start a project with university, I focus on long-term goals.	1	2	3	4	5	6 7
Q6	Working with university is one of my least favourite tasks.	1	2	3	4	5	6 7
R2	I am experienced in both the university and industry environment.	1	2	3	4	5	6 7
R3	I did not have much knowledge about university customs prior to the relationship with this research group.	1	2	3	4	5	6 7

		Strongly disagree					Strongly agree
R4	I am often involved in relationships between my business unit and university.	1	2	3	4	5	6 7
R5	I have a good understanding of a university's requirements and way of working.	1	2	3	4	5	6 7
R6	I have well-developed contacts with people from a university background.	1	2	3	4	5	6 7

DETAILS OF RESEARCH GROUP AND RELATIONSHIP

The following statements relate to details of your business unit and relationship.

Details of Your Business Unit

Number of staff (members of business unit) _____

Number of staff in the business unit working on the chosen relationship _____

Location of your office

- | | | |
|--|---|--|
| <input type="radio"/> Australian Capital Territory | <input type="radio"/> New South Wales | <input type="radio"/> Northern Territory |
| <input type="radio"/> Queensland | <input type="radio"/> Tasmania | <input type="radio"/> South Australia |
| <input type="radio"/> Victoria | <input type="radio"/> Western Australia | |

Details of Your Relationship

Length (date of the partnership agreement until today) _____

Type of Relationship Research Consultancy

Industrial Sector (multiple answers possible)

- | | |
|---|--|
| <input type="radio"/> Accommodation, Cafes and Restaurants | <input type="radio"/> Health and Community Services |
| <input type="radio"/> Agriculture, Forestry and Fishing | <input type="radio"/> Manufacturing |
| <input type="radio"/> Communication Services | <input type="radio"/> Mining |
| <input type="radio"/> Construction | <input type="radio"/> Personal and Other Services |
| <input type="radio"/> Cultural and Recreational Services | <input type="radio"/> Property and Business Services |
| <input type="radio"/> Education | <input type="radio"/> Retail Trade |
| <input type="radio"/> Electricity, Gas and Water Supply | <input type="radio"/> Transport and Storage |
| <input type="radio"/> Finance and Insurance | <input type="radio"/> Wholesale Trade |
| <input type="radio"/> Government Administration and Defence | <input type="radio"/> Others _____ |

AGAIN, THANK YOU VERY MUCH FOR YOUR TIME.

Please return the completed questionnaire using the prepaid reply envelope or faxing it to Carolin Plewa: 08 8303 4368

Appendix 4c. Cover Letter University



SCHOOL OF COMMERCE

CAROLIN PLEWA
Security House Room G.16a
THE UNIVERSITY OF ADELAIDE
SA 5005
AUSTRALIA
TELEPHONE +61 8 8303 4514
FACSIMILE +61 8 8303 4368
carolin.plewa@adelaide.edu.au
CRICOS Provider Number 00123M

..., 2004

«Contact_Person»
«University__Research_Group»
«Faculty__Street»
«City»
«Postcode»

Doctoral Research on University-Industry Relationships

Dear «Contact_Person»,

I am currently conducting a survey on the management of **university-industry relationships** as the central part of my PhD research. If you are engaged with industry, or are part of a research group that has partnered with industry, your participation in the survey would be greatly appreciated. All it requires is for you or the person in your organisation predominantly interacting with the industry partner to complete the enclosed questionnaire. This should only take 20-25 minutes of your time.

Please be assured that the information you provide will remain **strictly confidential**. Answers will only be reported in aggregate so that no organisation, university or relationship will be identifiable from any report presenting the results of the survey. For your information, please note that all participants will be provided with a summary report and recommendations. I also enclose a letter from Ms Ruth Drinkwater, Principal Manager Research and Education at the Australian Institute for Commercialisation, expressing her support for this study and her interest in the anticipated results.

It is very important that you **answer all questions**, even if some appear similar, to ensure that your questionnaire can be included in the research. After completing the questionnaire, please use the prepaid reply envelope to return the questionnaire or fax it to me, Carolin Plewa, on (08) 8303 4368, preferably **before 12 September 2004**.

PLEASE NOTE – Should you be involved in more than one industry relationship, please complete one survey for each relationship. Alternatively, I would be happy to schedule a meeting with you to reduce the time you spend on completing the questionnaires. Please contact me on carolin.plewa@adelaide.edu.au or (08) 8303 4514. If you prefer to complete the questionnaires on your own, please complete one at a time. **It is vital that you make distinctions between those relationships when completing each questionnaire.**

Clarification of terms used in this questionnaire:

Research group: The research group you are a part of. This term relates to the research group that works with the industry partner you concerned in this questionnaire.

Business unit: The industry partner you work with. If your industry partner is a small organisation, “business unit” may equal the whole organisation. If you work with several organisations on one project, please **choose one group** for this questionnaire. Please **do not** consider third parties (such as a technology transfer office).

Thank you very much for your time and your valuable contribution to the study.

Yours sincerely,

Carolin Plewa
Diplom Betriebswirtin

Appendix 4d. Cover Letter Industry



SCHOOL OF COMMERCE

CAROLIN PLEWA
Security House Room G.16a
THE UNIVERSITY OF ADELAIDE
SA 5005
AUSTRALIA
TELEPHONE +61 8 8303 4514
FACSIMILE +61 8 8303 4368
carolin.plewa@adelaide.edu.au
CRICOS Provider Number 00123M

..., 2004

«Contact_Person»
«Company»
«Street»
«City»
«Postcode»

Doctoral Research on University-Industry Relationships

Dear «Contact_Person»,

I am currently conducting a survey on the management of **university-industry relationships** as the central part of my PhD research. If you are engaged with university, or are part of a business unit that has partnered with industry, your participation in the survey would be greatly appreciated. All it requires is for you or the person in your organisation predominantly interacting with the university partner to complete the enclosed questionnaire. This should only take 20-25 minutes of your time.

Please be assured that the information you provide will remain **strictly confidential**. Answers will only be reported in aggregate so that no organisation, university or relationship will be identifiable from any report presenting the results of the survey. For your information, please note that all participants will be provided with a summary report and recommendations. I also enclose a letter from Ms Ruth Drinkwater, Principal Manager Research and Education at the Australian Institute for Commercialisation, expressing her support for this study and her interest in the anticipated results.

It is very important that you **answer all questions**, even if some appear similar, to ensure that your questionnaire can be included in the research. After completing the questionnaire, please use the prepaid reply envelope to return the questionnaire or fax it to me, Carolin Plewa, on (08) 8303 4368, preferably **before 12 September 2004**.

PLEASE NOTE – Should you be involved in more than one university relationship, please complete one survey for each relationship. Alternatively, I would be happy to schedule a meeting with you to reduce the time you spend on completing the questionnaires. Please contact me on carolin.plewa@adelaide.edu.au or (08) 8303 4514. If you prefer to complete the questionnaires on your own, please complete one at a time. **It is vital that you make distinctions between those relationships when completing each questionnaire.**

Clarification of terms used in this questionnaire:

- Business unit: The business unit you are a part of. This term relates to the business group that works with the university partner you concerned in this questionnaire. If your organisation is a small organisation, “business unit” may equal the whole organisation.
- Research group: The research group you work with. If you work with several universities on one project, please **choose one group** for this questionnaire. Please **do not** consider third parties (such as a technology transfer office).

Thank you very much for your time and your valuable contribution to the study.

Yours sincerely,

Carolin Plewa
Diplom Betriebswirtin

Appendix 4e. Support Letter

Australian Institute for Commercialisation Limited
ABN 70 100 485 407
Brisbane Technology Park, Miles Platting Road
PO Box 4425, Eight Mile Plains, Queensland 4113
Tel +61 7 3853 5225 Fax +61 7 3853 5226
info@ausicom.com www.ausicom.com



Australian Institute
for Commercialisation

Working with Australian research
institutions and industry to maximise returns
from research and development investment.

2nd August, 2004

TO WHOM IT MAY CONCERN

Dear Survey Participant,

Commercialisation of research outcomes from Australia's public sector research organizations has taken a high profile over the last few years, particularly under the banner of the Commonwealth's Backing Australia's Ability initiative.

There are a series of barriers to commercialisation identified by numerous research approaches and consultations. One of these barriers is fundamental – that of the differences in culture between the research and industry communities.

This PhD research program, being undertaken by Carolin Plewa from the University of Adelaide takes a cultural perspective on the nature of the relationships between Australian universities and industry partners. Existing research on the nature of these partnerships has focused on specific case studies rather than exploring the specific nature and model of those relationships.

We, here at the AIC, encourage you to support Ms Plewa's research by responding to her survey. The results of her research will contribute to an improved understanding of the nature of university-industry relationships potentially offering a more proactive approach to breaking down existing barriers. Improvements in commercialisation activities associated with public research outcomes and uptake by the industry sector has the potential to generate significant economic growth¹.

Yours sincerely,

Ruth Drinkwater
PRODUCT DEVELOPMENT & RESEARCH DIRECTOR
AUSTRALIAN INSTITUTE FOR COMMERCIALISATION

¹ Allen's Consulting (2003) "The economic impact of commercialisation of publicly funded R&D in Australia".

Appendix 4f. Pre-Test Questionnaire University

Questions relate to the relationship with ONE nominated partner firm/business unit.

PLEASE NOTE – When you are involved in more than one relationship with organisations, please complete more one survey for each relationship. In this case: I would like to make an appointment with you to assist you with, and reduce the time you spend on, completing the questionnaires. Please contact me under (08) 8303 4514 or carolin.plewa@adelaide.edu.au. If you prefer to complete the questionnaires on your own, please complete one questionnaire at a time. **It is vital that you ensure that you make distinctions between those relationships when completing each questionnaire.**

DETAILS			
Your Details			
Name			
University / Research Group			
Your Position	<input type="radio"/> Senior Management	<input type="radio"/> Middle Management	<input type="radio"/> Researcher
Details of Industry Partner (the relationship this questionnaire relates to)			
Organisation / Business Unit			
Contact Person			

RELATIONSHIP CHARACTERISTICS							
-------------------------------------	--	--	--	--	--	--	--

The following statements relate to the characteristics of your chosen relationship. Keeping in mind your **relationship with the chosen business unit**, please indicate to what extent you agree or disagree with the following statements. Please circle only **one response per statement**.

	Strongly disagree						Strongly agree
A1 I feel that I can trust the this business unit completely.	1	2	3	4	5	6	7
A2 Promises made by this business unit are kept.	1	2	3	4	5	6	7
A3 This business unit is knowledgeable about our relationship.	1	2	3	4	5	6	7
A4 We believe the information that this business unit provides us.	1	2	3	4	5	6	7
A5 This business unit is not open in dealing with us.	1	2	3	4	5	6	7
A6 If problems arise, this business unit is honest about the problems.	1	2	3	4	5	6	7
A7 This business unit has made sacrifices for us in the past.	1	2	3	4	5	6	7
A8 We trust that this business unit to keep our best interests in mind.	1	2	3	4	5	6	7
A9 This business unit can be counted on to do what is right.	1	2	3	4	5	6	7
A10 We feel this business unit has been on our side.	1	2	3	4	5	6	7

		Strongly disagree					Strongly agree	
B1	We defend this business unit when others criticize it.	1	2	3	4	5	6	7
B2	We have a strong sense of loyalty to this business unit.	1	2	3	4	5	6	7
B3	We are continually on the lookout for another business unit to replace this institution.	1	2	3	4	5	6	7
B4	We expect to work with this business unit for some time.	1	2	3	4	5	6	7
B5	If another business unit offered us better service, we would most certainly take them on, even if it meant dropping this business unit.	1	2	3	4	5	6	7
B6	We are not very committed to this business unit.	1	2	3	4	5	6	7
B7	We are quite willing to make long-term investment in our relationship to this business unit.	1	2	3	4	5	6	7
B8	The relationship with this business unit deserves our research group's effort to maintain.	1	2	3	4	5	6	7
B9	We are patient with this business unit when they make mistakes that cause us trouble.	1	2	3	4	5	6	7
C1	The degree of integration between us and the business unit is high during the entire development process.	1	2	3	4	5	6	7
C2	This product is developed from frequent interactions between us and the business unit and our cross-functional team effort.	1	2	3	4	5	6	7
C3	My ideas are welcomed by the business unit.	1	2	3	4	5	6	7
C4	We welcome ideas from the business unit.	1	2	3	4	5	6	7
C5	This business unit encourages suggestions from me for improving programs and processes related to our relationship.	1	2	3	4	5	6	7
C6	Many of this business unit's programs and processes seem to reflect very little input and appreciation of my concerns.	1	2	3	4	5	6	7

The following questions relate to how you typically **communicate** with the business unit.

		Daily	Weekly	Monthly	Every 2-3 months	Less than every 2-3 months		
D11	Written information, reports	1	2	3	4	5	6	7
D12	Email	1	2	3	4	5	6	7
D13	Face-to-face communication with partner staff	1	2	3	4	5	6	7
D14	Telephone interaction with partner staff	1	2	3	4	5	6	7
D15	Group meetings with staff from the business unit	1	2	3	4	5	6	7
D16	Communication at informal events	1	2	3	4	5	6	7

		Strongly disagree					Strongly agree	
D21	We share proprietary information with this business unit.	1	2	3	4	5	6	7
D22	Our research group provides this business unit with any information, which might help the business unit.	1	2	3	4	5	6	7

		Strongly disagree					Strongly agree
D23	We keep each other informed about events or changes that may affect the other.	1	2	3	4	5	6 7
D24	Our research group believes that sharing information in the relationship is important.	1	2	3	4	5	6 7
D31	We always respond to communication from the business unit.	1	2	3	4	5	6 7
D32	This business unit always responds to our communication.	1	2	3	4	5	6 7
D33	We have great dialogues.	1	2	3	4	5	6 7
D34	We exchange e-mail frequently.	1	2	3	4	5	6 7
D35	The business unit provides a lot of feedback.	1	2	3	4	5	6 7
D36	There's a lot of two-way communication between us and the business unit.	1	2	3	4	5	6 7
D41	In coordinating our activities with this business unit, formal communication channels are followed.	1	2	3	4	5	6 7
D42	The terms of our relationship have been written down in detail.	1	2	3	4	5	6 7
D43	Our expectations of the business unit are communicated in detail.	1	2	3	4	5	6 7
D46	The terms of our relationship have been explicitly verbalized and discussed.	1	2	3	4	5	6 7

RELATIONSHIP OUTCOMES

The following statements relate to your evaluation of **your chosen business unit**. Please indicate to what extent you agree or disagree with the following statements. Please circle only **one response per statement**.

		Strongly disagree					Strongly agree
E1	The business unit carried out its responsibilities and commitments with respect to the project.	1	2	3	4	5	6 7
E2	Our relationship with them has been productive.	1	2	3	4	5	6 7
E3	The time and effort we spent in the relationship has been worthwhile.	1	2	3	4	5	6 7
E4	The relationship with them has been satisfactory.	1	2	3	4	5	6 7
E5	Our choice to use this business unit was a wise one.	1	2	3	4	5	6 7
E6	I think we did the right thing when we decided to work with this business unit.	1	2	3	4	5	6 7
E7	We are always delighted with this business unit's performance in the relationship.	1	2	3	4	5	6 7
F1	I would recommend this business unit to someone who seeks my advice.	1	2	3	4	5	6 7
F2	I say positive things about this business unit to other people.	1	2	3	4	5	6 7
F3	I would recommend this business unit to others.	1	2	3	4	5	6 7
F4	I would encourage colleagues and partners to do business with this business unit.	1	2	3	4	5	6 7

The following questions relate to your **intention to renew the relationship**.

Using the following scale, in your view please indicate **the likelihood that the relationship with this business unit will be renewed**. Please circle one % figure. **Zero** indicates no chance that the relationship with this business unit will be renewed at the end of the current contract period and **100%** indicates that this relationship will definitely be renewed at the end of current contract.

0 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%

DIFFERENCES BETWEEN YOU AND THE BUSINESS UNIT

The following statements relate to potential differences between your research group and your **chosen business unit**. Please indicate to what extent you agree or disagree with the following statements. Please circle only **one response per statement**.

		Strongly disagree						Strongly agree
G1	We share similar interests with the people in the business unit.	1	2	3	4	5	6	7
G2	We have values similar to people in the business unit.	1	2	3	4	5	6	7
G3	We are very similar to people in the business unit.	1	2	3	4	5	6	7
H1	Our goals and objectives are consistent with those of the business unit.	1	2	3	4	5	6	7
H2	Our senior staff and the senior staff of the business unit have similar operating philosophies.	1	2	3	4	5	6	7
H3	Our senior staff have a management style different from that of senior staff in the business unit.	1	2	3	4	5	6	7
I1	In this relationship, incompatible reward/incentive systems exist.	1	2	3	4	5	6	7
I2	Differences in reward systems get in the way of us working together.	1	2	3	4	5	6	7
I3	Meeting my business unit's objectives does not impair this business unit's ability to meet their objectives.	1	2	3	4	5	6	7
I4	The goals of our groups are consistent and compatible.	1	2	3	4	5	6	7

CHARACTERISTICS OF YOUR RESEARCH GROUP

The following statements **relate to your research group**. Please indicate to what extent you agree or disagree with the following statements, having your research group in mind. Please circle only **one response per statement**.

The following questions relate to **values of your research group**.

		Strongly disagree						Strongly agree
J1	To succeed in this business, it is often necessary to compromise one's ethics.	1	2	3	4	5	6	7
J2	If an employee is discovered to have engaged in unethical behaviour that results primarily in personal gain, he or she should be promptly reprimanded.	1	2	3	4	5	6	7

		Strongly disagree					Strongly agree	
K1	Punctuality is important to anyone in this business unit.	1	2	3	4	5	6	7
K2	Time is money.	1	2	3	4	5	6	7
K3	This business unit goes to any lengths to meet deadlines.	1	2	3	4	5	6	7
L1	There is little action taken until a superior approves a decision.	1	2	3	4	5	6	7
L2	If individual researchers wished to make their own decisions, they would be quickly discouraged.	1	2	3	4	5	6	7
L3	Going through the proper channels in getting a job done is constantly stressed.	1	2	3	4	5	6	7
L4	Any decision individual researchers make has to have their superior's approval.	1	2	3	4	5	6	7
L5	There is no specific rule manual detailing what individual researchers should do.	1	2	3	4	5	6	7
M1	This research group can be described as flexible and continually adapting to change.	1	2	3	4	5	6	7
M2	New ideas are always being tried out here.	1	2	3	4	5	6	7
M3	Senior staff in this research group unit can be described as set in their ways.	1	2	3	4	5	6	7
M4	This research group is always moving toward improved ways of doing things.	1	2	3	4	5	6	7
N1	Individual researchers are permitted to use their own judgment in solving problems.	1	2	3	4	5	6	7
N2	Initiatives are encouraged in individual researchers.	1	2	3	4	5	6	7
N3	Individual researchers are allowed a high degree of initiative.	1	2	3	4	5	6	7
N4	Individual researchers are trusted to exercise good judgment.	1	2	3	4	5	6	7

The following questions relate to **the market orientation** of your research group.

		Strongly disagree					Strongly agree	
O1	In this research group, we meet with industry customers at least once a year to find out what products or services they will need in the future.	1	2	3	4	5	6	7
O2	Individuals from our research group interact directly with industry customers to learn how to serve them better.	1	2	3	4	5	6	7
O3	We are slow to detect changes in our industry customers' preferences regarding research outcomes.	1	2	3	4	5	6	7
O4	We poll our industry customers at least once a year to assess the quality of our research and services.	1	2	3	4	5	6	7
O5	We periodically review the likely effect of changes in our business environment (e.g. regulation) on industry customers.	1	2	3	4	5	6	7
O6	Information on industry customers, marketing success, and marketing failures is communicated across functions in the department.	1	2	3	4	5	6	7

		Strongly disagree					Strongly agree	
O7	We have interdepartmental meetings at least once a quarter to discuss market trends and developments.	1	2	3	4	5	6	7
O8	When something important happens to a major industry customer or market, the whole business unit knows about it in a short period.	1	2	3	4	5	6	7
O9	Data on industry customer satisfaction is disseminated at all levels in this university on a regular basis.	1	2	3	4	5	6	7
O10	Our research group's market strategies are driven by our understanding of possibilities for creating value for industry customers.	1	2	3	4	5	6	7
O11	We periodically review our efforts to ensure that they are in line with what industry customers want.	1	2	3	4	5	6	7
O12	Our business plans are driven more by technological advances than by market research.	1	2	3	4	5	6	7
O13	The activities of all staff in this research group are well coordinated.	1	2	3	4	5	6	7
O14	For one reason or another we tend to ignore changes in our customers' product and service needs.	1	2	3	4	5	6	7
O15	Complaints from industry customers fall on deaf ears in this research group.	1	2	3	4	5	6	7
O16	When we find out that partners are unhappy with the quality of our service, we take corrective action immediately.	1	2	3	4	5	6	7
O17	When we find that industry customers would like us to modify a product or service, the research group makes concerted efforts to do so.	1	2	3	4	5	6	7

The following statements relate to **factors that motivate your research group** to develop a relationship with industry.

		Strongly disagree					Strongly agree	
P1	Development of technology	1	2	3	4	5	6	7
P2	Generation of knowledge	1	2	3	4	5	6	7
P3	Publications	1	2	3	4	5	6	7
P4	Patents, Licenses	1	2	3	4	5	6	7
P5	Human resource issues (e.g. graduate employment)	1	2	3	4	5	6	7
P6	Profit making	1	2	3	4	5	6	7
P7	Funding for future research	1	2	3	4	5	6	7
P8	Basic Research	1	2	3	4	5	6	7
P9	Applied research	1	2	3	4	5	6	7
P10	Others:	1	2	3	4	5	6	7

INDIVIDUALS

The following statements relate to **you as an individual** being part of your research group. Please indicate to what extent you agree or disagree with the following statements.

		Strongly disagree						Strongly agree
Q1	I feel a real sense of accomplishment when working with industry.	1	2	3	4	5	6	7
Q2	Working with industry is challenging.	1	2	3	4	5	6	7
Q3	I devote a lot of time and energy to making relationships with industry work.	1	2	3	4	5	6	7
Q4	When I start a project with industry, I see it through to the end.	1	2	3	4	5	6	7
Q5	When I start a project with industry, I focus on long-term goals.	1	2	3	4	5	6	7
Q6	Working with industry is one of my least favourite tasks.	1	2	3	4	5	6	7
R1	Prior to my current employment, I worked in industry.	1	2	3	4	5	6	7
R2	I am experienced in both the university and industry environment.	1	2	3	4	5	6	7
R3	I did not have much knowledge about industry customs prior to the relationship with this business unit.	1	2	3	4	5	6	7
R4	I am often involved in relationships between my research group and industry.	1	2	3	4	5	6	7
R5	I have a good understanding of the industry's requirements and way of working.	1	2	3	4	5	6	7
R6	I have well-developed contacts with people from an industry background.	1	2	3	4	5	6	7

DETAILS OF RESEARCH GROUP AND RELATIONSHIP

The following statements relate to **details of your research group and relationship.**

Details of Your Relationship

Length (date of the partnership agreement until today) _____

Legal Arrangement of Relationship _____

Details of Your Research Group

Number of staff _____

Location of your office

- Australian Capital Territory New South Wales Northern Territory
 Queensland Tasmania South Australia
 Victoria

Details of Your Research Group- continued

Industrial/Research Sector

- | | |
|---|--|
| <input type="radio"/> Accommodation, Cafes and Restaurants | <input type="radio"/> Health and Community Services |
| <input type="radio"/> Agriculture, Forestry and Fishing | <input type="radio"/> Manufacturing |
| <input type="radio"/> Communication Services | <input type="radio"/> Mining |
| <input type="radio"/> Construction | <input type="radio"/> Personal and Other Services |
| <input type="radio"/> Cultural and Recreational Services | <input type="radio"/> Property and Business Services |
| <input type="radio"/> Education | <input type="radio"/> Retail Trade |
| <input type="radio"/> Electricity, Gas and Water Supply | <input type="radio"/> Transport and Storage |
| <input type="radio"/> Finance and Insurance | <input type="radio"/> Wholesale Trade |
| <input type="radio"/> Government Administration and Defence | |

AGAIN, THANK YOU VERY MUCH FOR YOUR TIME.

Please return the completed questionnaire using the prepaid reply envelope
or faxing it to Carolin Plewa: 08 8303 4368

Annex 4a. Pre-Test Questionnaire Industry

Questions relate to the relationship with ONE nominated university/research group.

PLEASE NOTE – When you are involved in more than one relationship with university research groups, please complete more than one survey. In this case: I would like to make an appointment with you to assist you with, and reduce the time you spend in, completing the questionnaires. Please contact me under (08) 8303 4514 or carolin.plewa@adelaide.edu.au. If you prefer to complete the questionnaires on your own, please complete one questionnaire at a time. **It is vital that you ensure that you make distinctions between those relationships when completing each questionnaire.**

DETAILS	
Your Details	
Name _____	
Organisation / Business Unit _____	
Position	<input type="radio"/> Senior Management <input type="radio"/> Middle Management <input type="radio"/> Researcher
Details of Partner University (the relationship this questionnaire relates to)	
University / Research Group _____	
Contact Person _____	

RELATIONSHIP CHARACTERISTICS	
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The following statements relate to the characteristics of your chosen relationship. Keeping in mind the **relationship you chose for this questionnaire**, please indicate to what extent you agree or disagree with the following statements. Please circle only **one response per statement**.

	Strongly disagree						Strongly agree
A1 I feel that I can trust this research group completely.	1	2	3	4	5	6	7
A2 Promises made by this research group are kept.	1	2	3	4	5	6	7
A3 This research group is knowledgeable about our relationship.	1	2	3	4	5	6	7
A4 We believe the information that this research group provides us.	1	2	3	4	5	6	7
A5 This research group is not open in dealing with us.	1	2	3	4	5	6	7
A6 If problems arise, this research group is honest about the problems.	1	2	3	4	5	6	7
A7 This research group has made sacrifices for us in the past.	1	2	3	4	5	6	7
A8 We trust this research group to keep our best interests in mind.	1	2	3	4	5	6	7
A9 This research group can be counted on to act with integrity.	1	2	3	4	5	6	7
A10 We feel this research group has been on our side.	1	2	3	4	5	6	7
B1 We defend this research group when others criticize it.	1	2	3	4	5	6	7
B2 We have a strong sense of loyalty to this research group.	1	2	3	4	5	6	7
B3 We are continually on the lookout for another research group to replace this one.	1	2	3	4	5	6	7

		Strongly disagree					Strongly agree	
B4	We expect to work with this research group for some time.	1	2	3	4	5	6	7
B5	If another research group offered us better terms, we would most certainly take them on, even if it meant dropping this research group after the legally bound time.	1	2	3	4	5	6	7
B6	We are not very committed to this research group.	1	2	3	4	5	6	7
B7	We are quite willing to make long-term investment in our relationship to this research group.	1	2	3	4	5	6	7
B8	The relationship with this research group deserves our business unit's effort to maintain.	1	2	3	4	5	6	7
B9	We are patient with this research group when they (or if they would) make mistakes that cause us trouble.	1	2	3	4	5	6	7
C1	The degree of integration between us and the research group is high during the entire research process.	1	2	3	4	5	6	7
C2	The research is stimulated by frequent interactions between us and the research group and our cross-functional team effort.	1	2	3	4	5	6	7
C3	Our ideas are welcomed by the research group.	1	2	3	4	5	6	7
C4	We welcome ideas from the research group.	1	2	3	4	5	6	7
C5	This research group encourages suggestions from us for improving programs and processes related to our relationship.	1	2	3	4	5	6	7
C6	Many of this research group's programs and processes seem to reflect very little input and appreciation of our concerns.	1	2	3	4	5	6	7

The following questions relate to how you typically **communicate** with the business unit.

		Daily	Weekly	Monthly	Every 2-3 months	Less than every 2-3 months
D11	Written information, reports	1	2	3	4	5
D12	Email	1	2	3	4	5
D13	Face-to-face communication with partner staff	1	2	3	4	5
D14	Telephone interaction with partner staff	1	2	3	4	5
D15	Group meetings with members of the research group	1	2	3	4	5
D16	Communication at informal events	1	2	3	4	5

		Strongly disagree					Strongly agree	
D21	We share proprietary information with this research group.	1	2	3	4	5	6	7
D22	Our business unit provides this research group with any information, which might help the research group.	1	2	3	4	5	6	7
D23	We keep each other informed about events or changes that may affect the other.	1	2	3	4	5	6	7
D24	Our business unit believes that sharing information in the relationship is important.	1	2	3	4	5	6	7
D31	We always respond to communication from the research group.	1	2	3	4	5	6	7
D32	This research group always responds to our communication.	1	2	3	4	5	6	7

		Strongly disagree					Strongly agree	
D33	We have great dialogues.	1	2	3	4	5	6	7
D35	The research group provides a lot of feedback.	1	2	3	4	5	6	7
D36	There's a lot of two-way communication between us and the research group.	1	2	3	4	5	6	7
D42	The terms of our relationship have been written down in detail.	1	2	3	4	5	6	7
D44	The terms of our relationship have been explicitly verbalized and discussed.	1	2	3	4	5	6	7
D41	In coordinating our day-to-day activities with this research group, formal communication channels are followed.	1	2	3	4	5	6	7
D43	Our expectations of the research group are communicated in detail.	1	2	3	4	5	6	7

RELATIONSHIP OUTCOMES

The following statements relate to your evaluation of **your chosen relationship**. Please indicate to what extent you agree or disagree with the following statements.

		Strongly disagree					Strongly agree	
E1	The research group carried out its responsibilities and commitments with respect to the relationship so far.	1	2	3	4	5	6	7
E2	Our relationship with them has been productive.	1	2	3	4	5	6	7
E3	The time and effort we spent in the relationship has been worthwhile.	1	2	3	4	5	6	7
E4	The relationship with them has been satisfactory.	1	2	3	4	5	6	7
E5	Our choice to work with this research group was a wise one.	1	2	3	4	5	6	7
E6	We think we did the right thing when we decided to work with this research group.	1	2	3	4	5	6	7
E7	We are always delighted with this research group's performance in the relationship.	1	2	3	4	5	6	7
F1	I would propose this research group to someone who seeks my advice.	1	2	3	4	5	6	7
F2	I say positive things about this research group to other people.	1	2	3	4	5	6	7
F3	I would recommend this research group to others in this field.	1	2	3	4	5	6	7
F4	I would encourage colleagues and partners to do business with this research group.	1	2	3	4	5	6	7

The following questions relate to your **intention to renew the relationship**.

Using the following scale, in your view please indicate **the likelihood that the relationship with this business unit will be renewed at the end of the current contract**. Please circle one % figure. **Zero** indicates no chance that the relationship with this business unit will be renewed at the end of the current contract period and **100%** indicates that this relationship will definitely be renewed at the end of current contract.

0 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%

DIFFERENCES BETWEEN YOU AND THE RESEARCH GROUP

The following statements relate to potential differences between you and **your chosen organisation**. Please indicate to what extent you agree or disagree with the following statements. Please circle only **one response per statement**.

	Strongly disagree	1	2	3	4	5	6	7	Strongly agree
G1 We share similar professional interests with the people in the research group.	1	2	3	4	5	6	7		
G2 We have values similar to people in the research group.	1	2	3	4	5	6	7		
G3 We are very similar to people in the research group.	1	2	3	4	5	6	7		
H1 Our goals and objectives are consistent with, or complementary to, those of the research group.	1	2	3	4	5	6	7		
H2 Our senior staff and the senior staff of the research group have similar or complementary operating philosophies.	1	2	3	4	5	6	7		
H3 The senior staff of our business unit has a management style different from that of senior staff in the research group.	1	2	3	4	5	6	7		
I1 In this relationship, incompatible reward/incentive systems exist, i.e. staff is rewarded for creation of company benefit versus publications, timeliness versus research quality.	1	2	3	4	5	6	7		
I2 Differences in reward systems create tension and get in the way of us working together.	1	2	3	4	5	6	7		
I3 Meeting our business unit's objectives does not impair this research group's ability to meet their objectives.	1	2	3	4	5	6	7		
I4 The goals of our groups are consistent and compatible.	1	2	3	4	5	6	7		

CHARACTERISTICS OF YOUR BUSINESS UNIT

The following statements **relate to your business unit**. Please indicate to what extent you agree or disagree with the following statements, having your research group in mind. Please circle only **one response per statement**.

	Strongly disagree	1	2	3	4	5	6	7	Strongly agree
J1 To succeed in this business, it is often necessary to compromise one's ethics.	1	2	3	4	5	6	7		
J2 If a member of the business unit is discovered to have engaged in unethical behaviour that results primarily in personal gain, he or she should be promptly reprimanded.	1	2	3	4	5	6	7		
K1 Punctuality is important to everyone in this business unit.	1	2	3	4	5	6	7		
K2 Time is money.	1	2	3	4	5	6	7		
K3 This business unit goes to any lengths to meet deadlines.	1	2	3	4	5	6	7		
L1 There is little action taken until a superior approves a decision.	1	2	3	4	5	6	7		
L2 If employees wished to make their own decisions, they would be quickly discouraged.	1	2	3	4	5	6	7		
L3 Going through the proper channels in getting a job done is constantly stressed.	1	2	3	4	5	6	7		
L4 Any decision employees make has to have their superior's approval.	1	2	3	4	5	6	7		

		Strongly disagree					Strongly agree	
		1	2	3	4	5	6	7
L5	There is no specific rule manual detailing what employees should do.	1	2	3	4	5	6	7
M1	This business unit can be described as flexible and continually adapting to change.	1	2	3	4	5	6	7
M2	New ideas are always being tried out here.	1	2	3	4	5	6	7
M3	Senior staff in this business unit can be described as set in their ways.	1	2	3	4	5	6	7
M4	This business unit is always moving toward improved ways of doing things.	1	2	3	4	5	6	7
N1	Employees are permitted to use their own judgment in solving problems.	1	2	3	4	5	6	7
N2	Initiatives are encouraged in employees.	1	2	3	4	5	6	7
N3	Employees are allowed a high degree of initiative.	1	2	3	4	5	6	7
N4	Employees are trusted to exercise good judgment.	1	2	3	4	5	6	7

The following questions relate to **the market orientation** of your business unit.

		Strongly disagree					Strongly agree	
		1	2	3	4	5	6	7
O1	In this business unit, we meet with our customers at least once a year to find out what products or services they will need in the future.	1	2	3	4	5	6	7
O2	Individuals from our business unit interact directly with customers to learn how to serve them better.	1	2	3	4	5	6	7
O3	We are slow to detect changes in our customers' preferences regarding our products.	1	2	3	4	5	6	7
O4	We poll our customers at least once a year to assess the quality of our products and services.	1	2	3	4	5	6	7
O5	We periodically review the likely effect of changes in our business environment (e.g. regulation) on customers.	1	2	3	4	5	6	7
O6	Information on customers, marketing success, and marketing failures is communicated across functions in the firm.	1	2	3	4	5	6	7
O7	We have interdepartmental meetings at least once a quarter to discuss market trends and developments.	1	2	3	4	5	6	7
O8	When something important happens to a major customer or market, the whole business unit knows about it in a short period (provided it is not confidential).	1	2	3	4	5	6	7
O9	Data on customer satisfaction is disseminated at all levels in this firm on a regular basis.	1	2	3	4	5	6	7
O10	Our firm's strategies are driven by our understanding of possibilities for creating value for customers.	1	2	3	4	5	6	7
O11	We periodically review our efforts to ensure that they are in line with what customers want.	1	2	3	4	5	6	7
O12	Our business plans are driven more by technological advances than by market research.	1	2	3	4	5	6	7
O13	The activities of all staff in this business unit are well coordinated.	1	2	3	4	5	6	7
O14	For one reason or another we tend to ignore changes in our customers' product and service needs.	1	2	3	4	5	6	7

		Strongly disagree					Strongly agree	
O15	Complaints from customers fall on deaf ears in this business unit.	1	2	3	4	5	6	7
O16	When we find out that customers are unhappy with the quality of our service, we take corrective action immediately.	1	2	3	4	5	6	7
O17	When we find that customers would like us to modify a product or service, the departments involved make concerted efforts to do so.	1	2	3	4	5	6	7

The following statements relate to **factors that motivate your business unit** to develop a relationship with university.

		Strongly disagree					Strongly agree	
P1	Development of technology	1	2	3	4	5	6	7
P2	Generation of knowledge	1	2	3	4	5	6	7
P3	Publications	1	2	3	4	5	6	7
P4	Patents, Licenses	1	2	3	4	5	6	7
P5	Human resource issues (e.g. graduate employment)	1	2	3	4	5	6	7
P6	Profit making	1	2	3	4	5	6	7
P7	Funding for future research	1	2	3	4	5	6	7
P8	Basic Research	1	2	3	4	5	6	7
P9	Applied research	1	2	3	4	5	6	7
P10	Taking an idea to reality	1	2	3	4	5	6	7
P11	Others:	1	2	3	4	5	6	7

INDIVIDUALS

The following statements relate to **you as an individual** being part of your business unit. Please indicate to what extent you agree or disagree with the following statements. Please circle only **one response per statement**.

		Strongly disagree					Strongly agree	
Q1	I feel a real sense of accomplishment when working with university.	1	2	3	4	5	6	7
Q2	Working with university is challenging.	1	2	3	4	5	6	7
Q4	I devote a lot of time and energy to making relationships with university work.	1	2	3	4	5	6	7
Q5	When I start a project with university, I see it through to the end.	1	2	3	4	5	6	7
Q6	When I start a project with university, I focus on long-term goals.	1	2	3	4	5	6	7
Q7	Working with university is one of my least favourite tasks.	1	2	3	4	5	6	7
R1	Prior to my current employment, I worked in university for a considerable time.	1	2	3	4	5	6	7
R2	I am experienced in both the university and industry environment.	1	2	3	4	5	6	7

		Strongly disagree					Strongly agree	
R3	I did not have much knowledge about university customs prior to the relationship with this research group.	1	2	3	4	5	6	7
R4	I am often involved in relationships between my business unit and university.	1	2	3	4	5	6	7
R5	I have a good understanding of a university's requirements and way of working.	1	2	3	4	5	6	7
R6	I have well-developed contacts with people from a university background.	1	2	3	4	5	6	7

DETAILS OF RESEARCH GROUP AND RELATIONSHIP

The following statements relate to **details of your business unit and relationship**.

Details of Your Relationship

Length (date of the partnership agreement until today) _____

Legal Arrangement of Relationship _____

Details of Your Business Unit

Number of staff _____

Location of your office

- | | | |
|--|---|--|
| <input type="radio"/> Australian Capital Territory | <input type="radio"/> New South Wales | <input type="radio"/> Northern Territory |
| <input type="radio"/> Queensland | <input type="radio"/> Tasmania | <input type="radio"/> South Australia |
| <input type="radio"/> Victoria | <input type="radio"/> Western Australia | |

Industrial/Research Sector

- | | |
|---|--|
| <input type="radio"/> Accommodation, Cafes and Restaurants | <input type="radio"/> Health and Community Services |
| <input type="radio"/> Agriculture, Forestry and Fishing | <input type="radio"/> Manufacturing |
| <input type="radio"/> Communication Services | <input type="radio"/> Mining |
| <input type="radio"/> Construction | <input type="radio"/> Personal and Other Services |
| <input type="radio"/> Cultural and Recreational Services | <input type="radio"/> Property and Business Services |
| <input type="radio"/> Education | <input type="radio"/> Retail Trade |
| <input type="radio"/> Electricity, Gas and Water Supply | <input type="radio"/> Transport and Storage |
| <input type="radio"/> Finance and Insurance | <input type="radio"/> Wholesale Trade |
| <input type="radio"/> Government Administration and Defence | <input type="radio"/> Others |

AGAIN, THANK YOU VERY MUCH FOR YOUR TIME.

Please return the completed questionnaire using the prepaid reply envelope or faxing it to Carolin Plewa: 08 8303 4368

Appendix 5. Test for Nonresponse Bias

The Table shows the results of a Levene's Test for the Equality of Variances and an independent samples t-test. As shown in the Table, unequal variances have to be assumed for two of the 13 variables. In these cases, the unequal variance estimates were utilised in the subsequent independent samples t-test (Coakes and Steed, 2003), also reported in the Table.

Table Appendix 5. Test for Nonresponse Bias

	Levene's Test		t-test for Equality of Means				
	F	Sig.	t	Df	Sig. (2-tailed)	Mean Difference	Std. Error Difference
PEII ^a	0.9072	0.3420	0.2041	205	0.8385	0.04450	0.217968
Position	0.7397	0.3908	-0.1002	198	0.9203	-0.01325	0.132177
Location	0.2303	0.6318	-0.2198	204	0.8262	-0.08754	0.398216
No. staff overall	12.523	0.0005***	-1.3219	49.884	0.1922	-54.2961	41.07363
No. staff spec. ^b	0.4625	0.4973	0.2402	201	0.8104	0.16366	0.681414
Rel. length	0.1559	0.6934	-0.0597	190	0.9525	-0.51695	8.662453
Research type	4.4719	0.0357*	-0.9676	70.778	0.3365	-0.10645	0.110013
Satisfaction	0.0958	0.7573	-0.1544	205	0.8775	-0.02930	0.189806
Commitment	0.0683	0.7941	-0.5083	205	0.6118	-0.10472	0.206007
Trust	0.0085	0.9268	-0.3217	205	0.7480	-0.06387	0.198532
Integration	0.1783	0.6733	0.4702	205	0.6387	0.10922	0.232273
O. compatibility	0.1345	0.7142	0.0373	205	0.9703	0.00759	0.203407
P. experience	0.2032	0.6526	-0.3546	205	0.7232	-0.07020	0.197945

*** p<0.001; * p<0.05

^a PEII = Previous employment in industry/university

^b No. staff spec. = Number of staff working on the specific relationship

Appendix 6. Assessment of Normality

Appendix 6a. Assessment of Normality – Generic Model

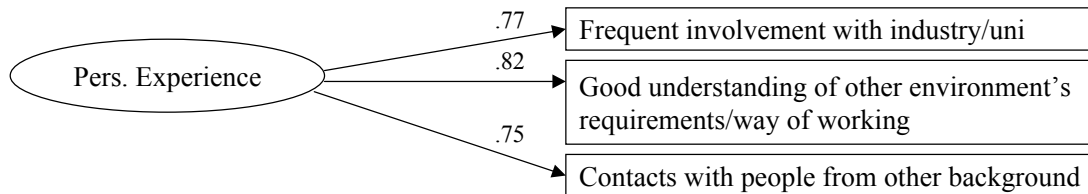
Variable	skew	c.r.	kurtosis	c.r.
Intention to renew	-.929	-5.456	-.140	-.410
Satisfaction	-1.298	-7.623	1.680	4.933
Integration	-.677	-3.978	-.188	-.551
Commitment	-1.054	-6.189	.750	2.201
Trust	-1.351	-7.935	2.219	6.517
Organisational compatibility	-.455	-2.674	.030	.089
Personal experience	-.999	-5.866	.969	2.847
Multivariate			22.987	14.732

Appendix 6b. Assessment of Normality - Dyadic Model

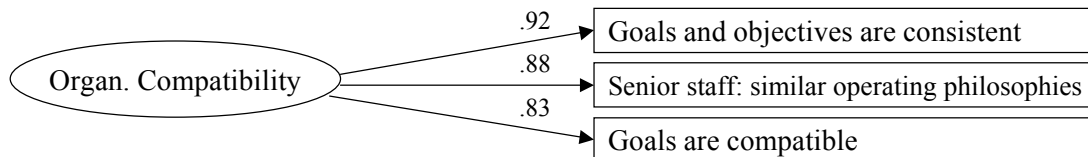
Variable	Skew	c.r.	Kurtosis	c.r.
Satisfaction	-.630	-2.024	-.218	-.351
Intention to renew	-.348	-1.118	-1.162	-1.868
Integration	-.292	-.940	-.612	-.984
Commitment	-.369	-1.185	-.432	-.695
Trust	-.537	-1.725	-.127	-.204
Time orientation difference	.765	2.460	.069	.111
Flexibility difference	.970	3.118	.911	1.464
Empowerment difference	.595	1.913	3.218	5.172
Market orientation diff.	1.320	4.242	1.331	2.140
Multivariate			9.801	2.742

Appendix 7. Additional One-factor Congeneric Models

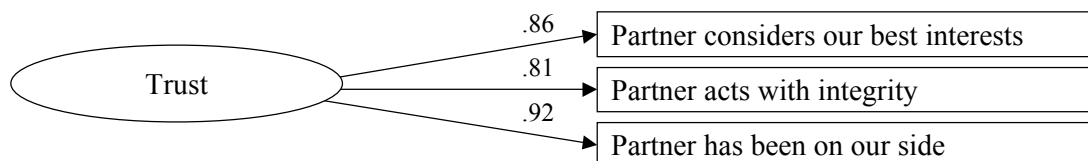
Appendix 7a. University Sample



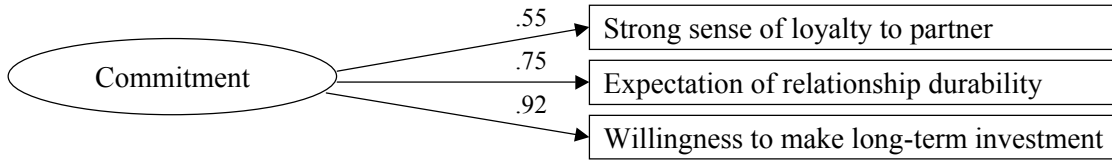
χ^2 value	.962	Adjusted Goodness-of-Fit (AGFI)	.971
Degrees of freedom	1	Root Mean-Square Error of Approximation (RMSEA)	.000
p value	.387	Tucker-Lewis Index (TLI)	1.001
χ^2/df value	.962	Comparative Fit Index (CFI)	1.000
Goodness-of-Fit (GFI)	.995	Normed Fit Index (NFI)	.993



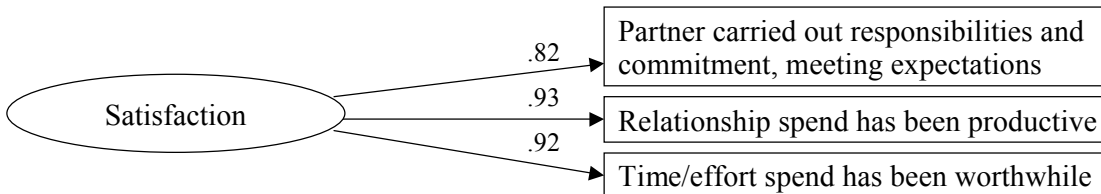
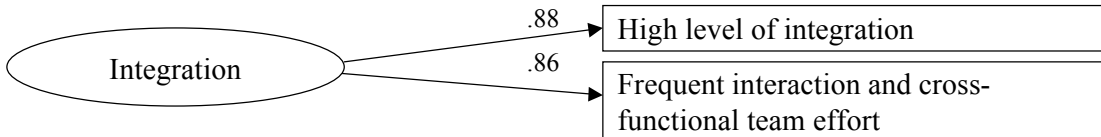
χ^2 value	.547	Adjusted Goodness-of-Fit (AGFI)	.984
Degrees of freedom	1	Root Mean-Square Error of Approximation (RMSEA)	.000
p value	.587	Tucker-Lewis Index (TLI)	1.005
χ^2/df value	.547	Comparative Fit Index (CFI)	1.000
Goodness-of-Fit (GFI)	.997	Normed Fit Index (NFI)	.998



χ^2 value	.103	Adjusted Goodness-of-Fit (AGFI)	.997
Degrees of freedom	1	Root Mean-Square Error of Approximation (RMSEA)	.000
p value	.798	Tucker-Lewis Index (TLI)	1.011
χ^2/df value	.103	Comparative Fit Index (CFI)	1.000
Goodness-of-Fit (GFI)	.999	Normed Fit Index (NFI)	1.000

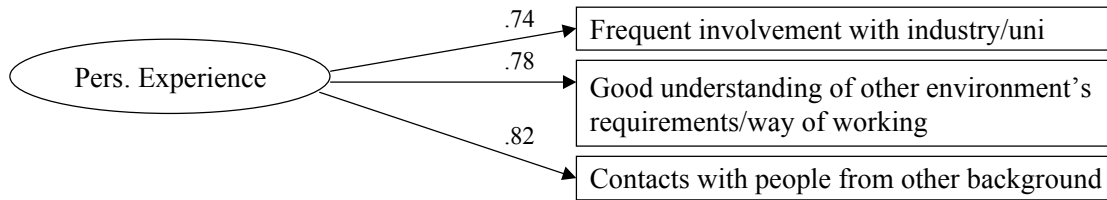


χ^2 value	1.013	Adjusted Goodness-of-Fit (AGFI)	.945
Degrees of freedom	1	Root Mean-Square Error of Approximation (RMSEA)	.013
p value	.848	Tucker-Lewis Index (TLI)	1.000
χ^2/df value	1.013	Comparative Fit Index (CFI)	1.000
Goodness-of-Fit (GFI)	.991	Normed Fit Index (NFI)	1.000

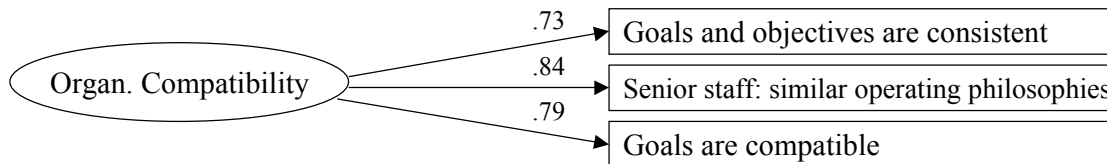


χ^2 value	1.319	Adjusted Goodness-of-Fit (AGFI)	.961
Degrees of freedom	1	Root Mean-Square Error of Approximation (RMSEA)	.049
p value	.387	Tucker-Lewis Index (TLI)	.997
χ^2/df value	1.319	Comparative Fit Index (CFI)	.999
Goodness-of-Fit (GFI)	.993	Normed Fit Index (NFI)	.996

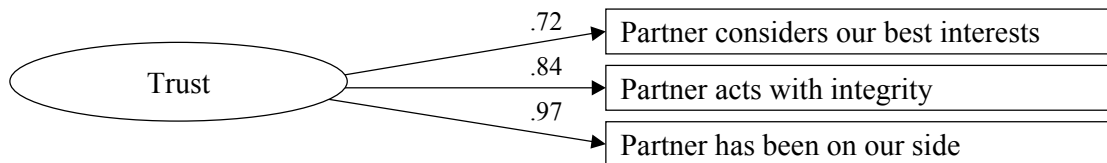
Appendix 7b. Industry Sample



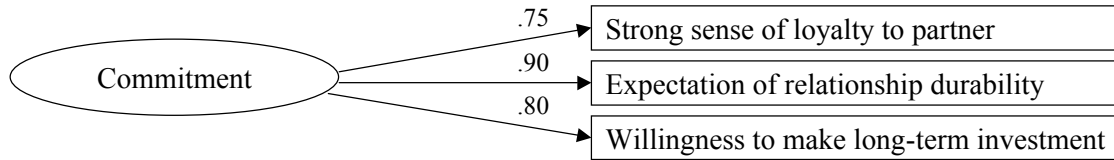
χ^2 value	.189	Adjusted Goodness-of-Fit (AGFI)	.990
Degrees of freedom	1	Root Mean-Square Error of Approximation (RMSEA)	.000
p value	.768	Tucker-Lewis Index (TLI)	1.032
χ^2/df value	.189	Comparative Fit Index (CFI)	1.000
Goodness-of-Fit (GFI)	.998	Normed Fit Index (NFI)	.998



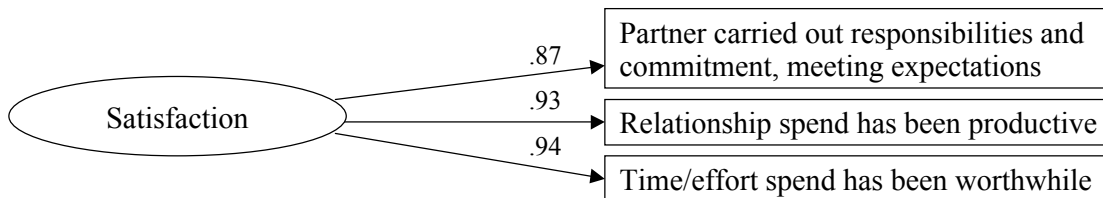
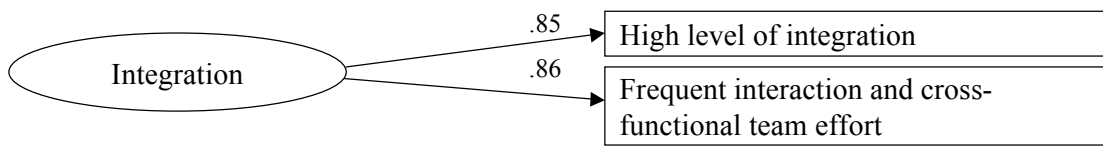
χ^2 value	.585	Adjusted Goodness-of-Fit (AGFI)	.968
Degrees of freedom	1	Root Mean-Square Error of Approximation (RMSEA)	.000
p value	.567	Tucker-Lewis Index (TLI)	1.016
χ^2/df value	.585	Comparative Fit Index (CFI)	1.000
Goodness-of-Fit (GFI)	.995	Normed Fit Index (NFI)	.993



χ^2 value	1.013	Adjusted Goodness-of-Fit (AGFI)	.945
Degrees of freedom	1	Root Mean-Square Error of Approximation (RMSEA)	.013
p value	.499	Tucker-Lewis Index (TLI)	1.000
χ^2/df value	1.013	Comparative Fit Index (CFI)	1.000
Goodness-of-Fit (GFI)	.991	Normed Fit Index (NFI)	.992



χ^2 value	.674	Adjusted Goodness-of-Fit (AGFI)	.963
Degrees of freedom	1	Root Mean-Square Error of Approximation (RMSEA)	.000
p value	.497	Tucker-Lewis Index (TLI)	1.010
χ^2/df value	.674	Comparative Fit Index (CFI)	1.000
Goodness-of-Fit (GFI)	.994	Normed Fit Index (NFI)	.994



χ^2 value	.346	Adjusted Goodness-of-Fit (AGFI)	.981
Degrees of freedom	1	Root Mean-Square Error of Approximation (RMSEA)	.000
p value	.645	Tucker-Lewis Index (TLI)	1.010
χ^2/df value	.346	Comparative Fit Index (CFI)	1.000
Goodness-of-Fit (GFI)	.997	Normed Fit Index (NFI)	.998

Appendix 8. Control for the Effect of Relationship Length

Appendix 8a. Correlation Matrix - Generic Model

Variable	Relationship Length	
	Pearson Correlation	Sig. (2-tailed)
Personal experience	.033	.653
Organisational compatibility	-.062	.395
Trust	-.027	.711
Commitment	-.044	.547
Integration	-.161*	.026
Satisfaction	-.080	.271
Intention to renew	-.019	.791

* Correlation is significant at the 0.05 level (2-tailed)

Appendix 8b. Correlation Matrix - Dyadic Model

Variable	Relationship Length	
	Pearson Correlation	Sig. (2-tailed)
Time orientation difference	-.121	.349
Market orientation difference	-.196	.126
Empowerment difference	-.222	.083
Flexibility difference	-.092	.479
Trust	-.115	.374
Commitment	.052	.688
Integration	-.101	.437
Satisfaction	-.127	.327
Intention to renew	.000	.997

Appendix 9. Independent Samples t-test - OCD Dimensions

The Table shows the results of a Levene's Test for the Equality of Variances and an independent samples t-test. As shown in the Table, unequal variances have to be assumed for the construct empowerment. In this case, the unequal variance estimate was utilised in the subsequent independent samples t-test (Coakes and Steed, 2003). Significant differences in means were established for three OCD dimensions, namely market orientation difference, empowerment difference and time orientation difference.

Table Appendix 9. Independent Samples t-test - OCD Dimensions

	Levene's Test		t-test for Equality of Means				
	F	Sig.	t	Df	Sig. (2-tailed)	Mean Difference	Std. Error Difference
Time orientation	0.001	0.972	-2.555	122	0.012*	-0.661	0.259
Market orientation	2.042	0.156	-2.396	122	0.018*	-0.520	0.217
Empowerment	4.112	0.045*	2.490	115.392	0.014*	0.440	0.177
Flexibility	0.089	0.767	1.616	122	0.109	0.295	0.183

* p<0.05

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