INTERORGANIZATIONAL TRUST IN BUSINESS TO BUSINESS E-COMMERCE

Inter-organisatorisch vertrouwen bij B2B e-commerce

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ABSTRACT

Most previous research in the Information Systems discipline focused on information systems and technology, e-commerce applications such as Inter-Organizational Systems (IOSs), competitive advantages, and security issues. The emphasis on IOSs' gave rise to concerns about Inter-Organizational Relationships (IORs), as trading partners became aware of the social-political factors that affected their relationships. IOSs involve the sharing of e-commerce applications in different locations. When this study was initiated in 1997, universal standards were not fully developed. This posed a security concern for Small-Medium-Enterprises, particularly in Australia and New Zealand.

This study examines the importance of inter-organizational trust (trading partner trust) in e-commerce participation. The objective of this study is to empirically examine the importance of inter-organizational-trust in e-commerce participation.

Despite the acknowledged importance of trust, only limited research has examined the role of trust among trading partners in business-to-business e-commerce, when this study was initiated in 1997. As the participation in e-commerce increased, the need for trust among trading partners became more pertinent in business-to-business e-commerce. Exploratory research was carried out via three case studies in the automotive industry. The automotive industry was selected as a critical and typical case for Electronic Data Interchange (EDI) via Value-Added-Networks, and the findings emphasized on the importance of inter-organizational trust in e-commerce participation.

The exploratory study, together with a literature review, provided the theoretical foundations for the development of the conceptual model. Theories from multiple disciplines including the marketing, management, sociology, information systems and e-commerce were applied in the conceptual model.

The research question developed for this study is:

> *How does inter-organizational trust (trading partner trust) influence the perception of e-commerce benefits and risks of e-commerce, thus influencing the extent of participation in e-commerce?*

The conceptual model was then tested using a multiple-case-study research strategy that aimed to solicit qualitative and in-depth understanding of inter-organizational trust in the context of business-to-business e-commerce. Ten organizations from a cross-industry selection that formed four bi-directional dyads and two uni-directional dyads participated in the study. They included a public sector organization involved in customs clearance; their Internet service provider; a customs agent (broker); an importer; two organizations in the computer and data communications industry; two organizations in the telecommunications industry; and two organizations in the automotive industry.

The primary unit of analysis in this study is the uni-directional dyad. The case study participants included e-commerce coordinators, IT managers, and senior executives involved in e-commerce. In addition, e-commerce applications, existing documents, and standards contributed to secondary data sources. For example, trading partner agreements, organizational charts, web sites, and internal security

policies gave evidence of the organizations' best business practices and background information on the organization and their products.

The findings of the four bi-directional dyads (eight organizations) and the two uni-directional dyads indicated that trust was important for participation in e-commerce. The findings differed by the type of e-commerce application used and the industry. For example, organizations that developed extranet applications had only one trading party (the supplier) undertaking the implementation process. Suppliers were involved in the installation of their websites that provided product information. In addition, suppliers had to train their buyers to use extranet applications. The products consisted of many different parts, (such as data communications, computers and telecommunications) which made the task of placing an order complex. These inter-organizational dyads (Cisco-Compaq NZ, and Siemens-Telecom NZ) experienced relational risks arising from the need to establish trust among their trading partners.

On the other hand, Avery Ford NZ and Toyota NZ applied intranet applications and Internet-based EDI for routine orders between the manufacturers and suppliers. Smaller organizations such as the customs broker and the importer experienced a smooth e-commerce adoption due to their application "Trade Manager" which was not connected to the Internet.

The study contributes to theory, practice and research in the following ways:

First, rather than inferring characteristics of e-commerce adoption from a technical and economic background, this study examined behavioral characteristics of trading partners in business-to-business e-commerce from theories in multi-disciplines. The primary emphasis of prior research was on transaction economics, its competitive advantages and/or external pressure (socio-political). This study focused on the importance of inter-organizational trust in e-commerce participation. The findings of the study led to the development of a model of inter-organizational trust within bi-directional dyads in e-commerce participation.

Second, the study contributed to practice as it increased the awareness of e-commerce practitioners, who will check the trust behaviors of themselves and that of their trading partners. Trading partners will be better able to select and evaluate trust and security-based mechanisms in e-commerce, thus protecting themselves against opportunistic behaviors of their trading partners.

Third, the study contributed to research as it paved the way for longitudinal studies. This study only took a micro-perspective of inter-organizational trust within dyadic relationships as it was intended to be an exploratory study. Further research should extensively test the model using a field survey with business-to-business e-commerce organizations.

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Introduction: Inter-Organizational Trust in E-Commerce Participation

1.1 Introduction – Inter-organizational Trust (Trading Partner Trust) in E-commerce Participation

E-commerce is the sharing of business information, maintaining business relationships, and conducting business transactions by means of telecommunications networks (Zwass, 1996:3). E-commerce applications facilitate communication and information exchanges between organizations, thereby enabling mass manufacturing, production, and customization to occur (Giaglis et al., 1998). E-commerce is changing the shape of competition, the dynamics of trading partner relationships, and the speed of fulfillment (Kalakota and Robinson, 2001).

In this study, a trading partner is considered to be an organization which engages in business-to-business e-commerce. Trading partners can play various roles of suppliers, merchants, brokers or customers. For trading partners to participate in e-commerce, they need to adopt, integrate, and use e-commerce technologies and applications. They interact with one another to form Inter-organizational relationships (IORs). Thus, in this dissertation the terms *trading partner trust* and *inter-organizational trust* are used interchangeably.

Internet use for business-to-business e-commerce is expected to grow at spectacular rates. According to Forrester research (1999), projections of e-commerce between organizations will increase from $8 billion in 1997 to $327 billion in 2002. Similarly, a World Trade Organization's (WTO) report put the value of e-commerce transactions at $300 billion by 2001 (WTO, 1998). For the past decade, network communications over the Internet have offered tremendous market potential for today's e-commerce businesses (Applegate et al., 1996; Bakos, 1998; Nath et al., 1998; Kalakota and Robinson, 2001). The benefits of business-to-business e-commerce include global connectivity, high accessibility, scalability, interoperability, and interactivity (Keen, 1999; Nath et al., 1998; Raman, 1996, Turban et al., 2000; Rayport and Jaworski, 2001). Due to an increasing large number of business transactions, occur over technology platforms, business-to-business e-commerce has recently received considerable attention (Sarkar, Butler and Steinfield, 1995).

This chapter is organized as follows: Section 1.2 discusses the background of inter-organizational trust in e-commerce leading to the research objective. Section 1.3 discusses prior significant research on trust in business relationships leading to the problem statement. Section 1.4 outlines the research objective and research question. While Section 1.5 discusses the research approach applied in this study; Section 1.6 concludes the chapter.

1.2 Background of Inter-organizational Trust (Trading Partner Trust) in E-commerce

E-commerce involves the use of computers and telecommunications in routine business relationships. It mostly affects the organizations' operations and daily relationships with their suppliers, customers, banks, insurers, distributors, and other trading partners. The close coupling between buyers and suppliers (sellers) forms inter-organizational relationships. Although most popular accounts of e-commerce focus on business-to-consumer e-commerce, business-to-business e-commerce is becoming key in inter-organizational relationships, (Clarke, 1997; Hart and Saunders, 1998; Keen, 1997). Kalakota and Robinson (2001) suggest that virtually every business today is

Hart and Saunders, 1998; Keen, 1997). Kalakota and Robinson (2001) suggest that virtually every business today is stretched to the limit, while attempting to maintain viability and profitability in the face of unparalleled uncertainty and change. E-commerce introduces an element of additional complexity into inter-organizational relationships (IOR) (Hoffman et al., 1999).

The proliferation of advanced e-commerce technologies and the lack of universal standards and policies to guide trading partners have left most organizations adopting e-commerce while lacking the necessary knowledge and expertise to do so. Trading partners may not fully understand the potential use of e-commerce technology and are implementing e-commerce systems for the sole purpose of gaining competitive advantage, without properly considering the trustworthiness of their partners or security consequences (Bensaou and Venkatraman, 1996; Iacovou et al., 1995; Parkhe, 1998; Raman, 1996). Complexity in operating e-commerce applications has led to uncertainties in the e-commerce environment.

The spatial and temporal separation between trading partners by the Internet generates an implict uncertainty around online transactions (Brynjolfsson and Smith, 2000). Uncertainties inherent in the current e-commerce environment give rise to a lack of trust in e-commerce relationships, thereby creating barriers to trade. For example Parkhe, (1998) and Ring and Van de Ven (1994) identify the following two types of uncertainties: uncertainty regarding unknown future events and uncertainty regarding trading partners' responses to future events. Uncertainties reduce confidence both in the reliability of business-to-business transactions transmitted electronically and, more importantly, in the trading parties themselves.

On the other hand trust among trading partners encourage information sharing and opens communication. Interdependencies between organizations arise from sharing e-commerce and associated technologies. Previous research in Electronic Data Interchange (EDI) adoption suggests that these interdependencies can lead to an imbalance of power between smaller suppliers and their more powerful buyers (Hart and Saunders, 1997; Helper, 1991; Webster, 1995). It is in this environment of dual uncertainty that trust becomes important for business-to-business e-commerce.

Research suggests that a perceived lack of trust in e-commerce transactions on the Internet could be a reason for the slow adoption of e-commerce (Keen, 1999; KPMG, 1999; Sabo; 1997; Storresten, 1998). Many businesses perceive that e-commerce transactions are insecure and unreliable. Despite the assurances of technological security mechanisms (such as encryption and authorization mechanisms, digital signatures, and certification authorities), trading partners in business-to-business e-commerce do not seem to trust the personnel involved in the transactions (CommerceNet, 1997; Fung and Lee, 1999; Marcella et al., 1998; Stewart et al., 2001). Electronic access to information introduces vulnerabilities (such as imbalance of power due to opportunistic behaviors) in inter-organizational relationships. To manage these uncertainties and ensure future opportunities for improving coordination, organizations will need to build trust relationships with their trading partners. According to Keen (1999), trust among trading partners is the currency of e-commerce. He notes "We are moving from an IT economy to a trust economy" (Keen, 1999, p.1). Similarly, the prominence of trust in e-commerce has recently been widely touted by practitioners and academicians alike (Heil, Bennis and Stephens, 2000; Keen, 2000; Yovovic, 1996).

Despite the growth of e-commerce for businesses, only limited research exists that explains how relationships evolve between organizations participating in e-commerce (Sako, 1998; Smeltzer, 1997), in fact, e-commerce adoption in Australia and New Zealand was in the early stages of development when this research was initiated in 1997. Thus exploratory research was needed to understand and describe the phenomenon. The exploratory research aimed to investigate if trading partner trust existed in and was relevant to e-commerce. Not much was known, recognized, and understood about the phenomenon of trust. Furthermore, the focus in the early stages was on technology and not trust. Case studies were conducted in three EDI-enabled organizations in the automotive industry described in Chapter 2. The findings of the exploratory study indicated that trading partner trust is important for business-to-business e-commerce. This paved the way for the problem statement, research objective, and research question.

1.3 Significant Prior Research, Research Rationale, and Problem Statement

Most of the previous research on trust in business relationships came from the marketing and management literature. Scholars who study trust in business relationships indicate that high levels of trust help increase competitive advantage, increase satisfaction, develop long-term relationships, reduce risks, and encourage large investments. (See Barney and Hansen, 1994; Cummings and Bromiley, 1996; Ganesan, 1994; Geyskens et al., 1998; Hosmer, 1995; Kumar, 1996; Mishra, 1996; Ring and Van de Ven, 1994; Zaheer et al., 1998). Despite considerable academic and managerial interest in the issue of trust between trading partners, to date only limited research exists on the determinants of inter-organizational trust (Dyer and Chu, 2000; Zucker, 1986). Moreover, only limited empirical research has actually been conducted on inter-organizational trust in dyadic business-to-business e-commerce relationships (Smeltzer, 1997; Senn, 1998). Zucker (1986, p.59), observed "for a concept that is acknowledged as central, trust has received very little empirical investigation."

Managers have often cited a lack of trust as the main reason for failed alliances (Parkhe, 1998). O'Hara Deveraux, and Johansen state that "trust is the glue of global work space and technology does not do much to create relationships" (1994, p. 243-244). While some scholars (Malone et al., 1987; Clemons et al., 1993) have focused on information technology as a means of reducing inter-organizational transaction costs. The findings of Kumar et al (1998) suggest the ability to substitute and complement trust and technology in reducing transaction costs in inter-organizational systems (IOS). Similarly, Hart and Saunders (1997), study examining power and trust in EDI adoption, found evidence that coercive power leads to mistrust, whereas persuasive power is conducive to building trust. Only recently has Information System literature recognized the complementary competing roles of technology and trust in inter-organizational business relationships, while interest from other disciplines appear to be increasing[1]

[1] The entire July/August 1998 issue of Academy of Management Review published a special issue on trust. Recent research themes in e-commerce and information system conferences such as Bled EDI-IOS International conference in E-Commerce, American Information Systems conference (AIS), Australiasian Conference on Information Systems (ACIS), European Conference on Information Systems (ECIS), Hawaii International Conference on Systems Science (HICSS), and International Conference on Information Systems (ICIS) have included mini-tracks and calls for papers on networking (e-commerce issues), trust in e-commerce, and workplace management.

(Academy Management Review, 1998). Since trust has been associated with successful buyer-seller relationships (Doney and Cannon, 1997), the role of business-to-business e-commerce and trust building mechanisms has recently become of fundamental importance (Palmer, Bailey and Faraj, 2000).

Trust plays an important (dominant) role in successful inter-organizational-relationships. In order for organizations to cooperate, collaborate, and communicate effectively, we need inter-organizational trust. Therefore, it is important that we understand the relative roles of technology and trust in promoting participation in e-commerce.

Sydow (1998) defines Inter-organizational trust (IOT) as "the confidence of an organization in the reliability of other organizations regarding a given set of outcomes or events" (Sydow, 1998, p.35). As this study examines trust between two organizations (i.e, bi-directional dyads) and since previous research indicated that trust involved risks, we adopted Sydow's definition of trust as our initial definition. Inter-organizational trust in this study is defined as "the confidence in the reliability of two organizations (bi-directional dyad) in a possibly risky situation, to act competently and dutifully."

1.4 Research Objective and Research Question

The primary objective of this study is to empirically examine the role of inter-organizational trust (trading partner trust) in e-commerce participation. By doing so, trust behaviors in business relationships can be identified. This will, in turn, increase the awareness of e-commerce practitioners, who will then presumably examine their own and their trading partners' trust behaviors.

Research Question

The research question developed for this study is as follows:

> *How does inter-organizational trust (trading partner trust) influence the perception of e-commerce benefits and risks of e-commerce, thus influencing the extent of participation in e-commerce?*

1.5 Research Approach

To achieve the research objective and to answer the research question, the following stages in the research process were undertaken:

1. Exploratory research to understand the phenomenon of trust and its role in e-commerce participation (Chapter 2);
2. Background literature review and problem analysis (Chapter 3);
3. Development of a conceptual model (Chapter 4);
4. Development and justification of the research approach (Chapter 5);
5. Empirical data and description of case studies (Chapter 6); and
6. Conclusions, contributions to this study, recommendations, and directions for future research (Chapter 7).

1.5.1 Stage 1: Initial Pilot Case Studies

Exploratory research was carried out in 1997 through three case studies. The results of the exploratory study are discussed in Chapter 2. Three automotive EDI organizations, Ford Motor Company of Australia Limited, Toyota

Motor Company of Australia Limited, and their first tier supplier Patent, Brakes, and Replacement (PBR) Automotive Proprietary Limited participated in the exploratory study. The aim of the exploratory study was to explore the importance of inter-organizational trust (trading partner trust) in EDI adoption. Data was collected from interviews and discussions with key personnel involved in EDI adoption and from existing documents relating to EDI implementation. The documents included information security policies, procedural agreements, trading partner agreements, suppliers' benchmarking standards as performance assessments, and EDI standards. The analysis of the cases revealed that the primary criteria for adopting business-to-business e-commerce was no longer the reliability of the technology, but the reliability of the trading parties.

1.5.2 Stage 2: Literature Review

A literature review was conducted by analyzing previous research on trust from multiple disciplines, including marketing, management, sociology, information systems, and e-commerce. In order to examine how and why trading partner trust impact business-to-business e-commerce, the following topics guided the search for the background literature:

1. Perceived benefits that motivate organizations to adopt e-commerce;
2. Barriers and challenges preventing organizations from adopting e-commerce (perceived risks);
3. Antecedent trust behaviors of trading partners and their impact on e-commerce participation;
4. Trust and security-based mechanisms derived from e-commerce technologies and applications; and
5. Influence of trading partner trust, and influence of trust and security-based mechanisms on perceived benefits and risks of e-commerce which determines the extent of e-commerce participation.

1.5.3 Stage 3: Development of a Conceptual Model

The conceptual model for inter-organizational trust in e-commerce developed in Chapter 4 was based on the theoretical foundations discussed in the literature review in Chapter 3 and the findings of the exploratory study discussed in Chapter 2. To achieve a complete and comprehensive conceptual model, five theoretical perspectives were applied: trust in business relationships, trust and security-based mechanisms in e-commerce, inter-organizational relationship (IOR) theory, transaction-cost-economics (TCE) theory, and resource-dependency theory contributing to behavioral, technological, organizational, economical, and socio-political perspectives.

1.5.4 Stage 4: Research Approach - Development of Research Design, Process, and Instrumentation

Given the exploratory nature of this study, a qualitative, in-depth case study research strategy was seen appropriate. The case study design for this study applied the guidelines given by Yin (1994). The design includes a discussion of the case study questions, research propositions, unit of analysis, the logic of linking the data to the research propositions, and criteria for interpreting the findings. The instrumentation of the conceptual model is outlined in Chapter 5.

1.5.5 Stage 5: Empirical Testing of the Conceptual Model through Multiple Case Studies

The conceptual model was empirically tested through ten case studies that formed four bi-directional dyads and two uni-directional dyads. The cases were selected from a variety of industry sectors including customs clearance service organizations, importers, a customs broker, an Internet service provider (ISP), a telecommunications company, computer and data communication parts distributors, and automotive distributors. A semi-structured questionnaire protocol was used to test the model.

1.5.6 Stage 6: Conclusions

A summary of the thesis, contributions made to the study, its implications, recommendations, limitations of the study, and directions for future research are discussed in the conclusion Chapter 7.

1.6 Chapter Summary

This chapter laid the foundations for the motivation of this study. It introduced the research gap that paved the way for an exploratory study, a research rationale, problem statement, research objective, research question, research approach, research contributions, and implications. The scope and definition of the concepts applied in this study, together with prior significant research, were presented. The next chapter presents the findings of exploratory research.

Chapter 2

Exploratory Research

2.1 Introduction

Chapter 1 introduced the problem statement and focused on the need for inter-organizational trust (trading partner trust) in e-commerce participation. When this study was initiated in 1997, only limited research on inter-organizational trust in information systems existed. Thus, we needed exploratory research to understand the problem domain before undertaking detailed research in this area.

This chapter presents the findings of exploratory research carried out in three Electronic Data Interchange (EDI) automotive organizations. The organizations include: Ford Motor Company of Australia Limited, Toyota Motor Company of Australia Limited, and Patent, Brakes, and Replacement (PBR) Automotive Proprietary Limited. The findings of the exploratory study together with a literature review contributed to the development of the conceptual model in chapter 4. The chapter is organized as follows: Section 2.2 discusses the research process, the choice of sample, how entry into sites was obtained, data collection, and analysis procedures. Sections 2.3 present the findings of three case studies. Section 2.4 finally concludes the chapter. Figure 2.1 depicts the structure of this chapter.

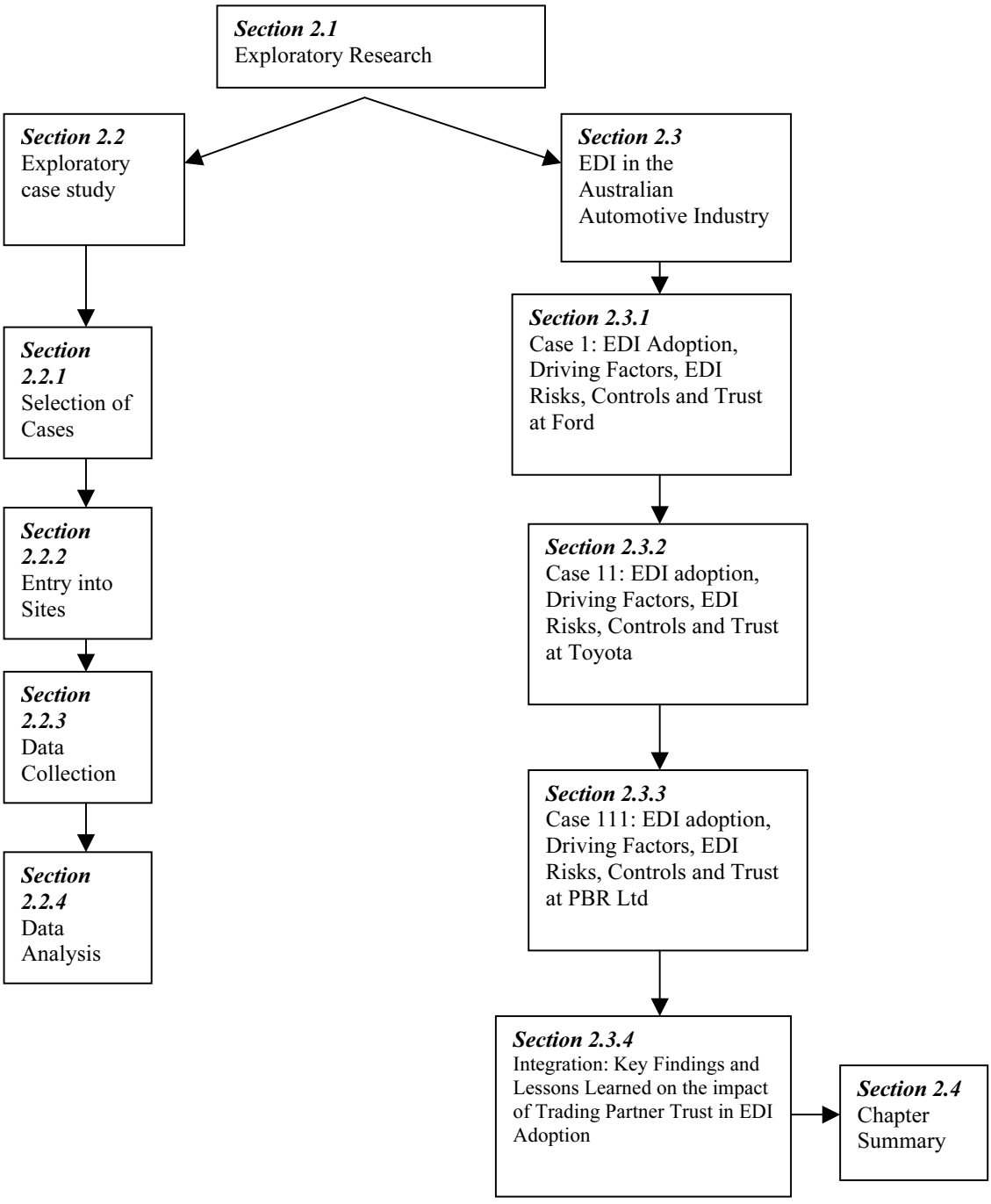

Figure 2.1: Structure of the Exploratory Chapter

2.2 Exploratory Case Study

These exploratory case studies aim to increase our understanding of inter-organizational trust (trading partner trust) in EDI adoption.

2.2.1 Selection of Cases

Case studies were chosen as a method of investigation because they allow a strong potential for discovery, exploration, and development of hypotheses. In addition, case studies provide an opportunity for in depth understanding of trust in EDI adoption.

Business-to-business e-commerce on the Internet in Australia during 1997 and early 1998 was in its infancy. Most organizations were either engaged in pilot testing or were holding preliminary discussions with their trading partners on how to adopt e-commerce. The difficulty in obtaining sites conducting business-to-business e-commerce restricted the scope of this exploratory study to organizations using EDI via Value-Added-Networks (VAN) within the automotive industry. EDI is one type of inter-organizational-system (IOS) or network technology used in business-to-business e-commerce. EDI, unlike other types of information technology innovations, cannot be adopted and used unilaterally; organizations motivated to adopt EDI must either find similarly motivated trading partners or persuade their existing trading partners to adopt EDI (Hart and Saunders, 1998; Webster, 1995).

The automotive industry provided an interesting focus for studying this topic for the following reasons:

- The automotive industry has a well-developed supplier strategy.
- The automotive industry was the first Australian industry to introduce EDI on a coordinated, industry-wide basis. It has been using EDI since electronic data transmissions commenced in 1988. The aim of these EDI systems was to communicate production requirements of five car manufacturers (Ford, General Motors Holden, Toyota, Mitsubishi, and Nissan) to their component/parts suppliers to meet the demands of the Australian and overseas motor vehicle markets (Mackay and Rosier, 1996). Consequently, at the time of this study, the automotive industry had more experience than other industries in developing trading partner relationships (Helper, 1991).
- It has been suggested that the transition to cooperative relationships between buyers and suppliers may be more difficult in the automotive industry due to high levels of complexity, compatibility, long lead times and past adversarial supplier relationships (Langfield-Smith and Greenwood, 1998). Japanese automotive companies have a long established history of developing relationships with their suppliers based on dependence and cooperation. Unlike the Japanese, in western countries like Australia, United Kingdom, and the U.S. recognizing the importance of cooperative partnerships is a relatively recent phenomenon, and is in distinct contrast to the ad hoc relationships of the past (Helper, 1991). Thus, choosing the three automotive organizations, Ford Motor Company of Australia Limited, Toyota Motor Company of Australia Limited, and their first tier supplier Patent, Brakes, and Replacement Automotive Proprietary Limited provides a better initial understanding of cooperative trading partner relationships and trading partner trust in EDI adoption.

2.2.2 Entry into sites

The three automotive organizations were selected because they have been using EDI for a substantial period of time. Telephone conversations, followed by letters describing the significance of the study gained entry to the three sites. Appointment times were confirmed with respondents who agreed. All interviews and meetings took place at the participant sites. The initial contact and negotiations with participants began in November 1997, and the site visits for interviews were carried out between February and August 1998.

2.2.3 Data Collection

Interviews and document analysis comprises the data collected for this study.

Interviews

A semi-structured interview protocol was used to elicit answers about EDI adoption with emphasis on identifying characteristics of trading partner trust relationships. Individuals directly involved in EDI participation were interviewed. Interviewees included EDI coordinators, accounting managers, senior managers, auditors, and IT managers. Interviews lasted from one to three hours. Multiple interviews were conducted with the same person in order to clarify and follow up with their responses. For participants whose time schedules did not permit face-to-face interviews, telephone interviews lasting between forty and sixty minutes were conducted. Most of the data was collected from document analysis, informal discussions and interviews using the semi-structured questionnaire protocol.

All interviews followed the same protocol, proceeding from an unstructured to a structured format allowing for greater reliability of the data collected. When participants expressed a viewpoint, they were prompted for specific supporting evidence. Questions about the organization's background information (such as number of employees and number of personal computers directly connected to EDI) were initially sought. Participants discussed their organizational structure, major products and services, competition in industry, corporate goals, and business successes and failures. They also provided descriptions of their EDI operations and business processes pertaining to EDI adoption and inter-organizational trust. During the unstructured portion participants provided an account of their trading partner relationships focusing on whether trust was a factor in promoting positive trading partner relationships. The factors discussed covered their day-to-day interactions with their trading partners. Occasionally, interesting differences of opinion emerged among participants within the same organization, thus providing additional insights into how the participants perceived their organization's experience with the impact of trading partner trust in EDI adoption. This provided for richer interpretation.

The following scales were applied during the interviews:

- Perceived importance ranking of EDI risks was carried out numerically;
- Risks were categorized by their impact on security services, which included integrity, authentication, availability, non-repudiation, confidentiality, and access controls;
- Likelihood of occurrence was measured via a likert scale: 1 = extremely unlikely, 2 = unlikely, 3 = likely, 4 = very likely, and 5 = extremely likely;

- Seriousness of impact of the risks was measured via a likert scale: 1 = extremely serious, 2 = very serious, 3 = moderately serious, 4 = not very serious, and 5 = not at all serious;
- The overall security was measured via a likert scale: Low = 0-3, Medium = 4-6, High =7-10.

Table 2.1 presents a list of respondents who participated in the exploratory case study followed by Table 2.2, which presents the technological background of the three organizations.

Title of Participant	Name of Organization	Years of E-commerce Experience	Directly Involved in EDI Adoption and Integration?	Number of Interview Sessions
Project Leader Communications Operations Process Leadership	Ford Motor Co	15	Yes	5
Auditor	Ford Motor Co	10	No	telephone interview (1)
General Accounting Manager	Ford Motor Co	12	Yes	3
IT Manager	Ford Motor Co	12	No	3
Supply Chain Management, Materials Planning and Logistics Core Group Management Manager	Ford Motor Co	10	No	2
Communications Manager	Toyota Motor Co	15	Yes	4
FCAI Chairman and EDI Coordinator	PBR Ltd	15	Yes	5

Table 2.1: Interview Participants from three organizations

Background Information	Ford – Buyer	Toyota – Buyer	PBR First–Tier Supplier
Year implemented EDI	mid 1980s' – 1989	1989	1987
Type of EDI technology	EDI/VANs	EDI/VANs	EDI/VANs
Type of translation software	Telstra TradeLink Software	General Electrics Information Services	Telstra TradeLink software
Number of EDI systems	2	2	3
Number of staff operating EDI systems	2	4	6
Volume of transactions	40-60 daily	25-40 daily	5-10 daily
Types of transactions	Purchase Orders Advance Shipping Notice Remittance Advice Acknowledgment	Purchase Orders Advance Shipping Notice Remittance Advice Acknowledgment	Purchase Orders Advance Shipping Notice Monthly statements
Number of Trading Partners	350	200	150
Number of branches	5	3	2
Number of employees	9000	4500	1100
Size of organization	Large	Large	Large
Stage of IT growth	Mature	Mature	Mature

Table 2.2 Technological Background information of Ford, Toyota and Patent Brakes and Replacement, Ltd.

Document Analysis

Documents including implementation guidelines, trading partner agreements, audit reports, and security guidelines were examined and analyzed for relevant information. Implementation guidelines further included quality practices, guidelines for operations, supplier performance assessments, and reports on progress. A description of the documents and standards used by the organizations in EDI adoption is enclosed in Appendix B.

2.2.4 Data Analysis

The semi-structured interviews were recorded and transcribed. Pattern matching and explanation building contributed to the analysis of the transcribed text. The data was scanned to identify similarities and differences, thereby paving the way for identifying consistent patterns and developing plausible explanations. Data relating to EDI business operations with trading partners was of particular interest because careful analysis revealed much about the importance of trading partner trust. Questions relating to trust were examined implicitly in the EDI business risk management process.

Repeated interpretations of the data were necessary to enrich and extend understanding. Klein and Myers (1996) suggest that during data analysis, "the process of interpretation moves from the precursory understanding of the parts to the whole and from a global understanding of the whole context back to an improved understanding of each part" (Klein and Myers, 1996, p 37).

Analyzing data in these qualitative case studies was more subjective and interpretative, while attempting to make sense that the research produced results that were believable and intelligible. Believability was addressed in two ways: 1) by providing direct quotations from the data collected; and 2) by deriving an ultimate picture that provided a reasonable basis for interpretation of inter-organizational trust in EDI participation. Intelligibility was addressed by considering two questions: 1) Does the picture add insight or provide a new way of thinking about trading partner trust in EDI participation? 2) Is the overall picture coherent and comprehensive?

2.3 EDI in the Australian Automotive Industry

Despite a general decline in the manufacturing output in Australia, the automotive industry remains a major segment of the Australian manufacturing sector. It is particularly important in Victoria, where Ford Australia, General Motors Holden, and Toyota have their headquarters and principal assembly plants. Although it is only a small part of the global motor vehicle industry, the Australian automotive industry makes an important contribution to the gross domestic product of Australia. In Australia, the original manufacturers are subsidiaries of large trans-national corporations based in the U.S. or Japan. If the automotive industry is to survive in Australia, it needs to improve efficiency and competitiveness. Hence, EDI was seen as a key element to reformation. The objectives of each company were to improve production, efficiency, and quality in order to remain globally competitive.

In 1984, the Federation Chamber Automotive Industries (FCAI) was formed to set up a standard procedure for adopting EDI. FCAI committee members discussed business issues, ramifications, and operations before negotiating with General Electrics in Information Services (GEIS) and Telstra TradeLink to create an EDI Value-Added-Network (VAN) system.

Figure 2.2 depicts the flow of EDI transactions between Ford and Toyota (the manufacturers) and their first tier supplier (Patent Brakes and Replacement Ltd). For example, the supplier sends an Advanced Shipping Notice (ASN) to the manufacturer before supplying the parts. At the same time, a copy of the ASN is sent to the Transport Company for the truck driver to deliver the right quantity. The truck driver also brings a copy of the ASN that was sent electronically to the manufacturer. The completed motor vehicle is then sent to the finance company and they collaborate with motor vehicle dealers and arrange credit terms for selling the motor vehicles.

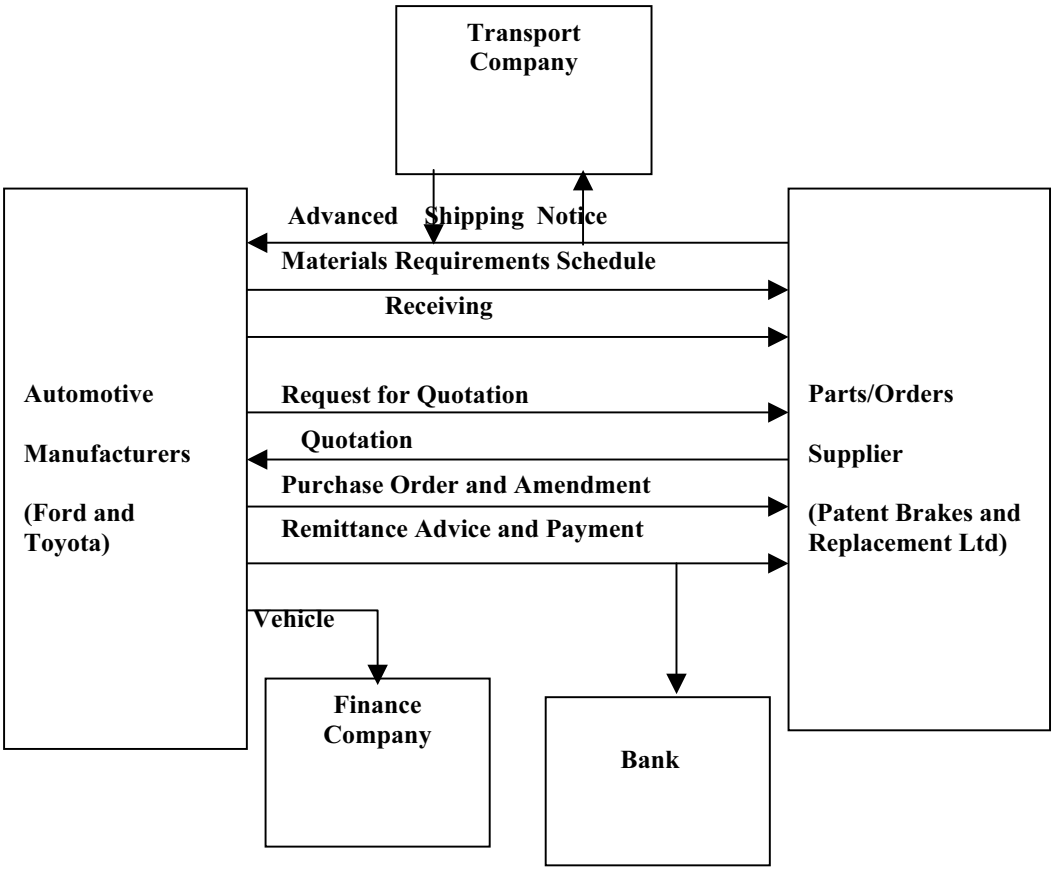

Figure 2.2: EDI Implementation at Ford, Toyota, and Patent Brakes and Replacement, Ltd.

2.3.1 Case 1: EDI Adoption, Driving Factors, Risks, Controls, and Trust at Ford

Ford was one of the earliest innovators of EDI inter-organizational network technology. In late 1987 and early 1988, Ford conducted acceptance testing of EDI business transactions. Telstra developed the Tradelink software in 1988. EDI messages such as Materials Requirements Schedules (MRS), and Advanced Shipping Notices (ASN) were initially implemented followed by other documents. By 1997, EDI use at Ford was in a mature stage. Ford has two EDI systems and many application systems across its five branches: Parts and Accessories, Original Equipment, Non-production, Purchasing, and Ford Credit and Finance. Ford's parent company in America was two to three years ahead of their Australian counterparts and supervised EDI implementation in Australia.

EDI implementation at Ford started with the Button Car Plan in the mid-1980s. The objectives of the Button Car Plan included:

- Creating a time frame to restructure and modernize (1985-1992);
- Increasing the industry's efficiency;
- Holding down vehicle price rises to no more than raises in the consumer price index;
- Minimizing disruption during restructuring; and
- Reducing job losses and providing job stability (Mackay and Rosier, 1996).

Driving Factors for Adopting EDI at Ford

Ford's aim in adopting EDI was to streamline its business processes and optimize its supply chain management. One of the principal objectives for implementing EDI was to improve efficiency in communicating manufacturers' production line needs to the suppliers of component parts. Thus, Ford's main objective was to increase its productivity and profitability by reducing costs. Ford's EDI Project Leader indicated:

> EDI was seen as a tool to transmit standard structured messages electronically from a computer application in one location to another computer application in another location. Therefore, EDI is an enabling technology, which allows our company to meet its business objectives. The analogy is the same as if one wishes to purchase a mobile telephone or a fax machine, EDI gives us competitive advantage.

Electronic trading was expected to bring about a number of benefits to Ford. They included improvements in general logistics, increased productivity, improved product quality, enhanced customer service, and lower inventory requirements.

Perceived EDI Risks at Ford

Despite protective mechanisms, there was a perception of risks in EDI usage. Most of the EDI risks perceived at Ford were perceived to have low importance, because their likelihood of occurrence was low. However, non-delivery or delayed delivery risk was rated extremely serious because the products from the supplier arrived at Ford before the Advanced Shipping Notice. Ford EDI Coordinator indicated:

> In most cases, our order entry clerk had to manually key in all the data, which was time-consuming and expensive in labor cost. Furthermore, the supplier's truck driver had to wait twenty minutes while Ford's order entry clerk recorded the delivery. Frequent occurrence of such events may even halt the rest of the assembly line.
>
> Non-authentic or unauthorized transactions were considered extremely serious, although their likelihood of occurrence was low. The remaining EDI risks shown in Table 2.3 were considered low-to-moderate because Ford imposed strict policies, best business practices, and governance mechanisms that contributed to a smooth flow of EDI transactions.

EDI Risks	Category	Seriousness Of Impact	Likelihood of Occurrence	Overall Security
1. Non delivery or Delayed delivery	Integrity Availability	Extremely Serious	Very likely	High
2. Non authentic Or unauthorized transactions	Authentication	Extremely Serious	Unlikely	High

3. Interconnection problem	Access Control	Moderately Serious	Likely	Medium
4. Inaccurate or Incomplete Transactions	Integrity	Moderately Serious	Likely	Medium
5. Incorrect data, tables or software	Integrity	Very Serious	Unlikely	Low
6. Record retention problem	Non-repudiation	Very Serious	Unlikely	High
7. Legal liability	Integrity	Very Serious	Extremely Unlikely	Low
8. Local hardware failure	Availability	Moderately Serious	Likely	Medium

Table 2.3: EDI Risks at Ford Motor Company (in order of perceived importance)

Perceived EDI Controls at Ford

The interviewees were asked to review a table of EDI controls (see Appendix B). Most of EDI controls at Ford aimed at detecting and preventing EDI risks. The findings indicated that EDI controls were part of their day-to-day procedures and their perceived impact was high. The impact of regular reviews in EDI operations, reports, documentation were rated as low because they were embedded in the EDI-VAN system (as checking mechanisms).

Trading Partner Trust at Ford

Interviews and informal discussions revealed that Ford's EDI risk assessment process, was influenced by trading partner trust and it was implicit in their day-to-day interactions. Therefore, all the necessary testing related to EDI systems were carried out before going into operations.

Interviewees at Ford agreed that trust was important for EDI participation. The following characteristics contributed to trust behaviors at Ford:

Increased Communication during EDI Adoption

Ford maintained other means of communication even after implementing EDI. Ford Accounting Manager indicated:

> Although EDI was established in the 1980s reflecting on our initial implementation procedures, we would still print off the order and fax the same order as well. Furthermore, after sending the order via EDI we would call our suppliers to check if they have received the order. In the early stages of EDI adoption and implementation we relied heavily on the daily audit trail and other feedback mechanisms such as fax and telephone.

It was found that frequent communication by other means (such as telephone, email and fax) encouraged frequent open communications that help to build trust.

Information sharing and understanding

Ford maintained regular face to face meetings with their trading partners. Ford Project Leader indicated:

> We met once bimonthly to discuss business issues relating to EDI operations within the automotive industry. We operate as a family unit and cooperate for the smooth flow of EDI operations. We represent the automotive industry.

It was found that as members of the Federation Chambers of Automotive industry, trading partners (both buyers and suppliers) met frequently to discuss EDI procedures and operational issues.

Increased Reputation

Ford's participants indicated that their reputation enabled their suppliers to develop trust with them. Ford Accounting Manager noted

> Our trading partners see our business to be important and are proud to deal with us.

Ford Australia is well known and had its largest plant located in Melbourne, Victoria. Ford was actively involved in community service (e.g. sponsoring sports events). Furthermore, many Australian residents drive Ford motor vehicles.

Belief in our trading partners that they will perform the required tasks

Ford had a history of trading partner relationships with their trading partners (suppliers). Ford IT Manager

> We believe that our trading partners are competent enough to perform the tasks as required. This is based on our long-term relationship. We have been trading with them for more than twenty years. Past experiences provided us with knowledge and information about our trading partners that allowed us to predict their present and future behaviors. Initially we received wrong messages but our trading partners have since shown competence in correctly and effectively performing the tasks using EDI.
>
> It was found that the standardized routines, procedures, and a tolerance for mistakes involved in EDI operations enabled trading partners to become competent in transmitting over EDI and build trust.

Ford identified two levels of trust

The project leader of Communications and Operations at Ford defined trust as:

> The level of confidence we have in our suppliers in being honest, reliable, having integrity and not taking actions that are detrimental to our business that would cause both business and security risks. He further went on to describe the two levels of trust at Ford.

Trust in Business Relationships

> The first type of trust (soft trust) is trust in the business relationship between Ford and their suppliers, which referred to open communications. Trading partners frequently communicated via telephone, fax, and email, as well as transacting via EDI. This translated into communication openness and trust via information sharing and concern over EDI operation. We do not check the delivery of goods, due to consistency in the quality of service provided by our suppliers. Our trading partners were willing to clarify issues in the trading partner agreement (i.e. when the meaning of a file was misread). This was an indication of confidence, belief and a willingness to communicate openly.

Trust in Data/Information Infrastructure

The second level of trust (hard trust) is more specific and related to integrity issues between IT departments who created the infrastructure indirectly from Telstra Tradelink and the EDI/Value-Added-Network software and hardware providers. Trust in entering the data on one side and retrieving the data from the other side was important. Sometimes we lose messages, obtain wrong messages because only mandatory fields of the EDI messages were shown. For example, we cannot correct human errors such as inserting a wrong date; although translation software checks on the mandatory fields, we have no control over human error.

2.3.2 Case 2: EDI Adoption, Driving Factors, Risks, Controls, and Trust at Toyota

The Japanese automotive organizations had an established history of developing relationships with their suppliers based on dependence and cooperation (Langfield-Smith and Greenwood, 1998). Toyota adopted EDI with help from their Japanese trading partners. Toyota relied upon the Kanban system, which acts as a method of quality control for the Toyota Production System (TPS). The Kanban system was used to order original equipment and parts, and to send out monthly Material Request Statements to Toyota's suppliers. This system moves in a circular manner between customers (requesting delivery of a portion of the parts as required) and has a reference number assigned to each job, so that the parts arrive in a consecutive order. The receiving clerk checks to ensure the reference number matches the purchase order number.

Toyota's purchase orders came in a proprietary electronic format (the Internal General Electrics Mark 3), from General Electrics in Information Systems (GEIS). Toyota Production System was connected to their mainframe system and two other EDI systems that maintained all EDI transactions. EDI operations were conducted internally in departments. Toyota's factory at Altona also assembles motor vehicles and is part of their network.
Toyota has been using EDI since 1989. Due to the high costs of setting up EDI via Value-Added-Networks (VAN), Toyota is now moving towards Internet-based applications that will allow their trading partners to have one part of their system connected to the Internet. Toyota's Communications Manager indicated:

> We are moving into Internet e-commerce rather than pure EDI because it is cheaper. Federation Chambers of Automotive Industry is sponsoring a feasibility study currently [late 1997], to set up an extranet called Automotive Network Exchange (ANX). –

The idea is to create an Intranet for their trading partners (suppliers and dealers) in the automotive industry which will provide a cheaper means to undertake business-to-business e-commerce.

Driving Factors for Adopting EDI at Toyota

Toyota's main objective in adopting EDI was to simplify their business processes. Telstra (Australian Telecom company) provided a secure communication link with high-speed lines. Another factor that increased the tendency to adopt Internet-based application was speed. When the concept of producing a car began, it took four years to manufacture a motor vehicle; now it only takes eighteen months. Due to the shorter production cycle time Toyota was able to save costs. Toyota's Communications Manager stated:

Most trading partners adopted EDI to increase their productivity and improve competitiveness, but for us EDI was used primarily for applications to transmit forecast information to suppliers on material requirements, thus providing detailed instructions on their daily shipment of materials required.

The findings implied that although EDI was used primarily for transmitting forecast information, it contributed to the reduction of paperwork and manual processing (from standard routine automated business processes that created efficiencies). Another benefit in using EDI included savings in time and getting paid quicker by the finance companies.

Perceived EDI Risks at Toyota

Table 2.4 shows the impact of EDI risks at Toyota. Perceived EDI risks at Toyota, was rated from low to medium. One explanation for this was that EDI use at Toyota was fairly low. Toyota does not rely on EDI for its day-to-day

survival. The assembly line control system (Kanban) details every line of assembly second by second and informs workers on the assembly line what to do for the car, based on specifications for a particular order. The assembly line control is vital for Toyota's Production System and Vehicle Tracking System. It provides information on when a motor vehicle was completed, ready to be imported into Australia, and tracks information on sale and customer details. The motor vehicles are sold to dealers before they are sold to customers. Toyota's Communications Manager indicated:

> We need to know who is the customer for warranty reasons. It is more a question of understanding what the risks are and how to manage them. Accountability is really understanding about the risks and making sure relevant authorities and shareholders really understand the risks and its implications. Hence, these two systems are the life of Toyota's business. The finance companies normally pay us within two hours.

EDI risks at Toyota were perceived to be low because they used the Kanban system, which had built in checking mechanisms aimed at continuous improvements and quality. Non-delivery or delayed delivery, and local hardware failure are more likely to occur. They have happened in the past, although not frequently. Toyota has experienced situations where the local hardware has failed, and delayed the process. The loss is not catastrophic, but a nuisance, and in most cases it was fixed within a short period of time.

EDI Risks	Category	Seriousness Of Impact	Likelihood of Occurrence	Overall Security
1. Non delivery or Delayed delivery	Integrity	Moderately Serious	Unlikely	Low
2. Local hardware failure	Availability	Not very Serious	Likely	Low
3. Interconnection problem	Availability	Moderately Serious	Unlikely	Low
4. Inadequate backup procedures/system	Integrity	Very Serious	Likely	Low
5. Record retention problem	Integrity	Very Serious	Likely	Low
6. Audit problem	Integrity	Very Serious	Unlikely	Low
7. Incorrect data, tables or software	Integrity	Very serious	Extremely Unlikely	Low

Table 2.4: EDI Risks at Toyota

Perceived EDI Controls at Toyota

The impact of EDI controls at Toyota was medium (see Appendix B) and most of the controls did not impact Toyota because they used a different EDI system (Kanban). Toyota does not undertake an ongoing business risk management process for EDI and does not consider it a key issue. The financial transactions are processed in the vehicle invoicing and finance areas. Both internal and external audit controls are implemented to check the invoices. For example, a process is set in place to detect an invoice sent for the payment within a certain time frame, which matches the operational processes.

The interviewees realized that the controls were embedded in the procedure's agreement and standards they had to abide. For example, assurance was obtained in the form of acknowledgments and audit logs. Toyota's Communications Manager noted:

> We take alternative means to verify the order either via telephone, fax, or by manually counting the tires in batches. This has happened on occasions. It is time consuming and we have notified our suppliers about it.

It was important to have assurances in order to avoid misunderstandings over discrepancies later on. By providing reliable and consistent assurances of EDI messages, trading partners became more confident.

Trading Partner Trust at Toyota

The communications manager of Toyota defined trust as the:

> Confidence in our trading partners in being reliable. Some of our suppliers have insecure systems that are incompatible. The ultimate sanction is that they lose our business. Failure by 200 suppliers to do everything is a loss for us. We need parts to be delivered on time and hope our suppliers understand the importance of business relationship. For those who are not sophisticated and insecure, we will rate their performance low, and decide whether to reduce the price or to transfer their business offshore as our trust in them lowers.

Toyota's trading partner trust during initial stages of EDI Adoption

The relationship between Toyota and their suppliers was typical of manufacturing companies: short-term and reactive with limited communications. Performance targets were set for suppliers on an adhoc basis, but results were rarely shared with suppliers'. Overall there was a lack of trust between Toyota and their new suppliers. Toyota's Communications Manager indicated

> Forcing our suppliers is not an issue for us because we have our own internal system and EDI is only a small part of our business. We were willing to depend on our trading partners to do business, because without the parts and tires (original equipment) we would be unable to manufacture our cars. We depended on our trading partners to maintain our supply chain management.

2.3.3 Case 3: EDI Adoption, Driving Factors, Risks, Controls and Trust at Patent Brakes and Replacement, Ltd

Patent Brakes Replacement (PBR Ltd) is a company with 1,100 employees. It is a major supplier, principally supplying original equipment (OE) parts to Ford and Toyota. PBR supplies up to 92% of component parts (mainly brakes) to the Passenger Motor Vehicle (PMV) lines and/or spare parts divisions. PBR is a first tier supplier for Ford and Toyota and has two branches: Original Equipment and After Marketing Company (AMC). PBR began adopting EDI when their EDI coordinator responded to the requirements of the Button Car Plan, which demanded high efficiencies and accuracies in EDI operations.

Driving factors for Adopting EDI at PBR

The main factor motivating PBR to adopt EDI was the simplification of their business processes. For example, the advanced shipping notice was key in maintaining their inventory on time. By adopting EDI, PBR eliminated manual re-keying of data, thus reaping time and labor savings.

Perceived EDI Risks at PBR

Table 2.5 shows the impact of EDI risks at PBR. PBR EDI Coordinator indicated that:

> The biggest risk is not necessarily in the automotive supply chain, but in the after-market sales. For example, an EDI risk could be duplicate purchase orders. A purchase order is a discrete document, which states what is to be supplied. The staff keying in the data could accidentally hit the F9 key twice, and goods

are delivered twice. In most cases, it is a user-input error.

Perceived EDI risks at PBR were rated from low to medium. For example, interconnection problems were likely to occur because when EDI was first initiated, their systems were not compatible with their manufacturers. The issue for PBR Ltd (as suppliers) was the inconvenience of using two parallel systems. They had to use Ford's EDI system and another system for conducting business with other customers. This contributed to higher switching costs for smaller suppliers (such as PBR Ltd), who in turn were unaware of the potential benefits of EDI. Ford's objective was to gain competitive advantage by working with their suppliers as a team. By doing so Ford was able to lock their suppliers and keep Ford's competitors out.

Hence, the overall perceived security was high, based on previous experience using EDI. Table 2.5, provides a list of PBR's EDI risks.

EDI Risks	Category	Seriousness Of Impact	Likelihood of Occurrence	Overall Security
1. Interconnection problem	Availability	Extremely Serious	Very likely	High
2. Non delivery or Delayed delivery	Integrity	Extremely Serious	Unlikely	High
3. Non authentic Or unauthorized transactions	Authentication	Moderately Serious	Likely	Medium
4. Inaccurate or Incomplete Transactions	Integrity	Moderately Serious	Likely	Medium
5. Incorrect data, tables or software	Integrity	Very Serious	Unlikely	Low
6. Record retention problem	Non-repudiation	Very Serious	Unlikely	High
7. Legal liability	Integrity	Very Serious	Extremely Unlikely	Low
8. Local hardware failure	Availability	Moderately Serious	Likely	Medium

Table 2.5: EDI Risks at Patent Brakes and Replacement, Ltd.

Perceived EDI Controls at PBR

PBR participants agreed that most of their control mechanisms were embedded in the trading partner agreement and performance assessment, as expected by their manufacturers. EDI controls were implemented as protective mechanisms. PBR EDI coordinator noted:

> Controls are provided by the network provider [Telstra Tradelink]. The VAN provider ensures the trustworthiness of participants by screening them. Part of this screening process was included in the cost of implementing the EDI infrastructure, which was high. Two levels of checking were carried out. First, when the pallets arrive, and second, when smaller breakable components are checked.

PBR EDI Coordinator went on to say that PBR wrote their own software so confidentiality of information audits and backups was not an issue.

> Tradelink automatically saves a copy. If a company is in a position and did not have anything to prove, then we use audit logs from Tradelink software. No supplier will ever trust the schedules that came in. EDI is only a carrier of the data, and with unreliable third party software, it can be a big issue. It is not a problem for us because we write all our own software. Disclosure of transaction content was also not an issue, because pricing information was not listed in the EDI messages.

The findings implied that EDI had embedded checking and detecting mechanisms as a copy of the EDI messages is automatically logged. Furthermore, confidentiality/privacy issues did not impact PBR because they wrote their own software, and financial transactions were conducted separately.

Trading Partner Trust at PBR

Competence of Trading Partners

Trust was related to security. PBR's trading partners respected the privacy and confidentiality of EDI messages. PBR EDI coordinator regarded EDI trust as the same as on paper.

> It was spelt out clearly in the trading partner agreement. Trust in trading partners, when using technology and communication depends on the urgency of the problem. If it was the wrong component, the manufacturer gets on the phone immediately. PBR must supply the stock within a specified time frame; you cannot have 150 suppliers supplying one manufacturer at the same time. Thus, trading partner trust aims to improve the productivity/profitability of your business. Our manufacturers require the components on time with the right quantity, quality, and cost effectiveness. We abide by the legal agreement and when a customer sends us a purchase order it is the same as the one being received by the supplier. This is similar to stamping in post offices. Relationships among suppliers, manufacturers, and retailers are different. We received a five-year contract for building components for the Passenger Motor Vehicles. The purchase order agreement also outlines the supplier performance assessment criteria such as zero defects, high quality, on time with low cost, and if you upset the manufacturer they will not renew my contract.

PBR participants indicated that their trading partners have shown integrity and honesty in maintaining the security of the information transmitted via EDI systems because it is equally important for them to maintain their business relationships. PBR EDI Coordinator indicated that:

> There were very few changes in the EDI operations since it was implemented in the late 1980s. Our trading partners are well trained in using EDI and when uncertainties arise they consult us immediately for clarifications via the telephone or fax. Our trading partners have shown high quality in their performance that enabled us to renew their contracts. The only area where mistrust can occur is when new trading partners lack the knowledge, skills, and awareness of the full potential of EDI technology [technology trust] that could lead to task and partnership uncertainties. The initial trust in the EDI system has been established by EDI message and industry standards. Trust definitely has a role in EDI security.

Power among trading partners

Suppliers with incompatible systems were requested to find appropriate solutions as quickly as possible. This is a situation where Ford exercised coercive power over PBR and similar findings relating to the application of power are reported in previous studies of EDI adoption within the automotive industry (Hart and Saunders, 1997; Helper, 1991; Webster, 1995). PBR EDI Coordinator noted:

> We felt we were coerced to adopt EDI, although initial support and directions via software for our IBM machines was given by Ford. Ford being our major manufacturer did apply coercive power when the EDI network was initially introduced. Ford made it clear to us that we should implement EDI. He went on to say:

> Furthermore the automotive industry dictated the requirements for an advanced period of time, and we were given a five-year contract to supply original equipment and parts to our manufacturers.

It was found that PBR focused more on technology then building trading partner relationships. One possible reason for this reflected in the manner they were treated by the more powerful buyers that created a situation of imbalance of power.

2.3.4 Integration: Key Findings and Lessons Learned on the Impact of Trading Partner Trust in EDI Adoption

This section outlines the key findings of the three exploratory studies.

EDI Protective Mechanisms

EDI governance mechanisms that protect trading partners include: written policies, legal agreements, standards, security mechanisms and business practices that ensure the smooth flow of EDI operations and security. Authorization mechanisms such as user Ids, passwords, encryption mechanisms, and digital signatures maintain security.

Trading Partner Agreements

EDI is a standard form of business-to-business e-commerce operating under prearranged rules and procedures. Trading partners using EDI within the automotive industry abide by the terms of the same trading partner agreements, EDI standards, and automotive industry guidelines. An EDI trading partner agreement is a signed legal agreement between trading partners. It consists of four levels of protection: a trading contract, purchase-order agreement, EDI legal agreement, and a procedure's agreement.

EDI Message and Industry Standards

Standards such as ANSI X12 and UN/EDIFACT guide EDI messages. In addition, EDICA, the EDI governance body in Australia, formerly called Electronic Commerce Australia (ECA), and now known as Tradegate Australia Pty Ltd controls the implementation of EDI standards within industry groups. The participants in this study agreed that EDI operates under the guidance of both message and industry standards.

EDI, unlike other types of inter-organizational systems (IOS), has structured message standards. The Federation Chamber of Automotive Industry (FCAI) and Federation of Automotive Product Manufacturers (FAPM), consisting of automotive manufacturers and suppliers, was set up to provide instructions in EDI operations guided by standards. FCAI represented members from all automotive organizations who met bi-monthly to discuss issues relating to EDI usage.

Closed User Group

The reliance on trading partner agreements, EDI/VAN agreements, screening of trading partners, EDICA guidelines, EDI message and industry standards, policies, and procedures have enabled a closed user group to emerge within the

automotive industry. In a closed user group the receipt of documents need not be verified because Telstra Tradelink (the network provider) authenticated the sender and receiver of each EDI transaction.

The findings from the three organizations suggested that trust was embedded in the EDI adoption procedures, particularly in the form of governance mechanisms. The automated protocols in the form of trust and security-based mechanisms embedded in EDI systems contribute to technology trust. Hence, governance mechanisms paved the way for structured EDI standards and industry guidelines that enabled the smooth flow of EDI operations. Trust was thus seen as an implicit factor and trading partners were expected to behave accordingly. However, trading partner trust was seen explicit in organizations that showed consistent positive behaviors, and a willingness to cooperate and share information.

Participants agreed that the outcomes of the case studies increased their awareness and understanding of the importance of trading partner trust in EDI adoption. Most participants agreed that existing service level agreements should be amended to include trading partner trust relationship factors, such as promoting open communications and sharing information that is timely, complete, and relevant. These factors reduce uncertainties and encourage good business practices among trading partners.

2.4 Chapter Summary

This chapter presented the findings of exploratory research carried out through in-depth qualitative case studies with three organizations in the automotive industry. The purpose of exploratory research was to investigate and understand trust in EDI and Internet commerce participation (adoption and integration). The findings of the exploratory research confirmed the need for studying the role of inter-organizational trust in e-commerce participation. The findings of the exploratory research, together with a literature analysis contributed to the development of the conceptual model. To achieve a comprehensive understanding of this concept, further literature research from existing literature was needed. The next chapter provides a review of literature on trust in business relationships and its impact on participation in e-commerce.

Chapter 3

The Importance of Inter-organizational trust in E-commerce Participation: Previous Research and Background Literature

3.1 Introduction

Chapter 2 discussed the exploratory research based upon three case studies. The findings of the exploratory research suggested that trading partner trust (inter-organizational trust) is important for business-to-business e-commerce participation. This chapter reviews and examines previous research in business-to-business e-commerce and discusses trust in business relationships. The findings of the exploratory research together with the literature review led to the development of the conceptual model in chapter 4.

The task of undertaking a literature review is challenging, especially when it involves theories from multiple disciplines. The chapter begins with a discussion of e-commerce from two perspectives: a technological perspective (including trust and security-based mechanisms), and a social perspective (discussing trust behaviors in business relationships). Incorporated into the analysis are previous theories of organizational behavior (inter-organizational relationships), economic (transaction-cost-economics theory) and political (resource dependency theory).

The chapter is organized as follows: Section 3.2 discusses literature relating to e-commerce adoption (including history, growth, types of applications, and factors that drive and inhibit e-commerce adoption). Section 3.3 discusses the definition of trust, existing models of trust in business relationships, types of trust, benefits of trust, barriers to building trust, and the evolution of trading partner trust from inter-organizational systems (IOSs) to inter-organizational trust (IOT). Section 3.4 discusses trust and security-based mechanisms in e-commerce from a technological perspective, often referred to as technology trust. This perspective incorporates trust and security-based mechanisms embedded in e-commerce technologies. Section 3.5 discusses organizational, economic, and political theories along with the evolution of inter-organizational systems into inter-organizational trust. While, Section 3.6 discusses perceived benefits of e-commerce, Section 3.7 discusses its perceived risks. Section 3.8 examines the extent of e-commerce participation, and section 3.9 concludes the chapter. Figure 3.1 depicts the structure of this chapter.

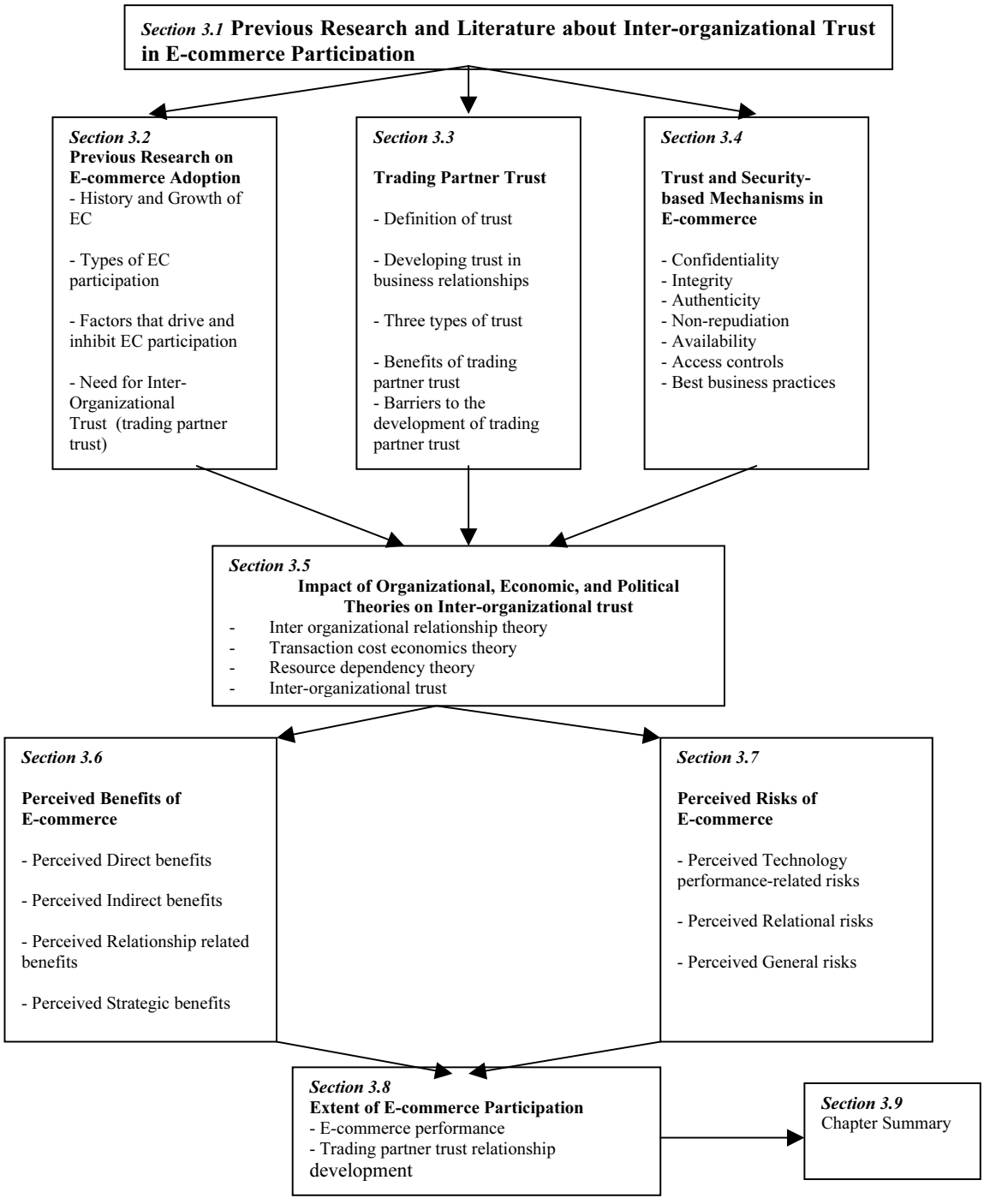

Figure 3.1 Structure of the Literature Review Chapter

3.2 Previous Research on E-commerce Participation

E-commerce participation refers to the adoption, integration, and use of e-commerce applications. Past researchers who examined e-commerce implementation suggest that e-commerce participation involves the handling of business transactions over communication networks and may encompass business-to-business, business-to-consumer, and consumer-to-business transactions (Applegate et al., 1996; Kalakota and Robinson, 2001; Senn, 1996; Wigand and Benjamin, 1997). To participate actively in e-commerce, organizations may need to alter their internal, and external integration processes and applications. This internal integration could involve interconnection with a variety of applications such as order-entry, invoicing, billing, and payment transfer. External integration includes e-commerce transactions with trading partners, such as suppliers, customers, governmental units, and financial institutions (Iacovou et al., 1995; Heck and Ribbers, 1999). Organizations seeking to participate in e-commerce have focused on existing relationships with their trading partners in order to improve their inter-organizational coordination through cooperation and information sharing. Well-documented cases such as Wal-Mart, Levi Strauss, and General Motors describe the creation of new kinds of relationships with certain suppliers and customers through bilateral electronic linkages (Henderson, 1990, Senn, 2000; Zwass, 1999). It is therefore important to note that e-commerce participation involves both e-commerce technologies and trading partner relationships. The next section discusses the history and growth of e-commerce participation.

3.2.1 E-Commerce History and Growth

Beginning in the late 1970s, businesses began to conduct a greater portion of their routine buyer-seller operational processes online (Walton, 1997). The literature pertaining to Electronic-Data-Interchange (EDI) suggests that significant benefits were achieved by organizations that were using EDI. In reality EDI adoption was not always completely successful. Organizations that used EDI relied mostly on value-added-networks (VAN) and private messaging networks, both characterized by relatively high costs and limited connectivity. As an automated information exchange, EDI standardizes documents such as purchase orders, invoices, and shipping manifests into agreed open coded format. Connectivity to VANs was available only for large organizations that already relied mostly on mailbox services. VANs were considered too expensive to implement (Pyle, 1996; Hart and Saunders, 1998). On the other hand, smaller suppliers were pressured to adopt EDI (Barrett, 1999; Helper, 1991; Iacovou et al., 1995; Langfield-Smith and Greenwood, 1998; Webster, 1995).

Over the last several years, organizations have invested heavily in inter-organizational-systems (IOS), and e-commerce applications such as e-mail, Internet-based EDI, and more recently, Internet commerce using the World Wide Web. What was once cost-effective for only large corporations conducting e-commerce in EDI format, is today feasible for all organizations through Internet commerce applications (using Internet-based EDI, intranets and extranets).

According to a Forrester research report (1999), business-to-business e-commerce in the United States worth $131 billion in 1999 is projected to reach $1.5 trillion by 2003. A study conducted by Jupiter Communications indicates the U.S. market for businesses involved in buying and selling goods on the Internet is expected to grow to $6 trillion dollars by 2005, from the current $336 million (New York Times, 2000). This means that in five years (2005), Internet trade will represent 42% of all product buying and selling among businesses,

compared to 3% today (in 2000). With such an exponential forecast in the growth of business-to-business e-commerce, establishing trust among trading partners in a global virtual environment becomes crucial.

3.2.2 Types of E-Commerce Participation

E-commerce enables many organizations to develop inter-organizational-systems, allowing buyers and sellers to share information electronically. Senn (1998) identifies three types of e-commerce relationships:

- *Person-to-person* relationships drive communications among people. E-mail and America Online are examples of this type of relationship;
- *Person-to-computer* relationships use templates (scripts using questions and responses) or a preformatted menu of options, controlled by a computer program. Extranet applications allow person-to-computer relationships between buyers who place orders online; and
- *Computer-to-computer* relationships that occur when organizations focus on inter-organizational-systems (IOS) such as EDI via value-added-networks, Internet-based EDI, intranets, and extranets to conduct exchange business transactions electronically.

The next section discusses factors that drive organizations from participating in e-commerce.

3.2.3 Factors that Drive E-commerce Participation

The Internet and World-Wide-Web are rapidly emerging as an important media for businesses to undertake e-commerce. A number of factors motivate e-commerce participation:

Reduced Costs

Past researchers have noted that the Internet is an inexpensive, flexible, and efficient means for businesses to trade and communicate (Hruska, 1995; Nath et al., 1998; Raman, 1996; Riggins and Rhee, 1998; Senn, 2000; Zwass, 1996). The biggest advantage of Internet-based EDI over VAN is the flat pricing which is not dependent on the volume of information transferred. While EDI conducted via a VAN costs about $150 per hour, the same business conducted over the Internet only costs $1 per hour.

Flexibility

Information on products, prices, business, and services in electronic databases are available to registered trading partners anytime from anywhere in the world. Internet commerce achieves accessibility, availability, and universality because trading partners can interact with one another easily as information and operations take place (Nath et al., 1998; Senn, 2000).

Open Channels for Inter-organizational Relationship Development

E-commerce enables business processes, inter-organizational transactions and trades to take place because the Web technology infrastructure performs information storage, browsing, and retrieval needed for these processes and transactions. The interactive capabilities of Web-based electronic catalogs eliminate the need for physical storage and enable dynamic, efficient, and effective updates (Raman, 1996; Shaw, 1997). Prices from different vendors can

be compared more easily, thus establishing better communication between suppliers and customers (Cavalli, 1995; Keen, 1999; Nath et al., 1998; Shaw, 1997).

Despite the phenomenal growth in the number of organizations using Internet for e-commerce, some are just not ready to take the plunge (KPMG, 1999). Organizations in a hurry to adopt e-business constantly face technical and operating issues. Some have made mistakes in e-commerce adoption and had to revisit their e-business goals. Many of the strategic issues surrounding the commercialization of the Internet have been clouded in the hype of security and misinformation (Senn, 1998). There are many social, legal, and technological issues at the present level of e-commerce technology which prevent the full realization of its benefits (Caruso, 1995). For example, some organizations are reluctant to publicly admit that they have been subjected to successful attacks by hackers (McWilliams, 2000). It is therefore essential for any e-commerce endeavor to identify the associated threats beforehand and devise a plan to reduce the risks. The next section discusses factors that inhibit e-commerce participation:

3.2.4 Factors that Inhibit E-commerce Participation

Competitive Pressure from other Trading Partners and the E-commerce Environment

Electronic partnerships between buyers and suppliers or manufacturers and distributors have become increasingly inconsistent due to competitive pressures in the global environment that demand quality (Premkumar and Ramamurthy, 1995). Iacovou et al (1995), suggest that external pressures and organizational readiness may affect e-commerce adoption. For most organizations the biggest challenge is not if or when to consider an Internet commerce solution, but rather how to select the best Internet commerce strategies to develop and sustain competitive advantage. In today's hyper-competitive global marketplace, shareholders and customers are increasingly pressured by businesses to provide easy-to-use, online applications as a better way to conduct business (Premkumar et al., 1997; Keen, 2000).

Pre-Adoption Negotiation – Startup and Restructuring Challenges

E-commerce adoption, unlike traditional information systems adoption, demands high levels of negotiation, cooperation, and commitment from participating organizations. Selecting transaction sets, negotiating legal matters, and defining performance expectations can burn up hours of staff time and also demand financial and technological resources (Senn, 1998). Furthermore, a survey by Storresten (1998) revealed that 51% of the respondents cited an internal fear of opening their organization's systems to suppliers, as implementing e-commerce could affect critical business processes such as procurement, inventory management, manufacturing, order fulfillment, shipping, invoicing, payments, and accounting (Nath et al., 1998; Senn, 1998; Storresten, 1998).

Trust and Security Concerns

The findings of the exploratory research suggest that businesses have adopted a wait and see attitude toward e-commerce, largely because of security issues (Cavalli, 1995; Norlan and Norton Institute, KPMG, 1999; Ratnasingam, 2001). Other concerns include the expandability of the Internet; and its ability to meet the needs and

expectations of all businesses. Even as the Internet becomes more secure, trading partners still do not feel safe. Security is but one barrier, the real underlying factor is insufficient trust in the reliability of Internet-based commerce to absorb the rapid increase in use (Keen, 1999; Raman, 1996). Despite the opportunities of Internet commerce, many businesses are reluctant to go online because they perceive the Internet as an intrinsically insecure environment (Bhimani, 1996; Cavalli, 1995; CommerceNet, 1997; Storrosten, 1998).

Lack of Top Management Support

With poor internal management and a lack of top level management commitment, implementing e-commerce even with the most advanced products becomes challenging. If management is unwilling to provide adequate financial resources, poor business practices might follow. For example, without full support an organization might neglect the need for a paper audit trail that would ensure the reliability of electronic certification and business continuity. Successful e-commerce adoption requires full top-level commitment, as many potential adopters are ignorant about the potential and use of e-commerce technologies and their potential benefits and risks (Jamieson, 1996; Marcella et al., 1998).

High Costs of Implementing E-Commerce

Startup costs for implementing e-commerce applications can be high. These include connection costs, hardware, software, set up, and maintenance (Iacovou et al., 1995; Nath et al., 1998, Saunders and Clark, 1992; Senn, 1998). Implementation costs may also include conducting an initial search costs, costs of writing contracts, and paying staff to update and maintain electronic databases (Senn, 1998). In addition, contractual, transmission, and coordination costs are also incurred (Nath et al., 1998; Saunders and Clark, 1992).

Technology and infrastructure costs increase, as organizations are required to implement compatible systems to receive messages from other trading partners. Organizations need to first develop the necessary IT infrastructure applications, acquire the technical implementation expertise, and invest in training. They must also acquire e-commerce translation and mapping software, and contract with a communication medium or company (Riggins and Mukhopadhyay, 1999). Thus, high costs may create initial barriers to e-commerce participation.

Lack of Standards and Policies

Extranets operate in environments that lack standards and best known practices, which can lead to potential compromises in network controls, maintenance, data ownership, internal and external security, and permissions (Riggins and Rhee, 1998; Senn, 1999). Current methods of standardization for structuring data exchanged among extranet applications totally ignore how e-commerce applications were designed to operate. In a survey of the Information Technology American Association (ITAA) Industry Pulse Sabo, (1997), found that barriers to e-commerce adoption included trust, budget constraints, and public policy regulations. Most organizations do not know what policies to set and many do not even have a complete security policy in place (Marcella et al., 1998). Lack of consistent government policies, laws, and practices may impact participation in e-commerce.

Lack of Technical Skills, Knowledge, and Expertise

Internet-based e-commerce was in its formative stages in 1997, in Australia and New Zealand while the U.S. and Europe were two to three years ahead (Norlan and Norlan, KPMG, 1999). Many trading partners lacked the skills, resources, and technical know-how to implement policies and strategies for secure e-commerce.

Saxena and Wagenaar (1997) conducted a study of EDI adoption at an organizational, industry, and country level. They found that one of the major barriers to successful EDI adoption was limited awareness of promotional activities in EDI use. This reasoning was consistent with previous empirical research that suggested that the lack of technical knowledge, expertise, and resources hindered IT use and e-commerce participation (Heck and Ribbers, 1998; Iacovou et al., 1995; Reekers and Smithson, 1996; Saunders and Clark, 1992).

E-commerce Uncertainties

The proliferation of e-commerce applications have left most trading partners uncertain of e-commerce operations and unaware of the full potential of e-commerce technology (Ghosh, 1998). Uncertainties may arise when trading partners encounter barriers in communication (such as incompatible e-commerce systems, or lack of uniform standards) that may lead to conflicts. Bensaou and Venkatraman (1996) classified three types of vulnerability: task, environment, and partnership. Similarly, such matters inside an organization were seen as roadblock even when EDI was first adopted (Emmelhainz, 1990; Nath et al., 1998; Premkumar et al., 1994). Although, risks are inevitable in every trading partner relationships, trust reduces the expectations of opportunistic behavior (Sako and Helper, 1998), and reduces perceptions of risks (Ganesan, 1994).

3.2.5 The Need for Inter-organizational trust

In spite of the efficiency and coordination benefits documented in both research literature and the trade press, e-commerce growth was relatively slow when this study was initiated in 1997. The findings of the Norlan and Norton Institute's, KPMG e-commerce survey (1999) indicated that Internet e-commerce growth was slower within the Asia-Pacific region as compared to the United States. This was due to perceived risks in security of business-to-business transactions and a lack of trust among trading partners (Drummond, 1995; Hudoklin and Stadler, 1997; Keen, 1999; Nath et al., 1998; Storreston, 1998). Fears about electronic fraud and lack of privacy hampered Internet commerce (Gorriz, 1999).

Trust has been identified as one of the central constructs in relationship marketing theory (Morgan and Hunt, 1994). The past decade has seen a paradigm shift toward relational marketing which encompasses relational contracting, working partnerships, and strategic alliances (Anderson and Narus, 1990; Dwyer, Schurr and Oh, 1987; MacNeil, 1980; Morgan and Hunt, 1994). Relational marketing includes activities directed toward establishing, developing, and maintaining successful relational exchanges. Relational exchanges include supplier partnerships (goods suppliers, just-in-time, and total quality management), lateral partnerships (competitors, technology alliances, nonprofit organizations, government), buyer partnerships (ultimate customers and intermediate customers), and internal partnerships (functional departments, employees, and business units).

Previous research on trust in the marketing and management suggests a focus on transaction-specific

investments and firm's performance (Doney and Cannon, 1997; Ganesan, 1994; Smith and Barclay, 1997; Zaheer et al., 1998). For example, trust in buyer-seller relations may be an important source of competitive advantage because it lowers transaction costs, increases satisfaction (Geyskens et al., 1998), facilitates investments, and other favorable outcomes (Barney and Hansen, 1994; Dyer and Chu, 2000; Gulati, 1995; Keen, 2000; Pavlou and Ba, 2000; Williamson, 1985). Research has also proposed that competitive advantage is too narrow a determinant for e-commerce adoption. Contemporary research on trust is converging toward a definition reflecting vulnerability, uncertainty, and risks (Das and Teng, 1998; Gambetta, 1998; Mayer et al., 1995; Parkhe, 1998; Sitkin and Pablo, 1992). Trust may also operate as a governance mechanism (Bradach and Eccles, 1989) that diminishes opportunism in exchange relations and promotes cooperation (Morgan and Hunt, 1994). Thus, buyer-seller interactions can be modeled along two dimensions: first, integrative interactions characterized by cooperative behaviors that satisfy the objectives of both trading partners; and second, distributive interactions characterized by competitive behaviors directed towards self-interest at the expense of the other trading partners (Mohr and Spekman, 1994).

Granovetter (1985) argues that social relations rather than institutional arrangements or generalized morality, are mainly responsible for the product of trust in economic life. As the duration and intensity of interactions between trading partners increase, bonds will develop. This line of reasoning is consistent with Fukuyama (1995) who claims that national efficiency is highly correlated with an existence of high trust in institutional environments. He argues that "the economic success of a nation as well as its ability to compete is conditioned by the level of trust inherent in the society" (Fukuyama, 1995, p.7).

Effective competition in the global economy demands trustworthy trading partners. While it is important for a supplier to gain the trust of a distributor, it is equally imperative that distributors (buyers) trust the supplier (Kozak and Cohen, 1997). Trust is required to achieve cooperation and commitment because the existence of trust encourages trading partners to:

- work at preserving relationship investments by cooperating with exchange partners;
- resist attractive short-term alternatives in favor of expected long-term benefits of staying with existing trading partner relationships; and
- view potentially high-risk actions as carefully as possible as commitment and trust exists in trading partners. Trust produces outcomes that promote efficiency, productivity, and effectiveness (Morgan and Hunt, 1994). In short, commitment and trust lead directly to cooperative behaviors for relationship marketing success.

Similarly, Hart and Saunders (1997) conducted a study on power and trust in EDI adoption. They discovered that trust played a very important role in EDI adoption for two main reasons:

- Trust encourages organizations to make investments necessary for electronic information exchange, including the technical investments needed for supporting greater information exchange across organizational boundaries. This, in turn, contributes to improved inter-organizational coordination and information sharing in e-commerce integration. It is important to reinforce trust during the e-commerce implementation process, as trading partners are encouraged and motivated to make investments in computer integration. Over time there will be an increase in e-commerce performance and information sharing.

- Trust discourages opportunistic behaviors that would clearly reduce information sharing over time. Here, trust helps reduce a firm's probability of behaving in an opportunistic way, thus mitigating risks and reinforcing the opportunity to expand information sharing over time.

This study focuses on inter-organizational trust within uni and bi-directional dyads in business-to-business e-commerce participation and considers not only economic benefits and risks, but also behavioral characteristics (as in trading partner trust benefits and risks).

3.3 Trading Partner Trust

Trust is a concept that has received attention in many social science fields including: psychology, sociology, political sciences, economics, marketing, anthropology, and history (see Anderson and Narus, 1990; Cummings and Bromiley, 1996; Dwyer, Schurr and Oh, 1987; Gambetta, 1988; Ganesan, 1994; Lewicki and Bunker, 1996; Moorman, Deshpande and Zaltman, 1993; Williamson, 1991). Recently, the role of trust in business has drawn increased attention recently from management researchers and practitioners alike (Hosmer, 1995; Mayer et al., 1995; Kramer and Tyler, 1996).

Trust consists of two components:

- Concerns on how we feel about being trusted (being capable of managing resources that other people value);
- Concerns on how we feel about having to trust other people (an uncomfortable activity that sometimes can bring about feelings of deterrence, anger, and anxiety) (Kipnis, 1996).

Trust has a dual meaning: it has both an emotional and intellectual component (Webster, 1992). The emotional component refers to the confidence, hope and assured anticipation that exists between organizations. The intellectual component of trust in e-commerce refers to a company's track record confirming integrity, veracity, and justice. Trust then is confidence, the absence of suspicion, a confirmed track record, and the ability to self-correct (Business Management, 1999). Trust is something no amount of money and resources can buy. People cannot demand the trust of another because it must be earned and takes time to develop. Building and maintaining trust is not a simple or fast process, but is rather an incremental process. Trust in inter-organizational settings can be developed through:

- Institutionalized processes or routines that enable trading partners to deal fairly and reliably (McKnight et al., 1998; Zaheer et al., 1998; Zucker, 1986);
- Alignment with economic incentives through hostages, or economic incentive-based trust (Williamson, 1985);
- Social relationships and embedded ties (relationship-based trust), (Dow et al., 1998; Granovetter, 1985; Gulati, 1995).

Arunachalam (1997) conducted a study analyzing issues in EDI adoption and suggested that establishing mutually beneficial trading relationships and customer service appear to be important considerations for EDI adoption. Handy (1995) suggests that the more virtual organizations are, the more their people need to rely on trust. Virtuality requires trust to make it work, technology alone is not enough (Handy, 1995). It is not an exaggeration to say that trust more than technology drives the growth of e-commerce in all its forms (Keen, 2000). This is because e-commerce is a shared technology and trust helps ensure that technology is used in ways that are beneficial to both trading partners. Internet commerce has led to intensified global competition, faster technological change, rising

costs, and risks in developing new products. All of this leaves organizations unable to do everything for themselves (Parkhe, 1998; Reekers and Smithson, 1996). They need to collaborate with other organization. Collaboration in turn depends on trust.

The marketing and management literature suggests the need for trust in distribution channels, (example Anderson and Narus, 1990; Morgan and Hunt, 1994) where vulnerability created by a high degree of interdependencies is usually found in channel relationships (Kumar, Scheer and Steenkamp, 1995). In a typical distribution channel arrangement, (between manufacturer-distributor; manufacturer-supplier) switching costs are relatively high (Doney and Canon, 1997). Trust can be viewed as a dyadic interpersonal phenomenon because both trading partners are dependent on each other (Ring and Van de Ven, 1992).

Sako (1992:48) stated "trust between buyer-supplier organizations is critical to the exchange of open and truthful information, especially when proprietary information such as, sales, orders, and inventories or information on future business plans facilitate collaboration."

Although the importance of trust has been acknowledged, how it develops and functions has received little theoretical attention (Ambrose and Johnston, 1997; McAllister, 1995; Sako, 1998).

It was found that trust is not automatically reciprocal (Cummings and Bromiley, 1996). For example, if A trusts B, it does not follow that B necessarily trusts A. The mere fact that A knows and accepts B's future actions does not make the opposite true. While trust is not reciprocal, it is not objective either (Cummings and Bromiley, 1996). Trust is the result of the subjective evaluations and personal perceptions one trading partner makes on another (Gambetta, 1988). Hence, individual trust can also mean inter-organizational trust because trust is derived from individuals in an organization, and is essentially a cumulative process (Hicks, 1999). The next section discusses characteristics and behaviors of trust in business relationships.

3.3.1 Trading Partner Trust Characteristics

The section discusses the different characteristics and behaviors of trust in business relationships. Despite the importance of trust, scholarly inquiry into the topic has been hampered as little academic research has attempted to empirically document the factors affecting trust in marketing relationships (Anderson and Weitz, 1989; Dwyer and Oh, 1987; Dyer and Chu, 2000). Numerous researchers have proposed that trust is essential for interpersonal and group behavior, managerial effectiveness, economic exchanges, and social or political stability. Yet, according to a majority of these researchers, this concept has never been precisely defined. A lack of clarity in the definition of trust has led to an overall picture of confusion, ambiguity, conflicting interpretations, and absence of reliable principles (Hosmer, 1995). In fact, no study has attempted to develop a complete and comprehensive theoretical framework of factors that influence trading partner trust in business-to-business e-commerce participation. Table 3.1, below outlines the definitions of trust from previous research that assisted in identifying and developing the definition and types of trading partner trust applied in this study.

Authors Source	Discipline	Definition of Trust
Anderson and Narus (1990)	*Marketing*	A firm's belief that another company will perform actions that will result in positive outcomes for the firm, as well as not taking unexpected actions that would result in negative outcomes for the firm
Barney and Hansen (1994)	*Management*	Mutual confidence that no party in an exchange will exploit one another's vulnerabilities.
Bromiley and Cummings (1992)	*Management*	Expectation that another individual or group will (1) have good faith and make efforts to behave in accordance with any commitments, both explicit or implicit, (2) be honest in whatever negotiations preceding those commitments, and (3) not take excessive advantage of others even when the opportunity (to renegotiate) is available.
Deutsch (1958)	*Sociology*	Actions that increase one's vulnerability to the other.
Doney and Cannon (1997)	*Psychology*	Perceived credibility and benevolence of a target of trust.
Dyer and Chu (2000)	*Management*	One party's confidence that the other party in the exchange relationship will not exploit its vulnerabilities.
Fukuyama (1995)	*Sociology*	Exceptions that arise within a community of regular, honest and cooperative parties, based on commonly shared norms, on the part of other members of that community.
Gabarro (1987)	*Management*	Consistency of behavior such that judgement about trust in working relationships is based on the accumulation of interactions, specific incidents, problems, and events.
Gambetta (1988, p217)	*Sociology*	Probability that one economic actor will make decisions and take actions that will be beneficial or at least not detrimental to another.
Ganesan (1994)	*Marketing*	Willingness to rely on an exchange partner in confidence.
Hosmer (1995)	*Management (Organizational behavior theory)*	Expectation by one person, group, or firm upon voluntarily accepted duty on the part of another person, group, or firm to recognize and protect the rights and interests of all others engaged in a joint endeavor or economic exchange.
Keen (1999)	*Information Systems and Management*	Confidence in the business relationship. The definition is extended to include risk, and it focuses on the relationships that directly involve computers and telecommunications thus creating a trust bond (security, safety, honesty, consumer-protection laws, contracts, privacy, reputation, brand, mutual self-interest).
Kumar (1996)	*Marketing and Management*	Trust is stronger than fear. Partners that trust each other generate greater profits, serve customers better, and are more adaptable.
Lewicki and Bunker (1996)	*Management and Sociology*	A state involving confident, positive expectation about another's motives with respect to oneself in situations entailing risk.
Lewis and Weigert (1986)	*Sociology*	Undertaking of a risky course of action on the confident expectation that all persons involved in the action will act competently and dutifully.
Mayer, Davis and Schoorman (1995)	*Management*	Willingness of a party to be vulnerable to the actions of another party based on the expectation that the other will perform a particular action important to the trustor, irrespective of the ability to monitor or control that other party.
McAllister (1995)	*Management*	Cognition based on the concept that we choose whom

		we will trust, in what respects, and under what circumstances; affective foundations of trust consist of emotional bonds between trading partners.
Mishra (1996)	*Management*	A party's willingness to be vulnerable to another party based on the belief that the latter party is a) competent, b) open, c) concerned, and d) reliable (Mishra, 1996).
Moorman, Deshpande and Zaltman (1993)	*Marketing*	Willingness to rely on an exchange partner with whom one has confidence. Also trust has been viewed as (1) a belief, sentiment or expectation; and as (2) a behavioral intention that reflects reliance on trading partners and involves vulnerability and uncertainty on the part of the trustor.
Morgan and Hunt (1994)	*Management*	Trust exists when one party has confidence in an exchange partner's reliability and integrity.
O' Brien (1995)	*Management*	An expectation about the positive actions of other people, without being able to influence or monitor the outcome.
Ring and Van de Ven (1994)	*Management*	Trust as confidence implies: a) the behavior of another will conform to one's expectation, and b) the goodwill of another.
Sabel (1993, p 1133)	*Psychology*	The mutual confidence that no party to an exchange will exploit the other's vulnerability. Trust is today widely regarded as a precondition for competitive success.
Sako (1998)	*Sociology*	An expectation held by an agent that its trading partner will behave in a mutually acceptable manner (including an expectation that neither party will exploit the other's vulnerabilities).
Schurr and Ozane (1987, p 940)	*Marketing*	The belief that a party's word or promise is reliable and a party will fulfill its obligations in an exchange relationship.
Zucker (1986, p 50)	*Sociology*	A set of logical expectations shared by everyone involved in an economic exchange.

Table 3.1: Definitions of Trust from Previous Research

Characteristics in the Definition of Trust

Based on the definitions of trust presented in Table 3.1, the following characteristics of trust were derived:

- A rational (or objective) view which is based on an economic perspective emphasizing the confidence in the predictability of one's expectations. There is a focus on the credible and confident expectations that arise in relation to a trading partner's expertise, skills, reliability, and intentions (Anderson and Weitz, 1989; Barney and Hansen, 1994; Dwyer and Oh, 1987; Ganesan, 1994; Morgan and Hunt, 1994; Moorman et al., 1992; Ring and Van de Ven, 1992). In e-commerce this view refers to organizational credibility (i.e., the extent to which a buyer believes that the supplier has the required expertise) and competence to perform the job effectively and reliably (Doney and Cannon, 1997).
- A relational (or subjective) view which is based on a social perspective emphasizing confidence in another trading partner's goodwill. Goodwill between trading partners focuses on faith and moral integrity and includes (Lewicki and Bunker, 1996; Mayer et al., 1995; McKnight et al., 1998; Jones and George, 1998). Researchers have also claimed that trust is a behavior reflecting reliance which involves risks, uncertainties, and vulnerabilities on the part of the trustor (Coleman, 1990; Das and Teng, 1996; Lewis and Weigert, 1986; Parkhe, 1998). Parkhe (1998) identified trust with an element of risk, uncertainty, and vulnerability. Parkhe

(1998) was consistent with other researchers who claimed that trust involves risks taking (Chiles and Mackmin, 1996; Das and Teng, 1998; Coleman, 1990; Deutsch, 1958; Koller, 1978; Lewis and Weigert, 1986; Sitkin and Pablo, 1992).

3.3.2 Trust-Building Mechanisms in Business Relationships

This section examines characteristics of trust behaviors from previous research that help to build trust in business relationships leading to an identification of three types of trust applied in this study.

Dwyer, Schurr and Oh (1987)

Dwyer, Schurr and Oh (1987) suggest five phases in the development of trading partner relationships:

1. Awareness occurs when trading partner A initially recognizes that trading partner B is a feasible exchange partner. In e-commerce, screening of trading partners is usually conducted to determine the most suitable trading partner.
2. Exploration is seen when a trading partner searches and tries purchases. The benefits and risks of trading relationships are considered. The exploration phase in turn is comprised of five sub-processes: attraction, communication and bargaining, development and exercise of power, norm development, and expectation development.
3. Expansion occurs when trading partners continually aim to increase their benefits, thus leading to trading partner satisfaction in each other's performance. For example, when a trading partner fulfills the perceived exchange, and obligations are met in an exemplary fashion, the other trading partner's attraction is increased.
4. Commitment is an implicit or explicit pledge of relational continuity between trading partners. In bilateral relationships commitment is based on governance structures and/or shared values. Commitment connotes solidarity and cohesion as characterized by durability and consistency.
5. Durability in the exchange over time. According to MacNeil, (1980, p 95) "organic solidarity consists of a common belief in effectiveness of future exchange". Durability presumes that trading partners can discern the benefits attributable to the exchange relation and anticipate an environment that will continue to be an effective exchange. Dwyer et al., (1987) study contributed to an understanding of trading partner relationship and trust development.

Gabarro (1987)

Gabarro (1987) suggests that working relationships and social relationships develop over time and can vary in stability, mutuality, and efficiency. He conducted a study of newly appointed company presidents and examined their processes in developing working relationships with key subordinates. His findings suggest that trust in open communications is seen as clear, consistent communication, and when trading partners keep their word. The process is seen as an "interpersonal contract" governed by a set of mutual expectations concerning performance, roles, trust, and influence. In addition, Gabarro (1987) identified four stages of development in new working relationships. They included:

1. Stage 1- orientation process, where employees form an impression about one another,

2. Stage 2- exploration process lasting a few months where tentative expectations become more specific and concrete,
3. Stage 3- tests the trust in their relationships. It could take between six months to a year to do this. The interpersonal contract limits each other's influence and gets into shape, and
4. Stage 4- emphasizes stabilizing the interpersonal contract as it becomes defined and expectations undergo little changes.

He suggested that trust can be characterized in different ways including predictability, communication openness, and creditability (the degree to which one person feels assured that another will not take malevolent or arbitrary actions). Gabarro (1987) study examined the development of working relationships with key subordinates thus contributing to inter-organizational trust.

Doney and Cannon (1997)

Doney and Cannon (1997) examined a study of buyer-supplier relationships. Their findings indicate that the development of trust involved five processes, namely:

1. A calculative process where trading partners calculate the costs and/or rewards of interacting with another trading partner. Most organizations, when implementing e-commerce, undertake a cost-benefit analysis.
2. A capability process, which involves determining another trading partner's ability to meet ones obligations, thereby focusing primarily on the credibility component of trust.
3. A predictive process, which relies on one trading partner's ability to forecast another trading partner's behavior based on repeated interactions, thereby enabling trading partners to interpret outcomes. For example, through repeatedly making promises and delivering on them, a salesperson develops the confidence of buying firms. Extending this line of reasoning, Lewicki and Bunker (1996), describe predictability as a source of trust that requires not only repeated (consistent) interactions, but also courtship (Shapiro et al., 1992).
4. An intentionality process, which occurs when the trustor interprets words, behaviors and attempts to determine intentions in an exchange. Trust emerges through interpretation and assessment of the other trading partner's motives.
5. A transference process, which involves a pattern of gaining trust through reputation and recommendation. This process uses a third party's definition of another as a basis for defining the other as trustworthy. Doney and Cannon (1997) study contributed to processes involved in trust development in buyer-supplier relationships.

Ring and Van de Ven (1994)

Ring and Van de Ven (1994), developed a framework describing how inter-organizational relationships emerge, evolve, and dissolve. They suggest that cooperative inter-organizational relationships consist of repetitive sequences of negotiations, commitment, and execution stages. For example, during the negotiation stage trading parties develop joint (not individual) expectations about their motivations, possible investments, and perceived uncertainties as they explore business deals. Repeated efforts in negotiations through formal bargaining and informal sense-making processes provide trading partners with opportunities to assess uncertainties associated with the deal. The commitment stage aims to fulfill trading partners' desires. They reach an agreement on obligations and rules for future action in the relationship. The governance structure of the relationship is established at the commitment stage,

leading to a formal relational contract or an informal understanding as a psychological contract between trading parties. In the execution stage, they carry out rules of action and commitment. Trading parties give orders to their subordinates, buy materials, pay the amounts agreed upon, and administer whatever is necessary to execute the agreement. Ring and Van de Ven (1994) study emphasized on the evolvement of inter-organizational relationships and was found relevant for this study, as we examined the evolvement of inter-organizational trust in e-commerce participation

Mayer, Davis, and Schoorman (1995)

Mayer, Davis, and Schoorman (1995) identified three trust behaviors that can help establish trustworthiness. They include:

- Skills, competence, and characteristics of trading parties that enable one trading partner to have some influence on another trading partner;
- Benevolence or wanting to do good to the trustor, aside from an egocentric profit motive. Benevolence suggests the trustee has some specific attachment to the trustor; and
- Integrity in the trustor's perception that occurs when the trustee adheres to a set of principles making them reliable and predictable (if they behave consistently).

Mayer et al (1995) study contributed to the definition and an initial awareness that different behavioral characteristics exist in different stages of trading partner trust development.

Mishra (1996)

Mishra (1996) defines trust as one trading partner's willingness to be vulnerable to another trading partner, based on the belief that the latter party is competent, open, caring, and reliable. These dimensions help reinforce trust and build interest in sustaining the other organization as a trading partner over time.

- Competence identifies a trading partner's ability to interpret information correctly, thereby enabling correct and accurate decisions. Consistent, competent behavior contributes to a trading partner's credibility. The greater the credibility, the greater the confidence and willingness to trust the other trading partner and value the relationship.
- Openness is the ability of one trading partner to affect changes in another trading partner (being flexible to changes) based on honesty. Openness implies that a trading partner is willing to listen to new ideas and share information rather than control a situation or withhold information (a situation of imbalance of power), thus reinforcing trust. Such demonstrations in turn reduce the probability that the other trading partner will behave opportunistically. Openness to change improves efficiencies which reinforces mutual interest in preserving the continuity of the relationship. Continuity reinforces confidence that a trading partner will not behave opportunistically, such as inappropriately using information.
- Caring indicates that one trading partner will act in ways designed to benefit the other trading partner. Caring leads to concern that trading partners believe they will not be taken advantage of.
- Reliability is seen in consistency, between what a trading partner says and what they actually do. Reliability determines the extent to which trading partners can depend on each other and checks whether trading partners can follow through on promises. Reliability reinforces cooperation which, in turn reinforces trust. Cooperation

is the complementary, coordinated action taken by organizations and interdependent relationships to achieve mutual outcomes with expected reciprocation over time. Therefore, trust at an inter-organizational level is important. Mishra (1996) study contributed to different trust behaviors in a trading partner relationship.

Lewicki and Bunker (1996)

Lewicki and Bunker (1996), extended the work of Shapiro et al (1992) by taking a psychological perspective. They argued the development of trust occurs in stages with deterrence-based being the first and identification-based the last stage or the highest level of trust. They also suggested that the development of trust is the same for all types of relationships be they romantic, manager-employee, among peers, or among trading partners in e-commerce. Figure 3.2, portrays a three-stage model of trust development. Based upon the work of Shapiro, Sheppard and Cheraskin (1992), this model identifies three types of trust: deterrence-based trust, knowledge-based trust, and identification-based trust.

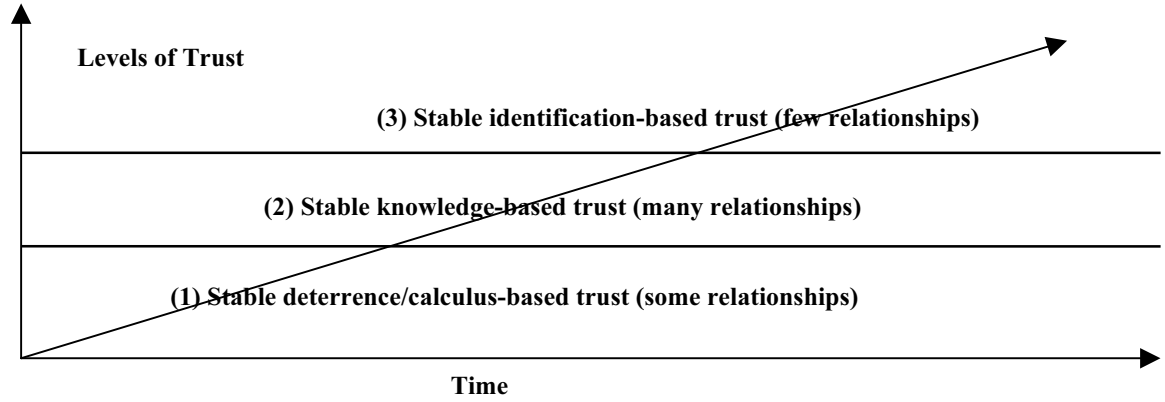

Figure 3.2: Three Stages in the Development of Trust

1 Deterrence-based trust emphasizes the behavioral consistency of trading partners, (as in trading partners' willingness to do what they say they are going to do). Although the threat of punishment in deterrence-based trust was seen as a negative factor, economic gains and rewards were seen as calculative measures. Lewicki and Bunker (1996) suggest that deterrence-based trust is grounded not only in the fear of punishment for violating trust, but also in the rewards derived from fulfilling actions (also known as calculus-based trust).

2 Knowledge-based trust is grounded in behavioral predictability based on prior knowledge and past experiences with the other trading partner (that is the trustee). One trading partner can predict the behavior of another trading partner.

3 Identification-based trust is based on empathy, concern, and common values for another trading partner's desires and intentions to the extent that one trading partner is able to act as an agent for the other. Identification-based trust tends to revolve around a common task rather than being based on individual cues.

The trust model by Lewicki and Bunker (1996) suggest that deterrence-based trust depend on the willingness to believe that there is a credible threat of punishment for a failure to cooperate. Knowledge-based trust assumes that people's dispositions are well known, and their behavior can be reliably predicted. This model is consistent with rational choice motivations. Finally, identification-based trust occurs when one trading partner fulfills the needs and desires of the other trading partner and acts in ways to realize joint gains. Lewicki and Bunker (1996) study

contributed to the stability of trading partner relationships and confirmed that trust develops gradually from one stage to another.

McAllister (1995)

McAllister (1995) focused on two principal forms of interpersonal trust: first, cognition-based trust (or rational trust) grounded in an individuals' belief about peer reliability and dependability and second, affect-based trust (or emotional trust) grounded in reciprocated interpersonal care and concerns or feelings of closeness and goodwill. Positive aspects of cognitive-based trust were seen in reliability, competence, fairness, and consistency of both trading partners. Over time these evolved into affective or emotional trust. Affective-based trust includes faith, care, concern, openness, encouragement, and information-sharing between trading partners. Cognitive and affective foundations of trust suggest that we choose whom we will trust, in what respects, and under which circumstances. We base the choice on what we take to be good reasons, constituting evidence of trustworthiness (Lewis and Weigert, 1985). In working relationships that involves high interdependencies, and peer performance that can have a determining impact on personal productivity. McAllister (1995) study contributed to different trust behaviors derived from two dimensions (i.e, a cognition (rational) versus an affective (emotional) perspective.

Barney and Hansen (1994)

Barney and Hansen (1994) identified three types of trust:

1 Weak trust is characterized by trading partners who have mutual confidence that others will not exploit their vulnerabilities. They do not depend on contractual or other forms of governance mechanisms. Weak form of trust emerges in the case of limited opportunities for opportunism (Das and Teng, 1996; Parkhe, 1998; Sitkin and Pablo, 1992).

2 Semi-strong trust depends on governance mechanisms such as reputation and contracts to safeguard against opportunism. Semi-strong trust occurs when significant exchange vulnerabilities exist and trust emerges from the protection of contracts. High costs are imposed on trading partners who behave opportunistically. Semi-strong trust can be an advantage particularly when competitors use different governance methods, skills, and abilities that are costly to initiate.

3 Strong trust (or principled trust) emerges as a response to set, internalized norms and principles guiding trading partners' behavior. It is independent of whether or not specific governance mechanisms exist, and is difficult to imitate. Previous scholars propose that trust exists in exchange relationships because of risks from the constant threat of opportunistic behavior linked with governance (Hill, 1990; Williamson, 1975). Barney and Hansen (1994) study contributed to different types of trust behaviors and its relation to governance mechanisms.

Sako (1998)

Sako (1998) identified three types of trust:

1 Contractual trust hinges on the other trading partner's ability to abide by contractual agreements. Contractual trust rests on shared norms of honesty, promise keeping, a shared understanding of professional conduct, and technical and managerial standards.

2 Competence trust relies on the other trading partner's likelihood of following through with her or his promises. It is the ability of trading partners to adhere to the business operations.

3 Goodwill trust relies on the other trading partner's commitment to taking initiatives for mutual benefit and refraining from unfair advantages. Goodwill trust can only exist if there is consensus on the principle of fairness. Goodwill trust includes collaboration. It is seen as highly cooperative (attempting to satisfy another trading partner's needs), and highly assertive (attempting to satisfy one's own needs). Sako (1998) study contributed to three types of trust behaviors suggesting that trust develops in stages.

Zucker (1986)

Zucker (1986) identified three sources of trust:

1 Process-based trust is derived from concrete experiences of social and/or economic exchanges. It assumes an expectation for future transactions deeply rooted in stable personal relations. This view is consistent with Granovetter (1985) and Fukuyama (1995) who suggests that there is social embeddedness in economic actions.

2 Characteristic-based trust relies on personal characteristics such as age, sex, and belonging to a particular ethnic community or social system. Exchanges are limited to those with a common cultivated system, shared background, and expectations.

3 Institutional-based trust transcends concrete exchange experiences, and does not depend upon the exchange partner. Sources of institutional-based trust include all traditions, professions, certifications, licenses, and brand names. Zucker (1986) study contributed to the sources of trust in this study.

Morgan and Hunt (1994)

Morgan and Hunt (1994) proposed a model for relationship marketing. It is called the "Key Mediating Variables" (KMV) model which focuses on trading partner relationships. They proposed that relationship commitment and trust are mediating variables among five antecedents of trust namely: relationship termination costs, relationship benefits, shared values, communication, and opportunistic behavior. This model has five outcomes: acquiescence, propensity to leave, cooperation, functional conflict, and decision-making uncertainty. Based on this model, if trading partners do not trust commercial web providers because they believe commercial web providers do not share their values about information privacy, they will lower their relationship commitment. This, in turn, will generate higher decision-making uncertainties, less cooperation, and a higher propensity to leave. Morgan and Hunt (1994) study identified trust behaviors that contributed to relationship commitment in this study.

Dyer and Chu (2000)

Dyer and Chu (2000) suggest that trust consists of three components namely: reliability, fairness, and goodwill. Trust is based on the confidence expected to emerge in situations where the trustworthy trading partner in the exchange relationship:

1 is known to reliably make good faith efforts to behave in accordance with prior commitments;

2 makes adjustments (as market conditions change) in ways perceived as fair by the exchange partner; and

3 does not take excessive advantage of an exchange partner even when the opportunity is available. Dyer and Chu (2000) study contributed to trust behaviors in a trading partner exchange relationship.

An analysis of trust behaviors and characteristics in business relationships examined in the previous section indicated that trust takes time to develop and that there are distinct characteristics in each stage of trust. Table 3.2 summarizes the trust characteristics and behaviors from previous research and contributes to the identification of three types of trust discussed in the next section.

3.3.3 Types of Trading Partner Trust

Synthesizing the above discussion of trust, we identified three basic types of trust: competence trust, predictability trust, and goodwill trust that gradually develop from one stage to another.

(1) Competence Trading Partner Trust

Previous research at an organizational and inter-organizational level suggests that the competency dimension of trust is discussed in the context of exchange relationships (Sako, 1992). The extent to which one supplier organization's products meets the quality needs of the buying organization and the buying organization no longer inspects those products before accepting delivery shows greater trust in the supplier organization's competence (Sako, 1992; Dyer and Chu, 2000). This view was consistent with the findings of the exploratory study when Ford stopped checking the goods delivered by their suppliers.

The first stage competence trust emphasizes trust in a trading partner's skill, technical knowledge, and ability to operate business-to-business e-commerce applications correctly and to do what they are supposed to do (Gabarro, 1987; Lewicki and Bunker, 1996; Mayer et al., 1995; Mishra, 1996). Trading partners who demonstrate competence and have the right skills and expertise in operating e-commerce systems tend to deliver high-quality goods, services or information to other trading partners (Helper, 1991; Webster, 1995). Thus, competence trust relies on an economic foundation where benefits are derived from savings in costs and time. Alternatively, a lack of competence trust may lead to additional costs, if trading partners need to be re-trained, or if the same transaction needs to be re-sent correctly.

(2) Predictability Trading Partner Trust

Predictability trading partner trust is derived from the consistent behavior of trading partners in the second stage. Consistency between what a trading partner says and actually does make the partner reliable (Hart and Saunders, 1997). It implies that trading partners are dependable and can follow through on promises, which develops high levels of cooperation and reinforces trust (Dyer and Chu, 2000; Mayer et al., 1995; Mishra, 1996; Zucker, 1986). Predictability trust is an extension of competence-based trust (i.e., a series of positive, consistent, reliable behaviors makes a trading partner predictable and therefore trustworthy (Lewicki and Bunker, 1996). McAllister (1995), suggests that we choose whom to trust and under which circumstances. This choice is cognition-based (interpersonal trust), and involves past measures of trust such as reliability and dependability. In addition consistent behaviors of trading partners lead to a foundation of familiarity. Alternatively, a series of negative consistent behaviors (i.e. a lack of competence trust, opportunistic behaviors, and an imbalance of power among trading partners) can lead to predictability mistrust.

(3) Goodwill Trading Partner Trust

Goodwill trading partner trust occurs when a trading partner believes the other trading partner is honest and dependable (Barney and Hansen, 1994; Dyer and Chu, 2000; Mayer et al., 1995; McAllister, 1995; Mishra, 1996; Sako, 1998). Goodwill trust develops from both competence and predictability trust. When expectations of reliability and dependability are met, trust moves to affective foundations that include emotional bonds such as, care

and concern. It emphasizes a belief in a trading partner's care, concern, honesty, and benevolence and permits other trading partners to further invest in their trading partner relationships. This, in turn, leads to a foundation of empathy characterized by an increased level of cooperation, open communication, information sharing, and commitment to increased participation in e-commerce thus leading to three stages of trust development. Trading partners who demonstrate care and concern are willing to share information and commit to long-term investments. Goodwill trust occurs when the primary reliance is on moral character. The next section discusses the benefits of the three types of trading partner trust.

Table 3.2 below relates these three types of trust to the typologies of trust as a gradual development of trust in three stages presented in previous literature.

Types of Trust Sources	**1st Stage Competence Trading Partner Trust Economic Foundation**	**2nd Stage Predictability Trading Partner Trust Familiarity Foundation**	**3rd Stage Goodwill Trading Partner Trust Empathic Foundation**
Zucker (1986)	Process-based trust	Characteristics-based trust	Institutional-based trust
Gabarro (1987)	Character Role competence	Judgment	Motives/ Intentions
Sako (1992)	Contractual	Competence	Goodwill
Barney and Hansen(1994)	Weak form of trust	Semi-strong form of trust	Strong form of trust
Mayer, Davis and Schoorman (1995)	Ability	Integrity	Benevolence
McAllister (1995)	Cognitive	Cognitive → affective	Affective
Lewicki and Bunker (1996)	Deterrence/ Calculus	Knowledge	Identification
Mishra (1996)	Competence	Reliability	Openness Care Concern
Dyer and Chu (2000)	Reliability	Fairness	Goodwill

Table 3.2: Types of Trust in Business Relationships

3.3.4 Perceived Benefits of Trading Partner Trust

Our survey of literature on the benefits identified three types of benefits. These include direct (economic), relationship-related, and strategic benefits which are discussed below.

Economic benefits

Trust in e-commerce networks has a productive value because trust is known to economize transaction and search costs, thereby creating conditions for trading partner exchanges (Carney, 1998; Ganesan, 1994). Economic benefits are derived from sharing initial connection and implementation costs associated in e-commerce. Buyers who trust their suppliers may direct them to purchase hardware and software from particular vendors, where discounts are available on those items. In addition, the buyer and seller gain the compatibility of their systems. Trust not only reduces transaction costs and the cost of monitoring trading partners' performance, but also eliminates the need for installing control systems based on short-term financial results (Cummings and Bromiley, 1996). By sharing e-commerce technologies, trust increases confidence and security in trading partner relationships, thereby promoting

open, substantive information exchanges (Gulati, 1995; Handy, 1995; Keen, 1999). Previous research suggests that trust in buyer-supplier relations may be an important source for competitive advantage because it lowers transaction costs (Barney and Hansen, 1994; Dyer and Chu, 2000; Zaheer et al., 1998). In short, trust improves information availability, reduces transaction costs, contributes to positive association, and ameliorates negative externalities.

Relationship-related benefits

Communication, which is the formal and informal sharing of meaningful and timely information between organizations, is the key to coordinating trading partners skills and resources (Anderson and Narus, 1990). Effective communication enables trading partners to benefit from one another, thereby learning each others' core competencies. Trading partners who exhibit consistent trust through confidence in the other trading partner's sincerity, reliability, loyalty, and willingness to refrain from opportunistic behavior are developing predictability trust. Predictability trust develops from consistent positive behaviors, and assurances between what the trading partner says and what they actually do that leads to reliability and dependability (Cummings and Bromiley, 1996; Lewicki and Bunker, 1996; Mishra, 1996).

Past studies indicate that organizations with short-term orientation rely on efficiencies from market exchanges to maximize their profits in a transaction, whereas organizations with long-term orientations rely on relational exchanges (repeated exchanges) to maximize their profits over a series of repeated transactions (Doney and Cannon, 1997; Hosmer, 1995; Ganesan, 1994; Morgan and Hunt, 1994). For example, a retailer's trust in a vendor can affect their long-term orientation by reducing the perception of risks associated with opportunistic behaviors. Hazards of opportunistic behaviors in long-term relationships can be mitigated or removed if trust between trading partners exist. Gulati (1995) suggests that trust enables incomplete contracting in dyadic relationships to adapt to unanticipated contingencies in a mutually profitable manner (Gulati, 1995).

Consistent positive predictability trust between trading partners could lead to commitment, relational dependencies, conflict resolution, mutual goals, cultural similarity, and organizational compatibility (Smith and Barclay, 1997; Hart and Saunders, 1997). Trust is based on fair dealing (Ring and Van de Ven, 1994), and a sense of reciprocity (Gulati, 1995). Smeltzer (1997) concludes that a trustworthy buyer is one who does not act in a purely self-serving manner and accurately discloses relevant information when requested.

Strategic benefits

Previous e-commerce research suggests that high implementation costs pose barriers to e-commerce adoption (CommerceNet, 1997; Iacovou et al., 1995; Nath et al., 1998; Raman, 1996; Storreston, 1998). These costs include transaction costs, operational costs, contractual costs, transmission costs, and coordination costs. Successful trading partner relationships lead to strategic benefits. For example, smaller suppliers who adopt e-commerce do not reap benefits immediately because it may take a few years for suppliers to reap the profits of investment in e-commerce. In the longer run, trading partners (as in buyers) tend to create large purchase orders for their suppliers, giving them an opportunity to yield profits. Thus, the receiving suppliers may sense support, increases motivation, and ego

enhancement that helps build goodwill trust and increase their commitment. Strategic benefits from sustainable, competitive advantages increase trading partner commitment (Hoffman, 2000).

Ganesan (1994) suggests that long-term orientation in buyer-seller relationships is a function of two factors: mutual dependence and the extent to which they trust one another. Anderson and Weitz (1989) suggest that these long-term orientations lead to commitment and a willingness to forego self-interests for mutual benefits. Similarly, Morgan and Hunt (1994) found that the stronger a trading partner's committment to the relationship, the less likely it is to end the relationship. One reason for continuing a trading partner relationship is satisfaction, as opposed to dependence or bonding by contract. A trading partner who is satisfied with a current relationship is more likely to maintain that relationship than a trading partner who is dissatisfied with the arrangement (Berry, 1999; Cannon and Perrault, 1999; Griffith et al., 2000). For example, Webb and Gile (2001) point out that by concentrating on customers, sellers can build a competitive advantage. Veliyath and Fitzgerland (2000) discuss several ways that customer satisfaction could achieve competitive advantage, some of which are: identifying, creating and predicting customer needs.

Commitment is an enduring desire to maintain a valued relationship (Moorman et al., 1992). Morgan and Hunt (1994), suggest that strategic benefits are derived from commitment and trust in marketing relationships that encourage trading partners to: (1) resist attractive short-term alternatives in favor of the future long-term benefits of continuing the relationship; (2) believe in cooperation to preserve and enhance the relationships; and (3) believe that the partner will not act opportunistically.

In the exploratory study, evidence of an increase in trading partner trust was observed when the buyer (Ford) trusted the supplier (PBR Ltd). Ford made less demands on their supplier in areas relating to payment mechanisms, prices, delivery times, and quality of products and services, and regularly renewed the contracts for a long-term trading partner relationship.

3.3.5 Percieved Risks in Trading Partner Trust

This section discusses relational risks derived from mistrust in trading partner relationships.

Within the context of e-commerce, formal governance mechanisms such as contracts, regulations, and policies generate technology mechanisms based trust (also known as technology trust). Williamson (1993) refers this to governance mechanisms or institutional arrangements as "calculative trust." Thus, contracts and other governance mechanisms that are seen as performance assessment criteria were used to measure the ability and competence of trading partners to conduct e-commerce.

Coercive Power among Trading Partners

In a buyer-supplier relationship, it is difficult to persuade resistant or even hesitant trading partners to adopt e-commerce (Morgan and Hunt, 1994). A number of events that occur in the course of a trading partner relationship may challenge trust at any given time. For example, challenges in a trustworthy relationship may arise from interdependencies in sharing technology that could cause a shift in the nature of the expectations regarding the other's performance.

Role conflicts

Anderson and Narus (1984) suggest that conflict and disagreements in working partnerships are determined by the frequency, intensity, and duration of disagreements. Conflicts in turn cause stress, tension, or hostility for trading partners. For example, role conflicts can occur when two or more role expectations are incompatible. Conflicts between trading partners A and B are inevitable when they are interdependent.

The findings of the exploratory study indicated that when Ford was given the incentive to produce large quantities at times pressured their dealers to accept more cars even during slow times. Thus, conflict was built into the system because manufacturers strive to maintain profits, despite the declining profits of their dealers.

Uncertainties

In an e-commerce environment trust is the primary means of social control and coordination (Miles and Snow, 1992). According to Blau (1964), social exchanges tend to engender feelings of personal obligation, gratitude, and trust while economic exchanges do not.

Previous researchers have identified uncertainties about whether trading parties will be able to rely on trust to counter problems of adverse selections and moral hazards (Bensaou and Venkatraman, 1996; Parkhe, 1998; Ring and Van de Ven, 1994). The next section discusses trust and security-based mechanisms (technology trust) in e-commerce.

3.4 Trust and Security-based Mechanisms in E-commerce (Technology Trust)

Trust and security-based mechanisms in e-commerce are control safeguards and protection services that provide assurances and guarantees in the form of security. For example, Tan and Thoen (1998) used the term 'control trust' to refer to embedded protocols, policies, procedures in e-commerce that help to reduce the risk of opportunistic behaviors among consumers and Web retailers. Similarly, Lee and Turban (2001) measured trustworthiness of Internet shopping based on consumer evaluations of technical competence and Internet performance levels (such as speed, reliability and availability).

They include technological mechanisms such as hardware, software, and third-party services and their presence varies according to the needs of the trading partner that is applying e-commerce (Cavalli, 1995). Most previous research relating to Internet security services refer to confidentiality, data integrity, authenticity, availability, and non-repudiation mechanisms built into e-commerce systems. To this list we add two more trust, and security-based mechanisms, namely access control and best business practices.

Confidentiality

Confidentiality mechanisms reveal data only to authorized parties, who either have a legitimate need to know or have access to the system. Disclosure of transaction content may lead to the loss of confidentiality (privacy) of sensitive information whether accidentally or deliberately divulged onto an e-commerce network or an EDI mailbox storage system (Caelli et al., 1991; Jamieson, 1996; Marcella et al., 1998). Confidentiality of business-to-business e-commerce transactions is achieved by encrypting the messages .

Integrity

Integrity mechanisms provide assurance that e-commerce messages and transactions are complete, accurate, and unaltered (Bhimani, 1996; Jamieson, 1996; Parker, 1995; Marcella et al., 1998). Unauthorized access to e-commerce systems can lead to the modification of messages or records of either trading partner, which could lead to fraud.

Errors in the processing and communication of e-commerce systems can result in the transmission of incorrect trading information or inaccurate reporting to management. Application and accounting controls are used to ensure accuracy, completeness, and authorization of inbound transactions from receipt to database update, and outbound transactions from generation to transmission. Accounting controls identify, assemble, analyze, classify, record, and report an organization's transactions that maintain accountability for the related assets and liabilities (EDICA, 1990; Marcella et al., 1998).

Authentication

Authentication establishes that trading partners are who they claim they are. Data origin authentication ensures that messages are received from a valid trading partner, and confirms that the trading partner is valid, true, genuine, and worthy of acceptance by reason of conformity. Authentication requires that 1) the sender can be sure that the message reaches the intended recipient, and only the intended recipient, and 2) the recipient can be sure that the message came from the sender and not an imposter. It is important that authentication procedures are included in the organization's security plan, the lack of these could lead to valuable, sensitive information being revealed to competitors which could affect their business continuity.

Encryption mechanisms provide authentication features that provide security and audit reviews. These reviews to ensure e-commerce messages are received only from authorized trading partners (Gentry, 1994; Marcella et al., 1998; Parker, 1995).

Non-Repudiation

Non-repudiation mechanisms prevent the receiver or the originator of an e-commerce transactions from denying that the transaction was received or sent. Non-repudiation of origin protects the message receiver against the sender denying the message was sent. Non-repudiation of receipt protects the message sender from the receiver denying that the message was received (Dosdale, 1994; Jamieson, 1996; Marcella et al., 1998). For example, Ba and Pavlou (2001) suggest that credibility can be quickly generated if the appropriate feedback mechanisms on the Internet are implemented. Non-repudiation can be achieved by using the Secure Functional Acknowledgment Message (FUNACK) protocol.

Availability

Availability mechanisms provide legitimate access to e-commerce systems and deliver information only to authorized trading partners, when required, without any interruptions. Service level agreements specify hours of operations, maximum down time, and response time to maintain the availability of e-commerce systems. Disruptions to e-commerce systems can come from both natural and manmade disasters. These could lead to system breakdowns and errors. Inadvertent or deliberate corruption of e-commerce related applications could affect transactions, thereby

impacting trading partner satisfaction, supplier relations, and perhaps business continuity. Availability issues are addressed by fault tolerance, duplication of communications links, and back-up systems that prevent denial of services to authorized trading partners (Marcella et al., 1998; Bhimani, 1996).

Access Controls

Access controls provide authorization mechanisms to protect e-commerce messages against weaknesses (such as loss of messages) in the transmission media. They also protect sending trading partners against internal fraud or manipulation (Jamieson, 1996). Access control is achieved by implementing a secure operating system and segregating crucial e-commerce functions (such as, inquiry, receipt, and payment) from unauthorized employees. In addition, implementing adequate and regular audit reviews and record retention procedures helps to establish access controls (Marcella et al., 1998).

Best Business Practices

Best business practices are implemented to deter, prevent, detect and recover quickly from risks in e-commerce. They provide e-business security by monitoring suspicious activity and detecting intrusions. Best business practices include the extent and quality of top management commitment, written policies, procedures, standards, contingency measures, risk analysis and management strategies. For example, Tallon et al (2000) argue that 'management practices' have an important role in the process of IT strategies intent towards a firm's performance thus suggesting that best business practices can increase technology trust and ultimately e-commerce performance.

Trading Partner Trust in E-Commerce participation

This section provides a summary of the behaviors and characteristics associated with three types of trading partner trust with regard to e-commerce participation.

Competence trust involves a formal (objective) calculative process of business transactions. It focuses on economic benefits derived from the trading partner's ability and skills to correctly operate e-commerce technologies. Trading partners apply performance assessments as a checking mechanism to evaluate competence trust. The focus is on compatibility of e-commerce systems and trust and security-based mechanisms and training trading partners to use e-commerce systems. There are risks derived from a lack of competence, and the trading partner relationship exists for a short period of time.

Predictability trust is based on the prior history of trading experiences and a trading partner's tolerance for mistakes. Trust moves from a calculative process to a predictive process. Consistent, competent performance of trading partners contributes to predictability trust.

In goodwill trust, trading partners emphasize future investments and a shared understanding of trading partners' goals. The focus is on strategic benefits based on profit, recognition, and reputation. Goodwill trust involves a long-term relationship among trading partners (more than five years). General risks are derived from the external environment beyond their control, and poor business practices become a concern. Table 3.3 outlines the characteristics of trading partner trust and technology trust in e-commerce participation.

Unit of analysis	Competence trust	Predictability trust	Goodwill trust
Foundation	Economic	Familiarity	Empathy
Evaluation	Formal – objective, rational (hard)	Formal and informal	Informal subjective social (soft)
Development of trust	Transactional trust Hard technology trust	Transactional trust to relational – hard to soft	Relational trust Soft relationship trust
Perceived Benefits	Direct – economic benefits Derived from efficiencies of e-commerce technologies and trading partner competence	Relationship related benefits derived from consistent negative trading partner predictability trust	Strategic – symbolic benefits
Perceived Risks	Technology performance related risks (derived from e-commerce technologies)	Relational risks (derived from trading partner mistrust)	General risks (derived from poor business practices)
Trust and security-based mechanisms (Technology Trust)	High reliance on e-commerce technological mechanisms Confidentiality Authentication Integrity –audit logs Access controls Availability – firewalls Access controls Non-repudiation – Digital signatures	Consistent use of trust and security-based mechanisms Uses people mechanisms such as auditors, training and education, security analysts	Consistent use of trust and security-based mechanisms and best business practices such as top management commitment, regular audit, and contingency procedures High use of people negotiations Training and education Sales consultants
Extent (Outcomes) of E-commerce Participation	Focuses on short-term fixed contracts 2-3 years Fixed volume, dollar value and types of business transactions Explores trading partner trust Evaluates formal technological mechanisms	Focuses on mid-term renewed contracts 3-5 years Explores on new types of transactions Relies on accurate forecasts Predictability (consistent behaviors) create predictability trust and the development of trust based on past experience	Focuses on long term contracts 5-10 years Expands to long term investments Establishes a commitment to trust Increases information sharing Increases communication Increases inter-organizational coordination Increases cooperation Increases satisfaction Reputation

Table 3.3: Characteristics of Trading Partner Trust in E-commerce Participation

3.5 Organizational, Economic, and Political Theories on Inter-organizational trust

This study concentrates not only on the technological perspective, but also on the behavioral, economical, and political perspectives. Limited research on inter-organizational trust within bi-directional-dyads in e-commerce warrants interest in this topic. Although, many theories exist that are applicable to the diffusion of e-commerce

technologies, inter-organizational-relationship theory (organizational theory), transaction-cost-economics theory (economic dimension), and resource-dependency theory (political dimension) were used to examine trust in business relationships because they focused on trust related behaviors in organizations. Analysis of these theories together with the findings of the exploratory study led to the development of the conceptual model in chapter 4.

3.5.1 Inter-organizational-relationship Theory and Trust

Inter-organizational-relationship (IOR) theory focuses on reasons and conditions for forming relationships. These include socio-political, structural, behavioral, and procedural dimensions (Oliver, 1990; Ring and Van de Ven, 1994; Van de Ven and Ferry, 1980). Inter-organizational-relationships have been variously described as value-added partnerships (Henderson, 1990; Johnston and Vitale, 1988) derived from implementing information systems, inter-organizational information systems (IOS), (Cash and Konsynski, 1985; Johnston and Vitale, 1988), and electronic integration (Malone et al., 1987; Zaheer and Venkatraman, 1995). Inter-organizational-relationship theory considers situational, structural and procedural factors that are relevant for e-commerce participation.

(1) Situational factors describe reasons for forming inter-organizational relationships. These factors include resource necessity, procurement and allocation, political pressure, asymmetry or dependency, the legitimizing of current organizational operations, external efficiency opportunities, reciprocity, and resource predictability (Bensaou and Venkatraman, 1996; Reekers and Smithson, 1996; Van de Ven and Ferry, 1976).

(2) Structural factors refer to procedures and governance mechanisms that control e-commerce transactions and exchanges between trading partners. Structural factors form formal institutional arrangements and governance mechanisms that prescribe an overall pattern of interactions in inter-organizational-relationships. Formalization of these interactions refer to the extent to which rules, procedures, instructions and communications are written (Pugh et al., 1968). It examines the extent of exchange resources and information administered through formal written policies, procedures, and contracts.

Vijayasarthy and Robey (1997) examined EDI adoption in smaller retailers and they found that intensity, formalization, and information quality were important in dyadic relationships. Information quality was seen in the integrity of e-commerce transactions (accuracy, timeliness, speed, and completeness of e-commerce transactions). This study argues that although centrality (i.e., the extent to which resources and information flows are dominated by one or a few trading partners) was not found to be important, this may not be completely true in the case of EDI automotive manufacturers. The automotive industry was characterized by centrality of industry standards and coercive power exercised by large buyers pressuring smaller suppliers to adopt EDI (Helper, 1991; Webster, 1995).

(3) Procedural factors refer to the interactions and behaviors that arise from trading partner interdependencies. Interdependencies among trading partners may cause exchange behaviors such as, power, dependence, cooperation, conflict, and trust that affects the performance of inter-organizational-relationships (Anderson and Narus, 1990; Ganesan, 1994; Kumar, 1996; Morgan and Hunt, 1994).

Inter-organizational-relationship theory contributes to a useful approach of analyzing causes and conditions for forming trading partner relationships in e-commerce participation. In particular, inter-organizational-relationships theory provides insights into e-commerce transactions, information flows, linkages, trading partner behaviors, interactions, and environmental factors (Bensaou and Venkatraman, 1996; Clemons et al., 1993; Malone

et al., 1987; Oliver, 1990; Ring and Van de Ven, 1994; Van de Ven and Ferry, 1976).

Inter-organizational-relationship theory has its limitations in that it fails to adequately distinguish between types of resources and organizations. The major limitation of previous studies in inter-organizational-relationships is that they simply extended or adapted the study across organizational levels without articulating which distinct role the study addresses.

3.5.2 Transaction Cost Economics Theory and Trust

Transaction-cost economics seeks to explain the economic rationale of alternative forms of organization, i.e., their relative efficiency. Williamson (1975) suggests that where transactions have highly uncertain outcomes, recur infrequently, and require unique or transaction-specific investment, they can be performed most efficiently within hierarchies.

Trading partners normally negotiate and monitor trading partner agreements as legal contracts to protect themselves from opportunistic behaviors and risks. Transaction costs are affected by asset specificity, uncertainties, complexity of exchange, bounded rationality and behavioral factors such as opportunism.

Hill (1990) suggests it is possible to reduce transaction costs through a reputation for non-opportunistic behavior. While it is difficult to observe the difference between opportunistic versus cooperative behaviors, it is possible to select cooperative trading partners. Opportunistic actions within a single market may might yield short-term benefits, but there is a long-term cost: the lack of trust that results might inhibit future acquisitions of cost-reducing and/or quality-enhancing assets (Kumar, 1996). Trust is not purely an economic phenomenon that can be reduced to a calculation in cost/benefit terms. Trust can also be found in social relationships because “reputation has an economic value” (Hill, 1990).

Transaction-cost-economics (TCE) contributes to an economic rationale understanding in the role of trading partner trust relationships. Williamson (1975) suggests that agents in any principal-agent relationship are not to be trusted and that the risk of opportunism is high. Williamson (1975:109) suggests that business managers often do act on the basis of trust but it is difficult to identify trustworthy agents. The concern is how to develop efficient safeguard strategies against the hazards of opportunism in the absence of uncertainty about the trading partner’s trustworthiness. In addition, trust is an ongoing, market-oriented, economic calculation; its value is derived from results of creating and sustaining the relationship relative to the costs of maintaining or severing it. Hence, trust is critical, particularly when the economic value of trading partner relationships is in question.

The limitation of transaction-cost-economics theory is that the traditional transaction cost approach ignores the role of inter-organizational-relations for the purpose of development and exchange of resources and competencies. TCE theory assumes opportunism as standard behavior. It ignores the crucial role that informal, socially embedded personal relationships have in producing stable relations of trust, obligation, and custom among formally independent organizations (Ring and Van de Ven, 1992). Transaction-cost-economics does not make a universal claim that applies to all organizations, nor does it accurately predict what will happen in specific situations (Reekers and Smithson, 1996). In addition, transaction-cost-economics provides limited insights into the strategic choices of organizations, and their abilities to adopt particular technologies. It neglects both the political and other non-economic aspects of inter-organizational relationships.

3.5.3 Resource Dependency Theory and Trust

Resource dependency theory complements transaction-cost-economics theory by adding a process dimension concerned with economic decision-making. It includes the political behavioral aspects of inter-organizational dyads (Pfeffer and Salancik, 1978; Reekers and Smithson, 1996). Resource dependency theory or political economy explicitly recognizes the political dimensions of the dyad. Resource dependency theory is concerned with:

- External forces in the prevailing and prospective environment within which the dyad operates; it accepts that members of the dyad are shaped by the internal structure and processes of the relationship through adaptation and interactions (Pfeffer and Salancik, 1978);
- Inter-organizational dimensions; and
- Interactions, as they influence the nature of the relationship within the dyad (Bensaou and Venkatraman, 1996).

Resource dependency theory contributes to political economic dimensions because of its holistic approach. It explicitly addresses the whole relationship over time; its history, anticipated future, and economic, political, as well as structural and behavioral dimensions. Ganesan (1994) found that trust and dependence play key roles in determining the long-term orientation of inter-organizational-relationships.

The limitation of resource dependency theory is that it lacks conceptual and operational definitions (Bensaou and Venkatraman, 1996; Reekers and Smithson, 1996). The previous section discussed inter-organizational-relationship theory (organizational theory), transaction-cost-economics theory (economic perspective), and resource dependency theory (political perspective). In the next section we discuss the evolution from inter-organizational-systems to inter-organizational trust.

3.5.4 Inter-Organizational System to Inter-organizational Trust

E-commerce technologies and Information Technology (IT) have become the main tools for implementing business processes between organizations. An Inter-Organizational-Systems (IOS) refers to “an automated information system shared by two or more companies” implemented for efficient exchange of business transactions (Cash and Konsynski, 1985, p134). Inter-organizational-systems facilitate the exchange of information electronically across organizational boundaries and provide both processing capabilities and communication links. The potential for inter-organizational-systems to serve as strategic information systems has been extensively discussed in academic journals (Cash and Konsynski, 1985; Johnston and Vitale, 1988). Inter-organizational-systems facilitate the exchange of business transactions among trading partners, as they improve the speed, ease, and quality of information transfer. Through inter-organizational-systems, buyers and sellers arrange routine exchanges of business transactions sometimes without direct negotiations. Because information is exchanged over telecommunications networks using prearranged formats, there is minimal need for telephone calls, paper documents, or business correspondence to carry out the transactions. Value-added-networks, Internet-based EDI systems, intranets, and extranet systems are examples of inter-organizational-systems. IOSs are a direct result of the growing desire to interconnect business partners for the purpose of reducing costs by streamlining processes, collapsing cycle time, and eliminating inefficiencies associated with paper processing.

Trust can be placed by one individual (trading partner) or a group of individuals (trading partners) in an organization. Moreover, trading partners in an organization may share common orientation towards trading partners

in another organization. Inter-organizational-systems provide a basis for trading partners to coordinate and share information which enhances competitive advantage (Arunachalam, 1997; Blois, 1999; Dyer and Chu, 2000; Zaheer et al., 1998). Consistent trading partner interactions between organizations lead to inter-organizational trust.

Organizational trust can be more transferable and can affect trading partners' responsibilities (Dow et al., 1998). Blois (1999) interprets inter-organizational trust as a short hand for "two sets of individuals each of which is trusting the organization of which the others are members." In other words, an organization might rely on a particular supplier because of his/her proven technical competence and reputation for dealing fairly. However, the employees will be ones who actually trust the supplier and determine whether or not the supplier is trustworthy. Doney and Cannon's (1997) study investigates the impact of supplier firm and salesperson trust on a buying firm's current supplier choice. They explicitly assume "persons and organizations can develop trust in a supplier firm's salesperson" (Doney and Cannon, 1997, p.35). Thus inter-organizational-relationships from this perspective lead to inter-organizational trust because they describe the extent of employees trust toward their trading partner's organization (Zaheer et al., 1998).

Sydow (1998) defines Inter-organizational trust (IOT) as "the confidence of an organization in the reliability of other organizations regarding a given set of outcomes or events" (p35). As this study examines dyadic relationships we adapt Sydow's definition and define inter-organizational trust as "the confidence in the reliability of two organizations in a possibly risky situation that all trading partners involved in the action will act competently and dutifully."

Thus, inter-organizational-systems implemented for the sole purpose of e-commerce contributes to the development of inter-organizational-relationships. Repeated daily interactions in inter-organizational-relationships lead to the incremental development of inter-organizational trust.

3.6 Perceived Benefits of E-Commerce

Perceived benefits of e-commerce technologies (applications) discussed in the research literature are remarkably similar. This indicates that organizations' experiences with regards the benefits have been fairly consistent (Dyer and Chu, 2000; Kalakota and Whinston, 1996; Marcella et al., 1998; Murkohpaday et al., 1995; Nath et al., 1998; Premkumar et al., 1994; Raman, 1996; Sydow, 1998; Vijayasarathy and Robey, 1997; Senn, 2000; Zaheer et al., 1998).

Perceived benefits of e-commerce in this study are categorized as perceived direct (economic), indirect, relationship-related and strategic benefits of e-commerce discussed in the next section.

3.6.1 Perceived Economic Benefits of E-commerce

Perceived direct (economic) benefits arise from improvements and efficiencies in business processes, as a result of speed and automation of e-commerce applications. These benefits occur because transactions are sent electronically from one application to another. They include a reduction of transaction costs and administrative expenses, time-savings from a faster trading cycle, and improved accuracy because the receiving trading partner need not re-key the data. Perceived economic benefits are derived from operational savings in using e-commerce technologies (Fearson and Philip, 1998; Iacovou et al., 1995; Nath et al., 1998; Senn, 1999).

Murkopdhyay, Kerke, and Kalathur (1995), conducted a study of Chrysler assembly centers and identified that EDI use improved the quality of information exchange and reduced inventory, transportation, and administrative costs. If properly configured, Internet applications can increase and enhance trading partners' productivity, and increase their capability to communicate globally. As more information and services are added to an organization's intranet, business decisions can be made more quickly. Intranets contribute to reduced costs of distributing corporate information such as newsletters and memos. Extranets on the other hand offer richer capabilities for information transfers, open new revenue prospects and decrease costs and cycle times by providing real-time tracking and monitoring information. Small to medium-sized businesses can now leverage Internet systems to reduce paperwork and interface with their trading partners, suppliers, and customers in real-time by taking advantage of "leaner and meaner" extranets (Jevans, 1999; Riggins and Rhee, 1998; Senn, 2000).

Extranet benefits include using familiar Internet tools and interface, increased communication between trading partners that allow for both internal, external communication, and real-time transaction recording. Transactions are duplicated across both the trading partner and supplier databases, thus facilitating a high degree of information sharing and enabling decision makers to make more informed decisions.

In addition there is greater flexibility, and rapid, customized product development because e-commerce systems are only monitored by trading partners. An extranet also provides improved communications among customers, suppliers, and collaborators who find it effective in decreasing overheads and increasing revenue because it permits precise and effective management of service and products. Buyer's benefits arise primarily from structural characteristics such as availability of information, provision of search mechanisms, and online product trial, all of which can reduce uncertainty in the purchase decision. Businesses benefit from the potential of the web as a medium for marketing (Hoffman and Novak, 1995; Sharp, 1998).

3.6.2 Perceived Indirect benefits of E-commerce

Perceived indirect benefits refer to positive opportunities that arise from direct financial gains. Indirect benefits include increased operational efficiencies, better customer service, improved IORs, and increased ability to compete. Indirect benefits emanate from reduced lead-time, reduced risk of obsolete stock, increased customer satisfaction, and more effective cash management. Customers benefit from increased buyer productivity, reduced acquisition time and cost, lower product prices, improved product/service quality, improved productivity, and improved profitability (Nath et al., 1998; Riggins and Rhee, 1999; Senn, 2000).

The interactive nature of the Web permits access to greater amounts of dynamic information and supports queries for decision-making (Hoffman et al., 1996). For example, intranets provide an economic backbone for enterprise networks, through closer contact with customers, suppliers, and employees who are able to access vast amounts of information. Extranets make information more accessible and simple to search, which can accelerate trading partner relationships. The web is used for everything from sharing documents to managing promotions or forecasting inventory.

3.6.3 Perceived Relationship-Related Benefits of E-commerce

Perceived relationship-related benefits refer to satisfaction that trading partners achieve in their trading partner relationships and from using e-commerce technologies. E-commerce systems such as EDI, intranets, and extranets assist buyer-seller trading partner relationships and improves supplier reliability by improving delivery performance, ensuring an acceptable quality, and correct quantity of goods (Walton, 1997). Technical connections derived from e-commerce applications between relationships are often strong, but trading partners in e-commerce organizations play an even more important role in building social bonds. Continued and repeated transactions lead to stronger relationships between trading partners, thereby tying trading partners together economically, technically, and socially. Relationship-related benefits show the presence of effective collaboration and communication between trading partners.

Coordination reflects the set of tasks one trading partner expects and the other trading partners perform. Successful trading partner relationships are marked by coordinated actions directed at mutual objectives consistent with organizational interests (Mohr and Spekman, 1994). High levels of communication permit self-disclosure about an organization's needs, priorities, prices, delivery, and terms of agreement and it also enhances an organization's reputation as being fair and equitable (Ozanne and Schurr, 1985).

Mohr and Spekman (1994) identified three aspects of communication that will improve coordination. The first is communication quality, defined as accuracy, timeliness, adequacy, correctness, and credibility of information exchanged. Second, is the extent of critical and proprietary information shared between trading partners. By sharing information and by being knowledgeable about each other's business, trading partners are able to act independently in maintaining the relationship over time. The systematic availability of information allows people to complete their tasks more effectively and is associated with increased levels of satisfaction, which is an important predictor of a successful trading partner relationship. The third aspect is the extent of participation in planning and goal setting between trading partners. When one trading partner's actions influence the ability of the other to effectively compete, the need for participation in specifying roles, responsibilities and expectations increases (Mohr and Spekman, 1994). Thus, coordination leads to a smooth flow of communication and satisfaction among trading partners, and leads to stronger commitment.

Commitment is another relational benefit, and is characterized by the willingness of trading partners to exert effort on behalf of their relationship. A high level of commitment contributes to a situation where both trading parties can achieve individual and joint goals without raising their opportunistic behaviors. Thus relationship-related benefits are derived from effective coordination, communication and commitment.

3.6.4 Perceived Strategic Benefits of E-commerce

Perceived strategic benefits refer to the long-term gains an organization achieves from developing closer ties with their trading partners by using e-commerce to improve its competitive position. Perceived strategic benefits include a compressed business cycle, intensified relationships with trading partners and the development of corporate strategies (Fearon and Philip, 1998). Yet, perceived strategic benefits are often unseen and difficult to quantify. E-commerce provides decision-making support where strategic use of information becomes available in a computer-

usable format. Changes to business processes from the use of e-commerce contribute directly operational improvements (Jamieson, 1996; Kalakota, 1996). For example, e-commerce allows for time-based competitive moves such as quick-response retailing, just-in-time manufacturing and close-to-zero inventories (Kalakota and Whinston, 1996; Kalakota and Robinson, 2001). In addition, e-commerce helps to achieve the broader goals of improving an organization's image, strengthening its reputation, increasing long-term investments, and reaching new markets (Riggins and Rhee, 1998; Senn, 2000). Others have also printed that trust is an essential element of e-commerce and can be used as a strategic mechanism in trading partner relationships (Keen, 2000; Speier, 1998).

3.7 Perceived Risks of E-commerce

Perceived risks refer to the weaknesses in e-commerce technologies, trading partner relationships, networks and e-commerce environment that can increase business risks from the trading partners. Risk has been defined as "the possibility of an adverse outcome, and uncertainty over the occurrence, timing or magnitude of that adverse outcome" (Cavello and Merkhofer, 1994). Perceived risk has been negatively associated with transaction intentions (Jarvenpaa et al., 2000), inter-organizational partnerships (Leverick and Cooper, 1998), and joint ventures (Gabrisch, 1993). The fact that the Internet was initially created to primarily share information and not to support business processes implies that no security mechanisms were implicitly included (Chellapa, 2001).

The widespread use of e-commerce has not only changed the way business is conducted, but has also introduced new risks that need to be addressed. The Internet, originally designed for scientific research use emphasizes open communication and has many inherent security flaws. For example, Internet-based EDI security is still an administrative nightmare with problems from eavesdropping, password sniffing, data modification, spoofing and repudiation (Bhimani, 1996; Drummond, 1994). Other e-commerce risks include snooping, misuse, theft, corruption of information, theft of identity and personal threats (Stewart, 1998).

Information travelling over the Internet passes through many inter-mediating nodes before reaching the final destination. With millions of transactions in the network, the potential for security breaches becomes even more significant. Trading partners are concerned with privacy and security, and may decide not to perform commercial transactions over the Internet if privacy and security are threatened. With increasing e-commerce activities, there has also been an increasing number of attacks on corporate networks (CERT, 2000). Therefore, Internet e-commerce requires effective and trusted mechanisms for ensuring information security and privacy.

E-commerce security risks can occur either internally or externally and can be primarily human or non-human (technology). The risks could be accidental or intentional. Risks can be caused by the disclosure, destruction, and modification of e-commerce transactions, or by denial of service attacks that lead to availability problems and the violation of confidential data. Ring and Van de Ven (1994) suggest various terms to describe risks such as technological, commercial, corporate risks. Similarly, Das and Teng (1996) used the term "performance risk" to account for the possibility, that objectives of inter-organizational relationships are not achieved although all partners cooperated. Perceived risks of e-commerce in this study are categorized as perceived technology performance-related risks, relational risks and general risks.

3.7.1 Perceived Technology Performance-related Risks of E-commerce

Perceived technology performance-related risks are associated with access to e-commerce infrastructure and involve the hazards of not achieving the performance objectives of a trading partner relationship (Das and Teng, 1996; Lemos, 2001). Trading partners are subject to security attacks and intrusions by hackers. The security break-ins not only result in revenue losses for businesses, but also result in projecting adverse perceptions of e-commerce security (Chellapa and Pavlou, 2001). The information transmitted may be vulnerable at various points including the trading partner's in-house applications, interface, translation software, network connection, or communication management as well as the carrier's network and mailbox services. Cross-vulnerabilities that exist between interdependent trading partners in an e-commerce network can put organizations at risk due to the "domino effect" of one trading partner's security failure comprising the integrity of the other trading partner's system (Jamieson, 1996; Marcella et al., 1998). Trading partners are subject to security attacks and intrusions by hackers. The security break-ins not only result in revenue losses for businesses, but also result in projecting adverse perceptions of e-commerce security (Chellapa and Pavlou, 2001). This is because e-commerce systems do not operate unilaterally, and the network which connects trading partners is often a shared telecommunications network.

Threats to network security can come from the Internet or from an organization's internal networks. Messages on internal networks may be intercepted due to improper configuration, overly restrictive access controls, or failure to closely monitor the network traffic. It is estimated that eighty to ninety-five percent of the total number of security incidents are due to insider attacks (Brensen, 1996; Chan and David, 2000). Furthermore, it was found that security techniques in existing software, and hardware cannot completely assure security (Nath et al., 1998). Hence, internal networks connected to the Internet become exposed to outside intruders thus contributing to technology performance-related risks.

3.7.2 Perceived Relational Risks of E-commerce

Perceived relational risks are closely related to risks derived from mistrust (Williamson, 1993). Relational risks develop from a lack of experience and technical knowledge about security, concerns about the auditability of e-commerce, task uncertainties, environment uncertainties, false impressions of unreliability, and concerns about the enforceability of transaction records in the electronic trade area. The automation of e-commerce systems where transactions are processed at high speed and volumes, has led to reduced opportunities to spot problems using human intuition (ICAEW, 1992). Thus, the timely resolution of errors or problems may be hampered by the potential loss of an audit trail. This could make re-construction and reconciliation of records difficult (Bhimani, 1996; EDICA, 1990; Jamieson, 1996; Nath et al., 1998). Relational risks such as production delays, disrupted cash flows, legal liability and loss of profitability can affect anticipated cost savings and business continuity (Jamieson, 1996; Hart and Saunders, 1998; Marcella et al., 1998).

Inter-organizational-relationships are often characterized by inherent instability arising from uncertainty regarding a partner's future behavior (Parkhe, 1998). Similarly, relational risks derived when poor cooperative relationships exist produce the fear that an organization may not work towards the mutual interests of their trading partner or that that they may not cooperate in a manner specified in the trading partner agreement.

The Coercive Power of Trading Partners

Power is an important issue in e-commerce adoption and in building trust among trading partners. Power is defined as "the capability of a firm to exert influence on another firm to act in a prescribed manner."

Coercive power is often exercised when trading partners lack cooperation. For example, trading partner A is likely to use coercive power when trading partner B, does not cooperate. Power can focus on the control of an organization's critical or strategic activities. Implicit in this issue is the concept of organizational inter-dependence (Saunders, 1990). Hart and Saunders (1997) based on a study of power and trust in EDI adoption, suggest that organizations with greater power can influence their trading partners to adopt EDI. Their findings indicate that use of power was negatively related to the volume of EDI transactions. While electronic networks may facilitate easier exchanges, they may not necessarily lead to increases in the frequency of business-to-business transactions. Thus, power exists on two levels: (1) as a motive, and (2) as a behavior.

Functional conflicts are the result of an imbalance of power, and they can often arise in inter-organizational relationships due to the inherent interdependencies between trading partners. The conflict between trading partners A and B is influenced by rewards (that are reward sources of power), and deprivations (coercive sources of power). This is particularly true in the case of Ford, when given the incentive to produce in large quantities, manufacturers found that it was necessary to pressure dealers to accept more cars than they desired during slow times. Conflicts tend to decrease the overall level of satisfaction within a relationship (Anderson and Narus, 1990).

Opportunistic Behaviors of Trading Partners

Williamson (1975, p 47) suggests that opportunism is lack of honesty in exchange, and that it involves "self-interest seeking with guile". The motives behind such discordant behavior can be rational or irrational. Opportunism leads to manipulation of information which affects the honesty and integrity of the trading partner (Hill, 1990). In an effort to control self-interested behavior, trading partners are compelled to negotiate and write explicit legal contracts that generally are time consuming and expensive.

3.7.3 Perceived General Risks of E-commerce

Perceived general risks are primarily derived from poor business practices. Examples of poor business practices include:

- Eavesdropping attacks on a network that can result in the theft of account information such as account balances and billing information;
- Password *sniffing* attacks that can be used to gain access to a system containing proprietary graphic algorithms;
- Data modification attacks that can be used to modify the contents of certain transactions;
- Spoofing which occurs when unauthorized personnel masquerade as another party. In one such situation, a criminal can set up a storefront and collect thousands or even millions of account numbers or other information from unsuspecting consumers, and;
- Repudiation which can cause major problems with billing systems and transaction processing agreements.

Even if it may be feasible to objectively measure the degree of security inherent in every transaction (CERT, 2000); Miyazaki and Fernandez, 2000), it is unclear whether this measurement would readily correspond into the exact trading partner perception about the security of their business transactions

3.8 Extent of E-commerce Participation

The extent of e-commerce participation in this study is measured by the extent to which an organization has adopted, integrated, and using e-commerce, and it is examined from two perspectives: first, the extent of e-commerce performance and second, the extent of trading partner relationship trust development.

3.8.1 Extent of E-commerce Performance

Extent of e-commerce performance refers to the extent to which both trading partners perceive their relationship to be effective in realizing performance objectives. E-commerce performance is measured as a percentage of an organization's business using e-commerce, volume, and dollar value of the transactions. It is the mutually held trading partner perceptions and agreement of their sales performance and satisfaction.

Massetti and Zmud (1995) suggested that EDI adoption and diffusion could be classified into volume (number of document exchanges using EDI) diversity (number of distinct document types a company handles with its trading partners), breadth (number of established connections with external trading partners), and depth (degree of electronic consolidation between two or more trading partners).

Bensaou and Venkatraman (1996) suggest the importance of the "fit" between trust in the trading partners and the socio-political climate, which impacts the performance of inter-organizational-systems. Similarly, electronic partnerships demand a conducive transaction climate and trust among trading partners (Anderson and Narus, 1990; Smith and Barclay, 1997). Hence, perceived e-commerce performance can be modeled as a predictor of satisfaction. Trading partners are likely to be more satisfied with relationships that are effective.

3.8.2 Extent of the Development of Trading Partner Trust Relationships

The extent of the development of trading partner trust relationships refers to the extent to which both trading partners in a relationship are satisfied with each other. The development of trust in trading partner relationships is measured by the intensity of communications, cooperation, and commitment, as well as increases in the number of trading partners. Trading partner satisfaction in e-commerce participation exists when trading partners are engaged in long-term business investments, thereby leading to business continuity and improved reputations.

In e-commerce, trading partner trust relationship development is based on:

- The degree of initial success each trading party had experienced in e-commerce participation,
- Well defined roles for all trading parties,
- Realistic expectations, and
- A well designed trading partner agreement, used as a guideline and not as a source of pressure.

Table 3.4 provides a summary of the theoretical perspectives applied in this chapter and together with the findings of the exploratory study (discussed in chapter 2), it forms the basis for the development of the conceptual

model in chapter 4. The table highlights the basic assumptions, units of analysis, strengths, weaknesses and contributions to the development of the conceptual model.

Measurement Characteristics	IORs Theory	TCEs Theory	Resource Dependency Theory	Trust in Business Relationships	Trust and security based Mechanisms in E-commerce
Paradigm	Social exchange theory Industrial marketing	Classical and neo-classical economics	Socio-political	Organizational behavior	Diffusion of technology
Unit of Analysis	Dyadic inter-organizational relationships	Relational transaction costs	Dyadic inter-organizational relationships	Business relationships Buyer-seller Manufacturer-supplier	Trading partners
Basic Assumption	Inter-organizational relations arise for a purpose and entail a particular set of structural, formal and procedural dimensions	The transaction costs determines the choice of an optimal governance structure	The extent of dependence between trading partners	The extent of trading partner trust	The reliance on technology efficiencies
Strengths	Examines reasons for the formation of situational, structural, procedural, and behavioral dimensions of dyadic inter-organizational relationships	Analyzes the efficiency and costs of governance structures	Considers political dimensions (imbalance of power, conflict resolution in an Inter-organizational dyad (IOD)	Examines the extent an Inter-Organizational -dyad is willing to cooperate, share information, communicate, coordinate and commit	Examines economic benefits from E-commerce systems and contributes to best business practices
Weaknesses	Determinants covered are broad ranging and heterogeneous. Previous studies focused	Narrow focus on economic aspects. Discrete and static analysis which assumes the existence of an optimal structure	Lacks empirical research and a conceptual definition of its dimensions	Limited empirical research of inter-organizational trust in E-commerce participation	Only focuses on the technology. Business-to-business has taken off but is still in its early stages of growth in the Asia Pacific region.

	primarily on public and welfare sector				
Contribution to this study and Conceptual Model	Conceptualizes the reasons for formation, situational, structural and behavioral exchanges in inter-organizational relationships from an organizational perspective	Conceptualizes the efficiency of inter-organizational dyadic relationships	Conceptualizes political dimensions of Inter-organizational dyad relationships.	Analyzes antecedent trust factors that determine different types of inter-organizational trust and how trust affects E-commerce participation	Analyzes reasons for trust and security-based mechanisms Inter-organizational-dyads and how they affect E-commerce participation
Perspective	Organizational	Economic	Political	Behavioral	Technological

Table 3.4: A Synthesis of Theories Applied in the Conceptual Model

3.9 Chapter Summary

This chapter examined the importance of trust from a multi-disciplinary perspective. E-commerce adoption was discussed highlighting factors that motivate and inhibit business-to-business e-commerce participation. Previous models of trust in business relationships were examined in order to identify trust behaviors and characteristics. Trust in inter-organizational relationships (IOR), transaction-cost-economics (TCE), and resource dependency theories were analyzed in order to provide an organizational, economic and socio-political perspective of trust in e-commerce participation. Trust and security-based mechanisms in e-commerce were examined, which led to security principles that provided a technology perspective in e-commerce. Perceived benefits (strengths) and perceived risks (weaknesses) of e-commerce determined the extent of inter-organizational trust in e-commerce participation. Finally, the evolution of inter-organizational-systems to inter-organizational trust was also examined. The next chapter discusses the development of a conceptual model of inter-organizational trust for e-commerce participation derived from the findings of the exploratory study and the theory discussed in this chapter.

Chapter 4

Conceptual Model of Inter-organizational trust in E-Commerce Participation

4.1 Introduction

Chapter 2 discussed the exploratory research. The findings of the exploratory research discussed in chapter two together with the theoretical foundations discussed in chapter 3 formed the basis for developing a conceptual model in this chapter. The conceptual model empirically examines the role and importance of inter-organizational trust (trading partner trust) in business-to-business e-commerce participation. In this model, theories about trust in business relationships and trust and security-based mechanisms in e-commerce contribute to motivating factors for e-commerce participation. These driving forces in turn influence the perceived benefits and risks that determine the extent of participation in e-commerce. This chapter is organized as follows: Section 4.1 presents the conceptual model. Section 4.2 discusses theories' that contribute to the constructs and sub-concepts in the conceptual model. Section 4.3 discusses and justifies the research propositions, and section 4.4 concludes the chapter. A summarized version of this chapter was accepted, published, and presented as a research in progress paper, at the ICIS, (2000)[1] conference.

4.1.1 Conceptual Model of Inter-organizational trust in E-Commerce Participation

The conceptual model depicted in Figure 4.2 presents a model of the effect of trading partner trust in e-commerce participation. The model was derived from the findings of the exploratory study on the importance of trading partner trust and from theories in multiple disciplines including marketing, management, sociology, information systems and e-commerce. Theoretical perspectives contributing to the development of the conceptual model include trust in business relationships, trust and security-based mechanisms in e-commerce, inter-organizational relationships (IORs), transaction-cost-economics (TCE), and resource-dependency theories as discussed in chapter 3. These theoretical perspectives yielded an understanding of the potential strengths and weaknesses of trading partner relationships in e-commerce participation. Moreover, they also provided a unique emphasis by not only considering the organizational, technological, economic, and socio-political perspectives of IORs, but also the behavioral dimensions relating to interactions between trading partners within a bi-directional-dyad. Figure 4.1 presents the structure of this chapter.

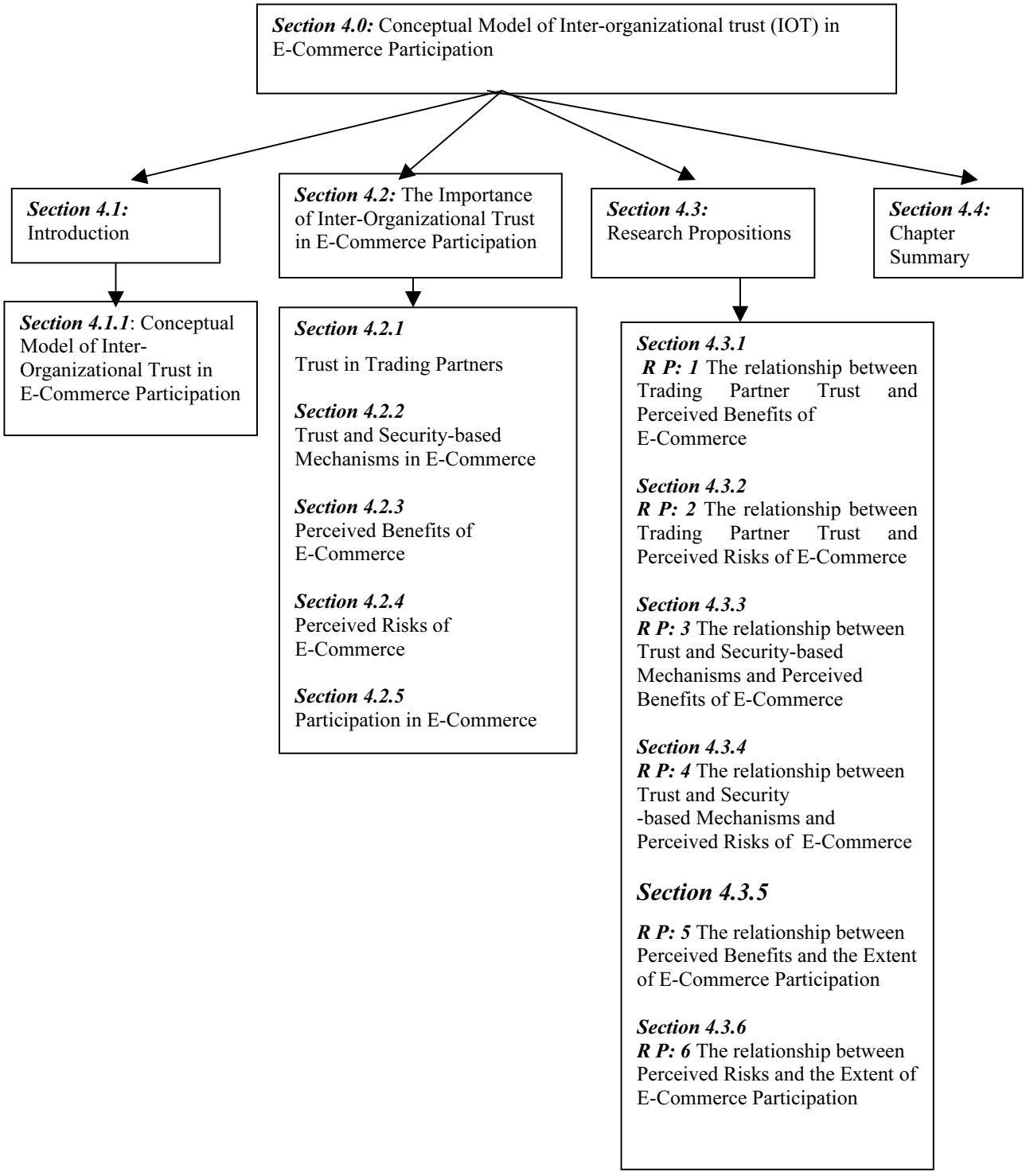

Figure 4.1: Structure of the Conceptual Model Chapter

Ratnasingham, P., and Kumar, K (2000) Trust in Business to Business Electronic Commerce Participation, 21st International Conference in Information Systems, Brisbane, Australia, Dec 10th – 13th pp..

Figure 4.2 depicts the conceptual model of inter-organizational trust in e-commerce participation.

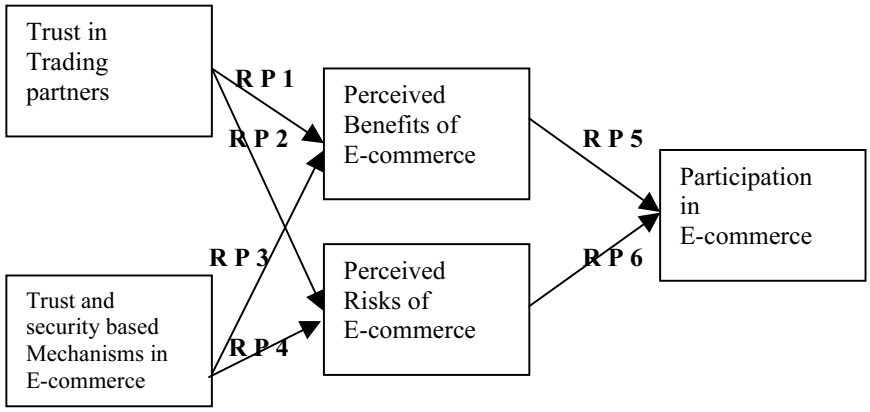

Figure 4.2: Conceptual Model of Inter-organizational trust in E-Commerce Participation

4.2 The Importance of Inter-organizational trust in E-Commerce Participation

The following section discusses the theoretical foundations leading to development of the conceptual model.

4.2.1 Trust in Trading Partners

Three types of trading partner trust were identified in e-commerce participation discussed in chapter 3, under section 3.3.3. They include competence trust (based upon economic foundations), predictability trust (based upon familiarity foundations) and goodwill trust (based upon empathic foundations).

It should be noted that there is a two-way or cyclic relationship between participation in Internet-based e-commerce and trust; trust is an antecedent of participation, and participation in e-commerce can, in turn, modify trust. This study will investigate only the forward part of the cyclic relationship: the role of trust in e-commerce participation. Table 4.1 presents a definition of the construct and sub-concepts of the three types of trading partner trust identified in this study.

Construct	Sub-Concepts	Definition
Trust in Trading Partners		Trust behaviors that determine competence, predictability, and goodwill types of trading partner trust:
	Competence Trust	Reliance upon the ability, skills, knowledge, and competence of a trading partner to perform business-to-business e-commerce correctly and completely. Competence trust examines a trading partner's ability, skills, and level of competence to undertake e-commerce operations and fulfill expectations.
	Predictability Trust	Reliance upon the consistent behaviors of trading partners that allow another trading partner to make predictions and judgments based on prior experiences. Predictability trust examines trading partners' consistent behaviors based on past experiences.
	Goodwill	Reliance upon the care, concern, honesty, and

	Trust	benevolence shown by trading partners that allow the other trading partner to further invest in the trading partner relationship. Goodwill trust examines a trading partner's honesty, care, and concern as well as the willingness to share information, cooperate, and commit to long-term investments.

Table 4.1 Sub-concepts and Definitions of Trust in Trading Partners

4.2.2 Trust and security-based mechanisms in E-Commerce

Trust and security-based mechanisms in e-commerce are controls that provide assurances and guarantees in the form of security safeguards and protection services. They include confidentiality, integrity, authentication, non-repudiation, access controls, availability, and best business practices (see section 3.4 in chapter 3). Table 4.2 presents a definition of the construct and sub-concepts/dimensions of trust and security-based mechanisms in e-commerce.

Construct	Sub-Concepts	Definition
Trust and security-based mechanisms in E- Commerce		Trust and security-based mechanisms in e-commerce are controls that provide assurances and guarantees in the form of security safeguards and protection services provided by e-commerce technologies, organizations, human, and third party services.
	Confidentiality	Protection of e-commerce transactions and message content against unauthorized reading, copying, or disclosure. Confidentiality examines the quality of encryption mechanisms and firewalls in e-commerce systems.
	Integrity	Assurance that e-commerce transactions have not been altered or deleted. Integrity examines the quality of audit procedures, sequencing of messages, and the existence of application and accounting controls.
	Authentication	Quality of being authoritative, valid, true, genuine, worthy of acceptance or belief by reason of conformity to the fact that reality is present. Authentication examines the quality of the authorization mechanisms and acknowledgment procedures in use.
	Non-repudiation	Originators of e-commerce transactions cannot deny receiving or sending transactions. Non-repudiation examines the quality of acknowledgment and retention practices in place.
	Access controls	Protection of e-commerce transactions against weaknesses in the transmission media and protection of the sender against internal fraud or manipulation. Access controls examines the quality of the network access controls, and authorization mechanisms in e-commerce.
	Availability	Assurance that e-commerce transactions are transmitted without interruption by providing authorized trading partners with an e-commerce system. Availability examines the segregation of duties and the security of the e-commerce networks.
	Best Business Practices	Refers to the policies, procedures and standards that ensure the smooth functioning of e-commerce operations. Best business practices examine the extent

		and quality of top management commitment, written policies, procedures, contingency measures, risk analysis and management strategies in place.

Table 4.2 Sub-concepts and Definitions of Trust and Security-based Mechanisms in E-Commerce

4.2.3 Perceived Benefits of E-Commerce

The perceived benefits of e-commerce are gains received by organizations and trading partners who adopt e-commerce. The perceived benefits of e-commerce in this study were discussed in chapter 3 (see section 3.6) and were categorized as perceived economic, indirect, relationship-related, and strategic benefits. Table 4.3 presents a definition of the construct and sub-concepts of perceived benefits of e-commerce.

Construct	Sub-Concepts	Definition
Perceived Benefits of E-Commerce		Perceived benefits of e-commerce are gains received by organizations that have adopted e-commerce.
	Perceived economic benefits of e-commerce	Benefits derived from direct savings in costs and time. Perceived direct benefits examine the speed and savings in costs and time from automation.
	Perceived indirect benefits of e-commerce	Benefits derived from accuracy and quality of e-commerce messages, and from competitive advantages, lead to trading partner satisfaction. Perceived indirect benefits examine trading partners' sharing of risks, service quality, productivity and competitive advantage.
	Perceived relationship-related benefits of e-commerce	Benefits derived from closer- trading partner relationships such as: open communications, information-sharing cooperation, and commitment. Perceived relationship-related benefits examine communication, information sharing, cooperation and commitment.
	Perceived strategic benefits of e-commerce	Benefits derived from long-term business investments and improved reputation of trading partners. Perceived strategic benefits examine the image, reputation, and long-term investments of a trading partner.

Table 4.3 Sub-concepts and definitions of Perceived Benefits of E-Commerce

4.2.4 Perceived Risks of E-Commerce

The perceived risks of e-commerce refer to the potential weaknesses, barriers and losses faced by organizations that adopt e-commerce. The perceived risks of e-commerce in this study were discussed in chapter 3 (see section 3.7) and were categorized as perceived technology performance-related risks, relational risks, and general risks. Table 4.4 presents a definition of the construct and sub-concepts of perceived risks of e-commerce.

Construct	Sub-Concepts	Definition
Perceived Risks of E-Commerce		Perceived risks of e-commerce are the potential weakness, barriers, and losses faced by organizations that have adopted e-commerce.
	Perceived Technology Performance	Risks derived from misuse of e-commerce technologies, viruses, and the lack of confidentiality, integrity, unauthorized access, or availability

	related risks of e-commerce	mechanisms. Perceived technology performance risks examine the compatibility, infrastructure, complexity, and uncertainties of e-commerce systems and operations.
	Perceived Relational risks of e-commerce	Risks derived from trading partner's lack of knowledge and training in e-commerce. Perceived relationship related risks examine opportunistic behavior, conflicting attitudes, poor reputation, lack of training and reluctance to change in trading partners.
	Perceived General risks of e-commerce	Risks derived from poor business practices, environmental risks, and lack of standards and lack of audit policies. Perceived general risks examine existing business practices, policies, and security services.

Table 4.4 Sub-concepts and Definitions of Perceived Risks of E-Commerce

4.2.5 Participation in E-Commerce

Participation in e-commerce is the extent to which an organization adopts, integrates, and uses business-to-business e-commerce (Hart and Saunders, 1997; Smith and Barclay, 1997; Iacovou et al., 1995). Extent of e-commerce participation includes two analysis: the extent of performance exchanged between trading partners (transaction volume, dollar value, and types of business transactions) and the extent of trading partner trust relationship development (i.e. commitment and high trust) as discussed in chapter 3 (see section 3.8). Table 4.5 presents a definition of the constructs and sub-concepts in participation in e-commerce.

Construct	Sub-Concepts	Definition
Extent of E-Commerce Participation		Participation in e-commerce is the extent an e-commerce organization engages in the adoption, integration and use of business-to-business e-commerce.
	Extent of E-Commerce Performance	Volume, dollar value, and types of business transactions exchanged between trading partners. Extent of e-commerce performance examines the volume and dollar value of e-commerce transactions.
	Extent of Trading Partner Trust relationship development	Positive affective state derived from all aspects of a trading partner relationship. Trading partner trust relationship development examines the cooperation, open communication, commitment, reputation, and long-term investments of trading partners.

Table 4.5 Sub-concepts and Definitions of the Extent of E-Commerce Participation

4.3 Research Propositions

Based upon the above research framework (Figure 4.2) and the definition of concepts presented in Section 4.2 this section develops the following six research propositions shown in Table 4.6.

R P 1: Trading partner trust is positively associated with perceived benefits of e-commerce.
R P 2: Trading partner trust is negatively associated with perceived risks of e-commerce.
R P 3: Trust and security-based mechanisms in e-commerce are positively associated with perceived benefits of e-commerce.
R P 4: Trust and security-based mechanisms in e-commerce are negatively associated with perceived risks of e-commerce.
R P 5: Perceived benefits of e-commerce are positively associated with e-commerce participation.
R P 6: Perceived risks of e-commerce are negatively associated with e-commerce participation.

Table 4.6: Research Propositions

4.3.1 R P 1: The Relationship between Trading Partner Trust and Perceived Benefits of E-Commerce

The proposed link between trading partner trust and perceived benefits of e-commerce is a subject of much discussion among researchers who have studied trust in business relationships and organizations (Barney and Hansen, 1994; Cummings and Bromiley, 1996; Doney and Cannon, 1997; McAllister, 1995; Mishra, 1996; Morgan and Hunt, 1994; Kumar, 1996; Ring and Van de Ven, 1994). A variety of research and evidence suggests that there is a positive relationship between trust and benefits.

Competence trust demonstrates a trading partner's ability and skills to operate business-to-business e-commerce applications. Consistent positive role competence contributes to the development of credibility among trading partners. When trading partners are able to send and receive e-commerce transactions correctly and in a timely manner, they are contributing to direct (economic) benefits. Economic benefits are derived from time and cost savings and from avoiding re-training or requesting trading partners to re-send the same transaction correctly.

Credibility from a series of consistent positive competence trust promotes reliability and willingness of trading partners to trust each other, and value their relationship, thereby making them predictable and trustworthy. Predictability trust in turn increases trading partners' confidence and encourages them to share information (i.e., timely, accurate, honest, and relevant). Trading partners exhibit collaboration, cooperation, communication openness, and satisfaction which contributes to indirect benefits. Morgan and Hunt, (1994), conducted a study of distribution channels and found that high levels of cooperation among trading partners contributed to satisfaction. Cooperation reduces conflict, increases communication and trading partner satisfaction and capitalizes on relationship-related benefits (Anderson and Narus, 1990; Morgan and Hunt, 1994). Satisfaction, in turn, reinforces trading partner trust and reduces the probability of trading partners behaving opportunistically, thereby inhibiting relationship-related risks (such as cheating, lying or giving inaccurate information). Moreover, satisfaction also increases commitment among trading partners and encourages long-term trading partner relationships and increased participation in e-commerce. Trading partners then gradually move to capitalize on the strategic benefits of e-commerce (Anderson and Weitz, 1989; Ganesan, 1994; Morgan and Hunt, 1994).

As predictability trust gradually develops into goodwill trust trading partners experience strategic benefits (seen from improved reputation and image of their organizations). Empirical evidence supports the link between suppliers' reputation and buyers' trust (Doney and Cannon, 1997; Ganesan, 1994). For example, in a study of industrial channel dyads, a retailer's favorable perception of their vendor's reputation led to increased credibility and trust (Ganesan, 1994). Goodwill trust is an important ingredient for long-term trading partner relationships because it shifts the focus to future conditions and encourages trading partners to increase investments in e-commerce participation (Anderson and Weitz, 1989; Dwyer, Schurr and Oh, 1987; Morgan and Hunt, 1994). This was evidenced in the exploratory study where Toyota's trading partner relationships emphasized on the importance of team spirit, that enabled their trading partners (suppliers) to communicate openly and share information. Therefore, we propose that:

R P 1: Trading partner trust is positively associated with perceived benefits of e-commerce.

4.3.2 R P 2: The Relationship between Trading Partner Trust and Perceived Risks of E-Commerce

The literature on trust suggests that regardless of the analysis level, trading partners remain vulnerable to some extent (Doney and Cannon, 1997; Williamson, 1975). Ring and Van de Ven (1994), and Das and Teng, (1996), classified risks, as either performance risks derived from the technology or relational risks derived from trading partner relationships. Interdependencies between trading partners can cause task uncertainties that contribute to technology performance-related risks derived from incompatible systems. Furthermore, uncertainties may be derived from poor business practices or a lack of competence trust due to changes in e-commerce applications in the operating environment.

Similarly a situation of imbalance of power between trading parties permit one of the trading partner to exercise coercive power and exhibit opportunistic behaviors with respect to the other (Hart and Saunders, 1997, Helper, 1991; Hill, 1990). Examples of coercive power used by powerful buyers in the automotive industry may include: slow delivery of vehicles to their distributors, slow payment on warranty work, unfair distribution of vehicles, threat of termination and bureaucratic red tape (Webster, 1995). This was also evidenced from the findings of our exploratory study where Ford imposed strict performance assessment criteria on Patent, Brakes and Replacement Ltd (their supplier). A situation of imbalance of power can create mistrust among trading partners. Furthermore, an exercise of coercive power among trading partners can motivate a lack of cooperation, encourage conflicts among trading partners, and contribute to a lack of goodwill trust. In addition, a dissatisfied trading partner will be suspicious of the other trading partner's intentions and motives and will demonstrate reluctance to share and engage in open communications, thus leading to general risks. Hill, (1990) suggests that a lack of trust affects the reputation of trading partners, and has an economic cost.

A series of consistent negative behaviors derived from a lack of cooperation and the absence of collaboration or prior consensus about the structure, function, and design of e-commerce networks may lead to predictability mistrust. In the long run, this can lead to fewer opportunities for smaller trading partners to develop their knowledge and expertise of e-commerce use thus contributing to relational risks.

While opportunistic behaviors among trading partners derived from poor business practices may yield short-term benefits, but the long-term costs from a lack of goodwill trust among trading partner inhibit future acquisitions of cost-reducing and/or quality enhancing assets (Kumar, 1996). Therefore, we propose that:

R P 2: Trading partner trust is negatively associated with perceived risks of e-commerce.

4.3.3 R P 3: The Relationship between Trust and Security-based Mechanisms in E-Commerce and Perceived Benefits of E-Commerce

The proposed link between trust and security-based mechanisms in e-commerce and its impact on perceived benefits has been studied by researchers who examined security services in e-commerce. Trust and security-based mechanisms are mostly derived from e-commerce technologies, third party services, and organizations (as in human/actors). By human actors we mean auditors, security analysts and top management personnel who are committed to enforcing best business practices in their organization. For example, the implementation of encryption mechanisms and the automation of e-commerce technologies that prevent transactions from being intercepted,

manipulated, or deleted leads to accurate, complete, correct, and timely business transactions. This, in turn, contributes to direct economic benefits of savings in time and costs (Dearing, 1990). For example, Mukhopadhyay, Kekre and Kalathur (1995), conducted a study of nine Chrysler assembly centers and found that EDI improved the quality of information exchanged, and reduced inventory, transportation, and administrative costs. They concluded that over a ten-year period, EDI use had helped Chrysler to realize a benefit of over $100 per vehicle, thus amounting to annual savings of $200 million. Therefore, the speed and automation provided by e-commerce technologies enable trading partners to not only achieve accurate, timely information, but also to increase their productivity and profitability (Nath et al., 1998; Premkumar et al., 1997; Senn, 2000).

Similarly, functional acknowledgments in the form of email feedbacks or other e-commerce protocols provide reliable and timely feedback mechanisms that increase trading partner satisfaction contributes to relationship-related benefits. For example, each trading partner has a reference (sequence) number that identifies where the transaction came from and contributes to accurate information. This was evidenced in the exploratory study where the EDI systems used by Ford and their supplier PBR Ltd had embedded security mechanisms that confirmed purchase order requests sent by Ford. E-commerce applications thus enable product and service differentiation and establish tighter links with suppliers, distributors and customers (trading partners). Consequently, both trading partners and customers achieve relationship-related benefits such as customer satisfaction and competitive advantages.

Top management commitment enforces audit, contingency planning procedures. The existence of top management commitment can also encourage trading partners to abide by best business practices. This strengthens a trading partner's reputation for exercising high standards, quality, fairness and contributes to strategic (symbolic) benefits where trading partners commit to long-term investments. Therefore, we propose that:

R P 3: Trust and security-based mechanisms in e-commerce are positively associated with perceived benefits of -commerce.

4.3.4 R P 4: The Relationship between Trust and Security-based Mechanisms in E-Commerce and Perceived Risks of E-Commerce

A lack of trust and security-based mechanisms in e-commerce may introduce vulnerabilities that make e-commerce a risky course of action (Hart and Saunders, 1997; Marcella et al., 1998). For example, a denial of service attack can occur when a malicious party (internal or external) cripples the network server's ability to respond to requests, (usually by flooding the server with many requests), or an organization may encounter software deliberately infected by a virus. These threats contribute to technology performance-related risks. Unauthorized access to e-commerce systems may provide increased opportunities for malicious parties to modify the records of single organizations or of their trading partners (Marcella et al., 1998; Parker, 1995). Such unauthorized modifications and deletions of e-commerce transactions may lead to integrity issues. Trading partners may act on those messages assuming that they came from a genuine authorized trading partner, which can contribute to technology performance-related risks and relational risks.

Similarly, poor business practices such as lack of proper training, inadequate audit and back up retention policies and procedures, or poor contingency planning procedures can lead to general risks. For example, the costs associated with businesses due to unavailable servers can severely impact business if real-time transactions are involved. Inadvertent or deliberate corruption of e-commerce records could impact trading partner satisfaction and perhaps the ultimate business continuity. Therefore, we propose that:

R P 4: Trust and security-based mechanisms in e-commerce are negatively associated with perceived risks of e-commerce.

4.3.5 R P 5: The Relationship between Perceived Benefits and Participation in E-Commerce

Trading partner trust and perceived benefits of e-commerce contribute to increased participation in e-commerce. For example, e-commerce technologies provide speed and automation of business processes which reduces transaction and administrative costs and contributes to direct (economic) benefits. Consequently, e-commerce applications provide real-time tracking information where buyers can log into the supplier's extranet application, track shipment details, and estimate arrival dates of goods they ordered (Riggins and Rhee, 1998; Senn, 2000).

Buyers are able to satisfy their end customers' needs by delivering the goods on time and increasing their customer satisfaction. This, in turn, contributes to indirect and relationship-related benefits. Increased satisfaction from e-commerce performance in turn contributes to high levels of predictability and goodwill trading partner trust. A series of consistent, high-quality services capitalize on strategic (symbolic) benefits. Strategic benefits include long-term investments (as in increased volume, diversity, and dollar value of e-commerce transactions), and increased reputation of organizations (Anderson and Narus, 1990; Doney and Cannon, 1997; Kumar, 1996; Morgan and Hunt, 1994; Smith and Barclay, 1997). For example, evidence of such trust-based performance was found by comparing supplier relationships in the automotive industry in Japan and United States. It was found that Toyota's relationship with their suppliers was deeply embedded in long-standing networks of social and economic relations characterized by high levels of goodwill trust thus contributing to perceived economic, relationship-related and strategic benefits (Barney and Hansen, 1994). Therefore, we propose that:

R P 5: Perceived benefits of e-commerce are positively associated with participation in e-commerce.

4.3.6 R P 6: The Relationship between Perceived Risks and Participation in E-Commerce

Participation in e-commerce involves time and costs. Trading partners may be operating with incompatible systems that lacks security mechanisms. This may give rise to technology performance-related risks an incompatible infrastructure and loss in the transmission media thus restricting participation in e-commerce (Jamieson, 1996).

Trading partners (as in suppliers) who make sacrifices and show concern for other trading partners (who could be their retailers and manufacturers) develop a reputation for fairness within their industry. Consistent behaviors from trading partners provide signals of their future actions. On the other hand, vendors who have a reputation for terminating relationships and seeking high profits provide signals to their retailers that they are solely interested in their own profits, thus contributing to relational risks that restrict participation in e-commerce (Helper, 1991; Langfield-Smith and Greenwood, 1998; Webster, 1995).

Similarly, trading partners who found themselves participating in inequitable relationships felt angry and resentful. Such feelings of dissatisfaction may result in suspicion, mistrust and conflicts. Trading partners may view each other as untrustworthy and exploitative. Consequently, trading partners will not trust each other and will not commit to long-term trading partner relationships. This inhibits e-commerce participation and contributes to relational risks and general risks (Dwyer et al., 1987; Ganesan, 1994; Smith and Barclay, 1997). Poor business practices and mistrust among trading partners thus contribute to general risks of e-commerce. Therefore, we propose that:

R P 6: Perceived risks in e-commerce are negatively associated with participation in e-commerce.

4.4 Chapter Summary

This chapter discussed the development of a conceptual model from relevant theoretical perspectives. It also provided a definition of the constructs and sub-concepts/dimensions in the conceptual model and justified the research propositions derived from the conceptual model. The next chapter will describe the research process and justify the multiple case study research method selected to test the conceptual model.

Chapter 5

Research Approach

5.1 Introduction

The aim of this study is to empirically examine the importance of inter-organizational trust (IOT), in e-commerce participation. The previous chapter discussed the conceptual model developed for this study and justified the research propositions. This chapter describes how the conceptual model was tested. The chapter is organized as follows: Section 5.2, discusses different research methods used in the Information Systems discipline, the research cycle, and the difference between quantitative and qualitative approaches. Section 5.3, identifies case study research method as an appropriate research method for this research. Section 5.4 discusses the case study research design, and the research process. Finally, section 5.5 concludes the chapter. Figure 5.1 presents the structure of this chapter.

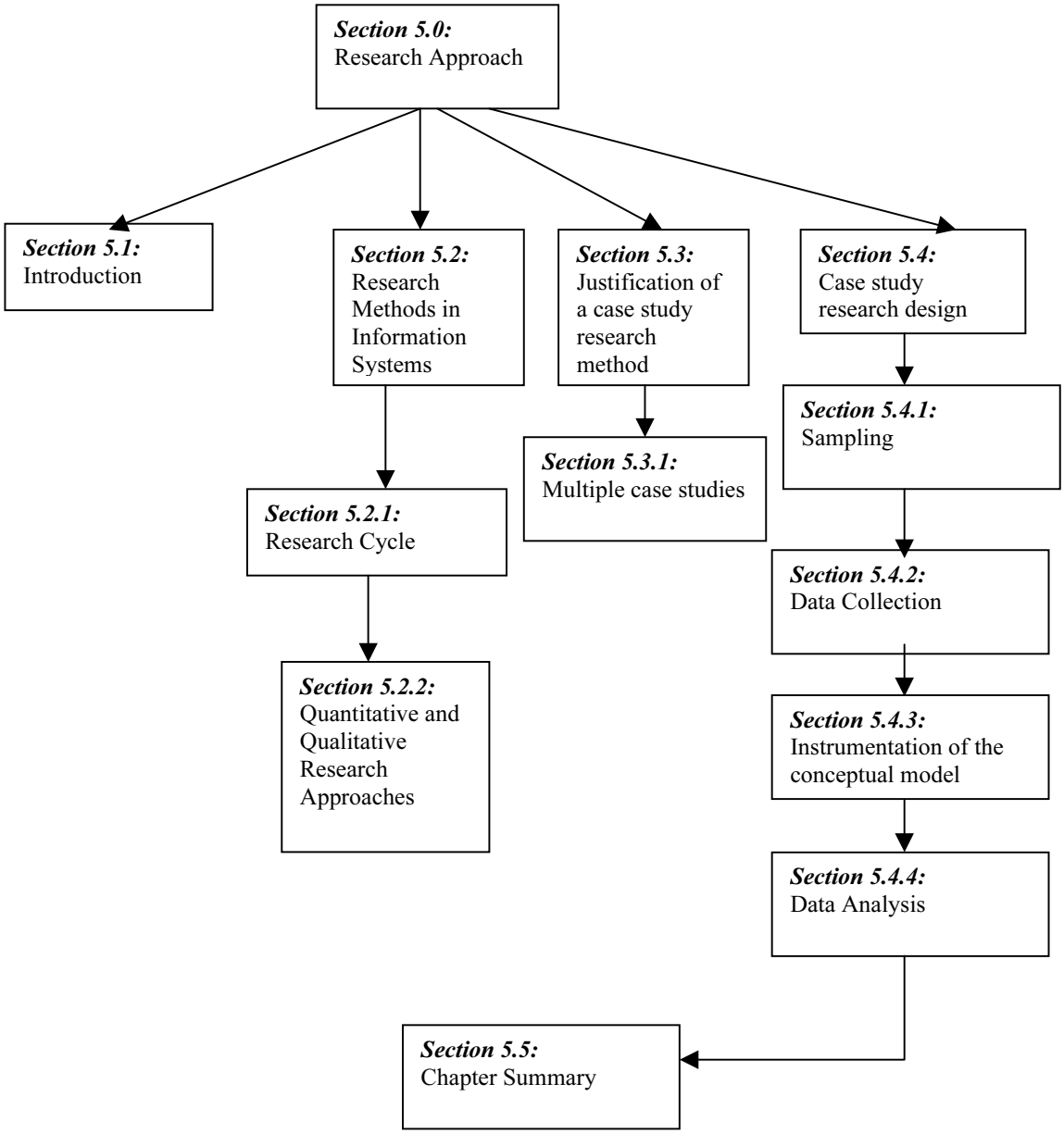

Figure 5.1: Structure of the Research Approach Chapter

5.2 Research Methods in Information Systems

Several researchers emphasize the importance of identifying the epistemological and philosophical foundation of research (Galliers, 1992; Klein and Myers, 1999; Neuman, 1994). Galliers (1992) makes a distinction between research method and research approach. He suggests that a research approach is the way of going about one's research, and may utilize different research methods and techniques. He classifies research approaches into two

categories: a "positivist" and an "interpretivist" research approach as shown in Table 5.1. Each technique makes an underlying philosophical assumption about the purpose of science and the nature of social reality.

- ***Positivist research philosophy*** presupposes that reality exists independently of the researcher and suggests that it can be objectively and rigorously measured.
- ***Interpretivist philosophy*** asserts that reality is a construct that people apply, and that social phenomenon cannot be examined independently of the individuals contributing to that reality. It also suggests that researchers themselves cannot be totally objective. It is from the researcher's conceptual orientation that the research questions, interpretations and explanations flow (Galliers, 1992). Consequently interpretative research emphasizes the context of this research and specifies the need for critical reflections on social and historical background of the research setting.

Positivist	Interpretivst
Surveys	Subjective/Argumentative Reviews
Case Studies	Case Studies
Laboratory Experiments	Action Research (descriptive/interpretive)
Field Experiments	Future research
Theorem Proof	Role/game playing
Forecasting	
Simulation	

Table 5.1: Common Research Approaches used in Information Systems Research (Galliers, 1992)

Based on these two types of philosophies, choosing the right research method becomes even more important. A wide variety of Information Systems research methods and their links to other reference disciplines (such as business, humanities, social sciences, management, and marketing) have made the choice of a research method even more complex. Yin (1994, p 6) suggests that choosing a research method requires a thorough understanding of the nature of the research question to be answered, as well as the characteristics of the method designed to provide the answer. Table 5.2 shows different types of research questions in relation to the research method.

Strategy	Form of research question?	Requires control over behavior and events?	Focuses on contemporary events?
Experiment	How? Why?	Yes	Yes
Survey	Who? What? Where? How many? How much?	No	Yes
Archival analysis	Who? What? Where? How many? How much?	No	Yes/No
History	How? Why?	No	No
Case Study	How? Why?	No	Yes

Table 5.2 Research Questions and Types of Research Strategies (Yin, 1994:6)

Furthermore, Yin (1994) suggests that apart from understanding the nature and purpose of existing research methods, it is important to address the following three questions when considering an appropriate research method:

- First, the type of research question posed is addressed. This study examines "how" and "why" types of research

questions. It asks how does inter-organizational trust (trading partner trust) influence the perception of benefits and risks of e-commerce, thus influencing the extent of participation in e-commerce?

- Second, the extent of control an investigator has over the actual behavioral events should be considered. The investigator (researcher) in this study had no control over the actual behavior of the trading partners and events.
- Finally, the degree of focus on contemporary, as opposed to historical events should be considered. In this study, the focus on contemporary events was high, as trust in business-to-business e-commerce on the Internet was a relatively new phenomenon.

This study focused on how and why research questions in a natural setting because the concept of inter-organizational trust was new in the Information Systems discipline in 1997 when this study was intiated.

5.2.1 Research Cycle

Shanks et al. (1993) proposed a research cycle classifying research activities into three stages, each with a specific research purpose (see Figure 5.2).

- ***Theory Building*** (inductive process) is the first stage. This occurs when initial exploration leads to theory building and research questions, and/or propositions and hypotheses are being established. An analysis of the literature in chapter 3, together with the findings of the exploratory research described in chapter 2 paved the way to the development of a conceptual model leading to research propositions discussed in chapter 4.
- ***Theory Testing*** (deductive process) is the second stage during which the research questions and propositions are addressed. Multiple case studies were carried out in e-commerce organizations from different industry groups. The research propositions were tested using a semi-structured questionnaire during in depth interviews with key representatives in these organizations. In order to maintain the reliability of data collected and to arrive at meaningful generalizations, the same questionnaire was applied throughout all the organizations. That is the subject of the following chapter 6.
- ***Theory Refinement*** the third stage, occurs when the initial theory was refined in light of the findings. The findings from multiple case studies contributed to the development of a refined model of inter-organizational trust within bi-directional dyads in e-commerce participation discussed in chapter 6. The initial theory regarding trust in business relationships was refined to inter-organizational trust in e-commerce participation.

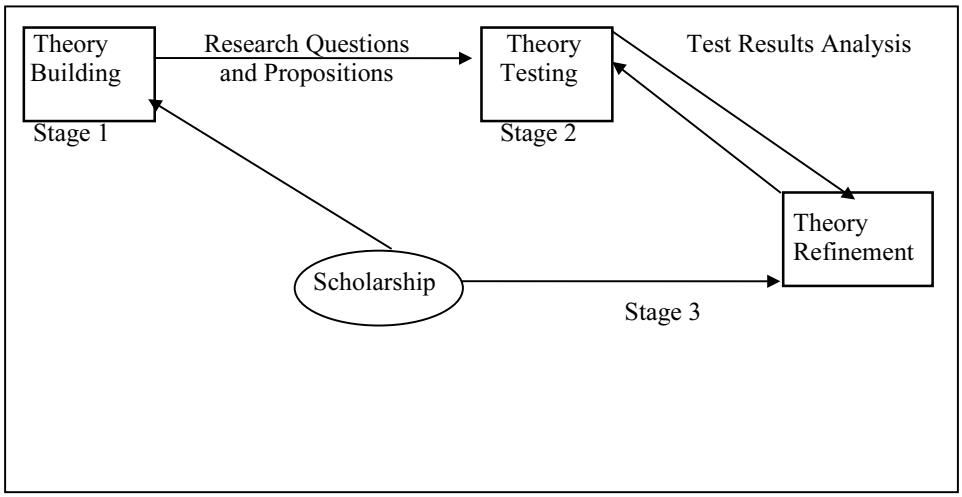

Figure 5.2: Research Design (adapted from Shanks et al., 1993)

5.2.2 Quantitative and Qualitative Research Approaches

Interest in qualitative research methods is growing in IS research (Klein and Myers, 1999). Despite the dominance of positivism, there are signs that interpretivism is gaining ground and the epistemological choice between interprevism and positivism is becoming an important issue for IS researchers (Walsham, 1995). The following section briefly describes both these approaches.

Quantitative Positivist Approach

The quantitative approach implies that an objective truth exists in the outside world, and this truth can be revealed through scientific methods for measuring and analyzing relationships among different variables, systematically, and statistically. The major concerns in quantitative methodology are that the measurements are reliable, valid, and generalizable in their predictions of cause and effect.

As much as possible, quantitative methods attempt to use standardized measures so that various perspectives and experiences of people can be fitted into a standard set of categories. The advantage of quantitative research is that it is possible to obtain and present a broad generalized set of findings concisely and succinctly. Hence, the focus is on the validation of the measuring instrument (for example, a survey) where a larger population receives the questionnaire.

Qualitative Interpretative Approach

Qualitative research approaches cover an array of interpretative techniques that seek to describe, decode, translate, and otherwise come to terms with the meaning, rather than the frequency of naturally occurring phenomena in the social world. Recently, in IS research, there has been a shift from the quantitative paradigm to the qualitative paradigm (see Klein and Myers, 1999). Researchers who once saw statistical analysis as rigorous and reliable now argue that subjectivity (for example, in the case study research method) has added strength to qualitative researchers (Yin, 1994). Qualitative methods allow researchers to study selected issues in depth without being restricted by predetermined categories of analysis. Silverman (1998) suggests that the particular strength of qualitative research for both researchers and practitioners is its ability to focus on actual practice in situ (i.e.) looking at how organizations are routinely enacted.

Qualitative techniques emerge from phenomenology and interpretative paradigms that emphasize a constructive approach, which assumes no clear-cut objectivity or reality. A case study is a specific method or technique within the research applied in interpretivsm. A case study may involve a detailed study of a single organization (single case study) or group of organizations (multiple case studies). Case studies explore, describe, or explain in detail a particular issue within a unit of study (Benbasat et al., 1987; Yin, 1994). The data from case studies are useful for their qualitative richness normally obtained in a complex and real world situation.

Qualitative data are said to reveal participants' thoughts and words during the interviews and conversations. This allows the researcher to better assess the meanings people place on their experiences, perceptions, and assumptions in their surrounding social world. Hence, the word *qualitative* implies an emphasis on the processes and meanings that cannot be examined or measured in terms of quantity, amount, intensity, or frequency. Social and organizational life is perceived as emerging from the shared creativity of individuals. Furthermore, qualitative researchers produce a great deal of information about a smaller set of cases, thus increasing their in depth understanding of the cases. Hence, the use of qualitative research stresses the socially constructed nature of reality.

Myers (1994) suggests that the distinguishing feature of qualitative research is the focus on a few entities (e.g., people, organizations, and systems) in depth rather than many entities more selectively. There are a variety of qualitative research methods, including the case study research strategy, the grounded theory approach, ethnography, semonitics, hermeneutics, longitudinal/historical studies, and action research. These research approaches differ in their purposes, procedures, and evaluation criteria.

Qualitative researchers propose the use of a triangulation of methods as one way to achieve rigor during data collection. Using multiple methods (or triangulation), secures an in-depth understanding of the phenomena in question. Triangulation is not a tool or strategy of validation, but rather an alternative to validation. The combination of multiple perspectives, methods, empirical materials, and observations in a study is therefore, best understood as a strategy adding rigor, breadth and depth to any investigation.

5.3 Justification of a Case Study Research Method

Benbasat et al., (1987) suggest three justifications for a case study research method. Case study research method was selected in this study for these reasons:

(1) A case study research approach (method) permits a study of inter-organizational-systems or information systems within their natural setting and allows learning from the "*state-of-the-art"* practice. It permits generation of theories from practice.

(2) A case study research approach (method) enables an understanding of the nature and complexity of processes occurring, by answering ***how*** and ***why*** research questions Yin, (1994). Similarly, Walsham, (1993) suggests that case studies are often advocated for intensive research, such as this, where we need to develop an in-depth understanding of the importance of inter-organizational trust in e-commerce participation.

(3) Case study research approach (method) is an appropriate research method, especially in an area where few previous studies have been conducted, and where the study relates to contemporary events. Bonoma (1985), proposed that case research methods are useful when a "phenomenon is broad and complex, where the existing body of knowledge is insufficient to permit the posing of causal questions, and when a phenomenon cannot be studied outside the context in which it occurs" (Bonoma, 1985, p 199). Previous research on inter-organizational trust in e-commerce has been limited (Hart and Saunders, 1997; Sako, 1998; Senn, 1998; Smeltzer, 1997). The research project for this study commenced in 1997. At that time the concept of trust in e-commerce was not widely recognized or understood. In fact it was hardly mentioned in the academic literature or practitioner journals. Studying inter-organizational trust in the business-to-business e-commerce participation phenomenon requires real

organizations using e-commerce systems or operating in an e-commerce environment and is therefore a complex area of study. Hence, the case study method was seen as relevant and appropriate for this study.

The potential strength of case studies include capturing *reality* in greater detail, with the ability to analyze many variables, thus providing a richness of information about the situation or organization (Galliers, 1992). A semi-structured questionnaire comprising questions for the constructs in the conceptual model was designed to collect rich qualitative data. Section 5.4.3 describes the instrumentation process and outlines the dimensions/variables for each construct and sub-concepts (enclosed in Appendix C). This study examined inter-organizational trust and its impact on perceived benefits, risks, trust and security-based mechanisms in e-commerce thereby influencing the extent of participation in e-commerce.

5.3.1 Multiple Case Studies

This study used multiple case studies, as it was considered to be an appropriate method chosen to test the research propositions (Yin, 1994). Yin suggests that: "*multiple case designs have distinct advantages and disadvantages in comparison to single case designs ... a major insight is to consider multiple cases as one would consider multiple experiments – that is, to follow a 'replication' logic. This is far different from a mistaken analogy in the past, which incorrectly considered multiple cases to be similar to the multiple respondents in a survey (or to the multiple subjects within an experiment) – that is to follow a sampling logic." (*Yin, 1989, 51)

Similarly, Benbasat, Goldstein and Mead (1987), provided a clear rationale for using multiple case studies:

> *"Multiple case designs are desirable when the intent of the research is descriptive, theory building, or theory testing… Multiple case designs allow for cross case analysis and extension of theory. Of course, multiple cases yield more general research results." (Benbasat et al, 1987,373)*

Multiple case studies were chosen because they allow an in-depth analysis of the concept in a real life situation, thus enabling trust behaviors and trading partner interactions to be observed. The conceptual model was tested in ten organizations (uni-directional dyads) forming four bi-directional dyads from a cross section of industries. The organizations consisted of both large and small-medium-enterprises, public and private sector organizations. Some used simple applications (i.e., electronic applications without the Web) while others used more Web-based electronic applications and e-commerce technologies. This paved the way for a cross-case analysis of the findings and contributed to meaningful generalizations.

5.4 Case Study Research Design

A research design is a technical plan (distinguished from a management plan, which deals with resources, logistics, scheduling and assignment of personnel, and other tasks involved in administering a research project). It attempts to link the beginning and ending of a study, thus helping researchers to get "from here to there" (Yin, 1989).

According to Yin (1994), the following components make up a case study research design:

- Case study's questions using how and why types of questions. This study seeks to investigate and examine the importance of inter-organizational trust in e-commerce participation within a natural setting. The research question developed for this study is: How does inter-organizational trust (trading partner trust) influence the

perception of e-commerce benefits and risks of e-commerce, thus influencing the extent of participation in e-commerce? Furthermore, the dimensions/variables that examine the constructs and test the conceptual model are designed to include how and why type of questions as well. Examples of these questions include: "how do the ability and skills of your trading partner impact trust in your trading partners? Why is it so important for a trading partner to correctly send business-to-business transactions? Please provide an example of a successful situation and an unsuccessful situation. How did it occur and how did it impact the trust in your trading partner?" Section 5.4.3 outlines the instrumentation process. The questionnaire in appendix C demonstrates how the constructs in the model were examined.

- Research propositions direct the researcher to focus on what kinds of information to collect. Without research propositions the researcher might be tempted to collect everything.
- Unit of analysis. It is important to link the objectives and questions to a basic unit of analysis. The primary unit of analysis in this study is a directional dyad (i.e., an organization). The next level of analysis is the bi-directional dyad, which involves two organizations interacting with each other. Ideally the concept of trust would be examined from both parties within a bi-directional dyad. By its very nature trust implies two parties, a subject A – the trusting party (trustor) and an object of trust B – the trusted party (trustee). Hence, the unit of analysis in this study is either the uni-directional dyad or two organizations forming a bi-directional dyad as shown in Figure 5.3. In figure 5.3, organization A is part of an uni-directional dyad when it interacts with and trusts organization B.

  In this study a bi-directional dyad involves both organizations A and B interacting and observing each other's trust. Hence, in one instance organization A is the trustor, and organization B is the trusted party, and in another instance the reverse takes place (i.e, organization B is the trustor and organization A is the trusted party).

Uni-directional dyad **Bi-directional dyad**

Figure 5.3: Uni and Bi-directional Dyads

- Logic of linking the data to the propositions. Multiple case studies paved the way for both qualitative and quantitative analysis of the data collected. One method used to link the data and propositions of this study is via pattern matching across cases (Yin, 1994, 25). Since the objective of this study was to achieve a better understanding of the importance of inter-organizational trust in e-commerce participation, a cross-referencing method was applied. Based on the responses from preliminary research, the semi-structured questionnaire was refined. Section 5.4.2 discusses and describes the data collection and analyzes procedures applied in this research.
- The criteria for interpreting the findings should be directly related to ways of linking data and propositions of study (Yin, 1994:25). Interpretation of the findings was carried out via pattern matching, and explanation building (as in narrative descriptions and causal explanations). This led to analytic generalizations that created a

story line and allowed predictions to be made. The first step identified recurring patterns and themes from the data collected during the interviews. Then the similarities and differences between the participants were identified. This was followed by a cross-case analysis of the cases that enabled generalizations to be made. Section 5.4.4 discusses and describes the data analysis procedures applied in this study.

5.4.1 Sampling

The criteria applied for choosing the case studies (sampling) were as follows:

- Organizations should be actively engaged in business-to-business e-commerce;
- The participants who were interviewed for this study should be well versed in their business-to-business e-commerce operations and adoption procedures. They included e-commerce coordinators, IT managers, accounting managers, chief executive officers, security analysts, sales consultants, and intranet administrators;
- The participants in the organization should be willing to introduce the researcher to their other trading partner, thus enabling the researcher to examine both trading partners within a bi-directional dyad;
- Although only two uni-directional dyads (two organizations) participated within each bi-directional dyad, the interactions between the two organizations may include one-to-one trading partner relationships one-to-many trading partner relationships, many-to-one trading partner relationships, or many-to-many. In this study the relationship between the bi-directional dyads was one-to-many, and many-to-many trading partner relationships. However, from these one-to-many, and many-to-many relationships only instances of dyadic relationships were extracted for study;
- The trading partners from both organizations should have met face-to-face at least once during the initial stages of e-commerce adoption (for example to negotiate and write up trading partner agreements). This study gives priority to trading partners' behaviors and interactions rather than e-commerce technologies;

Finally, information about organizational, product and background was gathered through document analysis. Due to time and budgetary constraints all the ten organizations that participated in this study were located in the Wellington region (in New Zealand). Entry into sites was obtained by making initial telephone calls to key representatives in the e-commerce organizations. A brief description and purpose of the study was discussed over the telephone before requesting them to participate. The telephone conversation was followed by an email including an attached file describing the purpose of the study. Most of the participants indicated their interest in participating in the study and requested that a report containing aggregate findings of all cases be given to them at the end of the study. Participants who were not interested in participating cited reasons such as immature use of e-commerce.

Once confirmation was received, appointment dates for interview sessions were arranged. Subjects were requested to answer structured and open-ended questions using a semi-structured questionnaire. The interviews were conducted over four (two-hour) session interviews (see Appendix C for a case study questionnaire). The interview sessions were recorded, and participants verified and confirmed their responses through a draft report. Each organization that participated received a report of the final findings and a thank you note.

Size of Research Sample

Galliers (1992) suggests that a single case study is useful when developing or refining generalizable concepts and frames of reference, but warned of the difficulty involved in generalizing. On the other hand, multiple case studies

solved that problem. Yin (1994) suggests that a single case study is appropriate, when it characterizes the critical case in testing a well-formulated theory. The theory identifies a clear set of propositions, as well as the circumstances within which the propositions were believed to be true. In this study, inter-organizational trust was still a relatively new phenomenon in e-commerce participation, and since no single case could hope to characterize the theory completely, a multiple case study research approach was deemed appropriate. Although multiple case studies permit a cross-case analysis and extension of theory, they also demand widespread resources and time (Benbasat et al., 1987, Yin, 1994). In order to limit the scope of the study to the time frame for completion, four bi-directional dyads consisting of eight organizations, and the remaining two uni-directional dyads (that communicated with their branch offices) were chosen for this study.

5.4.2 Data Collection

This section describes how data was collected for this study.

Data Collection Procedures

Data collection is the logic of linking the data and the propositions. Yin (1994), identifies six sources of case study evidence. These include documentation, archival records, interviews, direct observation, participant-observation, and physical artifacts. Hence, the method used for data collection is significant, as it affects the quality of data collected. This study followed three principles in the data collection process. They include using multiple sources, maintaining a chain of evidence, and examining a variety of documents from the case.

- First, the use of multiple sources of evidence was seen as a major strength in the case study research method. For example, document analysis in our case included trading partner agreements, organization charts, Web-sites, internal security policies giving evidence of the organization's best business practices, and their product information and background. In addition, trading procedures, answers to the semi-structured interview questionnaire, case study written notes, recorded audiotapes, telephone interview written notes were used to collect data. Furthermore, document analysis, tabular materials, narrative descriptions of written candid conversations, and informal discussions held with participants also contributed to the case study database.

  The fieldwork proceeded in the following manner. The questionnaire was first pre-tested with a group of academics and e-commerce practitioners via e-mail and telephone interviews. The aim of pre-testing the semi-structured questionnaire was to refine the jargon (commercial language) to suit case sites and to ensure that the questions were adequately covered in order to test trading partner trust relationships (bi-directional dyads) in e-commerce participation. Questions were pre-structured to have a qualitative focus using how and why questions. In addition, participants provided examples and evidence of their responses. This later led to quantitative measures examining the impact levels of trust, trust and security-based mechanisms, perceived benefits, and risks that determined the extent of e-commerce participation using likert scales (Low (0-3), Medium (4-6), and High (7-10)).

  The semi-structured questionnaire included the following themes:

  - Background information about the case, as in business processes and functions, and business-to-business e-commerce transactions roles/interactions;

- Trading partner trust relationships;
- Trust and security-based mechanisms in e-commerce;
- Perceived benefits of e-commerce;
- Perceived risks of e-commerce;
- Extent of e-commerce participation.

- Second, maintaining a chain of evidence in order to increase the reliability of the data collected was important. The case study description in Chapter 6 was made clear to allow external observers and readers to understand the study.
- Third, evidence for the case studies came from the written interview notes, and telephone interview notes conducted to clarify the data collected during the interviews. In addition to the interviews, analysis of existing documents that related to e-commerce adoption, day-to-day interactions, internal security policies, and trading partner agreements were observed and analyzed. Hence, a triangulation of methods help to establish rigor and reflect an attempt to secure an in-depth understanding of inter-organizational trust in e-commerce participation.

Ensuring the Validity of Data

This section discusses the data validity requirements applied in this study. The validity of a case study research relies heavily on the sampling criteria, research process, the method of analysis, and interpretation of the data collected (Yin, 1994). Similarly, Benbasat et al. (1987) found unit of analysis, representatives of the sample, and inclusion of extreme examples to be important (Benbasat et al., 1987). In order to achieve a correct unit of analysis and obtain a representative sample to help identify extreme cases, the focus on the research question and objectives of this study was taken into consideration.

The question of validity was achieved by applying credibility and generalizability of data and by simply seeking to describe the findings by providing a narrative account of the *thinking aloud* process and understanding how people make sense of their world. The quality of data collected in this study was maintained by the following the criteria as suggested by Yin (1994) in Table 5.3.

Criteria	Approaches to achieving criteria	Phase of Empirical Research
Construct Validity	Use of multiple sources of evidence	Data Collection
	Establish chain of evidence	Data Collection
Internal Validity	Use of pattern matching	Data Analysis
	Use of cognitive mapping	Data Analysis
	Use of cluster analysis	Data Analysis
	Use of factor analysis	Data Analysis
External Validity	Perform multiple case studies	Research Design
		Case Selection
Reliability	Developing case study data base	Data Collection

Table 5.3: Measures applied in data quality

The purpose of the semi-structured questionnaire was aimed to test the research propositions in the conceptual model. The quality of data collected by this instrument was assured by the following means:

(a) **Construct validity** aims to establish correct operational measures for the concepts being studied (Yin, 1994, p.40). The lessons learned from the exploratory pilot case studies provided insights for improving and refining the semi-structured questionnaire used in the multiple case studies. In addition, construct validity was achieved by using multiple sources of evidence. Multiple sources of evidences contributed to "multiple measures of the same phenomenon." For example, wherever possible, more than one participant was interviewed in the organizations participating in this study. Table 5.4 exhibits the number of participants that participated in this study. In addition, several documents related to the organization's background, products and best business practices were examined. Moreover, key informants were asked to review the case study report. Yin, (1984, p. 139) discusses such a review in this way;

> *"The corrections made through this process will enhance the accuracy of the case study, hence increasing the construct validity of the study. In addition, where no objective truth may exist, the procedure should help to identify the various perspectives, which can then be represented in the case study report."*

Maintaining a chain of evidence is important. In order to ensure construct validity and reliability, Yin (1989) recommends that a case study be constructed such that a reader or external observer will be able to trace from the conclusions back to the initial research questions or from the research questions to the conclusions. This concern was addressed by creating a detailed narrative case study that explaining the causal experiences of the participants.

(b) **Internal validity** aims to establish causal relationships (Yin, 1994, p.40). With internal validity "we can infer that a relationship between two variables is causal or that the absence of a relationship implies the absence of cause." For example, the findings from competence trust were matched with direct economic perceived benefits and technology-performance related risks to see if they correlated. Similarly, the findings from predictability and goodwill trust were matched against relationship-related benefits, strategic benefits, and relational and general risks.

(c) **External validity** establishes a domain in which the study's findings can be generalized (Yin, 1994, p.41). Another term for external validity is generalizability. Critics typically state that single cases offer a poor basis for generalizability. Case studies are commonly misunderstood for a lack of external validity resulting from not satisfying well-accepted "sampling logic." An accepted rationale for the legitimate use of one critical case to test well-formulated theory exists. However, such critics are implicit when contrasting the situation with survey research, where a sample (if selected correctly) is readily generalized to a large universe. This analogy is incorrect when dealing with case studies, because a survey research relies on statistical generalization, whereas case studies (as with experiments) rely on analytical generalization (Yin, 1994, p. 43). This study examined multiple cases using the same semi-structured questionnaire (i.e. replication logic). It thereby paved a way for analytical generalizations**.**

(d) **Reliability** minimizes errors and biases in the study by demonstrating that the same questionnaire was applied across all cases. The underlying concern of reliability is "whether the process of the study is consistent, reasonably stable over time, across researchers, and methods" (Miles and Huberman, 1994, p. 278). The multiple case studies took place in a real world setting, and by nature they are highly unlikely to recur and to be observed again in the same way. The following techniques were applied in order to ensure reliability.

- All cases followed the same semi-structured questionnaire and procedures and used a standard interview protocol (the semi-structured questionnaire). Hence, a well-documented case study protocol

provided a guide for external reviews to examine the reliability;

- An effort was made to establish an independent case study database which was categorized, and organized;
- Multiple participants from different cases were involved during the interview sessions (see Table 5.4);
- Triangulation of data sources were used (see section 5.4.2, on data collection);
- Written notes of the interviews and tabular materials were recorded. The central component of the case study database was however, the case study narrative. This attempted to synthesize different data sources and present a sequence of events that occurred in the organization with some coherence;
- Data analysis followed best practices from previous research applied in this study (see section 5.4.4. on data analysis).

Following Yin's arguments, this study expands and generalizes theories (analytic generalization) using case studies, rather than enumerating frequencies (statistical generalization). It is believed that the generalizability of the tested inter-organizational trust relationships and its impact on e-commerce participation has been strengthened by using replication logic in multiple case studies. Generalizability describes a theory that has been tested. Specified patterns in trading partner relationships have been matched by empirical data using the same patterns across a range of settings in other cases. Table 5.4 provides the duration, the number of participants and summarizes the situation in which the case studies were conducted.

Time Cycle	**Empirical Research Process**	**Number of participants**	**Type of E-Commerce Application**
Feb 1998-June 1998 Exploratory Study 1	Ford Motor Co	5	EDI/VANs – Planning to move to Internet based EDI
Jul 1998-Aug1998 Exploratory Study 2	Toyota Motor Co	1	EDI/VANs Pilot testing Internet based EDI
Jun 1998-Aug 1998 Exploratory Study 3	Patents, Brakes and Replacements Ltd– 1st tier supplier	1	EDI/VANs
Aug 1999-Oct1999 Multiple-Case Studies	NZ Customs Uni-Directional dyad – 1 Bi-Directional dyad - A	10	EDI/VANs X400, X25 Internet via ISP
Nov1999 – Jan2000 Multiple-Case Studies	Electronic Commerce Network (ECN) Internet Service Provider Uni-Directional dyad – 2 Bi-Directional dyad - A	2	X400 X25 Internet
Jan2000 – Mar 2000 Multiple-Case Studies	Customs Broker Uni-Directional dyad – 3 Bi-Directional dyad - B	2	Trade Manager
Feb2000– Mar 2000 Multiple-Case Studies	Pak Ltd (Importer) Uni-Directional dyad – 4 Bi-Directional dyad – B	2	Trade Manager
Jan 2000-Mar 2000 Multiple-Case Studies	Cisco NZ Uni-Directional dyad – 5 Bi-Directional dyad – C	10	Extranet – the initiator Cisco Connection Online
Jan 2000-Mar 2000	Compaq NZ	4	Extranet – respond to

Multiple-Case Studies	Uni-Directional dyad – 6 Bi-Directional dyad – C		Cisco's extranet
Mar2000–May 2000 Multiple-Case Studies	Siemens NZ Uni-Directional dyad – 7 Bi-Directional dyad – D	4	Extranet – the initiator – Mainstream express
Mar2000–May 2000 Multiple-Case Studies	Telecom NZ Uni-Directional dyad – 8 Bi-Directional dyad – D	6	Extranet – respond to Siemen's Extranet
Apr 2000-June 2000 Multiple-Case Studies	Avery Ford NZ Uni-Directional dyad – 9	1	Intranet – private software
Apr 2000-June 2000 Multiple-Case Studies	Toyota Motor Company Pty NZ Uni-Directional dyad – 10	1	Intranet – private software

Table 5.4:Time Table of the Empirical Case Studies

5.4.3 Instrumentation of the Conceptual Model

The case study semi-structured questionnaire was designed to test the conceptual model. The following design guidelines were used in the design of the questionnaire.

(1) Investigating, exploring, and examining qualitative issues relating to the importance of inter-organizational trust in e-commerce participation was the main concern, since inter-organizational trust was a newly identified phenomenon. Questions were related to how, why and in what situations.

(2) Questions were closely linked to the constructs, sub-concepts and dimensions of the conceptual model, thereby focusing on the relevance of this study.

(3) The design of the questionnaire paved the way for open discussions and candid conversations from the participants, in addition to answering the specific questions. The instrumentation table in appendix C outlines variables tested in the questionnaire.

5.4.4 Data Analysis

Pattern matching was used to analyze the findings from the interviews. Data analysis was carried out in the following manner:

- Analyzing the findings;
- Identifying similarities and differences in the opinions of participants from the same organization;
- Identifying similarities and differences between organizations within the same bi-directional dyad;
- Undertaking a cross-case analysis of the findings between inter-organizational dyads. Moreover, the use of likert type scales were employed to elicit respondent's preferences, thereby adding to a qualitative analysis.

Data analysis was conducted using both qualitative explanations in the form of direct quotes, explanations (narrative description), and quantitative analysis (in the form of a likert scale, as in Low (0-3), Medium (4-6), and High (7-10)).

- Case study descriptions were the starting point in examining the organizations' backgrounds. Moreover, the descriptions provided insights into key activities, events, and organizational issues. This paved a way for

analyzing the case study and allowed the researcher to develop normative statements within the limitations and constraints of the research design.

- The analysis focused on revealing themes via pattern matching. Thus, the process underlying the analysis consisted of iterative cycles of data interpretation along with discussion among researchers and participants from e-commerce organizations. After analyzing and elaborating the individual cases, similar patterns and themes were identified across cases for generalizations. According to Yin (1994), a case study analysis involves "examining, categorizing, tabulating or otherwise recombining evidence to invoke the initial propositions of a [case] study." Yin outlines two analytical strategies: relying on theoretical propositions and developing a case description. The latter is useful when theoretical propositions are absent. "Relying on theoretical propositions" is used when the original objectives and design of the case study are based on the research propositions. This in turn, reflects a set of research questions and/or hypotheses and literature reviews. The research propositions focused attention on analyzing relevant data. This research used "relying on theoretical propositions," thus focusing on the conceptual model of inter-organizational trust in business-to-business e-commerce participation.

Similarities and differences in the opinions and perceptions of participants within the same organization were initially sought. Where there were differences in their opinions within the same uni-directional dyad (organization), further explanations were requested. Scanned data from each participants identified similarities and differences through pattern matching. In addition, background information about the organization's e-commerce applications and adoption process from existing documents was also analyzed. Documents examined included: organizational charts, trading partner agreements, product information from brochures, web sites, security policies, performance assessments, quality standards, and background information. Finally, a cross case analysis was carried out between an inter-organizational dyad (i.e. two directional-dyads or two organizations). It is in this stage that meaningful analytical generalizations were derived from causal explanations and narrative descriptions. Chapter 6 presents the findings of both uni and bi-directional dyads.

5.5 Chapter Summary

This chapter described the multiple case study research strategy applied in this study. Furthermore, it justified the choice of a multiple case study research method. A description of the research process followed which included data collection, instrumentation, data analysis, and data reporting procedures. The next chapter analyzes and reports the findings of the multiple case studies that formed four bi-directional dyads and two uni-directional dyads. The findings contributed to a model of inter-organizational trust within bi-directional dyads in e-commerce participation.

Chapter 6

Case Studies: Findings and Discussion

6.1 Introduction

In chapter 4, a conceptual model of inter-organizational trust in e-commerce participation was developed. In chapter 5, a case study research method was selected to test the model. This chapter examines the research propositions and discusses the findings from ten uni-directional dyads.

The chapter is organized as follows: Section 6.2 describes the process of conducting case studies which includes a brief recap of the research objectives, research questions, research propositions, the type of study. This section also adds details about the sampling (as in choice of cases), unit of analysis, and data collection. Sections 6.3 through Section 6.12 report the findings of ten uni-directional dyads, case by case. Section 6.13 discusses the findings of the cross-case analyses and identifies the similarities and differences. Section 6.14 concludes the chapter and figure 6.1 depicts the structure of this chapter.

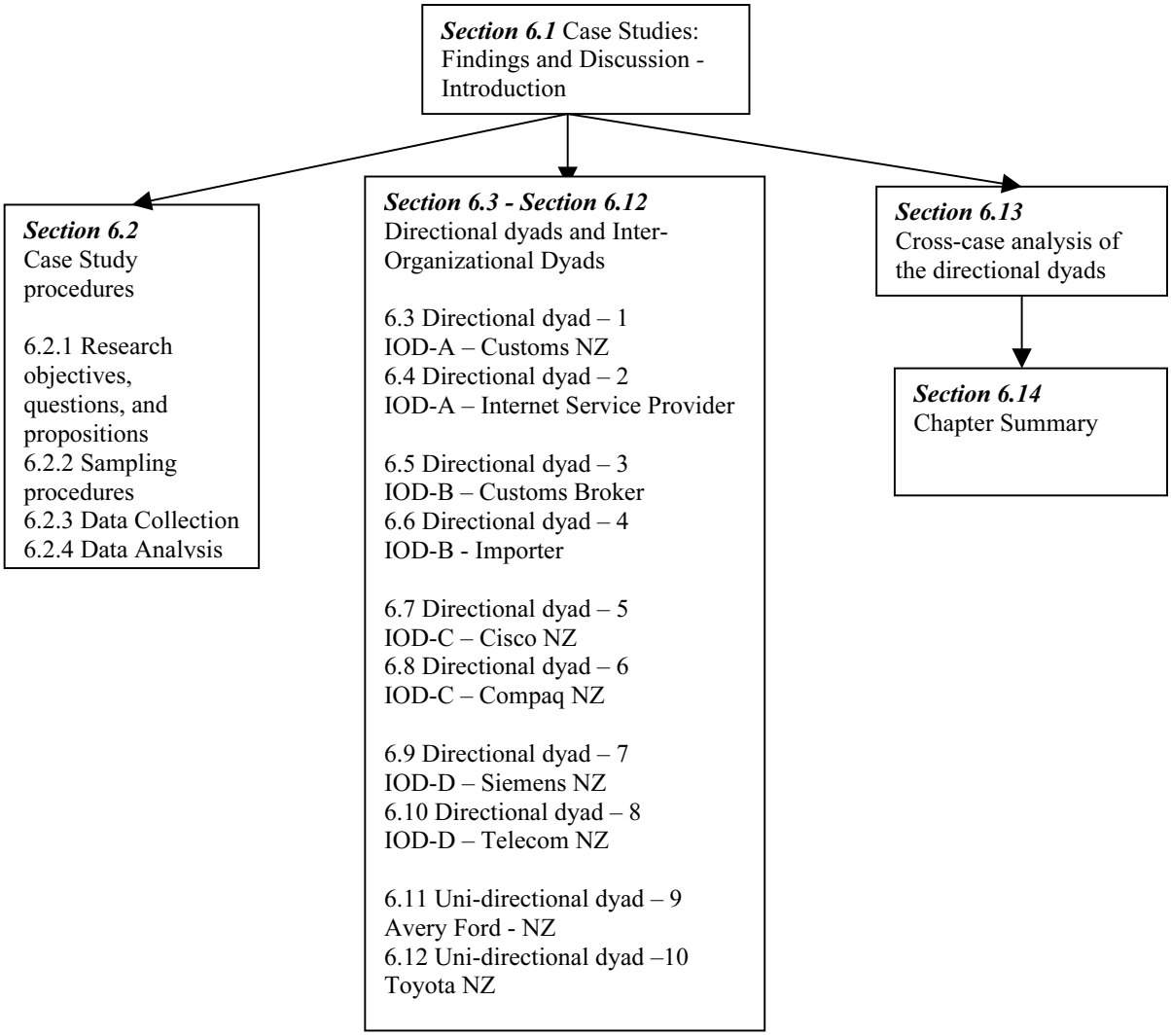

Figure 6.1: Structure of the Case Studies Findings and Discussion Chapter

6.2 Case Study Procedure

The case study research method (discussed in chapter 5) was selected to empirically examine the conceptual model.

6.2.1 Research Objectives, Questions and Research Propositions

The aim of this study was to empirically examine the importance of inter-organizational trust in e-commerce participation. At the time of initiation of this study there was only limited research on inter-organizational trust in e-commerce participation, so exploratory research was initially carried out. Exploratory research was conducted in three organizations that adopted EDI in the automotive industry in Melbourne, Australia (see Chapter 2 for details). The findings of the exploratory research provided evidence that inter-organizational trust (IOT) was perceived by trading parties to be important for secure and increased e-commerce participation. These conclusions led to the following research objectives:

- to identify and examine the importance of inter-organizational trust (trading partner trust);
- to examine how and why inter-organizational trust influences perceived benefits and perceived risks of e-commerce participation;
- to identify and examine the importance of trust and security-based mechanisms in e-commerce;
- to examine how and why trust and security-based mechanisms influence perceived benefits and perceived risks of e-commerce participation; and
- to examine how and why the perceived benefits and perceived risks of e-commerce influence the extent of e-commerce participation.

In light of the above research objectives, the research question developed for this study was as follows: How and why does inter-organizational trust (trading partner trust) influence the perceived benefits and risks of e-commerce, thereby influencing the extent of participation in e-commerce?

Conceptual Model of Inter-organizational Trust in E-commerce Participation

Figure 6.2 depicts the conceptual model developed for this study. It is followed by a recap of the research propositions.

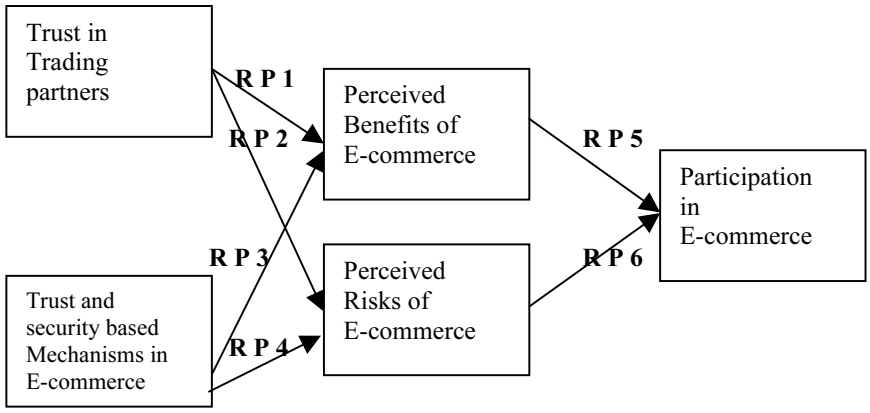

Figure 6.2: Conceptual Model of Inter-organizational Trust in E-commerce Participation

Research Propositions

- Research Proposition 1 - Trading partner trust is positively associated with perceived benefits of e-commerce.
- Research Proposition 2 - Trading partner trust is negatively associated with perceived risks of e-commerce.
- Research Proposition 3 – Trust and security-based mechanisms in e-commerce are positively associated with perceived benefits of e-commerce.
- Research Proposition 4 – Trust and security-based mechanisms in e-commerce are negatively associated with perceived risks of e-commerce.
- Research Proposition 5 – Perceived benefits of e-commerce are positively associated with e-commerce participation.
- Research Proposition 6 - Perceived risks of e-commerce are negatively associated with e-commerce participation.

6.2.2 Sampling Procedures (Choice of Organizations or Cases)

Galliers (1992) suggests that a sampling procedure must adequately represent the unit of analysis. The organizations that participated in this study were selected on the basis of having been involved in e-commerce for a substantial period of time as shown in Table 6.1. For each organization in this study, an "object of trust" was also identified, thereby establishing a directional dyad of trust. Our sample includes both uni and bi-directional dyads. Whereas in uni-directional dyads the phenomenon was examined only from one organization's perspective, in bi-directional dyads, reciprocal trust (i.e, trust from two directions) was examined.

In-depth case analyses were conducted in ten uni-directional dyads from a cross-section of industries, grouped to form four bi-directional dyads (i.e, eight organizations) and two uni-directional dyads. The organizations included a public sector firm involved in customs clearance, their Internet service provider, a customs agent (broker), an importer, two organizations in the computer and data communications industries, two organizations in the telecommunications industry, and two organizations in the automotive industry. Two of the organizations, Avery Ford NZ and Toyota NZ, interacted with their geographically widespread branches. Due to budget and time restrictions, travelling interstate to visit the branches was not possible. Thus, in these cases only uni-directional data was collected.

Organizations that participated in this study	Name of organization	Main role and size of the organization	Type of industry	No of Respondents	Type of E-commerce Application
Bi-directional Dyad A Uni-directional Dyad 1	NZ Customs → Internet Service Provider	Provides Customs clearance service Large	Public service	10	CusMod using EDI X25 and other means via ISP
Bi-directional Dyad A Uni-directional Dyad 2	Internet Service Provider → NZ Customs	E-commerce services Small-Medium Enterprise (SME)	Internet service provider	2	Facilitates CusMod
Bi-directional Dyad B Uni-directional Dyad 3	Customs broker → Importer	Trade facilitator SME	Customs brokerage	2	Trade Manager using Visual Basic – Microsoft
Bi-directional Dyad B Uni-directional dyad 4	Importer → Customs broker	Retailing SME	Retailing and service	2	Trade Manager using Visual Basic – Microsoft
Bi-directional Dyad C Uni-directional dyad 5	Cisco NZ → Compaq NZ	Supplier SME	Computer and data communications	10	Extranet Cisco Connection online
Bi-directional Dyad C Uni-Directional Dyad 6	Compaq NZ → Cisco NZ	Buyer Large	Computer and data communications	4	Extranet Cisco Connection online
Bi-directional Dyad D Uni-directional Dyad 7	Siemens NZ → Telecom NZ	Supplier SME		4	Extranet Main stream Express

Bi-directional Dyad D Uni-directional Dyad 8	Telecom NZ → Siemens NZ	Buyer Large	Telecommunications	2	Extranet Main Stream Express
Uni-directional dyad 9	Avery Ford NZ → their branches	Motor vehicle distributors	Automotive	6	Intranet and EDI X25
Uni-directional dyad 10	Toyota NZ → their branches	Motor vehicle distributors	Automotive	4	Intranet and EDI X25

Table 6.1: Summary of the Uni-directional dyads that participated in this study

6.2.3 Data Collection

Data was collected mainly through indepth semi-structured interviews with representatives from each uni-directional dyad (organization). Section 5.4.3, in chapter 5, provides a detailed description of the data collection procedures applied in this study.

6.3 Uni-directional Dyad 1: NZ Customs - (Bi-directional Dyad - A)

NZ Customs is a large public sector organization with 700 employees. NZ Customs undertakes the clearance of importing and exporting documents. NZ Customs uses CusMod (Customs Modernization), a complex and sophisticated alert system to perform intelligence testing using message queue series (a priority-based software). CusMod uses X400 with Electronic-Data-Interchange (EDI), to integrate all information and electronic processes involved in identifying and processing goods and passengers. CusMod is unique because it facilitates trade internationally and undertakes a backend imaging audit. A copy of the transaction is produced automatically for each adjustment made to a transaction. CusMod business functions include providing clearance service and information regarding import and export of goods, services, and people coming in and leaving the country, both nationally and internationally.

The New Zealand government's investment in implementing CusMod has put NZ Customs in the forefront of innovation worldwide. The objectives of CusMod are as follows:

- to have all invoice information transmitted electronically before shipment;
- to enable pre-clearance of most shipments;
- to enable consistency of declarations to Customs;
- to reduce customs clearance costs through the elimination of line fees; and
- to assist with the automated calculation of landed costs.

The dyad in this case consists of NZ Customs and their ISP. NZ Customs outsource part of their business-to-business e-commerce processes to their Internet Service Provider who facilitates the movement of business transactions between NZ Customs and their trading partners. The business transactions include cargo information, shipping documentation, clearance documents, and passenger information (both flight and sea) transmitted through CusMod. All incoming transactions have to go through the Internet Service Provider before coming into NZ

Customs. NZ Customs has more than 200 trading partners that include customs brokers (agents), regular importers, and exporters.

The ISP is a trade facilitator and has no interest in competing with NZ Customs. In this dyad, NZ Customs (trustor) is supposed to trust their service provider (ISP). NZ Customs also interacts directly with the trading partners (exporters and importers).

6.3.1 Research Propositions for Uni-directional dyad 1: NZ Customs (Bi-directional Dyad A)

In this section we examine the research propositions from the NZ Customs perspective.

- ***R P 1:*** *Trading partner trust is positively associated with the perceived benefits of e-commerce.*

The data suggesting the existence of competence, predictability, and goodwill trust leading to increased perceived economic, indirect, relationship-related, and strategic benefits of e-commerce was strongly supported by NZ Customs. For example, competence trust was rated high because NZ Customs outsourced part of their customs clearance process to their ISP (Electronic Commerce Network Ltd) which was responsible for training NZ Customs staff. The NZ Customs' trading partners consist of custom brokers, exporters, and importers have shown their ability and skills to operate business-to-business e-commerce transactions. NZ Customs' intranet administrator indicated:

> Of course, like any other new system we were trained to use the CusMod. Initially there were errors, as both our staff and trading partners had to learn to use CusMod. Trading partners had to bear the transaction costs if they continued to make errors, as they were required to re-send the same transaction correctly again. In the long run, trading partners realized the additional costs, and made every effort to get it correct. For example, when we first implemented export entries using CusMod, in October 1996, the error rate was 40-50%, but now it has dropped to 10%. This saves us a lot of time on phone calls, and enabled us to focus on other important aspects leading to strategic decisions, thus contributing to economic and strategic benefits.
>
> Furthermore, CusMod is 90% automated as the authorization and clearance process is conducted automatically. There is about 10% human intervention, which comes from an alert (i.e, in the case of drug use or fraud). Economic benefits experienced by NZ Customs staff include elimination of duplication and reduced delays in approving cleared goods, thus having a more productive workforce with fewer personnel. In addition, better intelligence systems allowed risks to be more readily and accurately identified. CusMod saved operating costs while improving service, as well as introducing common tariff classifications that enabled shipment of cargoes to and from international markets. This, in turn, benefits importers and exporters who received clearance electronically, as they need not pay for couriers, and no paper was involved thus contributing to importers and exporters economic benefits.

The findings show that standardized, structured routine procedures involved in customs clearance contributed to economic benefits from consistent competence and predictability trust leading to savings in costs. NZ Customs was able to eliminate paper, as there was no need to store backups (no offsite storage). In the past records for almost seven million transactions had to be stored, and the costs of storing several tons of paper led to maintenance problems.

Consistent behaviors in the ISP's interactions and ability to send in the customs documents in the required format enabled NZ Customs to predict their ISP's actions contributing to relational benefits. The ISP kept their business promises and adhered to policies, contract terms, and trading partner agreements.

NZ Customs experienced relationship-related benefits in the following ways:

- Improved communication and cooperation with their ISP;
- Information sharing (that is accurate, timely, speedy, complete, and relevant); and
- Increased level of commitment with their trading partners.

NZ Customs also experienced goodwill trust. Although NZ Customs did provide initial support to their importers and exporters in business-to-business operations it can be a complex area for new trading partners. Hence, trading partners' willingness to share information, and provide support, relating to e-commerce adoption was rated medium for goodwill trust and an NZ Customs consultant indicated:

> We work as a team and perceive benefits as a win-win situation. Positive feelings towards our trading partners is high, because NZ Customs played an influential role in information sharing because of our strong international networks and reputation for ethical behavior, efficiency, effectiveness, and innovation.

The ISP was willing to share information and did provide support thus building goodwill trust. Furthermore, importers and exporters did demonstrate care and concern in important decisions. The findings implied that trading partner trust played not only an important role in business-to-business e-commerce operations in NZ Customs who represented the nation, but also contributed to economic, indirect, relationship-related and strategic benefits.

- ***R P 2:*** *Trading partner trust is negatively associated with perceived risks of e-commerce.*

The data suggesting the existence of competence, predictability, and goodwill trust leading to decrease in the perceived technology performance-related, relational, and general risks of e-commerce was strongly supported by NZ Customs. For example, NZ Customs rated technology performance-related risks to be low to begin with because their ISP was responsible for the compatibility and security of e-commerce applications. The NZ Customs intranet administrator indicated:

> The ISP is responsible for the compatibility of the system between trading partners (importers and exporters) and the CusMod system.

Hence, compatibility of the system was not an issue because the ISP facilitated the movement of transactions between NZ Customs and their trading partners.

Although the ISP facilitated the technological needs for customs clearance, a few trading partners experienced relational risks. For example, the NZ Customs intranet administrator indicated:

> The development of CusMod and changes associated with business processes and the introduction of the Internet have left some companies reluctant to change and others hampering on our door demanding change, thus contributing to relational risks. We are aware of the culture shock and are trying to be patient with them. Some of our trading partners are loud, hostile, and even aggressive (i.e, related to functional conflict). For example, the Inland Revenue Department (IRD) wanted a list of all our employees and their income to be submitted through a secure web site. The IRD demonstrated absolute power and authority and we had no choice to exercise either politically or financially. We are trying to build partnerships, and while some trading partners are great at demonstrating change, most of them are not.

Like any change, NZ Customs experienced relational risks in the form of coercive power from senior authorities, reluctance to change and organizational inertia from their trading partners (importers and exporters).

NZ Customs rated perceived general risks from poor business practices to be low. The participants indicated that the customs clearance process was a legislative one and matters can go up to the ministry level. For example, fines and imprisonment can be imposed on the customs broker or importers and exporters who undertake illegal trading practices such as dealing with drugs. The findings emphasized that perceived risks of e-commerce was insignificant on one hand because trading partner trust played an important role, and on the other hand the

customs clearance process was a legal one.

- ***R P 3:*** *Trust and security-based mechanisms in e-commerce are positively associated with perceived benefits of e-commerce.*

The data suggesting the existence of trust and security-based mechanisms in e-commerce leading to increased perceived economic, indirect, relationship-related, and strategic benefits of e-commerce was strongly supported by NZ Customs. NZ Customs rated most of their trust and security-based mechanisms to be high because the CusMod system was a sophisticated system with embedded automated checking mechanisms and protocols that enabled detection of errors. Furthermore, the ISP provided the technical expertise, training and support, in addition to compatible systems that help build trust.

CusMod is a semi-manual automated system, which operates on a round-the-clock basis demands competence trust from NZ Customs trading partners. CusMod relies on a set of structured messages that run in a sequential number order. The set have to be submitted in a structured format, otherwise the system will reject the transaction. CusMod produces three outputs: namely CUSDER for customs declaration, CUSCAR for customs cargo, and CURRES for customs response which either confirms or rejects CUSDER and CUSCAR. If the output is confirmed by the system then the system automatically issues a delivery order and an invoice. Otherwise, it returns an error message in the case of insufficient information. NZ Customs security analyst indicated that the CusMod demands standardized, structured, routine processes. An NZ Customs security analyst indicated:

> The CusMod system operates round the clock 24 hours x 7. When NZ Customs first implemented CusMod, they had to face a forty-eight hour turnaround time for clearance, but now it is just under twenty minutes.

It can be seen that with embedded trust and security mechanisms in e-commerce applications, speed and accuracy of business-to-business e-commerce transactions are achieved. The flexibility that CusMod provides (i.e, round-the-clock access) increased the satisfaction of importers and exporters. Consequently, relationship-related benefits were rated high because of the provision of timely, accurate, complete, and correct information. A slight delay in the transactions from CusMod can affect the trust of importers and exporters. Furthermore, NZ Customs receives managerial support from the government. The following mechanisms help to ensure integrity of business transactions and they include:

- Business problems are handled by the NZ Customs call center in Auckland, for NZ Customs trading partners. Importers and exporters can rely on these services if they have any uncertainties;
- Datacom played the role as the NZ Customs service help desk; and
- The ISP dealt with client-related problems. In addition, NZ Customs worked with the Ministry of Agriculture and Forestry and the Immigration department thus, maintaining high levels of security. According to the NZ Customs security analyst:

  > There is a lot of confidential information in NZ Customs databases and there is a need to ensure privacy of the information. NZ Customs has installed anti-virus software programs in their computer systems in order to protect the databases. They undertake a daily backup of their system, and practice segregation of duties using swipe cards where certain staffs are forbidden from entering certain floors in the building.
  >
  > We have a formal code of conduct supported by guidelines on principles, conventions and practices issued by the State Services Commission. We have to set a good example to the public in order to ensure business continuity. We believe that top management commitment is necessary as a business driver in the

> technology edge. We have to provide a statutory declaration using electronic signatures stating that the goods are cleared.

In addition, NZ Customs experienced best business practices in the following ways. NZ Customs and their trading partners had to abide by the Customs Act. Privacy of information was important. NZ Customs security analyst indicated that each trading partner was allocated a unique identifier (reference ID), which informed NZ Customs that it is an authentic, authorized trading partner. Security audits alerted NZ Customs to implement adequate and complete risk management strategies (such as, intelligent system checks). Thus, economic benefits from regular audits provided timely, accurate information.

The findings implied that cooperation among the trading partners (importers and exporters) and the ISP assisted in maintaining security by detecting smuggling offences, protecting flora and fauna, monitoring the movement of strategic (military) goods, investigating revenue fraud, and seizing illegal drugs.

- ***R P 4:*** *Trust and security-based mechanisms in e-commerce are negatively associated with perceived risks of e-commerce.*

The data suggesting the existence of trust and security-based mechanisms of e-commerce leading to decreased perceived technology performance-related, relational, and general risks of e-commerce was not supported by NZ Customs. Most of the risks were rated low to medium. One possible explanation for this is that NZ Customs outsourced part of their customs clearance processes to their ISP was responsible for the security of the system. Technology performance-related risks were rated low, as CusMod had embedded mechanisms and protocols that detected all incorrect and incomplete transactions. The findings implied that efficient intelligent testing was implemented to avoid unauthorized log-on procedures or passwords that could interfere with the maintenance and use of technology. Relational risks and general risks did not impact NZ Customs because they received top management support and received directions from the government, thereby enforcing best business practices.

- ***R P 5:*** *Perceived benefits of e-commerce are positively associated with e-commerce participation.*

The data suggesting the existence of perceived economic, indirect, relationship-related and strategic benefits of e-commerce leading to increased e-commerce participation was strongly supported by NZ Customs.

NZ Customs experienced a gradual increase in the volume and dollar value of their business-to-business transactions sent and received using CusMod. NZ customs relied on e-commerce, as most of their processes involving clearance were automated. 98% of NZ Customs business was conducted through e-commerce and 92% of it was business-to-business e-commerce. The annual monetary value of e-commerce transactions is NZ $25,574 billion in the year July 1st 1998 to June 30th 1999. The annual number of e-commerce transactions including both import, and export entries was 974,279 transactions for the year 1998-1999 and the operating revenue was NZ $61,254,000. A NZ Customs consultant indicated:

> We represent the nation, and trading partners are definitely our driving forces for adopting e-commerce. NZ Custom's staff conducts regular meetings with industry groups, and conduct business surveys on how CusMod is operating. We have introduced a national call center with a toll-fee number in Auckland where information is made available, free of charge for both importers and exporters. We also have a solid framework (that is a business model) which incorporates government legislative bodies, and builds trust.

We have moved from a mere gatekeeper for e-commerce transactions to service transactions and business relationships. We try to maintain business continuity and trading partner relationships. Similarly, we perceived an increase in the level of cooperation in our trading partners, as we received support from the government (as in policies to abide). We also perceived an increase in the level of commitment from our trading partners, as the reputation of our organization increased. Without trust there is no effective communication and without effective communication there is no business-to- business e-commerce.

Hence, NZ Customs experienced an increase in the level of open communications and commitment from their trading partners. The findings also implied that in every aspect a good level of communication enhances the smooth flow of e-commerce operations, both at a simplistic level and at a complex level. Furthermore, the fact that NZ Customs represented the nation and its mission contributed to their strategic benefits.

- ***R P 6:*** *Perceived risks of e-commerce are negatively associated with e-commerce participation.*

The data suggesting the existence of perceived technology performance-related, relational and general risks of e-commerce leading to decreased e-commerce participation was not strongly supported by NZ Customs. NZ Customs admitted that it was a big decision for them to outsource part of their e-commerce operations to their ISP. The NZ Customs intranet administrator admitted:

> NZ Customs concern was about the poor business practices of the ISP that could lead to perceived risks of e-commerce. On the other hand, the time required to train NZ Customs staff to use the new system and manage their 200 trading partners (comprising of exporters, importers, customs brokers, and agents) can create additional administrative time and costs. Although, a cost benefit analysis was seen as critical in e-commerce participation, we realized that establishing a cooperative network of trading partner relationships was even more important for trading partners to communicate, cooperate, and collaborate effectively.

The introduction of the Customs Excise Act in 1996 was vital to NZ Customs significant modernization. It provided a platform for customs risk management that allowed for greater administrative flexibility and greater transparency in decision-making. NZ Customs intranet administrator and IT manager indicated:

> All our documents are considered to be legal declarations. NZ Customs mission is to protect and enhance the interests of the New Zealand community by:
> - minimizing the risks that arise from international trade and travel;
> - facilitating legitimate movement of people and goods across NZ borders; and
> - collecting Customs and excise revenue.
>
> Our services impact the entire nation, passengers travelling out and coming into the country. By and large, businesses aim to make money and provide high quality services, that will impact benefits. More importantly, in the customs clearance service, there is a need to collaborate, communicate, and cooperate in order to clear the goods in a timely fashion.

The findings implied that because NZ Customs is an organization that received top management support and strategic directions from the government and is involved in a legislative process, the risks were low.

6.4. Uni-directional dyad 2: Electronic Commerce Network Ltd (Bi directional Dyad A)

The Internet Service Provider (Electronic Commerce Network Ltd. ECN), provides e-commerce services for NZ Customs and their trading partners (exporters and importers). ECN was established in 1991, and is New Zealand's leading trusted electronic business intermediary. ECN's main role is to facilitate technical and operational processes for organizations that want to adopt business-to-business e-commerce. They provide services that enable business

transactions across any network between applications. In addition, the ISP provides other services such as 24 hours x 7 availability of the network and maintenance of network, help desk, maintenance of trading partners details (as in correct information and privacy of trading partner's details), fault reporting, and maintaining direct debit authority schedule. The ISP outsourcers their client-based technological services and operations to almost four thousand trading partners. The ISP director indicated:

> Sometimes the ISP needs to deliver EDIFACT format types of messages. During these times we will charge the customs broker a transaction fee for receiving and transmitting messages in EDIFACT format. We do consult with other trading partners regarding electronic trading, as most small businesses lack the financial resources, knowledge, skills, and awareness of the full potential of Internet e-commerce applications, and in order to remain competitive in the global e-commerce market, trading partners outsource their business transactions to us.

The dyad in this case is between the Internet Service Provider and NZ Customs. In this dyad the Internet Service Provider (trustor) is supposed to trust NZ Customs.

6.4.1 Research Propositions of Uni-directional dyad 2 – Electronic Commerce Network Ltd (Bi-directional Dyad A)

This section examines the research propositions from the ISP's (ECN Ltd) perspective. Most of the research propositions did not apply to them because the ISP was not directly competing with NZ Customs but was acting as a facilitator for their business transactions.

- ***R P 1:*** *Trading partner trust is positively associated with perceived benefits of e-commerce.*

The data suggesting the existence of competence, predictability, and goodwill trust leading to increased perceived economic, indirect, relationship-related, and strategic benefits was supported by the ISP. The ISP director stated:

> We believe that trust is important since our trading partners are the ones who actually input the data into the system for responses. Therefore, training our trading partners to use e-commerce applications correctly is important. We experienced relationship-related benefits from open communications and satisfaction of NZ Customs staff.

The ISP had regular face-to-face meeting with NZ Customs staff. The findings implied that trading partner relationship and trust is the key to sustained e-commerce participation and it fosters open communications, information sharing, and tolerance for mistakes.

- ***R P 3:*** *Trust and security-based mechanisms in e-commerce are positively associated with perceived benefits of e-commerce.*

The data suggesting the existence of trust and security-based mechanisms in e-commerce leading to perceived economic, indirect, relationship-related, and strategic benefits of e-commerce was strongly supported by ISP. The ISP director observed:

> Through mapping and translation services, our technology provisions are designed to meet the needs of our trading partners' business requirements, thus creating a gateway for business electronic transactions (including purchase orders, invoices, waybills, compliance with government agencies, and value added services, including payment and fulfillment transactions).
>
> We do have a firewall in our systems that separate the flow of transactions between our trading partners and the outside public. We allocate unique identifiers for each of our 4,000 trading partners.

The ISP was responsible for implementing e-commerce protocols that provide trust and security-based mechanisms such as confidentiality, integrity, and authentication of business transactions sent by both trading partners. Trading partners had to log onto the ISP system using User Ids and passwords, thereby achieving transaction integrity, confidentiality, and authentication of the trading partners and the messages. Although technology provided the speed, automation that contributes to economic benefits, relationship-related, and strategic benefits can only be derived in trustworthy trading partner relationships over a period of time where positive consistent behaviors of trading partners were experienced.

The findings implied that the main role of the ISP is to provide technical services for the trading partners based on their business requirements. Importers, exporters, and NZ Customs were able to reap economic benefits from using automated ways of trading. The following research propositions did not impact the ISP relationship with NZ Customs as the ISP was a service provider and was not directly competing with NZ Customs.

- ***R P 2:*** *Trading partner trust is negatively associated with perceived risks of e-commerce.*
- ***R P 4:*** *Trust and security-based mechanisms in e-commerce are negatively associated with perceived risks of e-commerce.*
- ***R P 5:*** *Perceived benefits of e-commerce are positively associated with e-commerce participation.*
- ***R P 6:*** *Perceived risks of e-commerce are negatively associated with e-commerce participation.*

6.5. Uni-directional dyad 3: Customs Broker (Bi-directional Dyad B)

The dyad in this case consists of a customs broker and an importer. The customs broker clears the goods for the importer through NZ Customs. The customs broker provides customs clearance services for importers and exporters and plays the role of a trade facilitator. Although, the customs broker has been using the "Trade Manager" software program for the past three years, they have been trading with the importer for the past ten years.

The customs broker Customs Agent Wellington Limited (CAWL), is a small company consisting of seven employees. Their business reach is local (that is, within the Wellington region, where they serve fifteen importers (their trading partners). They use Trade Manager, a software program designed to meet the needs of New Zealand exporters and importers. Trade Manager is an e-commerce application, which uses Microsoft Access with Visual Basic applications, and provides real-time tracking information. Trade Manager is connected to major couriers, postal services, shipping companies, and ports. Exporters use shipping companies with web sites to link their details to the customs broker's web site. Exporters use Trade Manager to prepare export documentation including invoices, shipper letters of instruction, picking and packing lists, order acknowledgments, and certificates of origin and customs declarations. Importers use Trade Manager to manage orders, keep a database of all their shipments, and calculate accurate landed costs. By doing so, trading partners can track their goods through this site thereby adding value to their export service. In this dyad, the customs broker (trustor) is supposed to trust the importer.

6.5.1 Research Propositions Uni-directional Dyad 3 – Customs Broker (Bi-directional Dyad B)

In this section we examine the research propositions from the customs broker's perspective.

- ***R P 1:*** *Trading partner trust is positively associated with perceived benefits of e-commerce.*

The data suggesting the existence of competence, predictability, and goodwill trust leading to increased perceived economic, indirect, relationship-related, and strategic benefits of e-commerce was strongly supported by the customs broker. The customs broker rated competence trust to be high, because Trade Manager application was a simple, user-friendly application. The customs broker noted:

> We experienced economic benefits from a major reduction of paper flow, automatic storage of information through computer backup procedures, direct clearance cost savings, reduction of clerical work, and reduction by one day in transit time.

The automated clearance process involved in customs clearance may lead to fewer errors and transactions are cleared more quickly, thus contributing to economic benefits from savings in time and cost. Economic benefits such as non-duplication of efforts, immediate access to data without disruption to workflow, greater accuracy with fewer input functions, and timely output of tracking information has enabled better utilization of human resources.

Economic benefits led to relationship-related benefits because of the provision of timely, accurate, complete, and correct information contributed to satisfaction of the importer. The customs broker indicated that relationship-related benefits came from cooperation.

> We cooperate and communicate openly, as we use the same application. We also pay indemnity insurance for the importer's paper work (as a way of sharing risks).

Relationship-related benefits were derived from the trading partner trust relationships that were built over the years before the company began using Trade Manager. We define trust as being reliable, credible, and honest in a business relationship, and honoring the quality of information. The findings implied that long-term trading partner relationships established with the importer contributed to relationship-related benefits.

- ***R P 2:*** *Trading partner trust is negatively associated with perceived risks of e-commerce.*

The data suggesting the existence of competence, predictability, and goodwill trust leading to decreased perceived technology performance-related, relational, and general risks of e-commerce was not strongly supported by the customs broker. For example, the customs broker rated technology performance-related risks to be low. One possible explanation for this is that Trade Manager is not a complex web-based application. The customs broker indicated that:

> Issues arising from the compatibility and infrastructure were few because the Trade Manager was a Microsoft application. In addition, we relied on other forms of communication, such as the fax, telephone, and email. Technology only enables the transmission of data from point to point. We need to trust the person keying in the data that the information is correct. Competence trust enables tracking of accurate information from using Trade Manager by the importer. The Trade Manager enables us to lock our trading partners. All events are recorded against each job, order on a date/time basis, and memos are created and referenced/filed to each job for future reference, thereby enabling importers to achieve lower clearance costs, and creating integrity of the business transactions.

The findings implied that Trade Manager had embedded protocols that detected errors thus reducing risks.

- ***R P 3:*** *Trust and security-based mechanisms in e-commerce are positively associated with perceived benefits of e-commerce.*

The data suggesting the existence of trust and security-based mechanisms in e-commerce leading to increased perceived economic, indirect, relationship-related, and strategic benefits of e-commerce was supported by the customs broker. For example, the customs broker rated most of their trust and security-based mechanisms to be

high. Mechanisms such as firewalls and encryption (for confidentiality), digital signatures (for non-repudiation), and network access controls were not implemented by the customs broker because the Trade Manager was a simple Windows Microsoft Access and Visual Basic application system. The customs broker noted that:

> Confirmations' and acknowledgments were received using the e-mail embedded in the Trade Manager. In case of urgent orders we use the telephone, e-mail, or fax.

The findings implied that confidentiality of business-to-business transactions sent and received by the customs broker was not an issue, because the system was not connected to their network. Separate log-on procedures using User Ids and passwords to send and retrieve information were applied. The security issues were limited, as the Trade Manager was a pre-programmed application.

- ***R P 4:*** *Trust and security-based mechanisms in e-commerce are negatively associated with perceived risks of e-commerce.*

The data suggesting that the existence of trust and security-based mechanisms leading to decreased perceived technology performance-related, relational and general risks of e-commerce was not supported by the customs broker. The customs broker indicated that:

> General risks were rated low, as we had to abide to the terms and standards of the Customs Act and are involved in a legislative process. We question our importers on their products for correct identity of the goods, and we trust what the importer says as we are making a legal declaration on their behalf. We do not apply segregation of duties, as we are a small company and most of our employees undertake multi-tasks.

The customs broker is aware of the legal implications involved in the customs clearance process and therefore abides by the standards of the Customs Act. The findings implied that employees work as a team and undertake multi-tasks that may contribute to poor business practices because training is only given to staff as and when required.

- ***R P 5:*** *Perceived benefits of e-commerce are positively associated with e-commerce participation.*

The data suggesting the existence of perceived economic, indirect, relationship-related and strategic benefits of e-commerce leading to increased e-commerce participation was supported by customs broker. For example, the customs broker indicated that, although only 35% of their business involved the use of Trade Manager, e-commerce was still important. Most of the customs broker's trading partners who were using fax, and e-mail to communicate are planning to go online. The custom broker's annual monetary value from e-commerce transactions in 1999 was NZ $200,000 (an increase of 10% from 1998). The annual number of e-commerce transactions was 7,200. The use of Trade Manager has increased e-commerce performance for both parties that, in turn helped to build trust and reputation. The customs broker stated that:

> We are now able to compete with the one-stop shop services offered by multi-national freight forwarders and have become a serious competitor for trading partners. Trust is explicit and is built in the trading partner relationship.

The findings implied that trading partner relationships, together with automated e-commerce applications increased in e-commerce participation.

- ***R P 6:*** *Perceived risks of e-commerce are negatively associated with e-commerce participation.*

The data suggesting the existence of perceived technology performance-related, relational and general risks of e-commerce leading to decreased e-commerce participation was not strongly supported by the customs broker. The customs broker perceived their risks to be low, as they were not directly competing with their importer. The customs broker was playing the role of a trade facilitator between the importer and NZ Customs.

6.6. Uni-directional dyad 4: Importer (Bi-directional Dyad B)

The dyad in this case is between the importer and the customs broker. The importer obtains clearance for their goods through the customs broker. The importer is a small company with thirteen employees. They import kitchen gadgets, plastics, baby wear, and cosmetics, and distribute them to the five largest supermarkets in New Zealand (including Woolworth, New Worlds, Big Fresh, Countdown, and Pak and Save). The importer has been using Trade Manager for the past five years. Their business transactions include invoices, line items, local charges, freight charges and storage charges. Most of the charges are automatically calculated by Trade Manager via pre-arranged agreement on prices and charges. Thus, when a shipment arrives at the port, the importer provides information to their customs broker who will then process the clearance of their shipment through customs. In this dyad the importer (trustor) is supposed to trust their customs broker.

6.6.1 Research Propositions Uni-directional Dyad 4: Importer (Bi-directional Dyad B)

In this section we examine the research propositions from the importer's perspective.

- ***R P 1:*** *Trading partner trust is positively associated with perceived benefits of e-commerce.*

The data suggesting the existence of competence, predictability, and goodwill trust leading to increased perceived economic, indirect, relationship-related, and strategic benefits of e-commerce was strongly supported by the importer. Competence trust was rated high because the importer found Trade Manager to be user-friendly software. The importer asserted that:

> Our customs broker responded to our queries through email, telephone, fax, and in getting the freight charges loaded into the system within a couple of hours (that is less than half a day), thus contributing to economic benefits from savings in time and costs. Economic benefits from savings in time and cost from making telephone calls or waiting for the information was experienced as the Trade Manager provided real-time tracking information. We were aware when the goods will be cleared and were better able to inform our suppliers. Furthermore, we only had to bring in our delivery order, which was electronically sent into our system by the customs broker. It takes less than twenty minutes to clear.

Relationship-related benefits were seen from open communications and information sharing. In the words of the importer:

> The customs broker has shown a willingness to share information, and provided support when we first implemented Trade Manager. The customs broker's staff came over and gave us some training. They did show care and concern not only in using the technology, but also in making important strategic decisions, such as designing a cost-effective approach for shipping and transport. The importer went on to say:
>
> Although we had a choice to do business with other customs brokers, we preferred to trade with our customs broker because of past experiences that contributed to a foundation of familiarity. We have been trading with them for almost ten years.

The findings implied that trading partner trust was high in this dyad. Embedded automated protocols in the Trade Manager provided technical efficiencies and together with competence trust in Trade Manager, economic benefits leading to enhanced trading partner trust were experienced. Satisfaction from real-time tracking information of the clearance process increased the importer's trust with their suppliers and contributed to relationship-related benefits.

- ***R P 2:*** *Trading partner trust is negatively associated with perceived risks of e-commerce.*

The data suggesting that the existence of competence, predictability, and goodwill trust leading to decreased perceived technology performance-related, relational, and general risks of e-commerce was not supported by the importer. The importer rated technology performance-related risks to be medium because the importer suspects that the customs broker exercises poor business practices.

Relational risks arising from uncertainties were rated medium. The importer indicated that:

> We did face initial uncertainties in using the Trade Manager that led to our dependence on our customs broker. These interdependencies gradually led to an imbalance of power. Although our customs broker provided us with free software and initial training, we were left in a difficult position. It is not something that you have to outsource, but we had to change our internal business processes in order to facilitate and simplify the business processes of the customs broker, which takes some time to get it completely right. We do face situations of conflict and handling discrepancies, but it is more a functional conflict relating to business processes rather than a personal conflict.

Opportunistic behaviors (such as increasing the charges for the goods cleared by the customs broker) were seen as relational risks. According to the importer:

> Our customs broker did appear to exercise opportunistic behaviors by increasing the charges and costs for clearance, which led to functional conflicts derived from a misunderstanding in calculating charges, due to the conversion of currencies, and taxes. In most cases the customs broker had to explain to us on how they derived the figures.

The findings implied that perceived risks were resolved by communicating openly with the customs broker who was willing to explain the situation, thus increasing trading partner trust.

- ***R P 3:*** *Trust and security-based mechanisms in e-commerce are positively associated with perceived benefits of e-commerce.*

The data suggesting the existence of trust and security-based mechanisms leading to increased perceived economic, indirect, relationship-related and strategic benefits of e-commerce was strongly supported by the importers. The importer indicated that:

> We used separate log-on procedures and applied segregation of duties in order to ensure different levels of authorization mechanisms in the importer's organization. The receptionist, administration staff, and drivers do not have access to the Trade Manager. Furthermore, we exercised best business practices in the form of daily backups and followed the Importers Institute standard. We maintained a backup hardcopy version of all purchase order numbers, invoice numbers, reference numbers.

Economic benefits in the form of less paper usage and lower error rates were achieved as a copy of the original invoice was given to the customs broker. They also experienced cheaper flat rates for custom clearance charges (no line fees) including landed cost reports, electronic proof of delivery, reconciliation of deferred payment, and tariff consultancy also resulted. The importer noted:

> We had more time (from less administrative work) from automated customs clearance service that enabled us to focus on our strategic planning.

The findings implied that real-time tracking information provided accurate information for the importer to act upon, which contributed to trading partner satisfaction and relationship-related benefits.

- ***R P 4:*** *Trust and security-based mechanisms in e-commerce are negatively associated with perceived risks of e-commerce.*

The data suggesting the existence of trust and security-based mechanisms in e-commerce leading to decreased perceived technology performance-related, relational and general risks of e-commerce was not supported by the importer. Most of the risks did not impact the importer and some were rated low because Trade Manager involves routine, structured business transactions. For example, reference numbers provided unique identification and data integrity, thereby mitigating internal security error. However, the importer was concern about privacy and indicated that:

> Our risks lie in the shipment information being leaked out to other competitors by our customs broker, whom they say sometimes fax documents. The fax revealed the quantity of stock imported for each delivery and can be seen by their employees or any other unauthorized personnel. There are risks in applying poor business practices (lack of audits, back-ups), particularly in a small firm where most of the employees performed multi-tasks.

General risks did not affect the importer because Trade Manager was a separate application used for a specific purpose. The findings implied that the customs clearance process was separate from other business functions (accounting, human resources, and inventory) in the importer's organization and because the importer enforces best business practices most of the risks were rated low.

- ***R P 5:*** *Perceived benefits of e-commerce are positively associated with e-commerce participation.*

The data suggesting the existence of perceived economic, indirect, relationship-related, and strategic benefits of e-commerce leading to increased e-commerce participation was supported by the importer. E-commerce was important for the importer because they obtained real-time information. There was a definite increase in profitability Trade Manager facilitated the customs clearance process. Efficiencies from speed, real-time tracking information, electronic clearance, and the reduction in paper work encouraged more orders to be cleared faster and cheaper, thus increasing productivity, profitability and trading partner satisfaction. According to the importer indicated that:

> The annual monetary value of e-commerce transactions in 1999 was NZ $1.5 million (an increase of 15% from 1998). The annual number of e-commerce transactions was 200 input entries that created 600 output entries per year, because each job created between four to five entries.

It can be seen from the findings that risks were more perceived than real. Furthermore, the established long-term relationship between the importer and the customs broker assisted in clarifying uncertainties. The importer defines trust as "being sure that the data input was correct, and not corrupted via viruses or human error."

- ***R P 6:*** *Perceived risks of e-commerce are negatively associated with e-commerce participation.*

The data suggesting the existence of perceived technology performance-related, relational, and general risks of e-commerce leading to decreased e-commerce participation was not supported by the importer because Trade Manager was a simple application. Most of the risks were rated low and did not impact the importer because their business functions were separated from Trade Manager. However relational risk from a situation of information power leading to functional conflicts was experienced at times, but in most cases these conflicts were solved.

6.7. Uni-directional dyad 5: Cisco NZ (Bi-directional Dyad C)

The dyad in this case is between Cisco NZ and Compaq NZ. Cisco supplies computer and data communication products to Compaq who integrates computer systems for their end customers.

Cisco NZ, established seven years ago, is a small to medium-sized organization with twenty employees located in Wellington, New Zealand. Their reach is international and their product line is data and communication. Cisco had a sales volume of US $480 billion, with 25,000 employees worldwide. Cisco Systems, Inc. is the second largest company in the world after Microsoft.

Cisco NZ joined forces with their head office in San Jose, California (U.S.) to implement their e-commerce applications. Cisco's business-to-business e-commerce extranet application, Cisco Connections Online (CCO) has built-in functions and business transactions such as purchase orders for equipment, delivery, and product information from web-sites. Secondary elements include ordering for equipment, delivery, and ability to check lead track time. Cisco's registered trading partners can download product, equipment, and pricing information from CCO. In addition, automated online tools are embedded within the system.

CCO is the foundation of interactive, networked services that provide immediate and open access to Cisco's information, resources, and systems, anytime and anywhere. Figure 6.3 depicts the functions and processes embedded within CCO. Cisco embraces the Global Networked Business model, which aims to implement innovative tools and systems, and to share information with diverse company stakeholders, such as suppliers, distributors, customers, and employees. By using CCO, Internetworking Product Center (IPC), and Partner Initiated Customer Access (PICA), Cisco is able to connect trading partners to the manufacturing resource planning system (Cisco, 1998).

Most of Cisco's trading partners are system integrators. They include Logical, Datacom, Compaq, IBM, Telecom, Unisys, Clear, Fujistu, and Computer Link. Cisco's trading partners were chosen on the basis of their reputation and by replicability as a channel. Trading partners are contracted for between three and five years to trade with Cisco NZ. In this dyad Cisco NZ (trustor) is supposed to trust Compaq NZ.

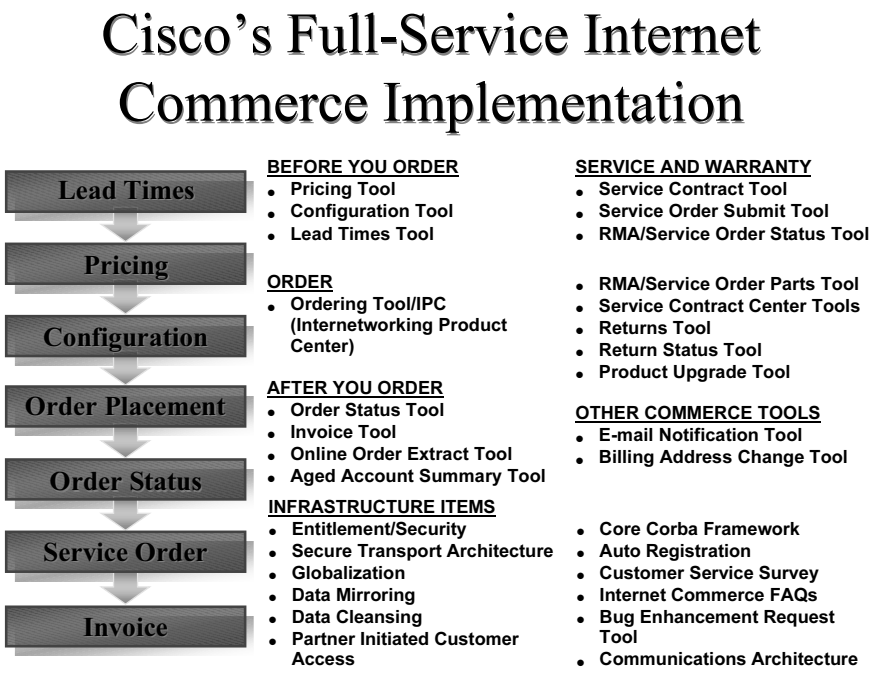

Figure 6.3: Supporting Tools and Infrastructure of Cisco Connection Online

6.7.1 Research Propositions Uni-directional dyad 5: Cisco NZ (Bi directional dyad C)

In this section we examine the research propositions from the perspective of Cisco NZ.

- ***R P 1:*** *Trading partner trust is positively associated with perceived benefits of e-commerce.*

The data suggesting that the existence of competence, predictability, and goodwill trust leading to increased perceived economic, indirect, relationship-related, and strategic benefits of e-commerce was not strongly supported by Cisco. Cisco rated competence trust of Compaq NZ to be low. One possible explanation for this is that although CCO, is a user-friendly package, the process involved in creating an order for the products and components is a complex one. CCO undertakes an automated checking mechanism, thereby contributing to 80% of the fault activities reported on the web. Cisco's accounting manager said:

> We have some trading partners who can perform competently, and some that cannot but have learnt it the painful way in terms of wasted time and costs, as they need to re-send the same order twice. Some of our trading partners do not have the underlying fundamental knowledge to place complete and correct orders, thereby, lacking the intellectual horsepower required to undertake the ordering process.
> The online ordering process permits Compaq staff to check the pricing and configuration of the order even

before placing the actual order. Improved order accuracy from the interactive web-based applications (with built-in rules and access to current pricing, product specifications, selection/configurations) ensured the submission of complete and accurate orders. Through CCO, Compaq staff were able to learn about Cisco's products and pricing, create an order, download software updates, search for known bugs, and resolve technical problems through the state-of-the-art network technical assistance applications.

In fact, 80% of the non-technical support questions were answered online through Cisco's convenient, self-service applications that in turn increased Compaq's satisfaction. Compaq received immediate, round-the-clock access to richer, more precise service and support information, thus contributing to economic and relationship-related benefits.

Relationship-related benefits further help to improve communication and cooperation with Compaq staff through constant emails and phone calls made to the Cisco's IT call center in Sydney – the Internet Business Solutions Group (IBSG). The IBSG provided additional clarifications to the technical jargon, product information to check if Cisco's trading partners were using the system properly, and other communication involved in the process.

Compaq staff will need to be aware of the right parts and are, therefore, dependent on Cisco for their actual products (which includes data and communication equipment, technical advice, and support to place an order). A Cisco Sales Consultant indicated that:

> Compaq staff is aware of the market coverage and is confident in their capability in resolving standardized issues. Over time Compaq staff have shown an ability to be competent channel system integrators using Cisco computer and communication equipment.

Consistent behaviors from Compaq staff in their ability to use CCO correctly gave an indication of their performance capability and confidence, and, therefore, increased their predictability trust. Compaq was thus able to fulfill end customers' preference, and experience relationship-related benefits.

Compaq staff was willing to share information regarding the amount of stock they required for an advanced period of time. A Cisco sales consultant indicated that Compaq staff were aware that Cisco is popular and had a reputation. Hence, by undertaking to do e-business with Cisco, Compaq's reputation has also improved.

Cisco provided Compaq staff with initial training that was found encouraging and supportive, as they were willing to share information relating to e-commerce adoption. Cisco NZ has a brand name and an increased level of technical knowledge, which enhanced Compaq's reputation.

The findings implied that Cisco's powerful tool, CCO has embedded automated protocols that provided reliable and timely information for Compaq staff who experienced both economic and relationship-related benefits.

- ***R P 2:*** *Trading partner trust is negatively associated with perceived risks of e-commerce.*

The data suggesting the existence of competence, predictability, and goodwill trust leading to decreased perceived technology performance-related, relational and general risks of e-commerce was not strongly supported by Cisco. Technology performance-related risks were rated low because CCO was only implemented by Cisco, and Compaq staff only had to log onto the web-site using authorization mechanisms. Relational risks were rated low because, although, trading partners in a situation of conflict and handling discrepancy do sometimes exhibit frustration or resentment, these issues are business-related and not personal. Cisco's accounting manager indicated that:

> Conflict does occur always as nobody wants to kill each other. Occasionally, they do get frustrated when they want something to be done. They negotiate and with cohesion depending on how important the situation is.

Cisco tries to match their objectives with Compaq's goals and occasionally there are cases of differences. Cisco's NZ Accounting manager noted:

> Although, the extranet site was maintained by Cisco it is was fairly secure. There were concerns that Compaq staff could leak out sensitive information (such as price and product information) to Cisco's competitors.

General risks were rated low because Cisco made sure that best business practices in the form of regular audit, high quality standards, checking mechanisms, risk management and top management support were implemented.

- ***R P 3:*** *Trust and security-based mechanisms in e-commerce are positively associated with perceived benefits of e-commerce.*

The data suggesting the existence of trust and security-based mechanisms leading to increased perceived economic, indirect, relationship-related, and strategic benefits of e-commerce was strongly supported by Cisco. CCO provides direct access to the manufacturing systems so that Compaq staff can track inventories, engineering changes, shipment status, and other information in real time. Furthermore, Cisco NZ has help desk and system technicians who provide support. The IT customer service in Sydney (ISBG) undertakes to answer queries and offer a second level of service and IT support. Cisco's accounting manager indicated that:

> Initially, the error rate was 80%, has now reduced to less than 15%, thus contributing to economic benefits from savings in time and cost (telephone calls, email, faxes for correcting mistakes). CCO provides benefits in the form of real-time order tracking information, and estimated arrival dates of goods. In fact, Cisco participants admitted that 35-40% of the revenue came from Compaq NZ.
>
> Economic benefits over a period of time led to positive, consistent behaviors shown by Compaq's improved customer service, product quality, and satisfaction. Cisco saved up to US$800 million dollars per year, as there was no need to re-key the same order information that was entered by our Compaq staff. The provision of real-time online tracking information has contributed to additional savings in time and costs previously handled via telephone calls and fax.
>
> Furthermore, regular system integrity tests and audits were conducted to detect flaws and security concerns in the e-commerce system. Each transaction that came from Cisco's system has a trading partner reference code (as in sequence numbers) together with an order number. Each time an order came in, the system checked and triggered an email back to the trading partner to confirm the receipt of the order. However, if the order was configured wrongly, the system would automatically trigger an error message back to the sender. The Cisco NZ's accounting manager noted:
>
> We try to resolve issues within twenty-four hours via telephone calls, e-mail and sometimes even face-to-face meetings as Compaq NZ was also located in the Wellington region, thus contributing to relationship-related benefits. Cisco has explicit trading and procedures agreement with Compaq regarding their roles and responsibilities outlined in the System Integration Supply Contract.
>
> He went on to say, Compaq staff do adhere to policies, terms of contract, and trading partner agreement. We do sign a three-to five-year contract with our trading partners', that outline the procedure to be followed from the time we place an order until settlement.

Cisco considers best business practices as the quality and correctness of the information ordered from the services they provide. The incoming orders undergo multiple checks through system security services (confidentiality, privacy, integrity, authenticity, and non-repudiation).

The findings implied that CCO plays an important role in building trading partner trust. Satisfaction derived from technological efficiency laid the groundwork for a trusting relationship to develop between trading partners.

- ***R P 4:*** *Trust and security-based mechanisms in e-commerce are negatively associated with perceived risks of e-commerce.*

The data suggesting the existence of trust and security-based mechanisms in e-commerce leading to decreased perceived technology performance-related, relational, and general risks of e-commerce was not supported by Cisco. Cisco NZ found their technology performance-related risks to be low because of their highly sophisticated extranet application and also indicated that most of the risks did not apply to them. Compaq staff only had to log onto Cisco's web-site and access product information before placing an order. Hence, compatibility problems with hardware and software were rated low.

Cisco NZ did not emphasize on relational or general perceived risks because they exercised good business practices. According to Cisco's Accounting manager:

> One possible explanation for this is our high quality services together with the information we provide (that is timely, accurate) and our IT support group staff are competent, and responsive.

The findings implied that the existence of top management support and commitment at Cisco contributed to low risks.

- ***R P 5:*** *Perceived benefits of e-commerce are positively associated with e-commerce participation.*

The data suggesting the existence of perceived economic, indirect, relationship-related and strategic benefits of e-commerce leading to increased e-commerce participation was strongly supported by Cisco NZ.

Increased e-commerce performance led to economic benefits. After an initial training period, Compaq staff were able to place orders correctly and completely, thereby saving Cisco staff a lot of time clarifying faults. Competence trust along with trust and security-based mechanisms provided real-time tracking information that led to increased trading partner satisfaction. The Cisco's accounting manager noted that:

> E-commerce is very critical to our organization as it helps reduce the costs and increase customer satisfaction with fewer errors.

Seventy to eighty percent of Cisco's business involved e-commerce, and the annual monetary value of e-commerce transactions is between NZ $17 to 34 billion dollars. The volume of transactions is 2.5 million e-commerce transactions per year. CCO is now selling U.S. $11 million in networking equipment at an annual rate of US $4 billion (Cisco Solutions, 1998). Cisco perceives their organization to engage in long-term business investments with Compaq NZ. Cisco NZ's sales consultant indicated that:

> Cisco NZ admitted that their number of trading partners has increased. When we first implemented e-commerce on the web we had between 3 to 5 major channel partners, now we have 10 trading partners (channel partners). Our main role is to establish customer preference, and increase the number of channel partners by trading relationship trust, which in turn increases e-commerce participation.

The findings implied that e-commerce success depends on both efficient technologies and well-planned partnerships

with mutual goals and trust. Cisco's experience in e-business has set the standard for e-commerce transformation and creating Internet solutions.

- ***R P 6:*** *Perceived risks of e-commerce are negatively associated with e-commerce participation.*

The data suggesting the existence of perceived technology performance-related, relational, and general risks of e-commerce leading to decreased e-commerce participation was not supported by Cisco. Most of the risks did not impact Cisco because they enforced best business practices and their standards were universally acceptable. Cisco's participants suggested that communicating with e-commerce transactions and paperwork involved in e-commerce adoption was not an issue, however, the business management issues that relied directly on trust behaviors and intentions of trading parties mattered a lot. The findings implied that because Cisco maintained a very good trading partner relationship with Compaq NZ, most of the risks they perceived were low and/or not applicable.

Cisco participants define trust as "information divulged to trading partners that must be kept confidential, and their trading partners must treat them equally, as they treat other business partners and there should be no dirty or under-the-table deals".

6.8. Uni-directional dyad 6: Compaq NZ (Bi-directional Dyad C)

The dyad in this case is between Compaq and Cisco NZ. Compaq NZ sells computers, application software, hardware, networks, databases, undertakes systems integration, and develops database application systems. Compaq's main role is to manufacture computer systems integration parts and provide computer services. A Compaq NZ Network Specialist Manager indicated that:

> Compaq is one of the key channel trading partners, and they purchase computer and data communication parts from Cisco.

Compaq NZ is a large company with 300 employees and their reach is both national and global. The Wellington branch is responsible for implementing business-to-business e-commerce via email and files, but mostly uses CCO (Cisco's extranet application). Compaq manages Cisco's orders relating to system integration, applies network equipment, direct products and prices to meet end customer needs. Compaq has five branches in New Zealand; one each in Wellington, Auckland, Christchurch, Hamilton, and Dunedin. In this dyad, Compaq NZ (the trustor) is supposed to trust Cisco NZ (trustee).

6.8.1 Research Propositions Uni-directional dyad 6 – Compaq NZ (Bi-directional Dyad C)

In this section we examine the research propositions from Compaq NZ's perspective.

- ***R P 1:*** *Trading partner trust is positively associated with perceived benefits of e-commerce.*

The data suggesting the existence of competence, predictability, and goodwill trust leading to increased perceived economic, indirect, relationship-related, and strategic benefits of e-commerce was strongly supported by Compaq NZ. For example, Cisco's configuration tool enabled Compaq staff to configure their orders. A Compaq network sales specialist described how:

> CCO enables us to check the prices, request a discount if necessary, and electronically receive an estimated

> time of arrival before even confirming the order. The system automatically gives the number of days as to when the goods will be delivered, thereby enabling Compaq staff to undertake an inquiry on the system in advance. The updated information on Cisco's website is accurate and reliable. Cisco kept their business promises which assisted Compaq to make better strategic decisions, thus contributing to economic benefits from savings in time and costs (from telephone calls).
>
> Competence trust was shown by Cisco staff who had the ability to do their job. Cisco staff is the 'pros' as they know what they are doing. Their IT support people are excellent, very responsive, and timely in providing complete and accurate information. In addition, their online tools have checking mechanisms that enabled Compaq to detect errors. Compaq staff are able to say that trading with Cisco is better than trading with most of Cisco's competitors, particularly when it comes to problem-solving which creates a confidence in handling conflict resolution and clarifying issues. I guess that's why Cisco is number two in the world and it is definitely based on reputation and goodwill trust. – Compaq Network Specialist Manager.

Compaq staff observed economic benefits from reduced operations, transaction and administrative costs due to quick responses and timely, accurate information retrieved from Cisco's extranet application. A Compaq network sales specialist manager describe the benefit:

> We have experienced reduced error rates and improved accuracy of information exchanged, as we can configure our orders and check them first before confirming the placement of the same order. Faster responses to orders and reduced lead time from CCO provided estimated arrival dates of the goods and tracking information which enabled us to inform our end consumers.

Hence, Compaq NZ experienced reduced inventory levels and optimized their supply chain because there was no need to keep stock. The stock arrives, is cleared at Customs, and then gets delivered directly to the end customers. The Compaq NZ Network Sales Specialist indicated that they were dependent on Cisco staff.

> Cisco's staff is reliable. We want to continue using Cisco's communication equipment for two reasons. First, Compaq NZ's end customers rely on Compaq as system integrators, and second, Compaq end customers order Cisco's equipment, which only Cisco can supply. In that respect Compaq was dependent on Cisco.

Most of Compaq's end customers require Cisco products and equipment because of Cisco's brand name and reputation.

Although, Compaq has been using CCO for the past eighteen months, Compaq had a trading partner relationship with Cisco for the previous ten years. Cisco NZ has a big commitment to make things work. Cisco's staff do backend work to constantly check all incoming orders in order to make sure that the orders sent are complete and correct. Cisco staff has shown consistent behaviors in their business interactions with Compaq staff. Although the focus may point towards a high level of competent trust in technology and financial resources, soft relationships (such as honesty, in providing reliable information and having a call centre when problems arise) were found to be important. The availability of financial resources can purchase any fancy e-commerce tool, but the key is not only in having the right skilled staff to manage the technology but also in having committed trading partners.

The increased level of commitment from Cisco NZ led to long term contracts that lasted between three and five years. Building trust and trading partner relationships was important because Cisco NZ was aware of the products. Compaq participants indicated that they trusted Cisco staff. Trust matters in e-commerce trading partner relationships, although it is implicit. As one Compaq NZ Network specialist says,

> We speak of trust in e-commerce systems with regard to actual dealings, but it takes some time for trading partner relationship trust to gradually develop.

The findings implied that the technological efficiency of CCO initially contributed to economic benefits for Compaq which led to satisfaction and relationship-related benefits.

- ***R P 2:*** *Trading partner trust is negatively associated with perceived risks of e-commerce.*

The data suggesting the existence of competence, predictability, and goodwill trust leading to decreased perceived technology performance-related, relational, and general risks of e-commerce was not strongly supported by Compaq NZ.

Technology performance-related risks were rated medium because of Compaq's initial experience in learning how to use the CCO application. Since it is new, it was difficult, but with training and calls made to their help desk, it was possible over time to see the pattern involved in using the CCO application.

Relational risks were rated low by Compaq staff. Compaq participants indicated:

Cisco staff did create a situation of imbalance of power, as they would like to have the names of our end customers. But when we chose not to give to them because we would like to have a bit of competition by buying from other suppliers, Cisco staff did not like it.

This was a situation of power exhibited by Cisco that contributed to relational risks. Compaq participants did indicate that Cisco staff could sometimes be arrogant, thus contributing to relational risks.

- ***R P 3:*** *Trust and security-based mechanisms in e-commerce are positively associated with perceived benefits of e-commerce.*

The data suggesting the existence of trust and security-based mechanisms in e-commerce leading to increased perceived economic, indirect, relationship-related and strategic benefits of e-commerce was strongly supported by Compaq. The online tracking of information was made available from the time an order was placed until the goods were delivered. Cisco's diagnosis software analyzes and reports software and hardware failures, which includes automatic logging of calls to the Customer Support Center. Compaq participants indicated that:

Indeed, CCO assisted us in making accurate strategic decisions and building our reputation, as we were able to fulfill our business promises, thus contributing to both economic and relationship-related benefits.

This cyclic process, in turn, built Cisco's reputation as Compaq's end customers continued to order Cisco products.

Other trust and security-based mechanisms practiced by Compaq staff include authentication mechanisms using User IDs and passwords, application controls, and accounting controls providing reference numbers for the transactions, and the implementation of best business practices. In the words of the Compaq accounting manager:

> We have reference numbers with Cisco NZ that served as unique identifiers thereby providing authentication. We believe that top management commitment is critical especially when it comes to the budget. We do have to meet with the standards set out by Cisco (industry and universal) and policies. We are part of the ISO 9000, but not all of the divisions. We have a trading partner agreement, and undertake regular audit checks in order to manage risks. We have a business risk management group of consultants who design contingency procedures for our e-commerce systems and operations.

The findings implied that Compaq NZ was also applying best business practices in their organization, which made it easier to work and to meet Cisco's high expectations and standards.

- ***R P 4:*** *Trust and security-based mechanisms in e-commerce are negatively associated with perceived risks of e-commerce.*

The data suggesting the existence of trust and security-based mechanisms in e-commerce leading to decreased perceived technology performance-related, relational, and general risks of e-commerce was not strongly supported by Compaq NZ. Technology performance-related risks from a lack of compatibility were rated low. Compaq NZ only required an e-mail system and an Internet application to download product information into their systems.

However, confidentiality concerns came from an awareness that Cisco staff could send out virus-infected information through their systems. For this reason, Compaq's computer systems had an updated virus scanner. Relational and general risks were rated low, and most of them were not applicable to Compaq NZ because the system was implemented by Cisco.

The findings of this bi-directional dyad implied that although the emphasis was on technology, Compaq staff was aware of the importance of an open and trustworthy trading partner relationship with Cisco NZ.

- ***R P 5:*** *Perceived benefits of e-commerce are positively associated with e-commerce participation.*

The data suggesting the existence of perceived economic, indirect, relationship-related, and strategic benefits of e-commerce leading to increased e-commerce participation was strongly supported by Compaq NZ.

Compaq NZ participants indicated that 80% of their business involved the use of e-commerce and out of that 20% came from Cisco. The remaining business came from other suppliers. Compaq's annual monetary value of e-commerce transactions in 1999 was NZ$6 million (an increase of 5% since 1998) from 700 annual e-commerce transactions. Compaq NZ's end customers will continue to be a major source of revenue, because Compaq end-consumers demanded Cisco products. There was an increase in the number of trading partners because of the popular demand for Cisco products. Compaq NZ perceives their organization will engage in a long-term business relationships with Cisco NZ.

Compaq participants further suggested that Cisco provides high quality services and is committed to be at the top. Cisco claimed that they are number two in the global marketplace. Furthermore, Cisco has been involved in e-commerce for the past twenty years and their standards are universally acceptable. They have a trading partner agreement which outlines procedures, undertakes regular risk analysis and audit checks. In addition, Cisco's provides training and education to Compaq, which they consider very important, thereby contributing to Cisco's high-quality service.

Strategic benefits were implicit because Compaq buys Cisco NZ products, thus helping to build Cisco's image and reputation. Compaq NZ Network specialists indicated that:

> We cannot promise that Cisco was our driving force for adopting e-commerce, as we adopted e-commerce to stay competitive in the business. We have our own web page, products, catalog, and use email with our customers. We, too, have explicit trading agreements with our trading partners' regarding roles and responsibilities and have maintained long-term trading partner relationships with them. We are Cisco's gold trading partner; that is one of Cisco's top ranked trading partners to trade with.

The findings implied that there is an increase in the volume of Compaq's e-commerce performance although trading partner trust relationship development was not obvious. One possible explanation for this is that Compaq NZ was competing with Cisco NZ. Compaq NZ experienced improved organizational image and reputation from better responses, timeliness, and quality of services.

- ***R P 6:*** *Perceived risks of e-commerce are negatively associated with e-commerce participation.*

The data suggesting the existence of perceived technology performance-related, relational, and general risks of e-commerce leading to decreased e-commerce participation was not supported by Compaq NZ. Most of the risks did not apply to Compaq NZ and were rated low. There were some relational risks arising from an imbalance of power and most of them related to functional conflicts that did not cause a concern. The findings did not emphasize general risks as Compaq NZ also implemented best business practices.

6.9. Uni-directional dyad 7: Siemens NZ (Bi-directional Dyad D)

The dyad in this case is between Siemens NZ and Telecom NZ. Siemens NZ supplies telecommunications products to Telecom NZ.

Siemens NZ consists of Siemens Communication Systems, Siemens Nixdorf, and Siemens Building Technologies Ltd. Siemens Information and Communication Networks Group was established in 1997. Siemens NZ is one of the world's leading providers of end-to-end solutions for voice, data, and mobile communication networks. With more than 16 years experience in the New Zealand market, Siemens NZ is firmly established as a leading provider of electrical, electronic, information, and communications technology. Siemens NZ has since learned that success requires relationship marketing, up-to-date designs and attention to costs. The Information and Communication network group provides products, systems solutions, service, and support for installation and maintenance of complete corporate and service provider networks. Siemens NZ products include keyphone systems, PABX systems, Call Center applications, voicemail, Integrated Cordless phones, Computer Telephone Integration (CTI), Interactive Voice Response and Video Conferencing equipment. Siemens Information and Communication networks division is a key supplier of broadband network technology to Telecom NZ.

Siemens NZ implemented an extranet e-commerce application called Mainstream Express. This extranet application is an information communication network, which enables electronic transmission of business-to-business e-commerce transactions. Mainstream Express is user-friendly software with an informal structure using a set of menu options to choose. Mainstream Express provides the latest product information, technical updates, news, and sales tools, fun and games. In addition, Mainstream Express has customized information and the presence of a website with ordering and tracking. This dyad is between Siemens NZ (the trustor) who is supposed to trust Telecom NZ.

6.9.1 Research Propositions Uni-directional dyad 7 – Siemens NZ (Bi-directional Dyad D)

In this section we examine the research propositions from the Siemens NZ perspective.

- ***R P 1:*** *Trading partner trust is positively associated with perceived benefits of e-commerce.*

The data suggesting the existence of competence, predictability, and goodwill trust leading to increased perceived economic, indirect, relationship-related, and strategic benefits of e-commerce was strongly supported by Siemens NZ. Siemens staff rated competence trust of Telecom staff to be medium. The Siemens Customer Marketing Manager indicated that:

> Although Telecom staff do have the competence, they continued to send us incomplete purchase orders with errors. We had to provide support and training to Telecom staff all the time.

> Each time an order came in we checked and verified the order manually. If the order came in incomplete, it will not do the job so we informed Telecom NZ from using e-mail that we cannot accept the order and explaining the reasons. We educate them so that their customers will have confidence in them. We even go with their sales team to their clients and explain the system. We do give seminar presentations relating to the functionality and add value of the products we supply. We write an e-mail news service, which Telecom obtains three times a week, in addition to our newsletters.

Siemens staff experienced economic benefits from reduced administrative work. Siemens staff also experienced indirect perceived benefits from improved customer service and product quality. The orders were verified before confirmation. Siemens Accounting manager indicated that:

> Our trading relationships with Telecom have been going on for the last 15 years, but we have been using Mainstream Express for the past three years. – Siemens NZ Accounting Manager.

Relationship-related benefits were rated high because of the supplier-customer relationship culture that Siemens practiced. Siemens participants indicated that they involved a lot of risk-taking from the supplier's perspective. Buyers only looked for trading partners that were easy to do business with and when a problem arose, Siemens NZ were expected to be quick, reliable, and efficient in fixing the problem. A Siemens NZ networking manager stated:

> Telecom staff often provided us with forecast information that enabled better planning so that we can supply the orders in a timely manner. We maintained a regular buffer stock in case of urgent demands. 90% of the time the orders that came in were correct. The fault in the remaining 10% was due to items that were complex and required additional technical knowledge.

A Siemens NZ accounting manager indicated that:

> There were fewer telephone calls and emails, as they stopped calling us. Positive feelings sometimes depend on who you are speaking to, and can be a perception, which can change from one event to another. Telecom staff was willing to put in the effort and invest in their trading partner relationships, thus developing goodwill trust.

> We are known for having up-to-date products as 50% of our products are less than eighteen months old. This is not a reciprocal arrangement. Our reputation is based on our solutions that assist Telecom customers to maintain their competitive advantage in an increasingly challenging environment thus contributing to strategic benefits. Having a contract means nothing because it only spells out the procedures and does not mean that an order will come in. Sometimes we move at a cost minus (loss) situation, and we feel whether it is worth while doing the business.

The findings implied that Siemens NZ made every effort to build and maintain their trading partner relationship and trust with Telecom NZ.

- ***R P 2:*** *Trading partner trust is negatively associated with perceived risks of e-commerce.*

The data suggesting the existence of competence, predictability, and goodwill trust, leading to decreased perceived technology performance-related, relational, and general risks of e-commerce was not supported by Siemens.

Technology performance-related risks were rated low by Telecom because Siemens implemented the extranet application and outsourced it onto a private server. Thus compatibility and security concerns were minimal. Relational risks were rated low. Telecom staff were initially unhappy when Siemens staff accessed their forecast information but later they permitted Siemens staff to access forecast information. Telecom was aware of the stock they required in order to meet incoming demands. Siemens Key accounting manager indicated:

> There was an incident when we received a phone call from a Telecom staff for an order and was told that it was an urgent order. We placed the order and when the goods arrived the senior manager asked me why we supplied it. We told that we had received an email and a phone call for this order and the person who made the order said that we misunderstood them and denied placing the order.

For example, Siemens rated predictability trust of Telecom staff to be low because of a lack of consistent behaviors. A Siemens Network manager indicated that:

> Sometimes we develop trust and goodwill with certain key people in Telecom and the next thing you know they have left the company.

Thus, the high turnover of Telecom staff made it difficult for Siemens to develop stable relationships and this contributed to relational risks, derived from uncertainties and a lack of knowledge. Siemens customer service manager indicated that:

> Everything was a bargain, and sometimes we did not feel confident. Telecom staff kept insisting on reducing the prices. All they wanted was the best price up front, and if we gave them the best deal, then they want another 10% off and if we refused it, we have become difficult to deal with. This has happened two to three times.

> We received the fax and confirmed the order using fax or e-mail that the order has been received. We have to deal with several different people at different levels, especially the people at operational level who do not see the big picture. People at the top level can see the whole picture but do not see the problem hence at times communication becomes challenging and it is to do with the buyer versus seller's culture.

Hence, it was seen that, there was a lack of trust (as in open, honest, reliable communication), due to the high turnover of Telecom staff, as Siemens staff had to deal with a different person in Telecom each time. Despite the fact that Siemens NZ gave their best price, and service, trading partner relationships and trust were difficult to achieve.

Telecom staff indicated that their end customers were unaware as to where the parts came from, as long as their products operated properly. Siemens' staff interpreted this as not totally true especially at this time where brand name counts. It is very important to build trading partner trust relationships. The findings implied that Siemens, experience with Telecom staff was open and honest most of the time, although there were incidents of dishonesty which contributed to relational risks.

- ***R P 3:*** *Trust and security-based mechanisms in e-commerce are positively associated with perceived benefits of e-commerce.*

The data suggesting the existence of trust and security-based mechanisms in e-commerce leading to increased perceived economic, indirect, relationship-related, and strategic benefits of e-commerce was supported by Siemens. Economic benefits were rated high, because savings in time and costs from ordering online were achieved. A

Siemens customer service manager indicated that:

> We experienced economic benefits from reduced telephone calls, as the online extranet application provides a source of information.

Thus, the embedded automated protocols in the extranet applications provided economic benefits. For example, the extranet website application was only for information access (that is read-only) and could not be modified or written. Changes and clarifications had to take place via fax or e-mail. Hence, both organizations (Siemens and Telecom NZ) maintained their own private information.

Confidentiality and integrity mechanisms were implemented thus contributing to relationship-related benefits. Each order contained a Telecom reference number, a Siemens NZ reference number, purchase order number, date received, date shipped to Telecom, and which contributed to a level of transaction integrity that enabled tracking of information. Relationship-related benefits were rated high because of real-time tracking information provided by Mainstream Express. Siemens NZ notified Telecom NZ within 24 hours of the receipt of the order, thus contributing to trading partner satisfaction. A Siemens NZ Key Accounting Manager indicated that:

> We need a couple days to re-order, and inform them of their estimated arrival date. We need to track it, as to when it left the shipping port, from Australia to Munich to Canada where it was manufactured and then shipped back to New Zealand. We undertake regular audits and internal tests and we abide by the British Standards (BS5750) and ISO 9000 for quality.

The findings implied that Siemens enforced best business practices that led to Telecom staff satisfaction. Siemens sales consultant indicated that:

We exercised best business practices and we received top management commitment. We trained and educated our Telecom staff. Training manuals were made available online.

Siemens NZ and Siemens Australia were jointly awarded the Australian Quality Council Award for progress towards business excellence in November 1999. Both ISO 9002 certification and the progress award provided an indication of Siemens commitment to continually improve and grow to meet market demands for high-quality and innovative products and services that add value to their customers in NZ. The findings implied that because the Siemens NZ extranet application was hosted on a private server their security concerns were low. Siemens NZ has put in a lot of effort to maintain their trading partner relationship with Telecom NZ due the competitive environment.

- ***R P 4:*** *Trust and security-based mechanisms in e-commerce are negatively associated with perceived risks of e-commerce.*

The data suggesting the existence of trust and security-based mechanisms leading to decreased perceived technology performance-related, relational and general risks of e-commerce was not strongly supported by Siemens NZ. Technology performance-related risks were rated low because the extranet application was hosted on a private server. The speed and provision of online tracking information contributed to low relational risks. General risks were rated low because Siemens NZ enforced best business practices.

- ***R P 5:*** *Perceived benefits of e-commerce are positively associated with e-commerce participation.*

The data suggesting the existence of perceived economic, indirect, relationship-related, and strategic benefits of e-commerce leading to increased e-commerce participation was supported by Siemens NZ. The extent of e-commerce

performance was rated high, although their extranet application was static (that is read-only), and served as an information bank to access information.

Siemens NZ's annual monetary value of e-commerce transactions was NZ $15 million in 1999 and their daily number of e-commerce transactions was 400 orders per day. Most orders were worth NZ$1 million and came with smaller parts that had to be re-ordered. A Siemens NZ Marketing manager indicated that:

> Telecom provided Siemens with estimated forecast of supplies required four months ahead.
>
> We take the risks in relying on the forecast. So far the forecast has been accurate enough but not perfect. Although it is not our preferred way of doing business we have no choice and try to be flexible. We do hold a buffer stock to meet Telecom NZ urgent orders.

Siemens Marketing manager indicated that:

> Our products were complex and we provide a certain amount of selling, in the form of face-to-face meetings with Telecom staff in order to explain the technical components. The widgets need to match the shelf and if Telecom staff ordered the wrong number or size we have to cancel and ask them to re-order by educating them as to what went wrong thus contributing to relationship-related benefits.

Strategic benefits were high because of the uniqueness of the telecommunications products. Siemens participants agreed that e-commerce, in a way, is against relationship building and it is even more difficult for businesses to establish trust due to the lack of human intervention. Reputation, brand name, and image of organization matter a lot, too.

Siemens NZ is working on a relationship charter (Partnering Charter – enclosed in Appendix D). The partnering charter is a non-binding contract, which aims to establish positive business relationships rather than a legal contract. Legal contracts are based on mistrust and suspicion. The relationship charter has three sections: 1) How do trading partners treat vendors?; 2) How do vendors get served by customers?; and 3) Reciprocal issues such as expecting ethical behaviors from both trading parties. All this is based on initial trust formation. The findings implied that Siemens NZ had put a lot of effort into maintaining their trading partner relationship with Telecom NZ.

- ***R P 6:*** *Perceived risks of e-commerce are negatively associated with e-commerce participation.*

The data suggesting the existence of perceived technology performance-related, relational, and general risks of e-commerce leading to decreased e-commerce participation suggested was difficult for Siemens NZ to establish a stable trading partner trust relationship with Telecom due to a high turnover of staff. Relational risks did exist because Telecom staff felt that they were giving business to Siemens and were misusing their power by demanding a lower price despite the added value in Siemens; products. Most of the general risks were not applicable to Siemens NZ. A Siemens sales consultant indicated that trust is established in a multi layer relationship in e-commerce: Siemens NZ Sales consultant indicated that:

> We defined trust as being predictable due to consistent behaviors. There should be no surprises to either party, and open dialog. – Siemens NZ Sales Consultant.

The findings implied that Siemens NZ does trust Telecom staff and the continuation of that trust is based on the continuation of correct behavior. Technology is only a mechanism for achieving the end goal. E-commerce mechanisms enabled us to meet our end goals. At the end of the day it is the business relationship that counts, not the technology.

6.10. Uni-directional dyad 8: Telecom NZ (Bi-directional Dyad D)

The dyad in this case is between Telecom NZ and Siemens NZ. Telecom NZ purchased telecommunication parts from Siemens NZ and manufactures telecommunication products for their end customers. Telecom products include mobile phones, Internet access, Telco service, and all forms of telecommunications, mobile, and Internet services. Telecom NZ is a large international organization, with 500 hundred employees situated in the Wellington branch. The Logistics group and network delivery section of Telecom handles the operation of applications and implementation from the corporate supply group. The Telecom staff log onto Siemens extranet application Mainstream Express in order to obtain product information, place orders, and retrieve real-time tracking information. In this dyad Telecom NZ (the trustor) is supposed to trust Siemens NZ.

6.10.1 Research Propositions Uni-directional dyad 8: Telecom NZ (Bi-directional Dyad D)

In this section we examine the research propositions from Telecom's perspective.

- ***R P 1:*** *Trading partner trust is positively associated with perceived benefits of e-commerce.*

The data suggesting the existence of competence, predictability, and goodwill trust leading to increased perceived economic, indirect, relationship-related, and strategic benefits of e-commerce was supported by Telecom staff. Telecom staff rated competence trust of Siemens NZ to be high. A Telecom NZ accounting manager indicated:

Siemens NZ staff are competent and reliable, and they do provide us with adequate operational support in the form of training.

Timely and reliable information contributed to economic benefits fewer telephone calls and e-mail was achieved. Furthermore, information sharing takes place when there is an early identification of problems. Siemens staff found ways to solve problems, within a reasonable time scale that fit the needs and operations thus contributing to satisfaction and relationship-related benefits. A Telecom NZ accounting manager indicated:

> Siemens NZ had access to our forecasting information, business development, and we know what price we have been charged for their products, as it was pre-arranged in the contract.

There were signs of improved communication and cooperation with Siemens staff as they shared information that was accurate, timely, fast, complete, and relevant. According to the Telecom NZ Transport Manager,

> We were able to receive accurate tracking information of the goods we ordered.

Goodwill trust and strategic benefits were not supported by Telecom NZ due to a high turnover of Telecom staff. The findings implied that there was a gradual increase in the benefits derived from trading partner trust.

- ***R P 2:*** *Trading partner trust is negatively associated with perceived risks of e-commerce.*

The data suggesting the existence of competence, predictability, and goodwill trust leading to decreased perceived technology performance-related, relational, and general risks of e-commerce was not supported by Telecom. Technology performance-related risks were rated low because Telecom staff had to log onto a private server. There were concerns in relational risks within Telecom. A Telecom NZ accounting manager indicated:

> Our top management commitment was low. Committing to certain important decisions was difficult.

Relational risks were rated medium because of the high turnover of staff, as Siemens had to re-train each new Telecom staff member on how to place orders correctly and completely. This led to relational risks. General risks did not impact Telecom because the system was not connected to Telecom NZ. The findings implied that both

technology and trading partner trust played an important role in reducing the risks of e-commerce.

- ***R P 3:*** *Trust and security-based mechanisms in e-commerce are positively associated with perceived benefits of e-commerce.*

The data suggesting the existence of trust and security-based mechanisms of e-commerce leading increased perceived economic, indirect, relationship-related, and strategic benefits of e-commerce was supported by Telecom. Telecom is a large organization and they have implemented best business practices.

Mainstream express the Siemens Telecom extranet application that provided real-time tracking information of the orders and product information contributed to economic benefits from savings in time and costs for telephone calls and e-mails.

Telecom abides by both industry and universal standards and policies. They, too, are ISO 9000 recognized for the Telecom directories. Their technology standard is Telco, which is an industry standard. Other trust and security-based mechanisms such as, encryption mechanisms that are carried out via user IDs, logons, and passwords. The findings implied that relationship-related and strategic benefits are not supported in this bi-directional dyad.

- ***R P 4:*** *Trust and security-based mechanisms in e-commerce are negatively associated with perceived risks of e-commerce.*

The data suggesting the existence of trust and security-based mechanisms in e-commerce leading to decreased perceived technology performance-related, relational and general risks of e-commerce was not supported by Telecom. Technology performance-related risks were rated low because the compatibility of e-commerce systems was not a concern as the extranet application was implemented by one trading partner (the supplier Siemens). Furthermore, the application was outsourced onto another private server in order to separate public information from private business information. Poor business practices was not an issue for Telecom as they supported a large turnover of staff. Telecom staff indicated that it was a competitive world and a certain amount of turnover or change was good for their organization.

The findings implied that there was a lack of open, trustworthy, and reliable communication between Telecom and Siemens NZ because their business goals were different. For example, Siemens NZ indicated that it was difficult to establish trust because of a high turnover of Telecom staff. On the other hand Telecom staff encouraged the high turnover of staff as they believed that it could bring them quality and skills from new employees.

- ***R P 5:*** *Perceived benefits of e-commerce are positively associated with e-commerce participation.*

The data suggesting the existence of perceived economic, indirect, relationship-related, and strategic benefits of e-commerce leading to increased e-commerce participation was supported by Telecom to a lesser extent. Although 80% of Telecom NZ business involved e-commerce using Siemens NZ extranet application, Telecom was not impressed. A Telecom NZ participant noted that:

> We are interested in solutions not individual items of sale, and encourage our trading partners to think outside the box with sound knowledge. We are in a competitive global environment and have to abide by our trading contract in order to maintain confidential information and intellectual property which allows us

> to disclose information, and protect our network from being abused and that they can be trusted to solve our problems. Siemens NZ is not totally the driving force for Telecom's e-commerce. Of course we look for speed, simplicity, cost which meets our purpose for undertaking e-commerce. Among other things, that can be on line purchasing and the provision of invoices. Telecom end customers are unaware as to where the technology came from. All they are interested to see is that the phone line works when it needs to.

The findings implied that Siemens NZ wanted the business and an ongoing relationship, but Telecom saw it merely as a business transaction.

- ***R P 6:*** *Perceived risks of e-commerce are negatively associated with e-commerce participation.*

The data suggesting the existence of perceived technology performance-related, relational, and general risks of e-commerce leading to reduced e-commerce participation was not supported by Telecom. Telecom participants indicated that sharing of risks was a concern because the extranet application was implemented by Siemens NZ. In fact, technology is counter-productive to relationship building. Organizations should find ways and other means to establish trust in their trading partner relationships (such as face-to-face meetings, telephone, e-mail or fax).

The findings implied that risks did exist, although it was implicit. General risks did not impact Telecom's participation in e-commerce as they exercised best business practices in the form of high quality standards and services.

6.11 Uni-directional dyad 9: Avery Ford NZ

Avery Ford NZ is uni-directional dyad between Avery Ford's head office and their branches who are automotive dealers. The nature of Avery Ford NZ's relationship is that they played the role of head office for their branches. In this case only the perceptions of Avery Ford trust towards their branches were examined because they used the same intranet system, and accessed the same information. Hence a bi-directional study was not conducted because Avery Ford (head office) played a supervisory role and was not in direct competition with their branches.

Avery Ford NZ is a subsidiary of Ford Motor company U.S. It was established in 1936 when the first assembly plant was opened in Lower Hutt in Wellington and then a second assembly plant was established in 1973. In 1981, an alloy wheel manufacturing plant was opened at the Manukau site. More than 800,000 wheels were designed, manufactured, and exported annually from this plant. Ford imports new vehicles from a variety of countries, including the Mondeo, Escort; and Transit from Europe; Festiva from Korea; Kia from Italy; Explorer from USA; Falcon from Australia; and Couriers and Econovans from Japan. To remain internationally competitive, Avery Ford NZ has devoted considerable resources to improve cost, quality, and customer service. The Wellington branch in Avery Ford NZ employs approximately 600 people.

Avery Ford controlled and managed orders for all five of their branches that were located in Wellington. The branches include: Johnsonville, Stevens Ford in Lower Hutt, Maidstone Ford in Upper Hutt, Wellington Mazda, and their head office at Taranaki. Information was transmitted using their intranet application called the Motor Vehicle Dealer System. Avery Ford NZ's parent company, Colonial Motors located in Auckland oversees all of the branches.

Ford's e-commerce application, the Motor Vehicle Dealer System, allows Ford staff to download information about new vehicles, their engine numbers, chassis numbers, vehicle descriptions and prices. Each time a motor vehicle was sold these details were provided to Ford Motor Company - Colonial Motors located in Auckland, and the Ford Motor Credit company. In addition, the Avery Ford dealers have to send dealer monthly orders or (status reports) to the head office. This identifies the location of the vehicles.

For example, when a car was released from Ford, a Data Analysis (DA 66) was issued. Avery Ford advised their dealers (Ford's branches in Wellington) through their Intranet application. Then Ford Motor Credit charges interest in addition to the vehicle cost. Ford Motor Credit receives the information within 48 hours and a payment. At the end of each month, Avery Ford provides the Data Analysis (DA 60) report, which is a financial report that informed the status of motor vehicles sold and not sold.

Avery Ford NZ accountant who participated in this study had been employed with Avery Ford NZ for the past eighteen years. In this section, we examine the trust perspectives of Avery Ford NZ (the trustor) towards their branches (the trustee). In this section, Avery Ford (the trustor) is supposed to trust their branch staff.

6.11.1 Research Propositions Uni-directional dyad 9: Avery Ford NZ

In this section we examine the research propositions from the perspective of Avery Ford NZ.

- ***R P 1:*** *Trading partner trust is positively associated with perceived benefits of e-commerce.*

The data suggesting the existence of competence, predictability and goodwill trust leading to increased perceived economic, indirect, relationship-related, and strategic benefits of e-commerce was supported by Avery Ford NZ. Competence trust in the branch staff were rated medium to high. One possible explanation for this is that their system was an intranet application (like an information bank). An Avery Ford accountant indicated:

Although, the motor vehicle dealer system is a user-friendly system, competence trust was rated medium because sometimes we get thrown things without any training given from our parent company and we are expected to work it out from our end.

The company has seen some efficiency from the intranet applications. Seventy percent of Ford's activities are on-line and the computer links the data sent by the branch staff, contributing to economic benefits from savings in time and cost. The remaining 30% are conducted via telephone, fax, email and other manual processes (such as writing out financial reports). The Avery Ford branch staff has shown consistent behaviors in their business interactions. Therefore, predictability trust was rated high.

According to Avery Ford's accountant,

> When an order is placed, the parts arrive the next day. Hence, there is a need to maintain inventory of parts, faster ordering time and supply. There is improved communication and cooperation with our branch staff. For example, if the network system was down, notification was made via fax or a telephone call. Our bosses meet with them monthly and their dealer representatives come over when we have a big sale. They interact with us very often.

The findings implied that open communication and information sharing takes place, although most of the time there is pressure to sell. There is concern when sales are down and provide new ways to sell cars are provided. Further, the status reports and payments have to go out on time. Having a central authority (the head office) to monitor the

performance of the branches contributed to consistent economic benefits. Technology is not a big emphasis as all staff had access to the same information via their Intranet system.

- ***R P 2:*** *Trading partner trust is negatively associated with perceived risks of e-commerce.*

The data suggesting the existence of competence, predictability, and goodwill trust leading to decreased perceived technology performance-related, relational, and general risks of e-commerce was not supported by Avery Ford NZ. A firewall was used to block their Motor Vehicle Dealer System from the outside public.

Technology performance-related risks were rated low because of Ford's user-friendly intranet application. Most of the risks examined in this study were not applied to Avery Ford NZ because the intranet application served as a read-only access information bank. However, relational risks were seen from positional power. An Avery Ford NZ accountant indicated:

> We did face difficulties in getting across our top management at times (managers in the parent company) because it has been in practice for last 50 years and hence there is no need for change. It is a situation of power and conflict, thus contributing to relational risks.

The findings implied that Ford and their branches undertook business-to-business e-commerce using intranet applications for the sole purpose of efficiencies and profitability as they shared common goals.

- ***R P 3:*** *Trust and security-based mechanisms in e-commerce are positively associated with perceived benefits of e-commerce.*

The data suggesting the existence of trust and security-based mechanisms leading to increased perceived economic, indirect, relationship-related, and strategic benefits of e-commerce was supported by Avery Ford NZ. The Motor Vehicle Dealer System was made accessible to all Ford employees. There are four different levels of authorization mechanisms. For example, level 0 provides no access, and someone with a higher authority can choose option number 4 which allows them to update the order (as in adding, modifying, and deleting) the records.

Ford Motor Company in Auckland and Ford Motor Credit are very strict with their dealership agreement. An Avery Ford NZ accountant indicated:

> Avery Ford will ring up their manager if anything goes wrong. Our manager will then kick our butts and there are cases where we did receive a sour letter in the past. The reason for this was because we are ISO 9000 and 9002 accredited and we rely on high quality services that have to be carried out completely and correctly.

It can be seen that best business practices were carried out at Avery Ford NZ in the form of high-quality standards. Other trust and security-based mechanisms included formal logon procedures using encryption mechanisms and the provision of reference numbers to ensure confidentiality and integrity of the data collected. For example, if someone tries to hack into the system, the user will receive a warning.

> We have to abide by the internal ethical procedures such as, the office has to be locked before one leaves the room. We also undertake regular system integrity tests and audits. We have an external audit twice every year. In addition security polls pad locks, alarm systems, and monitoring the workshop and parts areas are carried out.

These mechanisms contribute to relationship-related benefits such as satisfaction from high quality standards and services.

Ford has set an industry standard and continues to exhibit customer satisfaction. Ford uses a performance report to assess the assembly and productivity performances of their branches. Economic benefits experienced from electronic operations include gaining efficiency and a new level of quality and cost effectiveness.

Furthermore, reduced operation, transaction, and administrative costs from telephone calls was experienced by using an intranet application. One possible explanation for this is that the Motor Vehicle Dealer System is an automatic ordering system; it produces incoming invoice orders from the source, (the service department or the parts area). Prior to this, the staff had to manually key the data into the system and print it out because the assessment of perceived benefits is not strictly a business-to-business form of e-commerce between Avery Ford NZ and their branches, most of the questions pertaining to perceived benefits were not applicable.

- ***R P 4:*** *Trust and security-based mechanisms in e-commerce are negatively associated with perceived risks of e-commerce.*

The impact of trust and security-based mechanisms on perceived risks of e-commerce was not applicable to Avery Ford NZ because their transactions were internal between Avery Ford NZ and their branches.

- ***R P 5:*** *Perceived benefits of e-commerce are positively associated with e-commerce participation.*

The data suggesting the existence of perceived economic, indirect, relationship-related, and strategic benefits of e-commerce leading to increased e-commerce participation was supported by Ford. The use of the intranet, Motor Vehicle Dealer System has improved Ford's image and reputation. Avery Ford NZ's accountant indicated that:

> We conduct regular face to face meetings' with our branch staff, which helps to reinforce trust. We have been trading with our branches for a long time. For example, our parent company has been around for 77 years since the early 1900's.

Avery Ford NZ's trusts their branch staff to act on the messages they receive from the system, which in turn gives a higher competitive advantage. Avery Ford NZ has experienced (technology - hard trust) derived from the correct keying in the data from their branches (relationship - soft trust), as they have achieved a quality rate of 95% which contributes only a 5% error rate attributed to human errors.

Seventy percent of Ford's business was conducted through e-commerce applications; and the remaining 30% is carried out manually, for example, by writing sales notices and finance contracts. The total monetary sales from e-commerce transactions was NZ$110 million in 1999 (an increase of 5% from 1998). The annual number of e-commerce transactions was 700 transactions per year for parts.

The findings implied that although technology played a lesser role in this uni-directional dyad, trading partner trust was encouraged and developed over time.

- ***R P 6:*** *Perceived risks of e-commerce are negatively associated with e-commerce participation.*

The data suggesting the existence of perceived technology performance-related, relational, and general risks of e-commerce leading to decreased e-commerce participation was not supported by Avery Ford NZ. Most of the risks were not applicable and did not affect Avery Ford NZ. Avery Ford NZ's accountant noted:

> We feel as though our branch staff are closer to us, as our business requirements (goals) are met.

E-business is an integral part of Ford's strategy to become the world's leading consumer company of automotive product services. In today's Internet economy, businesses are working together to redefine the competitive advantage and create value for their customers and partners. For example, AutoXchange is an automotive e-business integrated supply chain created and run as a newly-formed joint venture between Ford Motor

Company and Oracle Corporation in the U.S. This new on-line automotive marketplace is expected to dramatically reduce Ford's purchasing costs, and increase its operating efficiencies through an integrated Internet supply chain system.

The findings implied that trust was not so much on the computer side of things as they worked properly most of the time. It is the human relationship that has to be maintained as a breakdown in communication and trading partner trust contribute to risks.

6.12. Uni-directional dyad 10: Toyota NZ

Toyota NZ is a uni-directional dyad between Toyota and its branches. Toyota NZ is a large organization with 280 employees and its reach is international. Their parent company is located in Japan. Toyota imports and distributes motor vehicle components and services. Their largest growth comes from automotive parts (soft products). The company's secretary who participated in this study had a legal background and was involved in designing contracts.
The history of Toyota NZ's e-commerce adoption involved the following stages:

(1) During the early 1980's there were no PCs. Toyota used only 2 to 3 Macintosh PCs in the mid-1980's;

(2) In 1990's, the automotive industry was restructured to open markets which changed the way Toyota conducted their business. For example, in 1996 large tariffs were imposed on NZ vehicles and Toyota was exposed to competition that forced them to re-develop into compatible systems.

(3) The Vehicle Inventory System (VIS) was developed in the early 1990's. A study was conducted by Ernst and Young, which took two and half years to complete. Toyota developed a nationwide WAN network in 1996 in NZ for all its dealers. Toyota's business-to-business e-commerce transactions include purchase orders, advanced shipping notices (every three months), invoices, and status reports on purchase of motor vehicles and parts. Toyota's manager reported:

> Our contracts are for eighteen months, and they use the KANBAN system. We communicate via email and have a franchise contract with our branches that has a reviewing process with targets on the share of volume and dollar value of parts. We have our support center the National Customer Center in Auckland.

In this uni-directional dyad Toyota (trustor) is supposed to trust its branches.

6.12.1 Research Propositions Uni-directional dyad 10: Toyota NZ

In this section we examine the research propositions from the perspective of Toyota NZ.

- ***R P 1:*** *Trading partner trust is positively associated with perceived benefits of e-commerce.*

The data suggesting the existence of competence, predictability, and goodwill trust leading to increased perceived economic, indirect, relationship-related, and strategic benefits of e-commerce was supported by Toyota NZ. For example, competence trust in Toyota NZ was rated high because their branch staff had the ability, skills and level of competence to operate the Vehicle Inventory System. Toyota NZ's Manager indicated:

We trust our branch staff and believe that our employees should be trained to see everything internally using our intranet applications.

Economic benefits were experienced from reduced operation, transaction and administrative costs as the employees were trained on how to use the system. Furthermore, the speed, accuracy, and data was received in a timely fashion,

which enables the branches to provide high quality service and staff satisfaction.

Predictability trust in Toyota NZ was seen as internal (that is, the application of intranets) and external trust derived from Toyota's branches. In addition, Toyota NZ's staff did exhibit consistent behavior in their day-to-day business interactions. Toyota NZ's branch staff were predictable as they kept their business promises, thus contributing to relationship-related benefits.

Toyota's branch staff was willing to share information and provide support relating to e-commerce adoption. Toyota engages in long-term trading partner relationships with our branches due to positive feelings and sense of cooperation and commitment shown by our branch staff.

Implementing the Vehicle Inventory System motivated a lot of face-to-face interactions with the branch staff. The regular meetings included:

1. Team meetings once a week,
2. A project meeting for business owners once a month,
3. An objective Microsoft team manager's meeting once a month. Everybody attends this meeting including the contractors. Toyota NZ's Manager indicated that:

We put in more effort and invest in trading partner relationships using a monthly bulletin, quarterly meeting. We rely on open communication rather than using a trading contract. Our branch staff actually participated in our business process from the planning stage to the implementation stage. They are honest in providing information and accuracy of deadlines, thus contributed to relationship-related benefits and goodwill trust. – Toyota's Manager.

Furthermore, increased level of commitment with Toyota's trading partners was tied in with communication, as there cannot be commitment without communication. The organization's image and reputation was improved due to the intranet application. Furthermore, increased long-term investments and continued trading partner relationships need to change the organizational culture. The findings implied that there was improved communication and cooperation with Toyota NZ's branch staff.

- ***R P 2:*** *Trading partner trust is negatively associated with perceived risks of e-commerce.*

The relationship between trading partner trust and perceived risks of e-commerce was not applicable for Toyota NZ.

- ***R P 3:*** *Trust and security-based mechanisms in e-commerce are positively associated with perceived benefits of e-commerce.*

The data suggesting the existence of trust and security-based mechanisms leading to increased perceived economic, indirect, relationship-related, and strategic benefits of e-commerce was supported by Toyota NZ. For example, confidentiality mechanisms were implemented using a secure web server and secure e-mail link to Japan. Furthermore, regular system integrity tests and audits were carried out as Toyota's branch staff relied on software developers who maintained their UNIX system. Non-repudiation and authentication mechanisms using formal logon procedures (using user IDs and passwords) determined different levels of authorization, and sequence numbers in messages were used as reference numbers.

Access to Toyota NZ's systems were based on the level of authority. Each employee has their own password protection, encryption, and server. Regular audit logs are carried out automatically by the system, thus reflecting message receipt confirmations and acknowledgments. Enforcing best business practices is important for Toyota. For

example, top management commitment is important as they determine the extent of training and financial resources available for e-commerce development. Toyota's staff had to abide to standards (both industry and universal) and policies.

Furthermore, Toyota NZ enforced explicit agreements with their branch staff (the trading partners) regarding roles and responsibilities which were clearly spelled out in the Dealer Franchise Agreement. The agreement also lays out the floor plan arrangement. Training and education of staff was seen as important. Toyota had different types of training. They included one-off specific training and distributed training in Auckland on a need by need basis, thus contributing to relationship-related benefits. The findings implied that Toyota NZ made every effort to increase the standard and quality of services by enforcing best business practices.

- ***R P 4:*** *Trust and security-based mechanisms in e-commerce are negatively associated with perceived risks of e-commerce.*

The data suggesting the existence of trust and security-based mechanisms leading to decreased perceived technology performance-related, relational, and general risks of e-commerce was not supported by Toyota NZ. Incomplete Toyota NZ's risks were rated low and most of the risks were not applicable to their organization. One possible explanation was that their intranet application was shared by their branches, and they carried the same company's name and sold Toyota cars. Hence compatibility of the computer systems was not an issue. The findings implied that compatibility issues with hardware and software were not of concern as there was no need to translate and interpret information. The system is easily accessible using passwords and user IDs.

- ***R P 5:*** *Perceived benefits of e-commerce are positively associated with e-commerce participation.*

The data suggesting the existence of perceived economic, indirect, relationship-related, and strategic benefits of e-commerce leading to increased perceived benefits of e-commerce participation was supported by Toyota NZ. E-commerce was important for Toyota's organization, as 98% to 100% of the business involves the use of e-commerce using intranet application, fax, and e-mail. The annual monetary value of e-commerce transactions was NZ$ 500-600 million. The annual number of e-commerce transactions via 11,000; new motor vehicles 5000; used motor vehicles, 16,000; and extra care products, 20,000–30,000. Furthermore, the enforcement of best business practices enabled the development of trading partner relationship and trust.

The findings implied that the number of the trading partners increased and Toyota NZ did engage in long term business investments with their trading partner.

- ***R P 6:*** *Perceived risks of e-commerce are negatively associated with e-commerce participation.*

The data suggesting the existence of perceived risks of e-commerce leading to decreased of e-commerce participation was not supported by Toyota NZ. One possible explanation for this is because both the head office and the branches shared the same system and had the same goals.

6.13 Cross-case Analyses of the Bi-directional Dyads

This section discusses the findings of the bi-directional dyads from a cross-case analysis.

6.13.1 Trading partner Trust and Perceived Benefits of E-commerce Participation

Miles and Huberman (1994) suggest that cross-case analysis enhances generalization and deepens understanding. This section discusses the findings from a cross-case analysis of ten uni-directional dyads (organizations) that formed four bi-directional dyads and two uni-directional dyads.

- ***R P 1:*** *Trading partner trust is positively associated with perceived benefits of e-commerce.*

The impact of competence, predictability, and goodwill trading partner trust on perceived economic, indirect, relationship-related and strategic benefits was strongly supported by most of the bi-directional dyads. Table 6.2 provides a summary of the impact of trading partner trust on perceived benefits of e-commerce. Competence trust was rated high by most of the bi-directional dyads except for bi-directional dyad D (Siemens-Telecom NZ). One possible explanation for this could be that in Siemens-Telecom NZ dyad, the impact on economic benefits were rated low to medium. Siemens NZ outsourced a private server for their extranet application. The increased turnover of Telecom staff created difficulties for Siemens staff as they had to re-train the new staff. In addition, the complexity of the parts and the lack of knowledge and expertise about the products led to uncertainties when placing an order. On the other hand, Telecom's end customers were unaware or were not concerned as to where the parts for their mobile phones or telecommunication equipment came from as long as the equipment works.

In the case of NZ Customs and their ISP (bi-directional dyad A) the ability of their trading partners to use e-commerce applications correctly after an initial period of making mistakes made them realize economic benefits (i.e, savings from time and costs in re-sending the same transaction twice). The findings show that although NZ Customs did provide initial support to their importers and exporters, it can be a complex area for new trading partners. Furthermore, NZ Customs received support from the government, and had the financial resources, and top management commitment to outsource part of their business-to-business e-commerce processes to their Internet Service Provider. In bi-directional dyad B, both the customs broker and the importer were two small organizations that applied a user-friendly, Microsoft application Trade Manager. The automated clearance process led to fewer errors and transactions were cleared more quickly, thus contributing to economic benefits from savings in time and cost for the importer. In addition, the customs broker provided free software installation and training for the importer who experienced relationship-related benefits from the past experiences they had with the customs broker. With Cisco-Compaq NZ (bi-directional dyad C), competence trust was rated medium to high because although, Cisco NZ, being the world's leader of e-commerce, had powerful and sophisticated tools with embedded checking mechanisms that detected errors made by Compaq, initial mistakes and training was observed. The process involved in creating an order for the products and components were a complex one. Furthermore, Cisco NZ's Internet Business Solutions group managed all queries about technical difficulties and clarifications through their extranet application (Cisco Connection Online). Although, Compaq has been using CCO for the past eighteen months, Compaq had a trading partner relationship with Cisco for the past ten years. It can be seen that the focus may point towards a high level of competence trust, technology and financial resources, relationships (such as honesty in providing reliable information) were found to be important. They were able to accomplish on-line what used to be done over the telephone and e-mail. The time saving allowed them to concentrate on strategic planning (goodwill trust), which contributed to economic, relationship-related, and strategic benefits.

Uni-directional dyads 9 and 10, Avery Ford NZ and Toyota NZ, applied intranet applications to communicate with their branches also experienced benefits from savings in time and costs. Toyota NZ experienced relationship benefits from an increased level of communication and commitment. The findings provided evidence that trading partner trust did play an important role in contributing to benefits. However, a history of consistent positive trust behaviors enabled the development of predictability trust and relationship-related benefits. Although, the technology initially contributed to economic benefits, one can argue that trading partners continued to trade for long periods of time (ten to fifteen years) even before the e-commerce technologies were implemented that contributed to trading partner satisfaction. Thus, trading partner trust was found to be important in e-commerce participation.

Three Types of Trading Partner Trust	**Bi-directional Dyad A NZ Customs and their ISP Directional dyads 1-2**	**Bi-directional Dyad B Customs Broker And Importer Directional Dyads 3-4**	**Bi-directional Dyad C Cisco NZ and Compaq NZ Directional dyads 5-6**	**Bi-directional Dyad D Siemens NZ and Telecom NZ Directional dyads 7-8**	**Uni-directional Dyad 9 Avery Ford NZ and their branches**	**Uni-directional Dyad 10 Toyota NZ and their branches**
Competence Trust Economic direct benefits	H	H	M-H	L-M	M-H	H
Predictability Trust Indirect personal benefits	H	H	H	H	H	H
Goodwill Trust Relationship related symbolic and strategic benefits	M	H	M	M-H	H	H

Table 6.2: Research Proposition 1 – Trading Partner Trust and Perceived Benefits

Legend: L = Low (0-3); M = Medium (4-6); H - High (7-10).

6.13.2 Trading Partner Trust and Perceived Risks of E-commerce Participation

- ***R P 2:*** *Trading partner trust is negatively associated with perceived risks of e-commerce.*

The impact of competence, predictability, and goodwill trading partner trust on perceived technology performance-related, relational, and general risks was not strongly supported by most of the bi-directional dyads. Table 6.3 presents the impact of trading partner trust on perceived risks of e-commerce. Most e-commerce systems and applications were user-friendly and came with standardized routines using a set of menu options that contributed to low technology-performance related risks. The risks derived from a lack of competence were rated low by most of

the bi-directional dyads. Bi-directional dyad A (NZ Customs) rated technology performance-related risks to be low because they had outsourced part of their business-to-business e-commerce process to their Internet Service Provider, who could exhibit opportunistic behaviors derived from expert knowledge that contributed to relational risks. In bi-directional dyad C (Cisco-Compaq) rated technology performance-related risks to be low because CCO was only implemented by Cisco and Compaq staff only had to log onto the web-site using authorization mechanisms. Similarly, Siemens-Telecom NZ (bi-directional dyad D) rated technology performance-related risks to be low because they, too, had outsourced their extranet application to a private server. However, they rated relational risks to be medium due to a lack of predictability trust arising from a high turnover of staff. Telecom staff on the other hand also rated technology performance-related risks to be low because they had to log onto a private server.

Relational risks were rated low to medium by the importer (bi-directional dyad B) because they were suspicious that their customs broker exercised poor business practices. The importer faxed invoices that revealed their details, prices of goods, types, and quantity of the goods ordered to the customs broker.

General risks were rated low and were not applicable by most of the bi-directional dyads, because of the implementation of best business practices (including audits, backups, high quality, standards, and training). The findings provided evidence that trading partner trust does impact risk. For example, in uni-directional dyad 9 and 10, both Avery Ford NZ and Toyota NZ had to receive directions from their head offices in U.S. and Japan. There were instances when communications were not smooth, but due to past experiences in dealing with their trading partners, resolving conflicts was not difficult. Most of the risks examined in this study were not applied to Avery Ford NZ. Trading partner relationship trust contributed to low risks in most of the directional dyads.

Three Types of Trading Partner Trust	**Bi-directional Dyad A NZ Customs and their ISP Directional dyads 1-2**	**Bi-directional Dyad B Customs Broker and Importer Directional dyads 3-4**	**Bi-directional Dyad C Cisco NZ and Compaq NZ Directional Dyads 5-6**	**Bi-directional Dyad D Siemens NZ and Telecom NZ Directional dyads 7-8**	**Uni-directional Dyad 9 Avery Ford NZ and their branches**	**Uni-directional Dyad 10 Toyota NZ and their branches**
Competence Trust Technology performance related risks	L-M	L-M	L	L	L	L
Predictability Trust Relational risks	M-H	L-M	L	M	L	L
Goodwill Trust General risks	N/A	N/A	L-N/A	L-N/A	L	L

Table 6.3 Research Proposition 2 – Trading Partner Trust and Perceived Risks

Legend: L = Low (0-3); M = Medium (4-6); H – High (7-10).

6.13.3 Trust and security-based mechanisms in e-commerce and perceived benefits of e-commerce

- ***R P 3:*** *Trust and security-based mechanisms in e-commerce are positively associated with perceived benefits of e-commerce.*

The impact of trust and security-based mechanisms on perceived economic, indirect, relationship-related and strategic benefits of e-commerce was strongly supported by most of the bi-directional dyads. Table 6.4 presents the impact of trust and security-based mechanisms on perceived benefits. Most of the bi-directional dyads rated perceived benefits to be high because the main goal of e-commerce systems and applications was to provide efficiency, thus contributing to economic benefits. Bi-directional dyad A (NZ Customs) rated perceived economic benefits to be high because the CusMod system had embedded automated checking mechanisms and protocols that enabled detection of errors. Furthermore, their ISP provided the technical expertise, compatible systems, training and support, that help build relational benefits. On the other hand, the customs broker and importer rated perceived benefits to be medium to high for reasons of confidentiality, access controls, and best business practices. One possible explanation for this is that their e-commerce application Trade Manager was not attached to their network. Most of the bi-directional dyads experienced benefits from trust and security-based mechanisms because of their initial investments in implementing e-commerce as they were able to provide adequate training and ensure that their systems were secure and met their business requirements and high quality standards. In the case of bi-directional dyad C, Cisco NZ's extranet application was a powerful tool with embedded checking mechanisms that detected and corrected errors, contributing to economic benefits from savings in time and cost. Similarly, Compaq too gained from the online tracking of information that was made available from the time an order was placed until the goods were delivered. Consistent achievement of economic benefits led to relationship-related benefits from trading partner satisfaction. In the case of bi-directional dyad D (Siemens-Telecom NZ), they, too, experienced economic benefits from savings in time and cost as product information was made available on their extranet application. Siemens extranet web site application was only for information access (i.e, read only) and could not be modified or written. Avery Ford NZ enforced best business practices in the form of high quality standards. The findings provided evidence that trust and security-based mechanisms enabled trading partner trust to be developed.

Trust and security based mechanisms in E-commerce	**Bi-directional Dyad A NZ Customs and their ISP Directional dyads 1-2**	**Bi-Directional Dyad B Customs Broker And Importer Directional dyads 3-4**	**Bi-directional Dyad C Cisco NZ and Compaq NZ Directional dyads 5-6**	**Bi-directional Dyad D Siemens NZ and Telecom NZ Directional dyads 7-8**	**Uni-directional Dyad 9 Avery Ford NZ and their branches**	**Uni-directional Dyad 10 Toyota NZ and Their Branches**
Confidentiality Direct economic benefits	H	M	H	H	H	H
Integrity Direct economic benefits	H	H	H	H	H	H
Authentication Indirect personal benefits	H	H	H	H	H	H

Non-repudiation Indirect personal and relationship related benefits	H	H	H	H	H	H
Availability Direct economic benefits	H	M	H	H	H	H
Access Controls Direct economic benefits	H	M	H	H	H	H
Best Business Practices Relationship related and symbolic strategic benefits	H	M	H	H	H	H

Table 6.4: Research Proposition 3 - Trust and security-based mechanisms and Perceived Benefits

Legend: L = Low (0-3); M = Medium (4-6); H - High (7-10).

6.13.4 Trust and security-based mechanisms in E-commerce and perceived risks of E-commerce

- ***R P 4:*** *Trust and security-based mechanisms in e-commerce are negatively associated with perceived risks of e-commerce.*

The impact of trust and security-based mechanisms on perceived technology performance-related, relational, and general risks of e-commerce were not strongly supported by most of the bi-directional dyads. Table 6.5 presents the impact of trust and security-based mechanisms on perceived risks of e-commerce. Trust and security-based mechanisms in e-commerce and its impact on perceived risks was rated low by all the organizations because compatibility of the systems was not an issue between trading partners in a dyad. Furthermore, there were efficiencies from e-commerce applications that came with embedded security mechanisms. These mechanisms enabled errors to be quickly detected and corrected, saving a lot of time transmitting e-commerce transactions. For example, in bi-directional A (NZ Customs-ISP) intelligent testing was implemented to eliminate unauthorized log-on procedures or passwords that could interfere with the maintenance and use of technology.

Most of the trust and security-based mechanisms were not applicable for bi-directional dyad B (Customs Broker-Importer), because the Customs broker is aware of the legal implications involved in the customs clearance process and therefore abides by the standards of the Customs Act. However, the importer was concern about confidentiality of their shipment information being leaked out to other competitors by the customs broker because of poor business practices. Cisco NZ found their technology performance-related risks to be low because of their highly sophisticated extranet application and also indicated that most of the risks did not apply to them. Avery Ford NZ and Toyota NZ, because their e-commerce applications were simple, user-friendly systems and information was internally distributed. Cisco NZ found their technology performance-related risks to be low because of their highly sophisticated extranet application and both Cisco NZ and Compaq NZ indicated that most of the risks did not apply to them. Furthermore, high quality standards were practiced. In bi-directional dyad D, Telecom NZ rated technology

performance-related risks to be low because the compatibility of e-commerce systems was not a concern, as the extranet application was implemented by the trading partner (Siemens NZ). The findings provided evidence of three factors. First, efficiencies of e-commerce technologies and applications reduced compatibility problems and technology performance-related risks. Second, due to past experience, relational risks were rated low as the organizations knew who they were dealing with. Finally, most of the bi-directional dyads enforced best business practices and had to abide by industry standards that provided high quality services that contributed to low general risks.

Trust and security based mechanisms in E-commerce	**Bi-directional Dyad A NZ Customs and their ISP Directional dyads 1-2**	**Bi-Directional Dyad B Customs Broker And Importer Directional dyads 3-4**	**Bi-directional Dyad C Cisco NZ and Compaq NZ Directional dyads 5-6**	**Bi-directional Dyad D Siemens NZ and Telecom NZ Directional dyads 7-8**	**Uni-directional Dyad 9 Avery Ford NZ and their branches**	**Uni-directional Dyad 10 Toyota NZ and Their Branches**
Confidentiality Technology performance related risks	L	M	L	L	N/A	L
Integrity Technology performance related risks	L-M	L	L	L	N/A	N/A
Authentication Relational risks	N/A	L	L	L	L	L
Non-repudiation Relational risks	N/A	L	L	L	N/A	L
Availability Technology performance and Relational risks	N/A	L	L	L	N/A	L
Access Controls Technology performance related risks	L	N/A	L	L	L	N/A
Best Business Practices General risks	N/A	L	N/A	L	N/A	L

Legend: L = Low (0-3); M = Medium (4-6); H - High (7-10). Not Applicable

Table 6.5: Trust and security-based mechanisms and Perceived Risks of E-Commerce

6.13.5 Perceived benefits of e-commerce and the extent of E-commerce Participation

- ***R P 5:*** *Perceived benefits of e-commerce are positively associated with e-commerce participation.*

The impact of perceived economic, indirect, relationship-related, and strategic benefits on the extent of e-commerce participation was strongly supported by most of the bi-directional dyads. Table 6.6 presents the impact of perceived benefits of e-commerce on the extent of e-commerce participation. One possible explanation for this is the automation and speed that e-commerce applications provided increased e-commerce performance, thus contributing to economic benefits. Most of the e-commerce operations involved standardized routine processes. Most of the trading partners were trading manually or used other means of communicating before trading with e-commerce applications. Furthermore, trading partners have met each other before. Bi-directional dyad A (NZ Customs-ISP), represents the nation and 98% of their business was conducted electronically. For example, in uni-directional dyads 9 and 10, Avery Ford NZ and Toyota NZ branch staff, have been trading with each other for more than ten years. Economic benefits in bi-directional dyad B were rated medium because the customs broker only acted as a trade facilitator and was not directly involved in the importing and distribution of the products or goods. The importer found e-commerce important for them because they received real-time information. Similarly, strategic benefits and their impact on e-commerce participation were rated medium by the importer. In bi-directional dyad C, seventy to eighty percent of Cisco's business involved e-commerce. Compaq NZ indicated that twenty percent of their e-commerce comes from Cisco. Compaq's findings indicated an increase in e-commerce performance, although trading partner trust relationship development was not obvious because Compaq was competing with Cisco NZ. Siemens rated strategic benefits to be high because of the uniqueness of the telecommunication products. Telecom NZ bi-directional dyad D, rated relationship-related and strategic benefits to be medium because their end-customers were unaware as to who actually manufactured the parts of their product. Seventy percent of Ford's business was conducted through e-commerce applications, and the remaining thirty percent was carried out manually. The findings implied that perceived benefits from both e-commerce applications and trading partner trust relationships increased participation in e-commerce.

Perceived Benefits of E-commerce	**Bi-directional Dyad A NZ Customs and their ISP Directional dyads 1-2**	**Bi-directional Dyad B Customs Broker and Importer Directional dyads 3-4**	**Bi-directional Dyad C Cisco NZ and Compaq NZ Directional Dyads 5-6**	**Bi-directional Dyad D Siemens NZ and Telecom NZ Directional dyads 7-8**	**Uni-directional Dyad 9 Avery Ford NZ and their branches**	**Uni-directional Dyad 10 Toyota NZ and their branches**
Perceived Direct benefits Extent of E-commerce Performance	H	M-H	H	H	H	H
Perceived indirect Benefits Extent of E-commerce Performance and trading partner trust relationship	H	H	H	H	H	H

development						
Perceived relationship related benefits of E-commerce Extent of trading partner trust relationship development	H	H	H	M	H	H
Perceived strategic benefits Extent of trading partner trust relationship development	H	M	H	M-H	H	H

Table 6.6: Research Proposition 5 - Perceived Benefits of E-commerce and the extent of participation in E-commerce

Legend: L = Low (0-3); M = Medium (4-6); H - High (7-10). Not Applicable

6.13.6 Perceived risks of E-commerce and the extent of E-commerce participation

- ***R P 6:*** *Perceived risks of e-commerce are negatively associated with e-commerce participation.*

The impact of perceived technology performance-related, relational, and general risks of e-commerce and its impact on the extent of e-commerce participation was not strongly supported by most of the directional-dyads. Table 6.7 presents the impact of perceived risks on e-commerce participation. The impact of perceived risks on the extent of e-commerce participation was rated low by most of the bi-directional dyads, except for the Siemens-Telecom NZ, which rated the impact of perceived risks on e-commerce participation to be medium. One possible explanation for this is that the ordering process was a complex one. Furthermore, the high turnover of staff by Telecom created added difficulties for Siemens NZ, as they had to re-train their new staff all over again. Thus a lack of consistent competence trust demonstrated from Telecom staff created a situation of dissatisfaction and contributed to relational and general risks Most of the risks did not impact bi-directional dyad C (Cisco-Compaq NZ), because they enforced best business practices and their standards were universally acceptable. In the case of NZ Customs the Customs Excise Act was vital to their significant modernization and customs risk management. Most of the risks did not impact bi-directional dyad C (Cisco-Compaq) because they enforced best business practices and their standards were universally acceptable. On the whole the findings provided evidence that perceived risks to e-commerce were not strongly supported by other bi-directional dyads. The next section discusses the similarities and differences in the bi-directional dyads.

Perceived Risks of E-commerce	Bi-directional Dyad A NZ Customs and their ISP Directional dyads 1-2	Bi-directional Dyad B Customs Broker and Importer Directional dyads 3-4	Bi-directional Dyad C Cisco NZ and Compaq NZ Directional Dyads 5-6	Bi-directional Dyad D Siemens NZ and Telecom NZ Directional dyads 7-8	Uni-directional Dyad 9 Avery Ford NZ and their branches	Uni-directional Dyad 10 Toyota NZ and their branches
Perceived technology performance related risks Extent of E-commerce Performance	L	L	L-N/A	M	L-N/A	L
Perceived relational risks Extent of trading partner trust relationship development	L	L	L	M	L-N/A	L
Perceived general risks Extent of E-commerce participation and trading partner trust relationship development	L	M	L-N/A	M	L-N/A	L

Table 6.7: Research Proposition 6 – Perceived Risks of E-commerce and the extent of participation in E-commerce

Legend: L = Low (0-3); M = Medium (4-6); H - High (7-10). Not Applicable

6.13.7 Similarities and Differences of the Bi-directional dyads

The similarities and differences in the findings came from the type of industry and e-commerce applications used. For example, Avery Ford NZ and Toyota NZ applied intranet applications and Internet-based EDI applications. Their business transactions were simple, standardized routines (such as purchase orders, material requirements, and advanced shipping notices) and they had prior business arrangements with their branch staffs. Organizations that implemented extranet applications (Cisco-Compaq NZ and Siemens-Telecom NZ) had to deal with complex parts and a difficult ordering process. Furthermore, the implementation of the e-commerce extranet application was carried out by only one trading party (i.e, the supplier – Cisco NZ and Siemens NZ), who is responsible for updating it with real-time tracking information of the products and orders placed by their buyers. These initial one-sided implementation cost, motivated suppliers, at times to apply coercive power and exhibit opportunistic behaviors (in the form of high prices) to their buyers, thus contributing to relational risks of e-commerce.

The similarities between NZ Customs, and the customs broker and importer were long-term trading partner relationships. The impact of e-commerce participation by smaller organizations such as the customs broker and importer was successful. One possible explanation for this was the simplicity of their e-commerce application, and for security reasons their e-commerce application was not connected to the networks. The differences between NZ Customs and their Internet Service Provider include outsourcing part of their e-commerce processes to their Internet Service Provider.

6.14 Chapter Summary

This chapter reported, analyzed and discussed the findings of ten uni-directional dyads (organizations) from a cross-section of industries that formed four bi-directional dyads and two uni-directional dyads interacting with their branches. The ten uni-directional dyads (organizations) included a public sector organization involved in customs clearance, their Internet Service Provider (bi-directional dyad A), a customs agent (broker), an importer (bi-directional dyad B); two organizations in the computer and data communications industry, Cisco and Compaq NZ (bi-directional dyad C); two organizations in the telecommunications industry, Siemens and Telecom NZ (bi-directional dyad D); and two organizations in the automotive industry using intranet applications that interacted with their branches. The next chapter provides a summary of the previous chapters, discusses the conclusions derived from the findings, contributions made to this study, its implications, and directions for future research.

Chapter 7

Conclusions

7.1 Introduction

This chapter provides a summary of the thesis. The conclusions of this study were based on the findings of ten uni-directional dyads that formed four bi-directional dyads and two uni-directional dyads. The participants agreed that trust and security-based mechanisms (also known as technology trust) by and large exists in e-commerce technologies and applications. However, what is more important is the need to develop trading partner relationships that will form cohesive (win-win) trading partner relationships. Most of the participants agreed that developing trust is a gradual process and can be challenging because of differing personalities and expectations, the lack of a physical presence, varied standards used within each organization and the changing external e-commerce environment.

The chapter is organized as follows. Section 7.2 provides a summary of the previous chapters. Section 7.3 discusses the impact of inter-organizational trust in e-commerce participation leading to generalizations derived from the findings of this study. Section 7.4 discusses the model of inter-organizational trust within bi-directional dyads, and section 7.5 discusses research contributions and implications to business theory, and practice. Section 7.6 discusses the limitations of this study and finally, section 7.7, provides a direction for future research and concludes the chapter. Figure 7.1 depicts the structure of this chapter.

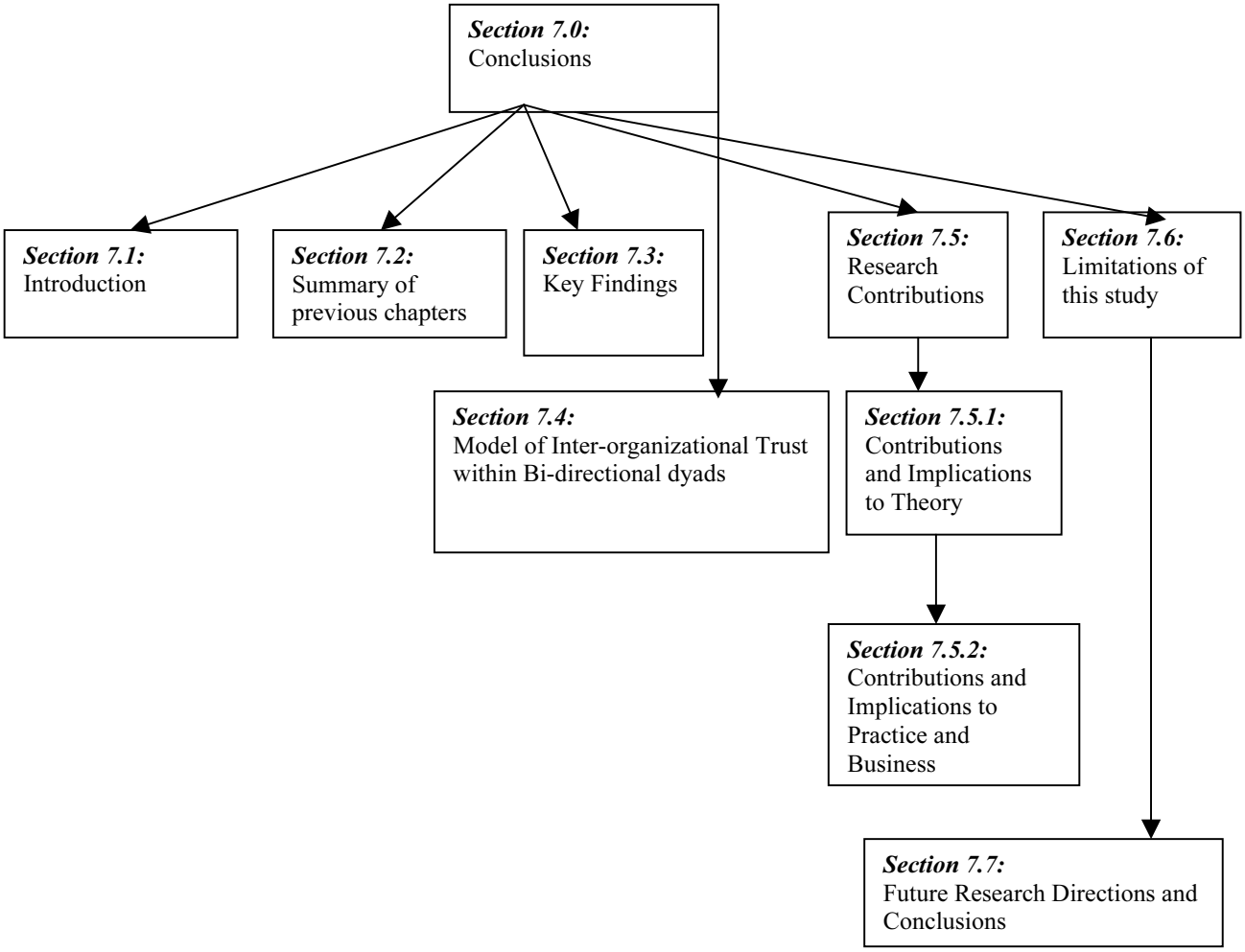

Figure 7.1: Structure of the Conclusions Chapter

7.2 Summary of Previous Chapters

Chapter 1 presents the foundations for the motivation of this study and provides an introduction to the research problem, rationale, aim, questions, and approach. The chapter also presents the scope and definition of the concepts together with the significance of this study. Inter-organizational trust (trading partner trust) in e-commerce participation can make a difference between a successful and unsuccessful e-commerce organization. Since previous research on inter-organizational trust in e-commerce participation was limited when this study commenced in 1997, the study first set out to explore and discover a general understanding of trading partner trust in three EDI organizations in the automotive industry.

Chapter 2 presents the findings of exploratory research carried out using three case studies in the automotive industry that also led to the development of the conceptual model of inter-organizational trust in e-commerce participation. The three organizations include the Ford Motor Company of Australia Limited, Toyota

Motor Company of Australia Limited, and their first tier supplier Patent, Brakes and Replacement (PBR) Automotive Proprietary Limited who applied EDI via Value-Added-Networks (VANs).

Chapter 3 presents a review of the literature on trust from multiple disciplines. The chapter discusses e-commerce adoption, highlighting factors that drive and inhibit business-to-business e-commerce adoption. We then examine previous definitions of trust as well as trust-building mechanisms in business relationships from past research in order to identify trust behaviors in e-commerce participation. Trust in inter-organizational relationships (IORs), transaction-cost-economics (TCEs), and resource-dependency theory was also discussed. Trust and security-based mechanisms in e-commerce include security principles that provide assurances in e-commerce transactions and best business practices. Perceived benefits (as in strengths) and perceived risks (as in weaknesses) of e-commerce determine the extent of inter-organizational trust in e-commerce participation (as in the extent of e-commerce performance and trading partner trust relationship development). Finally, we examine the evolution from inter-organizational systems and inter-organizational relationships to inter-organizational trust.

Chapter 4 discusses the development of a conceptual model of inter-organizational trust in e-commerce participation derived from the theoretical foundations discussed in chapter 3 and from the findings of the exploratory research in chapter 2. The chapter defines the constructs and sub-concepts and provides a justification of the research propositions from the conceptual model.

Chapter 5 discusses the research method chosen for this study, which is a case study research method. The chapter describes the research design and provides a justification of the research method, with comparison to other research methods in Information Systems discipline. We then discuss the data collection, data analysis, and data reporting procedures in light of how the choice of organizations (sample) for this study was established. The unit of analysis is uni-directional dyad (an organization). A description of the instrumentation process using a semi-structured questionnaire and document analysis is also given.

Chapter 6 presents the findings of ten uni-directional dyads (organizations) from a cross section of industries that formed four bi-directional dyads and two uni-directional dyads. They include a public sector organization involved in customs clearance, their Internet service provider, a customs agent (broker), an importer, two organizations in the computer and data communications industry, two organizations in the telecommunications industry, and two uni-directional dyads in the automotive industry. In addition, we examine a cross-case analysis of the bi-directional dyads together with the similarities and differences of the findings. This analysis led to the development of a model of inter-organizational trust within bi-directional dyads in e-commerce participation.

7.3 Key Findings

This section discusses the key findings in relation to the research propositions. The findings describe a range of the importance of trust (as in very important, not important or moderately important), and its impact on uni and bi-directional dyads, thus attempting to make some generalizations of this study.

- ***R P 1:*** *Trading partner trust is positively associated with perceived benefits of e-commerce.*

Trading partner trust was found to be important by most of the bi-directional dyads because the ability, skills, and competence of trading partners was essential for successful e-commerce participation. Even though trading partners were trading with each other prior to adopting e-commerce applications, they agreed that although the automation of

e-commerce technologies provided the speed, quality, and timely information, training trading partners was found to be even more important. Consistent, positive competence trust demonstrated by trading partners ability to transact correctly contributed to predictability trust and trading partner satisfaction, which in turn led to goodwill trust in the form of increased honesty, open communications, cooperation, commitment to long-term trading partner relationships, and reputation. Alternatively, Avery Ford and Toyota NZ uni-directional dyads did not find competence and goodwill trust to be important. One possible explanation for this is that they were using Intranet applications and their branch staff was not in direct competition with them. Thus, it can be concluded from the findings that trading partner trust was important as it contributed to economic benefits of e-commerce. Then perceived relationship-related benefits were derived from consistent positive competence trust that led to predictability trust. In the long run this led to strategic benefits from closer ties and commitment to long term investments. Table 7.1, below presents the importance of trading partner trust and its impact on perceived benefits of e-commerce.

Three Types of Trading Partner Trust	**Bi-directional Dyad A NZ Customs and their ISP Directional dyads 1-2**	**Bi-directional Dyad B Customs Broker and Importer Directional-dyads 3-4**	**Bi-directional Dyad C Cisco NZ And Compaq NZ Directional-dyads 5-6**	**Bi-directional Dyad D Siemens NZ and Telecom NZ Directional-dyads 7-8**	**Uni-directional Dyad 9 Avery Ford NZ and their branches**	**Uni-directional Dyad 10 Toyota NZ and their branches**
Competence Trust Economic direct benefits	M1	VI	VI	VI	NI	NI
Predictability Trust Indirect personal benefits	VI	VI	VI	VI	MI	MI
Goodwill Trust Relationship related and strategic benefits	VI	VI	VI	VI	NI	NI

Table 7.1: Findings of Trading partner Trust and Perceived Benefits of E-Commerce

Legend: Very Important (VI), Not Important (NI), Moderately Important (MI).

- ***R P 2:*** *Trading partner trust is negatively associated with perceived risks of e-commerce.*

Most of the bi-directional dyads rated the impact of technology performance-related risks to be very important (see Table 7.2). Avery Ford NZ and Toyota NZ uni-directional dyads rated technology performance-related risks to be moderately important because they used an internal system and their orders were monitored by the head office who also manages the entire budget and stock of the branches.

Relational risks and general risks arising from poor business practices were considered very important by all the bi-directional dyads. Abiding to high quality standards and procedures was expected from the organizations. Trading partners had to impress each other in order to build their reputation and image, thereby building goodwill trust. The findings concluded that the bi-directional dyads recognized the importance and impact of risks of e-commerce, and that every possible action was taken to enforce best business practices (e.g. implementing regular training programs) that help build competence trust. Table 7.2 presents the importance of trading partner trust and its impact on perceived risks of e-commerce.

Three Types of Trading Partner Trust	Bi-directional Dyad A NZ Customs And their ISP Directional Dyads 1-2	Bi-directional Dyad B Customs Broker and Importer Directional-dyads 3-4	Bi-directional Dyad C Cisco NZ and Compaq NZ Directional-dyads 5-6	Bi-directional Dyad D Siemens NZ and Telecom NZ Directional-dyads 7-8	Uni-directional Dyad 9 Avery Ford NZ and their branches	Uni-directional Dyad 10 Toyota NZ and their branches
Competence Trust Technology performance related risks	VI	VI	VI	VI	MI	MI
Predictability Trust Relational risks	VI	VI	VI	VI	VI	VI
Goodwill Trust General risks	VI	VI	VI	VI	VI	VI

Table 7.2: Findings of Trading partner Trust and Perceived Risks of E-Commerce

Legend: Very Important (VI), Not Important (NI), Moderately Important (MI).

- ***R P 3:*** *Trust and security-based mechanisms in e-commerce are positively associated with perceived benefits of e-commerce.*

Trust and security-based mechanisms in e-commerce and its impact on perceived benefits was rated very important (see Table 7.3) by most of the bi-directional dyads except Avery Ford NZ and Toyota NZ. Most of the trust and security-based mechanisms related to security principles (such as confidentiality, integrity, authenticity, non-repudiation, availability, and access controls), so measures were taken to include these mechanisms into their e-commerce systems and applications (as protocols). For example, a simple email acknowledgment followed by a telephone call confirmed that trading partners were communicating to the right trading party. Top management commitment (as in adequate and regular audits, a formal development methodology, risk management, and contingency procedures) ensured high-quality services, and contributed to economic and relationship-related benefits. The findings concluded that e-commerce technologies had embedded protocols contributed to economic benefits of e-commerce (i.e, the findings recognized the importance of technology trust). In addition, consistent

enforcement of best business practices led to relationship-related and strategic benefits as high quality standards and written policies were implemented. Table 7.3 presents the importance of trust and security-based mechanisms and its impact on perceived benefits of e-commerce.

Trust and security-based mechanisms in E-Commerce	**Bi-directional Dyad A NZ Customs and their ISP Directional dyads 1-2**	**Bi-directional Dyad B Customs Broker and Importer Directional-dyads 3-4**	**Bi-directional Dyad C Cisco NZ and Compaq NZ Directional-dyads 5-6**	**Bi-directional Dyad D Siemens NZ and Telecom NZ Directional-dyads 7-8**	**Uni-directional Dyad 9 Avery Ford NZ and their branches**	**Uni-directional Dyad 10 Toyota NZ and their branches**
Confidentiality Economic benefits	MI	VI	VI	VI	MI	MI
Integrity Economic benefits	VI	VI	VI	VI	MI	MI
Authentication Indirect and relationship-related benefits	VI	VI	VI	VI	MI	MI
Non-repudiation Indirect, and relationship-related benefits	VI	VI	VI	VI	MI	MI
Availability Economic benefits	VI	VI	VI	VI	VI	VI
Access Controls Economic benefits	VI	VI	VI	VI	VI	VI
Best Business Practices Relationship related and strategic benefits	VI	VI	VI	VI	VI	VI

Table 7.3: Findings of Trust and Security-based Mechanisms in E-commerce and Perceived Benefits of E-Commerce

Legend: Very Important (VI), Not Important (NI), Moderately Important (MI).

- ***R P 4:*** *Trust and security-based mechanisms in e-commerce are negatively associated with perceived risks of e-commerce.*

Trust and security-based mechanisms and its impact on perceived risks of e-commerce was rated very important (see Table 7.4) by all the bi-directional dyads. Although a lack of these mechanisms may contribute to technology performance-related risks from incompatibility of e-commerce applications in the short-run, they may also contribute to relational and general risks in the long run. Furthermore a lack of top management commitment could lead to poor business practices that inhibit trading partners from being fully trained to undertake e-commerce operations correctly. This in turn could lead to integrity risks as e-commerce transactions sent by trading partners may be incomplete and inaccurate. Trading partner dissatisfaction derived from a lack of competence could lead to

opportunistic behaviors, conflicts, and discontinuity of trading partner relationships. The findings concluded that the more time spent on planning and enforcing trust and security-based mechanisms, it may lead to decreased risks of e-commerce, as trading partners were trained to use e-commerce systems properly in turn, thereby making less errors and providing fewer opportunities for hackers. Table 7.4 presents the importance of trust and security-based mechanism and the impact on perceived risks of e-commerce.

Trust and security-based mechanisms in E-Commerce	**Bi-directional Dyad A NZ Customs and their ISP Directional dyads 1-2**	**Bi-directional Dyad B Customs Broker and Importer Directional-dyads 3-4**	**Bi-directional Dyad C Cisco NZ And Compaq NZ Directional-dyads 5-6**	**Bi-directional Dyad D Siemens NZ And Telecom NZ Directional-dyads 7-8**	**Uni-directional Dyad 9 Avery Ford NZ and their branches**	**Uni-directional Dyad 10 Toyota NZ and their branches**
Confidentiality Technology performance related risks	VI	VI	VI	VI	VI	VI
Integrity Technology performance related risks	VI	VI	VI	VI	VI	VI
Authentication Relational risks	VI	VI	VI	VI	NI	NI
Non-repudiation Relational risks	VI	VI	VI	VI	NI	NI
Availability Technology performance and relational risks	VI	VI	VI	VI	MI	MI
Access Controls Technology performance related risks	VI	VI	VI	VI	MI	MI
Best Business Practices General risks	VI	VI	VI	VI	VI	VI

Table 7.4: Findings of Trust and Security-based mechanisms in E-commerce and Perceived risks of E-Commerce

Legend: Very Important (VI), Not Important (NI), Moderately Important (MI).

- ***R P 5:*** *Perceived benefits of e-commerce are positively associated with e-commerce participation.*

Perceived economic benefits and its impact on the extent of e-commerce participation was rated very important (Table 7.5) by all the bi-directional dyads except NZ Customs. One possible explanation for this is that NZ Customs is a public sector service organization supported by the government. Their main goal was to provide customs

clearance services for the country, and not to engage in fierce competition to make high profits. The other bi-directional dyads experienced economic benefits from savings in costs and time derived from the automated e-commerce processes. Economic benefits led perceived indirect benefits that paved the way for trading partner trust relationship development which was very important for e-commerce applications to operate on a real-time round the clock basis, thus making information readily available and accessible. Consistent competence trading partner trust behaviors were important for organizations to manage their supply chain activities, thus leading to predictability trust. Increased satisfaction among trading partners led to relationship-related benefits that permitted trading partners to share information, have open communications, and increased commitment. This in turn gradually led to strategic benefits that contributed to increased e-commerce performance, long-term trading relationships, increased reputation of trading partners, and trading partner trust relationship development. The findings concluded that the importance of trading partner trust encouraged consistent open communications among trading partners, and a willingness to share information which led to positive feelings. Table 7.5 presents the importance of perceived benefits of e-commerce and the importance on the extent of e-commerce participation.

Perceived Benefits of E-Commerce	**Bi-directional Dyad A NZ Customs and their ISP Directional dyads 1-2**	**Bi-directional Dyad B Customs Broker and Importer Directional-dyads 3-4**	**Bi-directional Dyad C Cisco NZ and Compaq NZ Directional-dyads 5-6**	**Bi-directional Dyad D Siemens NZ And Telecom NZ Directional-dyads 7-8**	**Uni-directional Dyad 9 Avery Ford NZ and their branches**	**Uni-directional Dyad 10 Toyota NZ and their branches**
Perceived economic Benefits Extent of e-commerce Performance	MI	VI	VI	VI	VI	VI
Perceived indirect Benefits Extent of e-commerce Performance and trading partner trust relationship development	VI	VI	VI	VI	MI	MI
Perceived relationship-related benefits of Extent of trading partner trust relationship development	VI	VI	VI	VI	MI	MI
Perceived strategic Benefits Extent of trading partner trust	VI	VI	VI	VI	VI	VI

relationship development						

Table 7.5: Findings of Perceived benefits of E-Commerce and the Extent of E-Commerce participation

Legend: Very Important (VI), Not Important (NI), Moderately Important (MI).

- ***R P 6:*** *Perceived risks of e-commerce are negatively associated with e-commerce participation.*

Perceived risks of e-commerce and its impact on the extent of e-commerce participation was rated very important (as shown in Table 7.6 below) by all bi-directional dyads except for uni-directional dyads Avery Ford NZ and Toyota NZ. For example, the extent of e-commerce performance can be affected by perceived technology performance-related risks derived from a lack of training and competence of trading partners to use e-commerce applications correctly. Trading partners who constantly exhibit mistakes can cause delays in the supply chain management. This in turn could affect trading partner satisfaction and trading partner trust relationship development thus contributing to relational risks. Opportunistic behaviors from an imbalance of power can inhibit open communications and information sharing that could affect trading partner trust relationship development and ultimately their business continuity. The findings concluded that all bi-directional dyads recognized the importance of perceived risks of e-commerce as it can directly affect participation in e-commerce. Table 7.6 presents the importance of perceived risks of e-commerce and the impact on the extent of e-commerce participation.

Perceived Risks of E-Commerce	**Bi-directional Dyad A NZ Customs and their ISP Directional dyads 1-2**	**Bi-directional Dyad B Customs Broker and Importer Directional-dyads 3-4**	**Bi-directional Dyad C Cisco NZ and Compaq NZ Directional-dyads 5-6**	**Bi-directional Dyad D Siemens NZ and Telecom NZ Directional-dyads 7-8**	**Uni-directional Dyad 9 Avery Ford NZ and their branches**	**Uni-directional Dyad 10 Toyota NZ and their branches**
Perceived technology performance related risks Extent of e-commerce Performance	VI	VI	VI	VI	MI	MI
Perceived relational risks extent of trading partner trust relationship development	VI	VI	VI	VI	MI	MI
Perceived general Risks Extent of e-commerce	VI	VI	VI	VI	MI	MI

participation and trading partner trust relationship development						

Table 7.6: Findings of Perceived Risks of E-Commerce and the Extent of E-Commerce participation

Legend: Very Important (VI), Not Important (NI), Moderately Important (MI).

7.4 Model of Inter-Organizational Trust within Bi-directional dyads in E-commerce Participation

The model of inter-organizational trust within bi-directional dyads in e-commerce participation was developed from the findings. The model identifies the gradual development of inter-organizational trust in three stages. Table 7.7 outlines the characteristics of the three stages of inter-organizational trust. Figure 7.2 depicts the model of inter-organizational trust within bi-directional dyads in e-commerce participation.

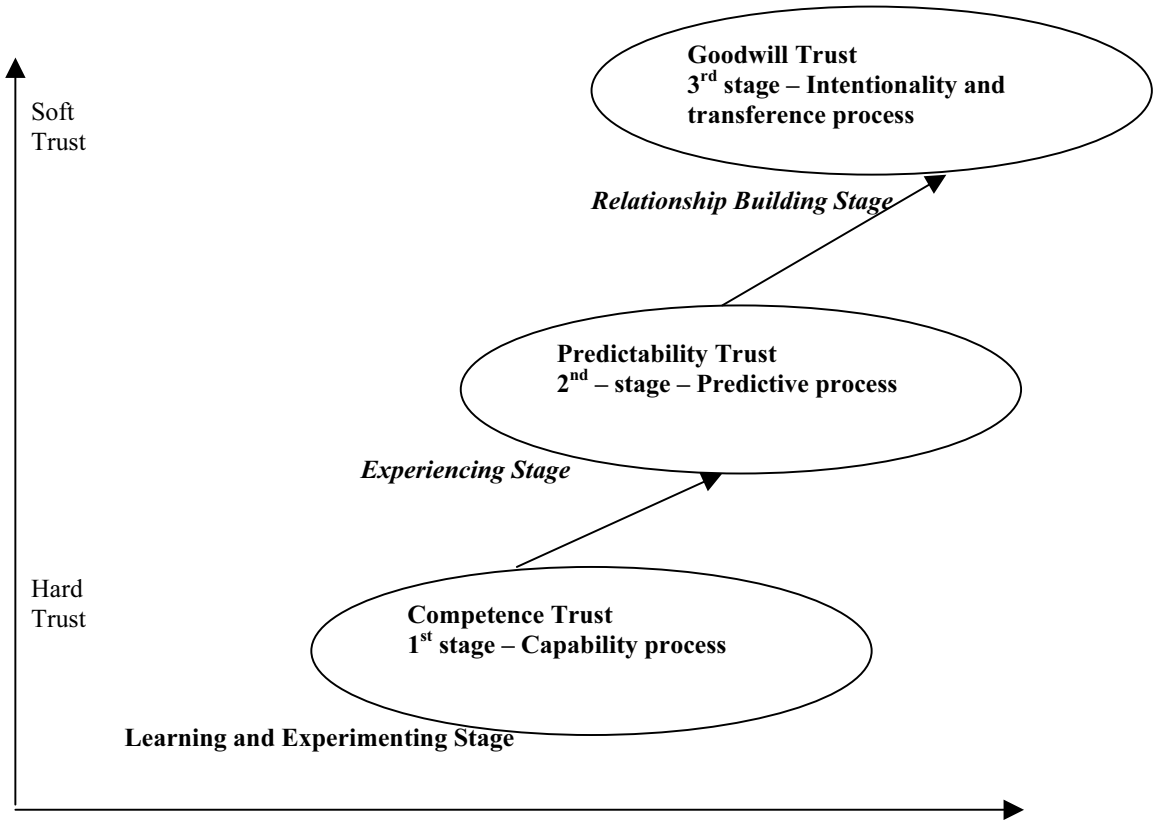

Figure 7.2: Model of Inter-Organizational Trust within Bi-directional Dyads in E-commerce Participation

Although business-to-business e-commerce systems and applications facilitate the development of initial competence trust, trust needs time to develop, as it evolves gradually from one stage to the next stage. The model enables trading partners to identify which stage of trust they and their trading partners belong to. In the first stage, new e-commerce adopters typically concentrate on training their trading partners to use e-commerce applications correctly, thus taking a bottom up approach in analyzing trust behaviors (such as trading partner skills, knowledge,

ability, and product expertise). The emphasis is on the trading partner's competence, skills, and ability to operate business-to-business e-commerce applications. The first stage of inter-organizational trust development contributes to transactional (objective) trust, and focuses on a capability process which examines how trading partners send and receive business-to-business e-commerce transactions (i.e. trading partner's competence). This contributes to economic benefits from high competence trust, and also from trust and security-based mechanisms (as automated protocols) embedded in e-commerce technologies that provide speed, and real-time accurate information. Economic benefits are derived from savings in time and costs as trading partners are able to send and receive transactions correctly. Alternatively, trading partners who operate using incompatible e-commerce applications or apply poor business practices (as in inadequate audit, lack of training) and constantly make errors during transacting contribute to technology performance-related risks.

During the second stage, consistent positive behaviors from trading partners lead to credibility and reliability. Positive behaviors from reliable trading partners contribute to trustworthy behaviors and predictability trust. This, in turn, increases trading partner satisfaction and contributes to relationship-related benefits such as open communication and a willingness to cooperate, commit and share information. The predictive process applies a middle-out approach for analyzing trust behaviors of trading partners because it is based on knowledge of past experiences. The focus gradually evolves from transactional (objective) trust to relational (subjective) trust that emphasized on trading partners behaviors (such as reliability, honesty and predictability). Alternatively, trading partners who do not exhibit consistent, reliable, positive trust contribute to relational risks derived from uncertainties, lack of knowledge, dependencies, situations of imbalance of power, and conflicts.

Finally, in the third stage goodwill trust focuses on institutional (organizational) reputation and brand names, accomplished by enforcing best business practices. Positive consistent behaviors encourage trading partners to invest in their trading partner relationships (i.e, renew the trading partners contract), increase e-commerce performance (as in volume, dollar value of goods), and reduce opportunistic behaviors (such as power, control, and the imposition of strict deadlines). Thus, positive repeated behaviors from trading partners enable goodwill trust to develop, which is an accumulation of both competence and predictability trust. The focus is on the organization and it takes a top-down approach in analyzing trading partner trust behaviors. This approach includes top management commitment, high-quality standards, open communication, information sharing, and long-term trading partner relationships, thus contributing to strategic benefits. Alternatively, poor business practices (such as a lack of audit reviews or top management commitment) may lead to general risks. Research on trust has shown that trust is transferable, thus trust in this stage is based on a transference process (See Doney and Cannon, 1997; Lewicki and Bunker, 1995). Table 7.7 presents trust behaviors and characteristics of bi-directional dyads in e-commerce participation.

Three Stages of Inter-Organizational Trust	Bi-directional Dyads A-D (Supplier)	Bi-directional dyads A-D (Buyer)
Competence based Trust (Economic Foundation) (win-lose situation)	- Enforces trading partner agreement - Provides initial training - Exhibits tolerance for mistakes Applies persuasive power - Focuses on operational goals - Emphasizes on trust and security based mechanisms from e-commerce applications	- Experiments with new e-commerce applications - Makes costly mistakes - Experiences an increase in communication and trading partner interactions (via telephone calls, email and fax) - Relies on IT technical support - Experiences economic benefits -Experiences technology performance related risks
Predictability based Trust (Familiarity Foundation) (could be win-lose, lose-win, win-win, or lose-lose situation)	- Consistent behaviors in providing high quality service - Focuses on mid-range tactical goals - Experiences relationship-related benefits from trading partner satisfaction - Experiences relational risks	- Experiences the ability to operate correctly from previous mistakes - Exhibits consistent behavior - Experiences both economic and relationship-related benefits - Experiences relational risks - End consumers exhibit satisfaction
Goodwill based Trust (Empathy Foundation) (win-win situation)	- Increases reputation of their organization - Brand names - Aims to sign long-term contracts - Plans strategic long-term goals - Experiences increase in e-commerce performance (that is increased volume, dollar value of goods) - Exhibits less opportunistic behavior - Experiences increase in trading partner trust - Exhibits willingness to share information, open communication	- Exhibits cooperation - Exhibits Commitment - Experiences an increase in trading partner satisfaction - Exhibits willingness to put every effort to invest in the relationship - Experiences strategic benefits and increased reputation - Engages in long term investments

Table 7.7: Model of Inter-Organizational Trust within Bi-directional dyads in E-commerce Participation

It can be concluded that inter-organizational trust is important for e-commerce participation. The model of inter-organizational trust within bi-directional dyads in e-commerce participation identified characteristics that determined positive and negative consequences of inter-organizational trust. E-commerce practitioners will benefit from this information, as they will be able to assess the likely effects and effectiveness of trust if applied correctly in their organization. This study contributed to the determinants of successful e-commerce participation.

7.5 Research Contributions and Implications

This section discusses the contributions (to theory, and business practices) and implications of this study.

7.5.1 Contributions and Implications to Theory

The first contribution came from an insight to successfully bridge the ideas about trust from multiple disciplines. The integrated conceptual model tested in this study was developed from the findings of the exploratory study (in chapter 2) and the basis of several well-established theories from many fields discussed (in chapter 3). They include

marketing, management, sociology, information systems, and e-commerce literature. The model was complete as it included both the strengths and weaknesses of both trading partner trust and trust and security-based mechanisms (technology trust). The five theoretical perspectives include,

- inter-organizational relationship theory;
- transaction-cost-economics theory;
- resource dependency theory;
- theories of trust in business relationships; and
- theories from computer science and information systems literature relating to trust and security-based mechanisms in e-commerce.

Although, information systems research relating to trading partner trust in e-commerce participation was limited, past research on trust in business relationships from other disciplines pointed towards the importance of trust in business relationships. A synthesis of the above theories provided a new approach for exploring, studying, and describing inter-organizational trust relationships in e-commerce participation. Previous research on e-commerce mostly focused on technological benefits and its competitive advantages. This study not only examined the technological perspective, but also behavioral, economical, organizational and socio-political perspectives of trading partners. The constructs in the conceptual model were adequate to conceptualize, describe, and empirically examine inter-organizational trust in e-commerce participation.

The second contribution to theory is the importance of the actual topic. Trust in e-commerce participation has received a lot of attention, especially in the recent years. The findings of this research provide evidence that technology alone is insufficient for successful e-commerce participation. Trading partner trust provides an avenue for increasing the understanding of bi-directional dyads in e-commerce participation.

The third contribution came from a cross-industry selection of organizations, and the perspectives of both the trustor and trustee that participated in this study. Most previous research only examined trading partner trust from either a supplier's or buyer's perspective, or from one type of industry. This study examined trading partner trust from both trading partner's perspectives (i.e., buyer-supplier; trustor-trustee) within a bi-directional dyad. This study is unique as inter-organizational trust was examined in ten uni-directional dyads (organizations) from a cross-section of industries namely telecommunications, computer and data communication supply, customs clearance (including an Internet service provider, importer, and customs broker), automotive dealers and distributors that formed four bi-directional dyads (Bi-directional dyads A-D). Table 7.8 presents a summary of the organizations that participated in this study. Based on the cross-case analyses it can be concluded that a positive impact of inter-organizational trust in e-commerce performance is necessary for long-term trading partner trust relationship development.

Organizations that participated in this study	Name of organization	Main role and size of the organization	Type of industry	Type of E-commerce Application
Bi-directional dyad A Directional dyad 1 Directional dyad 2	NZ Customs and their Internet Service Provider	Provides Customs clearance service Large and SME	Public service	CusMod using EDI X25 and other means via ISP
Bi-directional dyad B Directional dyad 3 Directional dyad 4	Customs broker and Importer	Trade facilitator and Retailing Both SMEs	Retailing and service	Trade Manager using Visual Basic – Microsoft
Bi-directional dyad C Directional dyad 5 Directional dyad 6	Cisco NZ and Compaq NZ	Supplier and Buyer SME and large	Computer and data communications	Extranet Cisco Connection online
Bi-directional dyad D Directional dyad 7 Directional dyad 8	Siemens NZ and Telecom NZ	Supplier and Buyer SME and large	Telecommunications	Extranet Main stream express
Uni-Directional dyad 9	Avery Ford NZ and Their branches	Motor vehicle distributors	Automotive	Intranet and EDI X25
Uni-Directional dyad 10	Toyota NZ and Their branches	Motor vehicle distributors	Automotive	Intranet and EDI X25

Table 7.8: Uni-directional dyads (Organizations) that participated in this study

The fourth contribution is the model of inter-organizational trust within bi-directional dyads in e-commerce participation (see figure 7.2). The model identifies the development of inter-organizational trust in three stages, and it allows trading partners to identify which stage of trust they and their trading partners belong to. The model shows a gradual development of trust from one stage to the next stage, thus providing an awareness of the trust behaviors that trading partners need to develop. For example competence trust emphasizes on an individual or team's ability and skills to operate e-commerce systems and applications. Predictability trust examined the reflections, and interpersonal experiences of the trading partners based on past experiences, and goodwill trust examined the institutional (i.e, the organization's image, and reputation that determined the strategic benefits.

7.5.2 Contributions and Implications to Practice and Businesses

This study has the potential to provide practitioners with insights to acknowledge the importance of different trust behaviors in their business relationships. A key strength of the research is that the respondents were practitioners from a wide range of organizations and occupations. Therefore, while the participating organizations and their people were not selected randomly, quite a diverse group did participate. This study contributes to the importance of inter-organizational trust in e-commerce participation by developing an integrated framework describing the role of trust and technology (security mechanisms) in participation in e-commerce. The framework was tested through multiple case studies. The findings contributed to a model of inter-organizational trust within bi-directional dyads in e-commerce participation. First, the participants of this study agreed that this study increased their awareness that inter-organizational trust relationships are worthy of inclusion in the production of their future audit reports, guidelines and security policies. Organizations should participate in industry working groups, thus increasing their awareness of security requirements, e-commerce methods of operations, and interchange standards. Participation in industry groups provides an indication of the organization's commitment and plan towards e-commerce

participation. For example, automotive manufacturers conduct regular discussions with key management personnel, thus allowing formal approvals and links in a realistic setting that encourages e-commerce participation. By doing so, their awareness of trading partner trust will increase, thereby enabling trading partners to sustain, and commit to long-term trading partner relationships. E-commerce organizations will be able to practice business-to-business e-commerce more confidently, as they will be made aware of the trust behaviors. Second, this study provides a guide for early developers and implementers of business-to-business e-commerce by improving and increasing their levels of awareness of the potential use of e-commerce technology. Trading partners will be made aware of the importance of inter-organizational trust in their trading partner relationships, thereby helping e-commerce organizations to improve their chances of surviving in a competitive global market environment. Third, experienced e-commerce practitioners (trading partners) will be able to observe the behaviors of their trading partners and will be able to monitor, assess, and evaluate antecedent trust behaviors of themselves and their trading partners. By doing so they can determine the extent of their trading partners' trustworthiness and will be able to protect themselves against fraud, on the opportunistic, suspicious behaviors of their trading partners. Although governance mechanisms (including legal contracts, trust and security-based mechanisms in e-commerce) provide technological assurances (using digital signatures, encryption mechanisms, functional acknowledgment procedures, and trading partner agreements) that help mitigate perceived risks of e-commerce, the findings provided evidence that inter-organizational trust is still the key to sustained long-term relationships. The model of inter-organizational trust within bi-directional dyads in e-commerce participation thus acts as a checking mechanism for both growth and development of inter-organizational trust in business-to-business e-commerce participation. Therefore the contributions to practice focused on:

- designing and implementing an effective trading contract (that emphasizes a partnering contract) rather than a trading contract;
- designing a pre-adoption education and training program in order to develop competence trust of trading partners. For example, Stewart (1998) suggests building trust in e-commerce by educating trading partners and ensuring security, privacy of transactions, and protection of trading partners. Trading partners should establish ground rules so that commercial laws, tax and customs tariffs, trade policies, market access, and intellectual property measures create a universal standard for electronic transactions. This, enhances the information infrastructure through common interoperable standards, and access to open networks. It also maximizes benefits of e-commerce by developing awareness and skills, encouraging widespread Small-Medium-Enterprise adoption, and ensuring participation and use by all countries.
- finding alternative ways of improving trading partner trust relationships rather than relying on trading partner agreements; and
- developing and designing a partnering charter (as in a trading partner relationship contract) which emphasizes on trading partner trust behaviors in relation to e-commerce business operations.

The partnering charter[2] is a jointly developed document that sets out mutually agreed objectives. The partnering charter is not a complex, unintellgentable, legal document, but is simply an agreement between the interested parties setting out mechanisms, procedures and expectations of each trading partner towards the other, in clear, concise and understandable terms. Partnering is a process of team building and mutual goal setting, where both trading parties are able to appreciate and understand the legitimate business aspirations of the other. Through this understanding they act appropriately for mutual benefit. The partnering charter is an evolving document modified and adjusted to suit the changing cultural, business or political environments. Most fundamentally, it is an agreement based on trust.

7.6 Limitations of this study

Despite the acknowledged importance of trust, current scholarly inquiry on the topic has been limited in two ways. First, little academic research exists that attempts to empirically document the factors affecting trust in trading relationships (Dyer and Chu, 2000; Hosmer, 1995; Sako, 1998). By and large, most IS research emphasizes information technology, IOSs, and their relative and competitive advantages. At the time this thesis was initiated, no study was found that attempted to develop a theoretical framework of antecedent trust factors influencing business-to-business e-commerce participation on the Internet. Second, past research did not systematically distinguish trust from its related behaviors such as competence, reliability, predictability, commitment, and cooperation. Trust itself can be seen as a very complex and multi-dimensional construct and there have been numerous attempts to define and conceptualize it, its antecedents and outcomes (Lewis and Weigert, 1985; McKnight et al., 1998; Wehmeyer et al., 2001).

The findings of this study may be constrained by the research context, i.e, dyadic relationships. Although, ten uni-directional dyads (organizations) were examined in this study, it cannot be regarded holistically (i.e. the results may not be generalizable), even though the evidence of the study contributed to key findings and interesting patterns in trading partner relationship management within an e-commerce environment. However, the researcher believes that many of the findings in this study have wider applicability. For example, competence trust and its correlation to economic benefits can be applied to many other organizations using e-commerce applications. Likewise the issues or risks relating to trading partner trust (relational risks) can have broad applicability in most powerful trading partner relationships.

This study took a micro-perspective of inter-organizational trust. It was not intended to examine other aspects of e-commerce such as adoption process, types of e-commerce applications, cultural dimensions or the size of organizations applying e-commerce. The study was restricted only to dyadic organizations involved in business-to-business e-commerce located in Melbourne, (Australia) and Wellington, (New Zealand) regions. It is possible that given different levels of social capital in different regions of the world, some of the results of this study may not be globally generalizable. Furthermore, this research examined only a subset of the possible characteristics and behaviors between trust and its antecedents, consequences and moderating variables.

7.7 Future Research Directions and Conclusions

[2] Partnering Charter is a document which Siemens NZ designed and developed from their previous trading partner agreement into

Future research should take a more extensive approach to cover all possible positive and negative characteristics and behaviors of trust in e-commerce participation. Though our findings supported the general theoretical framework, it is also possible that a different sequence of relationships setting similar to all cross-sectional studies longitudinal research can further enhance or refute the empirical findings. In addition, the dynamic and constantly changing context of the e-commerce environment may affect the nature of inter-organizational trust in the future. Therefore, longitudinal studies will probably be the research method of choice for understanding the role and nature of trust in e-commerce participation.

Since this study was primarily exploratory in nature and focused on identifying and examining the importance of trust behaviors within dyadic relationships in e-commerce participation, future research should address at greater length how this model could be used to explain inter-organizational trust at a wider scale. An abstract model incorporating many theories was developed for this study as it was intended to be an exploratory study in nature. The next step is to examine the constructs in this model in greater depth by applying the most recent literature. For example, the constructs in this study could be improved to include more detailed measures, and it could be tested extensively (using a survey).

This chapter provided a summary of the previous chapters in this thesis and a discussion of the importance of inter-organizational trust in e-commerce participation. A discussion of the key findings paved the way to the development of a model of inter-organizational trust within bi-directional dyad in e-commerce participation. Then contributions and implications made to theory and business practices were discussed. In addition, practical guidelines were given for businesses and e-commerce adopters. Limitations of this study and directions for future research were also recommended as part of a longitudinal study.

a partnering contract. A copy of the detail content of a partnering charter is enclosed in Appendix D.

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GLOSSARY OF TERMS – APPENDIX A

AANX – Australian Automotive Network Exchange

ACR – Auditor Control Review

AIAG – Automotive Industry Action Group

ANSI X12 – American National Standard Institute

ASN – Advanced Shipping Notice

B2B – Business to Business

CUG – Closed User Group

EC – Electronic Commerce

ECA – Electronic Commerce Australia

EDI – Electronic Data Interchange

EDICA – Electronic Data Interchange

EDIFACT – EDI for Administration, Commerce and Transport

FAPM – Federation Automotive Product Manufacturers

FCAI – Federation Chambers Automotive Industries

GEIS – General Electrics Information Services

IORs – Inter-Organizational- Relationships

IOSs – Inter-Organizational-Systems

IOT – Inter-Organizational-Trust

PBR Ltd – Patent, Brakes and Replacement Ltd

MRS – Materials Requirements Schedule

TCEs – Transaction Cost Economics

VANs – Value Added Networks

WWW – World Wide Web

ANSI 830 – manufacturer sends to supplier both incoming and going for us.

856 – ASN outgoing except for one incoming from the states

861 – receiving advises for discrepancy report by exception – under/over, quality problem or runs

EDI Documents in the Australian Automotive Industry – APPENDIX B

The following is a list of documents used by organizations that implemented EDI in the Australian automotive industry.

Type	Definition and/or Description
Button Car Plan	Senator Button introduced the Button Car Plan in the mid 1980's that initiated EDI adoption in the automotive industry.
Tradegate Australia Pty Ltd	Formerly known as Electronic Commerce Australia (Tradegate) is an e-commerce organization set up to help organizations from different industries to adopt e-commerce. It provides guidelines for organizations to adopt EDI and other e-commerce applications.
Closed User Group	Closed User Group is a family-oriented approach for EDI operations. It includes all EDI trading partners within the automotive industry. Technically CUG refers to the receipt of documents that need not be verified as the service provider, Telstra Tradelink software, authenticates the sender and the receiver of each transaction.
FCAI (All)	Formed in 1984, the Federation Chamber of Automotive Industry introduced standard procedures for implementing EDI. The members meet bi-monthly to discuss issues relating to EDI operations.
FAPM (All)	Federation Automotive Products Manufacturers is an association consisting of 190 trading partners in the automotive industry who make up 82% of the members in this association. FAPM addresses concerns with the pace of development in the Original Equipment chain.
GEIS (Toyota)	General Electrics Information Service is a provider of translation software for EDI messages.
AIAG (All)	Automotive Industry Action Group was implemented in 1994 to improve EDI accuracy and speed of planning. It aims to schedule information transfer to lower tiers (suppliers).
AANX (All)	Australian Automotive Network Exchange (AANX) monitors EDI communication over the Internet. AANX requires an Internet Protocol background, EDI, transfer files, dumb terminal to host applications, and an email. EDI messages are sent via an X/400 (a communication protocol) network, and the Internet network.
EDI/VAN mailbox (All)	EDI/VAN mailbox contains folders that store messages either before or after transmission, or after receipt. The mailbox identifier (address) number must match the trading partner's IDs.
EDIFACT (All)	EDI for Administration, Commerce and Transport, is a European message standard that has emerged as a global standard.
Telstra TradeLink (All)	A computer translation software used to convert EDI messages from an organization's computer format to an EDI format (generally either ANSI X12 or UN/EDIFACT).
Functional acknowledgement (All)	A message acknowledging receipt of an EDI message and confirming a reply of the message status (as accepted or rejected).
Remittance advice (All)	Part of a payment order/remittance advice message. This component is forwarded to the payee.
Standard EDI Agreement (Vendor) checklist (All)	An agreement prepared by ECA, which outlines the rights and responsibilities of vendors when dealing with network providers.
Supplier performance assessment (Ford)	Supplier performance assessment is determined by the following factors: • Utilization of Ford supplier communication system; • Up to schedule shipping performance; • Reactions to problem; • Over shipment;

	• Record maintenance; • Other supplier performance.
ACR 552 (Ford)	Auditor Control Review 552 evaluates EDI and other computer systems (financial, critical or private information system), internally, externally or (both). It is signed off during an audit control review by the EDI project leader, internal control coordinator and auditor
EDI Procedures and Responsibilities (Ford)	A manual providing a description of business processes associated with EDI use. It was reviewed by the Material Supervision and Management department. It defines document requirements, services, trading documents, operational issues, EDI suppliers' responsibilities and contact details. The aim of the manual is to cover business issues and prevent disputes.
EDICA Guidelines (All)	A document that defines the code of practice for EDI operations and explains security measures and responsibilities for maintaining EDI.
Information security policy (Ford)	A document describing security procedures and contingency measures for employees to follow.
Corporate System Manual (Ford)	A document describing the corporate information security program and outlining the information security policy. It defines the requirements for computer security of the following: internal control, business continuity planning, information access control, and separation of duties. It is also documents abuse of computer resources and contingency procedures.

EDI Terms identified in the document analysis

'All' in the first column indicates that the document was used by Ford Motor Company of Australia Limited, Toyota Motor Company of Australia Limited, and Patent, Brakes and Replacement (PBR) Automotive Proprietary Limited.

EDI Controls at Ford APPENDIX B

The table below outlines EDI controls at Ford. The following letters were used in the table.

Low -L–(0-3)

Medium-M-(4-6)

High-H-(7-10))

E- eliminated the loss

R- reduced the loss

T-transferred the loss

AC-accepted the risks

AV - avoided the risks and

RE - retained the risks

EDI Controls	Cat	Impact (L,M,H)	Treat	Trust
Top management support	1	H-9	AC	Y
Communication with EDI partners	4	H-9	AC,AVT	Y
Treatment of EDI in strategic plans /Business Continuity Planning	1,4	H-9	AV	N
Regular reviews of operations	1,2	L-3	E	N
Establishment of EDI task force	4,3	M-5	AC,T	N
Training and education of staff	4	H-9	R,AV	N
High quality project plan	4	H-9	AV	Y
Formal development methodology	1,4	H-9	AV	Y
Participation in industry groups	1,2,34	H-9	AC,T	N
Cost/benefit analysis	0	H-9	AC	Y
Evaluation of vendor software	1,4	H-9	E	Y
Network service agreements	1,4	H-9	E	Y
Evaluation of network provider	2,4	H-9	E	Y
Trading partner agreement	1,4	M-4	R,T	Y
Risk analysis	1,4	H-7	AV	Y/N
Audit involvement	1	H-9	AV	N
Follow-up procedures for errors	3	H-9	R	Y
Contingency planning and backup	3	H-9	R	Y
Software upgrade procedures	3,4	M-5	R	Y
Record retention practices	1,2	M-5	T,A	N
Access controls on files/programs	4	H-7	R	N
Application controls in software	4	H-9	R	N
Reports/Documentation	2,3,4	L-3	AV	N
Acknowledgments	4	M-6	R,AV	N
Change controls on software/tables/ Control of System Changes	4	H-9	AV	Y
Sequence numbers in messages	2	L-2	E	N
Written policies and procedures	1,2,34	L-3	E,T	N
Audit and management trails	2	H-7	AV	N
Matching transactions with records	2,3	M-6	AV	N
Accounting controls	2	H-9	AV	N
Encryption mechanisms	4	N/A	N/A	N
Manual checks	2,3	M-6	AV,T,RE	Y
Segregation of duties/Separation of Duties	4	H-9	E	N
Communication protocols for error recovery	3,4	H-9	E	N
Procedures for delivery failures	3	H-7	E	Y
Fall back measures for network failures	3,4	H-8	E	Y
Restrict access to data/logs	4	H-9	AV	N
Safeguards over network access	4	H-9	AV	Y
Audit trails of network access	2,4	H-9	AC,T	N
Retention of transaction logs	2,3,4	M-6	RE,T	N
Network/mailbox reports	2,3,4	M-6	AV	N
Capability of network support staff	1,4	H-8	AV	Y
Screen new partners for mailbox	1	H-7	AV	Y
Authorization mechanisms	2,4	H-9	AV	Y
Central approval for mailbox changes	2,4	H-7	AV	Y
Security reviews on network systems	1,3,4	H-8	E	Y

EDI Controls at Ford

(Low -L–(0-3), Medium-M-(4-6), High-H-(7-10)). (E- eliminated the loss, R- reduced the loss, T- transferred the loss, AC-accepted the risks, AV - avoided the risks, RE - retained the risks).

EDI Controls at Toyota – APPENDIX B

The table below outlines EDI controls at Toyota. The following letters were used in the table.

Low -L–(0-3)

Medium-M-(4-6)

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E- eliminated the loss

R- reduced the loss

T-transferred the loss

AC-accepted the risks

AV - avoided the risks and

RE - retained the risks

EDI Controls	Cat	Impact (L,M,H)	Treat	Trust
Top management support	1, 4	L-1	AV	N
Communication with EDI partners	4	M-5	AV	Y2
Treatment of EDI in strategic plans /Business Continuity Planning	4	H-8	AV	Y3
Regular reviews of operations	2,4	L-2	R	N
Establishment of EDI task force	4	M-5	E	Y3
Training and education of staff	4	M-5	AV	Y2
High quality project plan	4	H-8	AV	Y3
Formal development methodology	------	--------	------	------
Participation in industry groups	4	M-5	E	Y3
Cost/benefit analysis	-----	------	-------	------
Evaluation of vendor software	4	H-7	R	Y1
Network service agreements	4	M-4	AV	Y1
Evaluation of network provider	4	M-4	AV	Y1
Trading partner agreement	4	L-1	AV	Y3
Risk analysis	------	---------	-------	------
Audit involvement	2,4	L-2	R	N
Follow-up procedures for errors	3	H-8	E	N
Contingency planning and backup	-----	---------	------	-------
Software upgrade procedures	3	M-5	AV,E	Y2
Record retention practices	2,4	L-2	R	N
Access controls on files/programs	4	H-9	AV	Y1
Application controls in software	4	H-9	AV	Y1
Reports/Documentation	-----	---------	------	-------
Acknowledgments	------	---------	-------	------
Change controls on software/tables/ Control of System Changes	3	M-5	AV,E	Y2
Sequence numbers in messages	----	------	------	------
Written policies and procedures	----	-------	-------	-------
Audit and management trails	----	-------	-------	-------
Matching transactions with records	-----	--------	-------	-------
Accounting controls	4	H-9	AV	Y1
Encryption mechanisms	-----	------	------	-------
Manual checks	2	H-8	AV	Y2
Segregation of duties/Separation of Duties	4	M-5	AV	Y1
Communication protocols for error recovery	3	H-8	AV	N
Procedures for delivery failures	3	H-8	AV	Y2
Fall back measures for network failures	3	H-8	AV	N
Restrict access to data/logs	4	H-7	AV	Y2
Safeguards over network access	4	H-9	AV	Y1
Audit trails of network access	------	--------	------	------
Retention of transaction logs	2	M-5	AV	Y1
Network/mailbox reports	2	M-5	AV	Y1
Capability of network support staff	4	M-5	AV	Y2
Screen new partners for mailbox	4	L-1	AV	Y3
Authorization mechanisms	----	--------	------	------
Central approval for mailbox changes	3	M-5	AV,E	Y2
Security reviews on network systems	2,4	L-2	R	N

EDI Controls at Toyota

(Low -L–(0-3), Medium-M-(4-6), High-H-(7-10)). (E- eliminated the loss, R- reduced the loss, T- transferred the loss, AC-accepted the risks, AV - avoided the risks, RE - retained the risks).

Semi-Structured Questionnaire Design – APPENDIX C

The semi-structured questionnaire includes four sections:

Section 1:

Section 1 consists of three parts. The objective of the first part was to obtain background (demographic) information about the organizations. The questions included: type of organization, size, number of trading partners, types of products and the type of e-commerce technology/application adopted. (Refer to Appendix D, on questions relating to demographic background information about the organization).

The second part of section 1 examines factors that motivating the organization to adopt e- commerce and determines antecedent trust behaviors in trading partners. A total of 18 items were applied to evaluate different types of trading partner trust. Competence trust was examined using two antecedent trust behavior questions that relate to trading partners' ability, skills, competence and their level of dependence. Predictability trust was examined with four antecedent trust behavioral questions about consistent trading partners' behavioral patterns leading to knowledge gained and enabling other trading partners to make predictions. Finally, goodwill trust was examined with twelve antecedent trust behavioral questions about care, concern, open communication, training, education, and commitment, and leading to long-term trading partner relationships.

The third part of section 1 examined factors relating to trust and security-based mechanisms in e-commerce. A total of 20 items identified trust and security-based mechanisms in organizations. Confidentiality was examined with two questions about privacy (encryption mechanisms, and firewalls). Integrity was examined with five questions about data accuracy and completeness. Authentication was examined with one question about formal user logon procedures. Non-repudiation was examined with one question about acknowledgement procedures. Access controls were examined with two questions about authorization mechanisms and network access controls. Availability was examined with one question about segregation of duties. Finally best business practices were examined with seven questions about audit involvement, risk analysis, top management commitment, and contingency procedures.

Section 2:

The object of section 2 was to examine the organization's perceived benefits in participation in e-commerce. Perceived benefits derived from both trading partner trust relationships, and trust and security-based mechanisms in e-commerce were examined. A total of 13 items were used to examine perceived benefits from four different categories. Perceived direct benefits (or economic benefits) were examined using four questions about tangible economic benefits derived from cost savings. Perceived indirect benefits was examined with four questions about productivity, profitability and competitive advantage. Perceived relationship-related benefits, were examined with three questions about trading partner satisfaction (i.e. improved communication, cooperation and commitment). Finally, perceived strategic benefits (or symbolic benefits) were examined with two questions about organizations' image, reputation and long-term investments.

Section 3:

Section 3 examines the organization's perceived risks of e-commerce. Perceived risks derived from both trading partner trust relationships and trust and security-based mechanisms in e-commerce were examined. A total of 25 items was applied to examine perceived risks from three different categories. Perceived technology performance-related risks were examined using seven questions about the e-commerce technology. Perceived relational risks were examined using eight questions about trading partner's uncertainties, unreliability, and signs of opportunistic behaviors. Finally, perceived general risks were examined using ten questions about poor business practices such as, a lack of proper standards, written policies, and procedures.

Section 4:

Section 4 examines an organization's extent of e-commerce participation. E-commerce participation was examined from two different perspectives. A total of 11 questions were applied to examine e-commerce participation from two different categories. E-commerce performance was examined with four questions about the intensity, volume and dollar value of the e-commerce transactions. Trading partner trust relationship development was examined with seven questions about cooperation, communication, commitment and reputation.

For each of these questions, respondents were asked to indicate their impact level using likert scales (as in Low (0-3), Medium (4-6) and High (7-10)). They indicated explanations and reasons on their responses. Participants provided examples and evidence, for each question even if their responses were negative. This helped develop causal links and provided richer explanations. Hence, by consistently applying the semi-structured questionnaire across all cases, reliability of the data was achieved and led to meaningful generalizations and conclusions about the importance of different types of trading partner trust in e-commerce participation. These conclusions yielded consistent results that supported and confirmed the predictions, refuted the predictions, or produced mixed results that made explaining and reasoning difficult at times.

Construct	Sub-Concepts	Definition	Evaluation Pointers & Instrumentation
Trust in Trading Partners	*Competence Trust*	Ability, skills, knowledge and competence of trading partners to perform business to business e-commerce correctly and completely (section 3.3.4 in Chapter 3 discusses competence trust)	Examines competence trading partner trust via two items. How, why, to what extent, and in what situations (provide evidence and examples) (Refer to the questionnaire in Appendix C)
	Predictability Trust	Consistent behaviors of trading partners that allow another trading partner to make predictions and judgements due to past experiences (section 3.3.4 in Chapter 3 discusses	Examines predictability trading partner trust via four items. How, why, to what extent, and in what situations (provide evidence, and examples) (Refer to the questionnaire in Appendix C)

		predictability trust)	
	Goodwill Trust	Care, concern, honesty, and benevolence shown by trading partners that allows the other trading partner to further invest in their trading partner relationship (section 3.3.4 in Chapter 3 discusses goodwill trust)	Examines goodwill trading partner trust via twelve items. How, why, to what extent, and in what situations (provide evidence, and examples) (Refer to the questionnaire in Appendix C)
Trust and security-based mechanisms in E-Commerce	*Confidentiality*	Protection of e-commerce transactions and message content against unauthorized reading, copying, or disclosure (section 3.4.1 in Chapter 3 discusses confidentiality)	Examines confidentiality mechanisms via two items. How, why, to what extent, and in what situations (provide evidence, and examples) (Refer to the questionnaire in Appendix C)
	Integrity	Accuracy and assurance that e-commerce transactions have not been altered or deleted (section 3.4.2 in Chapter 3 discusses integrity)	Examines integrity mechanisms via five items. How, why, to what extent, and in what situations (provide evidence, and examples) (Refer to the questionnaire in Appendix C)
	Authentication	Quality of being authoritative, valid, true, genuine, worthy of acceptance or belief by reason of conformity to the fact that reality is present (section 3.4.3 in Chapter 3 discusses authentication)	Examines authentication mechanisms via one item. How, why, to what extent, and in what situations (provide evidence, and examples) (Refer to the questionnaire in Appendix C)
	Non-Repudiation	Originator of e-commerce transactions cannot deny receiving or sending that transaction (section 3.4.4 in Chapter 3 discusses non-repudiation)	Examines non-repudiation mechanisms via one item. How, why, to what extent, and in what situations (provide evidence, and examples) (Refer to the questionnaire in Appendix C)
	Access Controls	Protection of e-commerce transactions against weaknesses in the transmission media and protection of the sender against internal fraud or manipulation (section 3.4.5 in Chapter 3 discusses access controls)	Examines access control mechanisms via two items. How, why, to what extent, and in what situations (provide evidence, and examples) (Refer to the questionnaire in Appendix C)
	Availability	Assurance that passes or conveys e-commerce transactions without interruption by providing authorized users with e-commerce systems (section 3.4.6 in Chapter 3 discusses availability)	Examines availability mechanisms via one item. How, why, to what extent, and in what situations (provide evidence, and examples) (Refer to the questionnaire in Appendix C)
	Best Business Practices	Policies, procedures and standards that ensure smooth functioning of e- commerce (section 3.4.7 in Chapter 3 discusses best business practices)	Examines best business practices via seven items How, why, to what extent, and in what situations (provide evidence, and examples) (Refer to the questionnaire in Appendix C)

Perceived Benefits of E-Commerce	*Perceived direct (economic) benefits of E-commerce*	Benefits derived from direct savings in costs and time (section 3.6.1 in Chapter 3 discusses direct perceived benefits)	Examines direct perceived benefits via four items How, why, to what extent, and in what situations (provide evidence, and examples) (Refer to the questionnaire in Appendix C)
	Perceived indirect benefits of E-commerce	Benefits derived from accuracy and quality of the messages from competitive advantage (section 3.6.2 in Chapter 3 discusses indirect perceived benefits)	Examines indirect perceived benefits via four items. How, why, to what extent, and in what situations (provide evidence, and examples) (Refer to the questionnaire in Appendix C)
	Perceived relationship-related benefits of E-commerce	Benefits derived from closer trading partner relationship such as open communications, information sharing, cooperation, and commitment (section 3.6.3 in Chapter 3 discusses relationship related perceived benefits)	Examines human related perceived benefits via three items. How, why, to what extent, and in what situations (provide evidence, and examples) (Refer to the questionnaire in Appendix C)
	Perceived strategic benefits of E-commerce	Benefits derived from long-term business investments and improved reputation of the organization (section 3.6.4 in Chapter 3 discusses strategic perceived benefits)	Examines strategic perceived benefits via two items. How, why, to what extent, and in what situations (provide evidence, and examples) (Refer to the questionnaire in Appendix C)
Perceived Risks of E-Commerce	*Perceived technology performance related risks of E-commerce*	Risks derived from misuse of the e-commerce technology, integrity, viruses, confidentiality, unauthorized access, availability (section 3.7.1 in Chapter 3 discusses technology performance related perceived risks)	Examines technology related perceived risks via seven items. How, why, to what extent, and in what situations (provide evidence, and examples) (Refer to the questionnaire in Appendix C)
	Perceived relational risks of E-commerce	Risks derived from trading partner's behavior, such as opportunistic behavior, conflict, power(section 3.7.2 in Chapter 3 discusses people related perceived risks)	Examines people related perceived risks via eight items. How, why, to what extent, and in what situations (provide evidence, and examples) (Refer to the questionnaire in Appendix C)
	Perceived general risks of E-commerce	Risks derived from environmental risks, standards and audit policies (section 3.7.3 in Chapter 3 discusses general perceived risks)	Examines general perceived risks via ten items. How, why, to what extent, and in what situations (provide evidence, and examples) (Refer to the questionnaire in Appendix C)
Extent (Outcomes) of E-Commerce Participation	*Extent (Outcomes) of E-Commerce Performance*	Intensity, volume and dollar value of the business transactions (section 3.8.1 in Chapter 3 discusses e-commerce performance)	Examines e-commerce performance via four items. How, why, to what extent, and in what situations (provide evidence, and examples) (Refer to the questionnaire in Appendix C)
	Extent of trading partner trust development	Trading partner relationship development (section 3.8.2 in Chapter 3 discusses trading partner trust relationship	Examines mutual satisfaction in trading partner relationships via seven items. How, why, to what extent, and in what situations

		development)	(provide evidence, and examples) (Refer to the questionnaire in Appendix C)

Case Study Questionnaire – APPENDIX C

Date:

To Whom it may concern

Dear Sirs

Re: A Study of Inter-organizational trust in Business-to-Business E-Commerce Participation

The purpose of this study is to examine the impact of inter-organizational trust in e-commerce participation. E-commerce participation refers to the extent an organization adopts, integrates or implements business-to-business e-commerce. Inter-organizational trust is actually interpersonal trust, hence it also refers to trading partner trust. We aim to examine how and why inter-organizational trust (or trading partner trust) influences the perception of benefits and risks in e-commerce, thus leading to the extent of e-commerce participation. We believe that you will find it interesting and useful to participate in this study. It is our hope that this knowledge will help increase business to business e-commerce participation.

The questionnaire consists of four sections:

Section 1:
This section seeks to obtain background (demographic) information about your organization. We seek information relating to factors that motivated your organization to adopt e-commerce and determine antecedent trust behaviors relating to trading partner relationships, trust and security-based mechanisms in e-commerce participation.

Section 2:

This section seeks information about your organization's perception of benefits in e-commerce participation (that is perceived benefits derived from both trading partner relationships, trust and security-based mechanisms in e-commerce).

Section 3:

This section seeks information about your organization's perception of risks in e-commerce participation (that is perceived risks derived from both trading partner relationships, trust and security-based mechanisms in e-commerce).

Section 4:

This section seeks information about your organization's extent of e-commerce participation.

Confidentiality

All responses will be kept in its strictest confidence. No individuals or organizations will be named in any outputs, nor will demographic information be revealed, such that the individual organizations can be identified. When the results of this study are published, it will be impossible to identify specific individuals or organizations, unless prior permission was received.

Summary Results

We will send a summary of the results to all organizations that participate in this study. The summary will provide conclusions related to the extent of inter-organizational trust impacts perceived benefits and risks, thus leading to business to business e-commerce participation. We truly appreciate the time and effort you have put into this study. Your response will be of considerable help to this study.

Thank You
Ms Pauline Ratnasingam

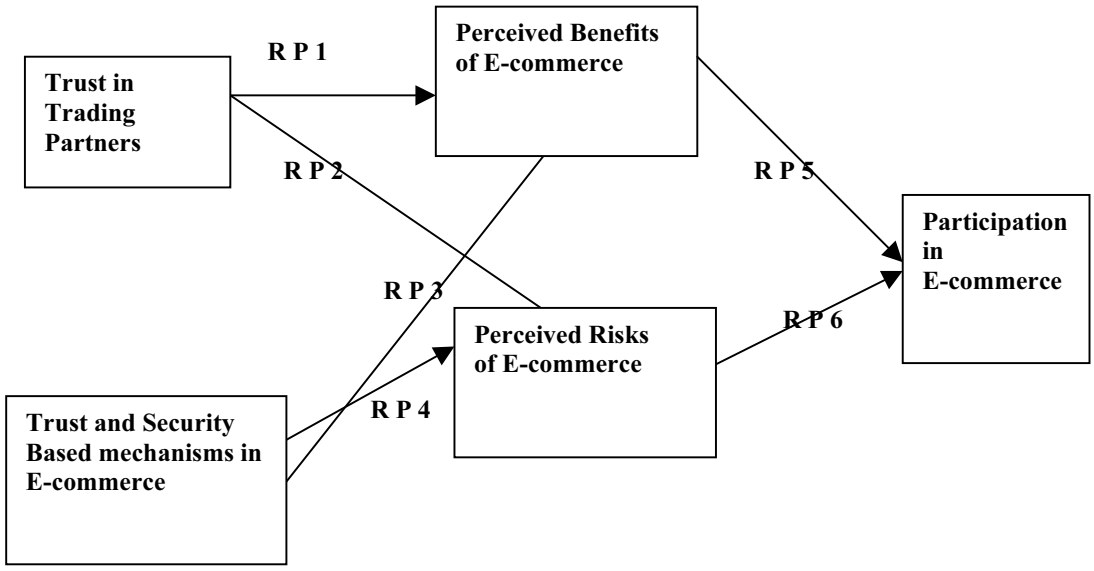

Figure 1: Theoretical Model of Trading Partner Trust in E-commerce Participation

Research Topic: The Importance of Inter-organizational Trust in E-commerce Participation

Research Question: How and why does inter-organizational trust (trading partner trust) influence the perception of benefits and risks in business-to-business e-commerce, thus leading to the extent of its participation (adoption and integration)?

Section 1:

A) Demographic Section

1. Name of your organization?

2. Your job title?

3. What is your organization's reach? (Local, regional, national, or global)?

4. What is the size of your organization – (large or Small-Medium-Enterprise)?

5. Type of industry and sector your organization is involved in (public or private)?

6. What is your organization's product line?

7. What is the main role of your organization? (Buyer, seller, manufacturer, or supplier)?

8. Who is responsible for implementing e-commerce and is involved in e-commerce operations in your organization?

9. What types of business transactions are actively supported by e-commerce in your organization?

10. What types of e-commerce technologies/applications did your organization implement or will be implementing?

11. How many trading partners does your organization have?

12. How did your organization choose its trading partners?

13. How long has your organization been trading with these trading partners?

14. How do you maintain your trading partners (renewal of contracts)?

15. What other measures are used?

B) Trading Partner Trust

Trading Partner Trust – refers to the expectation that one trading partner will abide to the trading contract, is honest, and will act in a way not to take advantage of other trading partners. Trading partner trust is categorized as low, moderate, and high.

Please indicate your organization's reflections on behavioral characteristics relating to trading partner trust relationships. If yes, how, why, and in what situations do you relate these behaviors to trading partner trust

(please provide examples and evidence)? Are there other trust behaviors that your organization faces in e-commerce participation?

Competence Trading Partner Trust

1. Trading partner's ability, skills, and level of competence in business to business e-commerce operations.

2. Trading partner depends on your organization.

Predictability Trading Partner Trust

3. Trading partner's consistent behavior in business interactions.

4. Trading partner's reliability in keeping business promises.

5. Trading partner's adherence to policies, terms of contract, and trading partner agreements.

6. Predictability of your trading partner.

Goodwill Trading Partner Trust

7. Trading partner's willingness to share information and provide support relating to e-commerce adoption.

8. Trading partner demonstrates care and concern in important decisions.

9. Trading partner is committed to business arrangements and exhibits cooperation.

10. Positive feelings towards your trading partner.

11. Long-term trading relationships with your trading partner.

12. Your organization is willing to put in more effort and invest in your trading partner relationships.

13. Trading partner is honest in providing information and shows accuracy in meeting deadlines

14. Trading partner behavior in a situation of conflict and handling discrepancies exhibits?
Does your organization feel anger, frustration, resentment, or hostility towards your trading partner?

15. Trading partner in a situation of pressure or imbalance of power.

16. Trading partner considers security concerns.

17. Trading partner is the driving force for adopting e-commerce.

18. There are explicit agreements with the trading partners regarding roles and responsibilities.

How do you maintain your trading partner relationships? Is it short-term or long-term? What do you look for? How, why and in what situations?

On a scale of 10 what would you rate the level of trading partner trust?
(Low = 0-3, Medium = 4-6, High = 7-10)

What did you rate the level of trading partner trust to be?
How, why, and in what situations?

Are there other antecedent trust behaviors your organization perceived in your trading partners?

C) Trust and Security-based Mechanisms in E-commerce

Trust and security-based mechanisms in e-commerce refer to trust assurances as in confidence in the security protection services provided by e-commerce technologies.

Please indicate if your organization has adopted the following trust and security-based mechanisms in e-commerce. If yes, how, why, and in what situations were they implemented (please provide examples, evidence)? Are there any other trust and security-based mechanisms that your organization has implemented?

Confidentiality

1. Firewalls

2. Encryption mechanisms

Integrity

3. System integrity tests and audits

4. Sequence numbers in messages

5. Application controls

6. Accounting controls

7. Web seal assurances

Authentication

8. Formal logon procedures (user-IDs and passwords)

Non-repudiation

9. Message receipt confirmations and acknowledgments

10. Digital signatures

Access Control

11. Network access controls

12. Authorization mechanisms

Availability

13. Segregation of duties

Best Business Practices

14. Top management commitment

15. Standards (industry and universal) and policies

16. Trading Partner Agreement

17. Audit check

18. Training and education of staff

19. Risk analysis and audit involvement

20. Contingency procedures

On a scale of 1-10, how would you rate the level of trust and security mechanisms in e-commerce? (Low = 0-3, Medium = 4-6, High = 7-10)

What did you rate the level of trust and security-based mechanisms in e-commerce?

How, why, and in what situations?

Are there any other trust and security mechanisms in e-commerce your organization has implemented?

How does trading partner trust influence the perception of trust and security-based mechanisms in e-commerce?

Section 2: Perceived Benefits in E-commerce

Perceived Benefits refer to gains that your organization may receive from adopting e-commerce. The perceived benefits are derived from both your trading partner relationships and from the e-commerce technology. Perceived benefits are categorized as direct (economic), indirect, relationship-related, and strategic benefits.

Please indicate if your organization faces the following benefits? If yes, how, why, and in what situations do you relate to the perceived benefits (please provide examples, evidence). Are there any other perceived benefits your organization faces? How does trading partner trust influence the perception of benefits in your organization?

Perceived Economic (direct) Benefits

1. Reduced operation, transaction, and administrative costs

2. Reduced error rates and improved accuracy of information exchanged

3. Faster response to orders and creating reduced lead time

4. Reduced inventory levels and optimized supply chain

Perceived Indirect Benefits

5. Improved customer service and product quality

6. Improved productivity, improved profitability, and increased sales

7. Gaining competitive advantage

8. Sharing of risks with your trading partner

Perceived Relationship-related Benefits

9. Improved communication and cooperation with your trading partners

10. Sharing of information that is accurate, timely, speedy, complete, and relevant

11. Increased level of commitment with your trading partners

Perceived Strategic Benefits

12. Improved organizational image and reputation

13. Increased long-term investments and continued trading partner relationships

On a scale of 10, how would you rate the level of perceived benefits in e-commerce?

(Low = 0-3, Medium = 4-6, High = 7-10)

What is the impact of these perceived benefits as a result of trading partner trust and trust and security-based mechanisms in your organization?

What did you rate the level of perceived benefits to be?

How, why, and in what situations?

Are there any other perceived benefits in e-commerce your organization faces?

Section 3: Perceived Risks in E-commerce

Perceived Risks refer to barriers and obstacles your organization faces as a result of adopting e-commerce. Perceived risks are derived from both trading partner relationships and from the e-commerce technology. Perceived risks are categorized as technology performance-related risks, relational risks and general risks.

Please indicate if your organization faces the following perceived risks? If yes, how, why, and in what situations do you relate to these perceived risks (please provide examples, evidence)? Are there any other perceived risks that your organization faces? How does trading partner trust influence the perception of risks in your organization?

Perceived Technology Performance-related Risks

1. Compatibility problems with hardware and software

2. Infrastructure and initial implementation costs

3. Confidentiality concerns due to viruses

4. Lack of adequate accounting controls

5. Internal security error (lack in integrity as in delayed and inaccurate messages)

6. Complexity in operating business transactions

7. Uncertainties (task and environment)

Perceived Relational Risks

8. Trading partner reluctance to change

9. Lack of training, knowledge, and awareness

10. Poor reputation of trading partner

11. Trading partner demonstrating a conflicting attitude

12. Lack of trust in your trading partner

13. Trading partner demonstrating opportunistic behaviors

14. Partnership uncertainty

Perceived General Risks

15. Lack of security in your trading partner's system

16. Difficulty in identifying or quantifying costs and benefits

17. Repudiation

18. Authenticity of your trading partner

19. Availability of technology

20. Lack of a standard infrastructure (for data and payments)

21. Lack of government policies

22. Poor business practices

On a scale of 10 how would you rate the level of perceived risks in e-commerce to be? (Low = 0-3, Medium = 4-6, High = 7-10)

What is the impact of these perceived risks as a result of trading partner trust and trust and security-based mechanisms in your organization?

What did you rate the level of perceived risks in e-commerce to be?

How, why, and in what situations?

Are there any other perceived risks your organization faces?

Section 4: Participation in E-commerce

Participation in E-commerce refers to the extent your organization has adopted e-commerce. Participation in e-commerce is categorized as performance in e-commerce and the extent of mutual satisfaction your organization has with its trading partners.

Please reflect on your organization's extent of e-commerce participation. If yes, how, why, and in what situations do you relate to e-commerce participation (please provide examples, evidence)? Are there any other factors that your organization faces which contribute to e-commerce participation?

Extent of E-Commerce Performance

1. How important is e-commerce for your organization?

2. What percentage of your business involves the use of e-commerce?

3. What is the annual monetary value of e-commerce transactions in NZ$?

4. What is the annual number of e-commerce transactions?

On a scale of 10 how would rate the extent of e-commerce performance in your organization? (Low = 0-3, Medium = 4-6, High = 7-10)

What did you rank the extent of e-commerce performance in your organization?

How, why, and in what situations?

Are there any other performance factors relating to e-commerce your organization has achieved?

How does trading partner trust influence the perception of e-commerce performance?

How do perceived benefits impact e-commerce performance?

How do perceived risks impact e-commerce performance?

Extent of Trading Partner Trust Relationships Development

5. The trading partner will continue to be a major source of revenue for us.

6. Has the number of trading partners increased?

7. Do you perceive your organization to engage in long-term business investments with your trading partner?

8. Do you perceive an increase in the level of open communications in your trading partner?

9. Do you perceive an increase in the level of cooperation in your trading partner?

10. Do you perceive an increase in the level of commitment in your trading partner?

11. Has the reputation of your organization increased as a result of your trading partner?

On a scale of 10 how would you rate the extent of satisfaction in your trading partner relationships? (Low = 0-3, Medium = 4-6, High = 7-10)

What did you rate the level of satisfaction in your trading partner relationships to be?

How, why, and in what situations?

Are there other factors relating to trading partner satisfaction that your organization experienced?

How do trading partners trust, influence the perception of satisfaction in your trading partner relationships?

How do perceived benefits influence the perception of satisfaction in your trading partner relationships?

How do perceived risks influence the perception of satisfaction in your trading partner relationships?

Findings of the directional dyads and Inter-organizational dyads – APPENDIX D

Table 1 presents the background information of directional dyads 1-2 in IOD-A

Characteristics of the cases	**NZ Customs – IOD-A**	**Electronic Commerce Network IOD-A**
Number of Participants	10	2
Title of Participants	Intranet administrator, Consultant, CusMod coordinators, Intelligent system administrators, Security analysts	Chief Executive Officer (Director) Systems programmer
Type of Industry	Public Sector Service Industry Customs Clearance	Private sector Computer and communications Industry – Internet Service Provider
Size of Organization	Large	Small-Medium-Enterprise
Number of Employees	700	14
Type of E-Commerce Application	CusMod – Customs Modernization - uses EDI X400 and the Internet	X400 and other ISP EDI, Internet and other software applications
Number of years using E-Commerce	5	9-10
Types of business to business transactions	Cargo information, shipping documentation, clearance documentation and passenger information	Purchase orders, invoices, trans-rail bills, advanced shipping notices, purchase order acknowledgment, shipping notices, customs declaration, customs cargo notice, customs clearance response and electronic certificates
Number of Trading Partners	200	4000

Table 1: Background Information of directional dyads 1-2 in IOD-A

Table 2 presents the findings of trading partner trust of directional dyads 1-2 in IOD-A

Trust in Trading Partners Competence Trust	**NZ Customs IOD-A**	**Electronic Commerce Network (ISP) IOD-A**
1. Ability, skills, knowledge	Y (H-7)	Y (L-2)
2. Dependability	Y (H-9)	Y (H-10)
Predictability Trust		
3. Consistent behavior	Y (M-6)	Y (H-7)
4. Reliability	Y (H-7)	Y (H-8)
5. Adherence to policies, terms of contract	Y (H-9)	Y (H-10)
6. Predictability of trading partner	Y (H-8)	Y (H-7)
Goodwill Trust		
7. Willingness to share information and provide support	Y (M-6)	Y (H-8)

8. Care and concern	Y (M-6)	Y (H-7)
9. Commitment and cooperation	Y (H-7)	Y (H-7)
10. Positive feelings	Y (H-8)	Y (H-7)
11. Long-term trading relationships	Y (H-7)	Y (H-8)
12. Effort and investment in the relationship	Y (H-7)	Y (H-9)
13. Honesty	Y (H-8)	Y (H-10)
14. Conflict and handling discrepancies	Y (L-1)	Y (M-6)
15. Situation of pressure	Y (H-8)	Y (M-6)
16. Security concerns	Y (H-9)	
17. Driving force	Y (H-9)	Y (H-9)
18. Explicit agreements roles/responsibilities	Y (H-10)	Y (H-9)
Others	N	N

Table 2: Trading Partner Trust of directional dyads 1-2 in IOD-A

Legend: Y = Yes; N = No; L = Low (0-3); M = Medium (4-6); H - High (7-10).

Table 3 presents the findings of trust and security-based mechanisms of directional dyads 1-2 in IOD-A

Trust and security-based mechanisms Confidentiality/Privacy	**NZ Customs IOD-A**	**Electronic Commerce Network (ISP) IOD-A**
1. Firewalls	N	Y (H-9)
2. Encryption Mechanisms	Y (H-9)	Y (M-4)
Integrity		
3. Systems integrity tests and audits	Y (H-9)	Y (H-8)
4. Sequence numbers in messages	N	Y (H-9)
5. Application controls	Y (H-8)	Y (H-7)
6. Accounting controls	Y (H-8)	Y (H-9)
7. Web seal assurances	N	N
Authentication		
8. Formal log on – User IDs, passwords	Y (H-9)	Y (H-10)
Non-Repudiation		
9. Message receipt confirmation and acknowledgments	Y (H-8)	Y (H-9)
10. Digital signatures	Y (H-8)	N
Access Control		
11. Network access controls	Y (H-8)	Y (H-9)
12. Authorization mechanisms	N	Y (H-10)
Availability		
13. Segregation of duties	Y (H-10)	Y (H-8)
Best Business Practices		
14. Top management commitment	Y (H-8)	Y (H-9)
15. Standards and policies	Y (H-7)	Y (H-10)
16. Trading partner agreement	Y (H-8)	Y (H-10)
17. Audit check	Y (H-8)	Y (H-10)
18. Training and education of staff	Y (H-7)	Y (M-6)
19. Risk analysis and audit involvement	Y (H-8)	Y (H-9)
20. Contingency measures	Y (H-9)	Y (H-9)
Other factors	N	N

Table 3: Trust and security-based mechanisms in E-Commerce of Directional dyads 1-2 in IOD-A

Legend: Y = Yes; N = No; L = Low (0-3); M = Medium (4-6); H - High (7-10).

Table 4 presents the findings of perceived benefits of e-commerce of Directional dyads 1-2 in IOD-A

Perceived Benefits of E-Commerce Perceived Economic benefits	**NZ Customs IOD-A**	**Electronic Commerce Network IOD-A**
1. Reduced operation, transaction and administrative costs	Y (H-9)	N
2. Reduced error rates and accuracy of information exchanged	Y (H-8)	N
3. Faster response to orders and reduced lead time	Y (H-8)	N
4. Reduced inventory levels and optimized supply chain	Y (H-8)	N
Perceived Indirect Benefits		
5. Improved customer service and product quality	Y (H-7)	N
6. Improved productivity, profitability and increased sales	Y (H-8)	N
7. Gaining competitive advantage	Y (H-7)	Y (H-7)
8. Sharing of risks with your trading partner	Y (H-7)	Y (M-5)
Perceived Relationship Related Benefits		
9. Improved communication and cooperation with your trading partners	Y (H-7)	Y (H-9)
10. Sharing of information that is accurate, timely, speedy, complete, and relevant	Y (H-9)	Y (H-7)
11. Increased level of commitment with your trading partners	Y (H-8)	Y (H-8)
Perceived Strategic (symbolic) Benefits		
12. Improved image and reputation of organization	Y (H-9)	Y (H-9)
13. Increased long-term investments, and continued trading partner relationships	Y (H-9)	Y (H-9)
Other factors	N	N

Table 4: Perceived Benefits of E-Commerce of Directional dyads 1-2 in IOD-A

Legend: Y = Yes; N = No; L = Low (0-3); M = Medium (4-6); H - High (7-10).

Table 5, presents the findings of perceived risks of e-commerce of Directional dyads 1-2 in IOD-A

Perceived Technology performance related Risks	**NZ Customs IOD-A**	**Electronic Commerce Network IOD-A**
1. Compatibility of H/W and S/W	Y (L-2)	N
2. Infrastructure and initial implementation costs	Y (L-3)	N
3. Confidentiality concerns – viruses	Y (L-3)	Y (H-9)

4. Lack of adequate control	N	Y (H-8)
5. Internal security error – integrity issues as in delayed and inaccurate messages	N	N
6. Complexity in operating business transactions	Y (M-5)	N
7. Uncertainties – task and environment	Y (L-3)	N
Perceived Relational Risks		
8. Trading partner reluctance to change	Y (H-8)	N
9. Lack of training, knowledge and awareness	Y (L-2)	Y (M-5)
10. Poor reputation of trading partner	Y (L-2)	
11. Trading partner demonstrating a conflicting attitude	N	Y (M-6)
12. Lack of trust in your trading partner	Y (L-1)	
13. Trading partner demonstrating opportunistic behaviors	Y (L-1)	Y (M-6)
14. Partnership Uncertainty	Y (L-2)	N
Perceived General Risks		
15. Lack of security in your trading partner's system	Y (L-2)	N
16. Difficulty in identifying and quantifying costs/benefits	Y (L-3)	N
17. Repudiation	Y (L-3)	N
18. Authenticity of your trading partner	Y (L-1)	N
19. Availability of technology	Y (L-2)	N
20. Lack of a standard infrastructure – data and payments	Y (L-2)	N
21. Lack of government policies	Y (L-1)	N
22. Poor business practices	N	N
Other Factors	N	N

Table 5: Perceived Risks of E-Commerce of Directional dyads 1-2 in IOD-A

Legend: Y = Yes; N = No; L = Low (0-3); M = Medium (4-6); H - High (7-10).

Table 6 presents the findings of the extent of e-commerce participation of Directional dyads 1-2 in IOD-A

Participation in E-Commerce E-Commerce Performance	**NZ Customs IOD-A**	**Electronic Commerce Network IOD-A**
1. Importance of EC for your organizations	Y (H-9)	Y (H-10)
2. Percentage of your business using EC	98%	100%
3. Annual monetary value of the business transactions	NZ$25574 billion during the year (1/7/1998 - 30/6/1999)	An average NZ$3,000,000 per year
4. Annual number of EC transactions	974,279 (98/99)	5 million transactions per year
Mutual Satisfaction in Trading Partner Relationships		
5. Will trading partner continue to be a major source of revenue?	Y (H-7)	Y (H-9)
6. Has the number of trading partners increased?	Y (M-5)	Y (L-3)
7. Do you perceive your organization to engage in long-term investments with your	Y (H-9)	Y (H-9)

trading partner		
8. Do you perceive an increased level of open communications in your trading partner?	Y (H-9)	Y (H-9)
9.Do you perceive an increased level of cooperation in your trading partner?	Y (H-9)	Y (H-9)
10. Do you perceive an increased level of commitment in your trading partner?	Y(H-9)	Y (H-9)
11. Has the reputation of your organization increased as a result of your trading partner?	Y (H-9)	Y (H-9)

Table 6: Extent of E-Commerce Participation of directional dyads 1-2 in IOD-A

Legend: Y = Yes; N = No; L = Low (0-3); M = Medium (4-6); H - High (7-10).

Table 7 presents the background information of Directional dyads 3-4 in IOD-B

Characteristics of the cases	**Customs Agent (Broker) IOD-B**	**Importer IOD-B**
Number of Participants	2	2
Title of Participants	Director Accountant	Financial Accounting Administration Manager Director
Type of Industry	Private Sector Trade facilitator Customs brokering	Private Sector Retail
Size of Organization	Small-Medium Enterprise	Small-Medium Enterprise
Number of Employees	7	13
Type of E-Commerce Application	Trade Manager	Trade Manager
Number of years using E-Commerce	15-20	5
Types of business to business transactions	Customs clearance documents purchase order, Invoice	Invoices, line items, local charges, freight charges and storage charges
Number of Trading Partners	15	20

Table 7: Background Information of Directional dyads 3-4 in IOD-B

Table 8 presents the findings of Trading Partner Trust of Directional dyads 3-4 in IOD-B

Trust in Trading Partners	**Customs Agent (Broker) IOD-B**	**Importer IOD-B**
Competence Trust 1. Ability, skills, knowledge	Y (H-7)	Y (H-9)
2. Dependability	Y (H-9)	Y (H-8)

Predictability Trust		
3. Consistent behavior	Y (H-7)	Y (H-8)
4. Reliability	Y (M-6)	Y (H-8)
5. Adherence to policies, terms of contract	Y (H-7)	Y (H-9)
6. Predictability of trading partner	Y (H-8)	Y (H-8)
Goodwill Trust		
7. Willingness to share information and provide support	Y (M-6)	Y (H-7)
8. Care and concern	Y (M-6)	Y (H-7)
9. Commitment and cooperation	Y (H-7)	Y (H-7)
10. Positive feelings	Y (H-7)	Y (H-6)
11. Long-term trading relationships	Y (H-8)	Y (H-8)
12. Effort and investment in the relationship	Y (H-7)	Y (H-7)
13. Honesty	Y (H-7)	Y (H-9)
14. Conflict and handling discrepancies	Y (L-3)	Y (M-6)
15. Situation of pressure	Y (L-3)	Y (M-6)
16. Security concerns	Y (M-6)	Y (L-2)
17. Driving force	Y (H-8)	Y (H-8)
18. Explicit agreements roles/responsibilities	Y (H-9)	Y (H-9)
Others	N	N

Table 9: Trading Partner Trust of Directional dyads 3-4 in IOD-B

Table 10 presents the findings of Trust and Security-based mechanisms in E-Commerce of Directional dyads 3-4 in IOD-B

Trust and security-based mechanisms Confidentiality/Privacy	**Customs Agent (Broker) IOD-B**	**Importer IOD-B**
1. Firewalls	N	N
2. Encryption Mechanisms	N	N
Integrity		
3. Systems integrity tests and audits	Y (L-2)	Y (H-7)
4. Sequence numbers in messages	Y (H-9)	Y (H-9)
5. Application controls	Y (H-7)	Y (H-7)
6. Accounting controls	Y (H-7)	Y (H-7)
7. Web seal assurances	N	N
Authentication		
8. Formal log on – User IDs, passwords	Y (M-4)	Y (H-6)
Non-Repudiation		
9. Message receipt confirmation and acknowledgments	Y (H-7)	Y (H-7)
10. Digital signatures	N	N
Access Control		
11. Network access controls	N	N
12. Authorization mechanisms	Y (M-4)	Y (H-8)
Availability		
13. Segregation of duties	N	Y (H-7)
Best Business Practices		
14. Top management commitment	Y (H-7)	Y (H-7)
15. Standards and policies	Y (H-8)	Y (H-9)
16. Trading partner agreement	Y (H-9)	Y (H-8)
17. Audit check	Y (L-3)	Y (L-2)
18. Training and education of staff	Y (M-5)	Y (H-7)

19. Risk analysis and audit involvement	Y (L-3)	Y(M-6)
20. Contingency measures	Y (L-3)	Y (H-7)
Other factors	N	N

Table 10: Trust and Security-based mechanisms in E-Commerce of Directional dyads 3-4 in IOD-B

Table 11 presents the findings of perceived benefits of E-commerce of Directional dyads 3-4 in IOD-B

Perceived Benefits of E-Commerce **Perceived Economic benefits**	**Customs Agent (Broker) IOD-B**	**Importer IOD-B**
1. Reduced operation, transaction and administrative costs	Y (H-7)	Y (H-7)
2. Reduced error rates and accuracy of information exchanged	Y (H-9)	Y (M-6)
3. Faster response to orders and reduced lead time	Y (H-8)	Y (H-8)
4. Reduced inventory levels and optimized supply chain	Y (H-9)	Y (H-7)
Perceived Indirect Benefits		
5. Improved customer service and product quality	Y (H-9)	N
6. Improved productivity, profitability and increased sales	Y (H-7)	Y (H-7)
7. Gaining competitive advantage	Y (H-7)	Y (H-7)
8. Sharing of risks with your trading partner	Y(M-4)	N
Perceived Relationship Related Benefits		
9. Improved communication and cooperation with your trading partners	Y (H-7)	Y (H-7)
10. Sharing of information that is, accurate, timely, speedy, complete, and relevant	Y (H-8)	Y (H-7)
11. Increased level of commitment with your trading partners	Y (H-9)	Y (H-7)
Perceived Strategic (symbolic) Benefits		
12. Improved organization's image and reputation	Y (H-8)	Y (H-7)
13. Increased long-term investments, and continued trading partner relationships	Y (H-7)	Y (H-7)
Other factors	N	N

Table 11: Perceived Benefits of E-Commerce for Directional dyads 3-4 in IOD-B

Table 12 presents the findings of perceived risks of e-commerce for Directional dyads 3-4 in IOD-B

Perceived Technology performance related Risks	**Customs Agent (Broker) IOD-B**	**Importer IOD-B**
1. Compatibility of H/W and S/W	N	N
2. Infrastructure and initial implementation costs	N	N
3. Confidentiality concerns – viruses	Y (M-4)	Y (H-7)
4. Lack of adequate control	N	N
5. Internal security error – integrity issues as in delayed and inaccurate messages	N	Y (L-3)
6. Complexity in operating business transactions	N	N
7. Uncertainties – task and environment	N	N
Perceived Relational Risks		N
8. Trading partner reluctance to change	Y (H-7)	N

9. Lack of training, knowledge and awareness	N	N
10. Poor reputation of trading partner	N	N
11. Trading partner demonstrating a conflicting attitude	Y (M-6)	Y (L-2)
12. Lack of trust in your trading partner	Y (L-3)	N
13. Trading partner demonstrating opportunistic behaviors	Y(L-3)	N
14. Partnership Uncertainty	N	N
Perceived General Risks		
15. Lack of security in your trading partner's system	N	N
16. Difficulty in identifying and quantifying costs/benefits	Y (L-3)	Y (L-2)
17. Repudiation	N	N
18. Authenticity of your trading partner	N	N
19. Availability of technology	N	N
20. Lack of a standard infrastructure – data and payments	N	N
21. Lack of government policies	N	Y (L-2)
22. Poor business practices	Y (L-3)	N
Other Factors	N	N

Table 12: Perceived Risks of E-Commerce commerce for Directional dyads 3-4 in IOD-B

Table 13 presents the findings of the extent of participation in e-commerce for Directional dyads 3-4 in IOD-B

Participation in E-Commerce **E-Commerce Performance**	**Customs Agent (Broker) IOD-B**	**Importer IOD-B**
1. Importance of EC for your organizations	Y (M-6)	Y (M-6)
2. Percentage of your business using EC	25-35%	25-35%
3. Annual monetary value of the business transactions	An average of NZ$ 200,000	An average of NZ$1,500,000 per year
4. Annual number of EC transactions	7200	4800
Mutual Satisfaction in Trading Partner Relationships		
5. Will trading partner continue to be a major source of revenue?	Y (H-9)	Y (H-9)
6. Has the number of trading partners increased?	Y (L-2)	Y (L-1)
7. Do you perceive your organization to engage in long-term investments with your trading partner?	Y (H-7)	Y (H-8)
8. Do you perceive an increase level of open communications in your trading partner?	Y (H-7)	Y (H-8)
9.Do you perceive an increased level of cooperation in your trading partner?	Y (H-7)	Y (H-8)
10. Do you perceive an increased level of commitment in your trading partner?	Y (H-7)	Y (H-8)
11. Has the reputation of your organization increased as a result of your trading partner?	Y (H-7)	Y (H-8)

Table 13: Extent of E-Commerce Participation for Directional dyads 3-4 in IOD-B

Table 14 presents the background information of directional dyads 5-6 in IOD-C

Demographic Items	Cisco NZ IOD-C	Compaq NZ IOD-C
Number of Participants	10	4
Size of Organization	Small Medium Enterprise (SMEs)	Large
Number of Employees	20	300
Main Role of Organization	Manufacturer and service organization	Buyer & manufacturer, service organization
Type of Industry	Private Computers & Communications	Private Communications
Type of E-Commerce Application	Extranet	Extranet implemented by Cisco, Email and Intranets
Name of E-Commerce System (if any)	Cisco Connection Online (CCO)	Uses Cisco Connection Online (CCO)
Number of years using E-Commerce	3 years	18 months on CCO, but prior to that was trading with Cisco for 5 years via email and fax
Types of business to business transactions	Purchase order of equipment and delivery, tracking information from the web sites. Ordering and equipment	Purchase order of equipment and delivery, tracking information from Cisco's web site
Number of Trading Partners	20	200

Table 14: Background Information of Directional dyads 5-6 in IOD-C

Table 15 presents the findings of Trading Partner Trust of Directional dyads 5-6 in IOD-C

Trust in Trading Partners Competence Trust	Cisco NZ IOD-C	Compaq NZ IOD-C
1. ability, skills, knowledge	Y (L-3)	Y (H-9)
2. dependability	Y (H-9)	Y (H-9)
Predictability Trust		
3. consistent behavior	Y (H-7)	Y (H-7)
4. reliability	Y (H-8)	Y (H-8)
5. adherence to policies, terms of contract	Y (H-8)	Y (H-9)
6. predictability of trading partner	Y (H-9)	Y (H-10)
Goodwill Trust		
7. willingness to share information and provide support	Y (M-5)	Y (H-7)
8. care and concern	Y (H-7)	Y (H-7)
9. commitment and cooperation	Y (H-7)	Y (H-8)
10. positive feelings	Y (H-7)	Y (H-7)
11. long-term trading relationships	Y (H-7)	Y (H-7)
12. effort and investment in the relationship	Y (H-7)	Y (H-7)
13. honesty	Y (H-7)	Y (H-7)

14. conflict and handling discrepancies	Y (M-6)	Y (L-3)
15. situation of pressure	Y (M-6)	Y (L-3)
16. security concerns	Y (L-3)	Y (L-2)
17.driving force	Y (H-9)	Y (M-4)
18. explicit agreements roles/responsibilities	Y (H-10)	Y (H-10)
Others	N	N

Table 15: Trading Partner Trust of Directional dyads 5-6 in IOD-C

Legend: Y = Yes; N = No; L = Low (0-3); M = Medium (4-6); H - High (7-10).

Table 16 presents the findings of trust and security-based mechanisms in e-commerce for Directional dyads 5-6 in IOD-C

Trust and security-based mechanisms Confidentiality/Privacy	**Cisco NZ IOD-C**	**Compaq NZ IOD-C**
1. Firewalls	Y (H-10)	Y (H-8)
2. Encryption Mechanisms	Y (H-10)	Y (H-7)
Integrity		
3. Systems integrity tests and audits	Y (H-9)	Y (H-7)
4. Sequence numbers in messages	Y (H-10)	Y (H-7)
5. Application controls	Y (H-8)	Y (H-7)
6. Accounting controls	Y (H-9)	Y (M-6)
7. Web seal assurances	N	
Authentication		
8. Formal log on – User IDs, passwords	Y (H-10)	Y (H-9)
Non-Repudiation		
9. Message receipt confirmation and acknowledgments	Y (H-10)	Y (H-10)
10. Digital signatures	N	N
Access Control		
11. Network access controls	Y (H-10)	Y (H-7)
12. Authorization mechanisms	Y (H-9)	Y (H-10)
Availability		
13. Segregation of duties	N	N
Best Business Practices		
14. Top management commitment	Y (H-8)	Y (H-9)
15. Standards and policies	Y (H-10)	Y (H-10)
16. Trading partner agreement	Y (H-10)	Y (H-10)
17. Audit check	Y (H-7)	Y (H-8)
18. Training and education of staff	Y (M-4)	Y (H-7)
19. Risk analysis and audit involvement	Y (H-8)	Y (H-8)
20. Contingency measures	Y (H-10)	Y (H-7)
Other factors	N	N

Table 16: Trust and security-based mechanisms in E-Commerce for Directional dyads 5-6 in IOD-C

Legend: Y = Yes; N = No; L = Low (0-3); M = Medium (4-6); H - High (7-10).

Table 17 presents the findings of perceived benefits of e-commerce for Directional dyads 5-6 in IOD-C

Perceived Benefits of E-Commerce **Perceived Economic benefits**	**Cisco NZ** **IOD-C**	**Compaq NZ** **IOD-C**
1. Reduced operation, transaction and administrative costs	Y (H-7)	Y (H-9)
2. Reduced error rates and accuracy of information exchanged	Y (H-9)	Y (H-8)
3. Faster response to orders and reduced lead time	Y (H-10)	Y (H-9)
4. Reduced inventory levels and optimized supply chain	Y (H-10)	Y (H-9)
Perceived Indirect Benefits		
5. Improved customer service and product quality	Y (H-7)	Y (H-9)
6. Improved productivity, profitability and increased sales	Y (H-9)	Y (H-9)
7. Gaining competitive advantage	Y (H-7)	Y (H-7)
8. Sharing of risks with your trading partner	N	N
Perceived Relationship Related Benefits		
9. Improved communication and cooperation with your trading partners	N	Y (H-7)
10. Sharing of information that is, accurate, timely, speedy, complete, and relevant	Y (M-6)	Y (M-6)
11. Increased level of commitment with your trading partners	Y (M-6)	Y (M-6)
Perceived Strategic Benefits		
12. Improved organization's image and reputation	Y (H-8)	N
13. Increased long-term investments, and continued trading partner relationships	Y (H-7)	Y (M-6)
Other factors	N	N

Table 17: Perceived Benefits of E-Commerce for Directional dyads 5-6 in IOD-C

Legend: Y = Yes; N = No; L = Low (0-3); M = Medium (4-6); H - High (7-10).

Table 18, presents the findings of perceived risks of e-commerce for Directional dyads 5-6 in IOD-C

Perceived Technology Performance Related Risks	**Cisco NZ** **IOD-C**	**Compaq NZ** **IOD-C**
1. Compatibility of H/W and S/W	Y (L-2)	N
2. Infrastructure and initial implementation costs	Y (L-1)	N
3. Confidentiality concerns – viruses	Y (H-7)	Y (H-9)
4. Lack of adequate control	N	N
5. Internal security error – integrity issues as in delayed and inaccurate messages	N	N
6. Complexity in operating business transactions	Y (H-9)	N
7. Uncertainties – task and environment	Y (H-7)	N
Perceived Relational Risks		
8. Trading partner reluctance to change	N	N
9. Lack of training, knowledge and awareness	N	N
10. Poor reputation of trading partner	N	N

11. Trading partner demonstrating a conflicting attitude	N	Y (M-5)
12. Lack of trust in your trading partner	N	Y (M-6)
13. Trading partner demonstrating opportunistic behaviors	N	Y (M-4)
14. Partnership Uncertainty	N	N
Perceived General Risks		
15. Lack of security in your trading partner's system	N	N
16. Difficulty in identifying and quantifying costs/benefits	N	N
17. Repudiation	N	Y (L-3)
18. Authenticity of your trading partner	N	Y(L-3)
19. Availability of technology	N	N
20. Lack of a standard infrastructure – data and payments	N	N
21. Lack of government policies	Y (M-6)	N
22. Poor business practices	N	N
Other Factors	N	N

Table 18: Perceived Risks of E-Commerce for Directional dyads 5-6 in IOD-C

Legend: Y = Yes; N = No; L = Low (0-3); M = Medium (4-6); H - High (7-10).

Table 19 presents the findings of the impact and extent of e-commerce participation for Directional dyads 5-6 in IOD-C

Participation in E-Commerce E-Commerce Performance	**Cisco NZ IOD-C**	**Compaq NZ IOD-C**
1. Importance of EC for your organizations	Y (H-10)	Y (H-7)
2. Percentage of your business using EC	70%-80%	20%
3. Annual monetary value of the business transactions	17 – 34 billion dollars	3 million dollars
4. Annual number of EC transactions	2.5 million transactions	700 transactions
Mutual Satisfaction in Trading Partner Relationships		
5. Will your trading partners continue to be a major source of revenue?	Y (H-9)	Y(H-7)
6. Has the number of trading partners increased?	Y	N
7. Do you perceive your organization to engage in long-term investments with your trading partner?	Y (H-8)	Y (M-6)
8. Do you perceive an increase level of open communications in your trading partner?	Y (H-9)	Y (H-7)
9.Do you perceive an increased level of cooperation in your trading partner?	Y	Y H-7
10. Do you perceive an increased level of commitment in your trading partner?	Y (H-9)	Y (H-7)
11. Has the reputation of your organization increased as a result of your trading partner?	Y (H-9)	N

Table 19: Extent of E-Commerce participation for Directional dyads 5-6 in IOD-C

Legend: Y = Yes; N = No; L = Low (0-3); M = Medium (4-6); H - High (7-10)

Table 20 presents the background information of directional dyads 7-8 in IOD-D

Demographic Items	Siemens NZ IOD-D	Telecom NZ IOD-D
Number of Participants	4	2
Title of Participants	Customer marketing manager Key Accounting Manager Sales consultant Customer service manager	Manager of Transport Accounting Manager
Size of Organization	Small Medium Enterprise in NZ	Large
Number of Employees	10	700
Main role of Organization	Supplier and manufacturer of telecommunication products	Buyer and manufacturer of telecommunication products
Type of Industry	Private – telecommunications industry	Private – Telecommunication Industry
Type of E-Commerce Application	Extranet application	Uses Siemens Extranet application
Name of E-commerce application	Mainstream Express	Uses Siemens extranet application
Number of years using E-Commerce	15 but Mainstream Express for 5 years	5 years
Types of business to business transactions	Purchase order, order tracking information	Purchase order, order tracking information
Number of Trading Partners	One in Wellington (NZ)	Hundreds of trading partners distributing telecommunication products

Table 20: Background Information of directional dyads 7-8 in IOD-D

Table 21 presents the findings of trading partner trust of directional dyads 7-8 in IOD-D

Trust in Trading Partners Competence Trust	Siemens NZ IOD-D	Telecom NZ IOD-D
1. ability, skills, knowledge	Y (M-6)	Y (H-7)
2. dependability	Y (H-8)	Y (H-7)
Predictability Trust		
3. consistent behavior	Y (L-3)	Y (H-7)
4. reliability	Y (M-5)	Y (H-7)
5. adherence to policies, terms of contract	Y (H-8)	Y (H-9)
6. predictability of trading partner	Y (H-7)	Y (H-7)

Goodwill Trust		
7. willingness to share information and provide support	Y (H-7)	Y (H-8)
8. care and concern	Y (H-8)	Y (H-8)
9. commitment and cooperation	Y (M-6)	Y (H-7)
10. positive feelings	Y (M-5)	Y (M-5)
11. long-term trading relationships	Y (H-7)	Y (H-8)
12. effort and investment in the relationship	Y (H-7)	Y (H-7)
13. honesty	Y (H-7)	Y (M-6)
14. conflict and handling discrepancies	Y (M-6)	Y (L-3)
15. situation of pressure	Y (M-6)	Y (L-3)
16. security concerns	Y (L-3)	Y (L-3)
17.driving force	Y (H-7)	Y (M-6)
18. explicit agreements roles/responsibilities	Y (H-7)	Y (H-8)
Others	N	N

Table 21: Trading Partner Trust in of directional dyads 7-8 in IOD-D

Legend: Y = Yes; N = No; L = Low (0-3); M = Medium (4-6); H – High (7-10).

Table 22 presents the findings of trust and security-based mechanisms in e-commerce for directional dyads 7-8 in IOD-D

Trust and security-based mechanisms **Confidentiality/Privacy**	**Siemens NZ** **IOD-D**	**Telecom NZ** **IOD-D**
1. Firewalls	Y (H-7)	Y (H-7)
2. Encryption Mechanisms	Y (H-8)	Y (H-7)
Integrity		
3. Systems integrity tests and audits	Y (H-7)	Y (H-7)
4. Sequence numbers in messages	Y (H-9)	N
5. Application controls	N	Y (H-7)
6. Accounting controls	Y (H-9)	Y (H-9)
7. Web seal assurances	N	N
Authentication		
8. Formal log on – User IDs, passwords	Y (H-9)	Y (H-9)
Non-Repudiation		
9. Message receipt confirmation and acknowledgments	Y (H-9)	Y (H-9)
10. Digital signatures	N	N
Access Control		
11. Network access controls	Y (H-9)	Y (H-9)
12. Authorization mechanisms	Y (H-9)	Y (H-9)
Availability		
13. Segregation of duties	N	N
Best Business Practices		
14. Top management commitment	Y (H-9)	Y (H-9)
15. Standards and policies	N	N
16. Trading partner agreement	Y (H-9)	Y (H-9)
17. Audit check	Y (H-7)	Y (H-7)
18. Training and education of staff	Y (H-8)	Y (L-3)
19. Risk analysis and audit involvement	Y (H-7)	Y (L-3)
20. Contingency measures	Y (H-7)	Y (H-7)
Other factors	N	N

Table 22: Trust and security-based mechanisms in E-Commerce for directional dyads 7-8 in IOD-D

Legend: Y = Yes; N = No; L = Low (0-3); M = Medium (4-6); H - High (7-10).

Table 23 presents the findings of perceived benefits of e-commerce for directional dyads 7-8 in IOD-D

Perceived Benefits of E-Commerce **Perceived Economic benefits**	**Siemens NZ** **IOD-D**	**Telecom NZ** **IOD-D**
1. Reduced operation, transaction and administrative costs	Y (H-9)	Y (M-6)
2. Reduced error rates and accuracy of information exchanged	N	Y (H-7)
3. Faster response to orders and reduced lead time	Y (H-9)	Y (H-7)
4. Reduced inventory levels and optimized supply chain	Y (L-2)	Y (H-7)
Perceived Indirect Benefits		
5. Improved customer service and product quality	Y (H-8)	Y (H-8)
6. Improved productivity, profitability and increased sales	Y (H-9)	Y (H-9)
7. Gaining competitive advantage	Y (H-7)	Y (H-8)
8. Sharing of risks with your trading partner	Y (H-8)	N
Perceived Relationship-related Benefits		
9. Improved communication and cooperation with your trading partners	Y (H-9)	Y (H-7)
10. Sharing of information that is, accurate, timely, speedy, complete, and relevant	Y (H-9)	Y (H-7)
11. Increased level of commitment with your trading partners	Y (H-9)	Y (H-7)
Perceived Strategic Benefits		Y (H-7)
12. Improved organization's image and reputation	Y (H-8)	Y (H-8)
13. Increased long-term investments, and continued trading partner relationships	Y (H-7)	Y (H-7)
Other factors	N	N

Table 23: Perceived Benefits of E-Commerce for directional dyads 7-8 in IOD-D

Legend: Y = Yes; N = No; L = Low (0-3); M = Medium (4-6); H - High (7-10).

Table 24 presents the findings of perceived risks of e-commerce for directional dyads 7-8 in IOD-D

Perceived Technology Performance related Risks	**Siemens NZ** **IOD-D**	**Telecom NZ** **IOD-D**
1. Compatibility of H/W and S/W	N	N
2. Infrastructure and initial implementation costs	N	N
3. Confidentiality concerns – viruses	Y (L-3)	N
4. Lack of adequate control	N	N
5. Internal security error – integrity issues as in delayed and inaccurate messages	N	N

6. Complexity in operating business transactions	N	N
7. Uncertainties – task and environment	Y (L-1)	N
Perceived Relational Risks		
8. Trading partner reluctance to change	N	N
9. Lack of training, knowledge and awareness	Y (L-1)	N
10. Poor reputation of trading partner	N	N
11. Trading partner demonstrating a conflicting attitude	N	N
12. Lack of trust in your trading partner	Y (L-2)	Y (L-2)
13. Trading partner demonstrating opportunistic behaviors	Y (L-2)	Y (L-2)
14. Partnership Uncertainty	Y (L-2)	N
Perceived General Risks		
15. Lack of security in your trading partner's system	N	N
16. Difficulty in identifying and quantifying costs/benefits	Y (L-2)	N
17. Repudiation	N	N
18. Authenticity of your trading partner	N	N
19. Availability of technology	N	N
20. Lack of a standard infrastructure – data and payments	N	N
21. Lack of government policies	N	N
22. Poor business practices	N	N
Other Factors	N	N

Table 24: Perceived Risks of E-Commerce for directional dyads 7-8 in IOD-D

Legend: Y = Yes; N = No; L = Low (0-3); M = Medium (4-6); H - High (7-10).

Table 25 presents the findings on the extent of e-commerce participation for directional dyads 7-8 in IOD-D

Extent of E-Commerce Participation **Extent of E-Commerce Performance**	**Siemens NZ IOD-D**	**Telecom NZ IOD-D**
1. Importance of EC for your organizations	Y (H-9)	Y (M-6)
2. Percentage of your business using EC	80%	90%
3. Annual monetary value of the business transactions	$30-50million	$40 million
4. Annual number of EC transactions	120,000 transactions	100,000 transactions
Extent of Trading Partner Trust Relationship Development		
5. Will your trading partner continue to be a major source of revenue?	Y (H-8)	Y (H-9)
6. Has the number of trading partners increased?	N	N
7. Do you perceive your organization to engage in long-term investments with your trading partner?	Y (H-9)	N
8. Do you perceive an increase level of open communications in your trading partner?	Y (H-8)	Y (H-8)
9.Do you perceive an increased level of cooperation in your trading partner?	Y (H-8)	Y (H-8)
10. Do you perceive an increased level of commitment in your trading partner?	Y (H-9)	Y (H-8)
11. Has the reputation of your organization increased	Y (H-8)	N

as a result of your trading partner?		

Table 25: Extent of E-Commerce participation for directional dyads 7-8 in IOD-D

Legend: Y = Yes; N = No; L = Low (0-3); M = Medium (4-6); H - High (7-10).

Table 26 presents the background information of directional dyads 9 – Avery Ford NZ

Demographic Items	Avery Ford NZ
Number of Participants	1
Title of Participant	Accountant
Type of Industry	Private Sector – Automotive Industry Motor Vehicle distributor and dealer
Size of Organization	Large
Number of Employees	600
Type of E-Commerce Application	Intranet, Motor Vehicle Dealer System
Number of years using E-Commerce	5
Types of business to business transactions	Purchase orders, parts, invoices Product information, sales report
Number of branches in Wellington	5

Table 27 presents the findings of trading partner trust of directional-dyad 9 – Avery Ford NZ

Trust in Trading Partners Competence Trust	Impact of trading Partner trust IOD-E
1. ability, skills, knowledge	Y (M-5)
2. dependability	Y (H-9)
Predictability Trust	
3. consistent behavior	Y (M-6)
4. reliability	Y (H-7)
5. adherence to policies, terms of contract	Y (H-8)
6. predictability of trading partner	Y (H-9)
Goodwill Trust	
7. willingness to share information and provide support	Y (M-6)
8. care and concern	Y (H-9)
9. commitment and cooperation	Y (H-9)
10. positive feelings	Y (H-8)
11. long-term trading relationships	Y (H-9)
12. effort and investment in the relationship	Y (M-6)
13. honesty	Y (M-6)
14. conflict and handling discrepancies	Y (M-5)
15. situation of pressure	Y (M-4)
16. security concerns	Y (L-1)
17.driving force	Y (H-9)
18. explicit agreements roles/responsibilities	Y (H-9)
Others	N

Table 27: Trading Partner Trust in directional-dyad – 9 Avery Ford NZ

Legend: Y = Yes; N = No; L = Low (0-3); M = Medium (4-6); H - High (7-10).

Table 28 presents the background information of directional dyads 10 – Toyota NZ

Demographic Items	Toyota NZ Ltd
Number of Participants	1
Title of Participant	Company secretary – National Consumer Service
Type of Industry	Private Sector – Automotive Industry
Size of Organization	Large
Number of Employees	280
Type of E-Commerce Application	Intranet, Vehicle inventory system, KANBAN system
Number of years using E-Commerce	5
Types of business to business transactions	Purchase orders, parts, invoices, product information, and status report

Table 28: Background Information of Directional dyads 10 – Toyota NZ

Customer Contract - Partnering for Success – APPENDIX D

Introduction
Sadly, relationships with our customers' are often characterised by mistrust, poor communication, and adversity. Complex and onerous contracts are developed between the parties; the negotiation process is often long and arduous, setting a negative tone for the on-going relationship. Ultimately contracts are there to protect each party from the misdemeanours of the other, they are conceived and written from a perspective of worst case scenario, they are by definition not conducive to a cooperative relationship.

This paper seeks to identify a mechanism to restore trust and cooperation, business and cultural alignment between the parties.

Concept
The concept is simply partnering. The key to success is turning this nebulous concept into something tangible and meaningful for both parties and providing a basis for the continuing relationship.

Partnering is a process of team building and mutual goal setting where both parties are able to appreciate and understand the legitimate business aspiration of the other and through this understanding act appropriately for mutual benefit.

The Agreement
Key to the partnering concept is the "*Partnering Charter".* The Partnering Charter is a jointly developed document setting out mutually agreed objectives. The partnering charter is not a legal document, it is not complex, it is not unintelligible, it is simply an agreement between the interested parties setting out the mechanisms, procedures and expectations of each party towards the other, in clear, concise and understandable terms.

The partnering charter is an evolving document, being modified and adjusted to suit the changing cultural, business or political environments. Most fundamentally and overriding is that it is an agreement based on trust.

Creating the Charter
Perhaps even more valuable than the Charter, is the process of creating it. Both parties work together to develop the document and through these discussions an opportunity for relationship building and better understanding of mutual needs is provided.

Principles of a Partnering Charter
A charter will encompass the key needs of each party, specifically: -

- **Commitment** – Partnering agreements are only effective with the buy-in of top management stakeholders.

- **Equity** – Both parties must recognise and appreciate the legitimate business aspirations of the other and work towards assisting their partner to achieving their objectives.

- **Trust** – Contracts are about suspicion, Charters are about trust. Not only to write about trust but to implement the relationship and maintain it through communication. The creation of a Partnering Charter should be a positive and educational experience for both parties.

- **Mutual Goals or Objectives** – Generally contacts are written with the interest of one party in precedence. The Charter is based on reciprocal benefits and shared interests.

- **On-going Evaluation –** The Partnering Charter provides a mechanism for parties to measure their performance and voice legitimate concerns if or when commitments are not met. The Partnering Charter is a living document and will be constantly reviewed and modified

- **Communications** – Partnering agreements are an opportunity to bring together management stakeholders on a regular basis to evaluate the progress and the efficacy of the current agreement.

- **Conflict resolution -** Serious issues can be addressed early and corrections made before relationships break down and contracts are imposed.

Partnership Charter Clauses
The following are some generic clauses that could form part of a bi-lateral Partnership Charter:

Siemens Unilateral commitments

- On-going development – we will keep you up to date with new products and solutions
- Education – we will train your staff to operate our products effectively
- Accuracy - Information provided will be accurate and honest, no hype, no misleading narrative

Customer unilateral commitments

- No surprises - If there is a problem we will tell you first
- Strategic planning – We will keep you informed of our business planning and future direction
- Forecasting – We will assist you to deliver on time by providing forecasting information

Reciprocal agreements

- We are accountable - we take whole and total responsibility, no blaming third parties and no excuses.
- Honesty and Integrity – We are ethical business partners
- We keep our promises - what we say is what we do
- Confidentiality – If it's secret we will keep it that way
- Commitments – verbal commitments are binding on both parties

The Process
One party would initiate the Partnering Charter, generally at senior management level and most effectively through a short presentation. Assuming broad agreement is reached, a follow up or alignment meeting would be arranged to select a working group to develop the partnering plan

A partnering workshop will be scheduled where both parties would prepare for the workshop with draft clauses that they wish to include in the Charter. It is recommended that such a workshop be administered by an external faciitator.

The outcome of the workshp wull be the Partnering Charter encompassing at a minimum the elements already explored above.

Conclusion
The Partnering Charter can be used as a mechanism to enhance existing relationships or initiate new ones. In the typical vendor-customer relationship, the customer holds the power and therefore controls the relationship. The Partnership contract subtlety redresses the balance back towards the vendor and at the same time will be perceived by our customers' as a proactive measure to improve our business process.

Good business is built primarily and fundamentally on good people relationships. The partnering charter provides a mechanism to establish and maintain such relationships.

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