

BUSINESS-TO-BUSINESS ELECTRONIC MARKETPLACES

**BUYER-SUPPLIER RELATIONSHIPS AND THE ADOPTION OF
BUSINESS-TO-BUSINESS ELECTRONIC MARKETPLACES**

By

SHAN WANG, B.A., M.A.

A Thesis

Submitted to the School of Graduate Studies

in Partial Fulfillment of the Requirements

for the Degree of

Doctor of Philosophy

McMaster University

© Copyright by Shan Wang, October 2004

DOCTOR OF PHILOSOPHY (2004)

BUSINESS

McMaster University

Hamilton, Ontario

TITLE: Buyer-Supplier Relationships and the Adoption of Business-to-Business Electronic Marketplaces

AUTHOR: Shan Wang, B.A. (Wuhan University, Wuhan, P.R. China),
M.A. (Queen's University, Kingston, Canada)

SUPERVISOR: Professor Norman P. Archer

NUMBER OF PAGES: XIV, 219

ABSTRACT

Despite the high expectations that researchers and practitioners had for business-to-business electronic marketplaces (EMs), EMs have not prospered, for reasons that are not well understood. Research to this point on EM adoption is very limited due to their quickly changing nature and the complexity of the issue, which involves multiple economic, political and technical factors at both macro and micro levels.

EM adoption and buyer-supplier relationships are related. Buyer-supplier relationships play an important role in firms' EM adoption decisions since businesses are not willing to change their current relationships with trading partners to adopt EMs and their support functionalities, such as auctions, reverse auctions, transaction support, etc. The adoption of EMs also impacts buyer-supplier relationships. A framework is proposed in this thesis to investigate these mentioned issues. A buyer-supplier relationship perspective is adopted to investigate EM adoption, and both the economic and power dimensions of buyer-supplier relationships are examined. It is proposed that power can speed up the adoption of EM functionalities and that the effect of power is moderated by market structure. Some important contingencies are suggested that underlay buyer-supplier relationships, such as transaction uncertainty, transaction frequency, transaction specific investment, complexity of product description and non-contractible factors, and it is proposed that they are likely to affect choice of functionality. At the same time, it is proposed that EMs can make short-term relationships efficient and long-term relationships effective. It is also proposed that the use of EMs causes varying degrees of satisfaction of participants with their online trading partners.

A case study approach was adopted to examine the framework. A total of five EMs and some of their participating buyers and suppliers were studied to validate the propositions. Some important findings are reported. The first finding was that the classification of EMs should not be a dichotomy, but a continuum. It was also found that complexity of product description could not explain why companies choose to use different functionalities, since simple products tended to be involved in EM trading, in all the functionalities that we studied. It was confirmed that relationship efficiency and

effectiveness gains were moderated by the drawbacks of EMs and the lack of participant system and process integration into EM systems. Finally, based on the results of the case studies and the confirmed propositions, a refined framework is presented and described.

Key words: Adoption, Buyer-Supplier Relationships, Electronic Marketplaces, Case Studies

Dedication

To my son: Andrew Yian Xu

ACKNOWLEDGEMENT

I would like to give my heartfelt thanks to my supervisor Dr. Norm Archer for his outstanding support and personal backing during the course of my thesis. I am thankful for his insightful and esteemed guidance in the generation of the research ideas, his encouragement in choosing the idea of this research, and his involvement in the data collection. Without his help this thesis could not have been written.

I would also like to sincerely thank my supervisory committee members, Dr. Milena Head and Dr. Dean Mountain. Their guidance and feedback helped me to improve the quality of this thesis more than it otherwise could have been.

I would like to give my special thanks to a Ph.D. colleague, Wuping Zheng. His suggestions on the framework and his great voluntary help as the second coder made this research more rigorous.

I would like to acknowledge all the participants in the case study for their contribution. I am thankful for their contribution of time to do interviews, providing more information, and giving me feedback. Every one of them provided a valuable component of the research.

I am thankful to my parents, Zhiju Li and Pingxing Wang, for their unconditional support. They are always there, teaching me the value of hard work and encouraging me to pursue my dream. I would like to thank my husband, Bing Xu, for his encouragement and support. His humor and optimistic attitude toward life always affected me and encouraged me to overcome the difficulties during the course of the thesis. I would also like to extend my thanks to my mother and dad-in-law for taking care of my son. Their unconditional support allowed me to concentrate on the writing of the thesis.

To my loved son, I owe you too much. I am very sorry for leaving you when you were so young. Thanks for talking to me over the phone, although I seldom got what you were talking about. But that was the best support I have ever gotten.

TABLE OF CONTENTS

LIST OF FIGURES AND TABLES.....	XI
LIST OF APPENDICES.....	XIII
ACRONYMS.....	XIV
CHAPTER 1. INTRODUCTION.....	1
1.1 Definitions of Electronic Marketplaces: Reflections and Clarifications.....	2
1.2 Classification of EMs.....	6
1.3 A Brief Review of EM History.....	10
1.3.1 Proprietary Networks and EDI (1960s- Current).....	11
1.3.2 Buy-Side and Sell-Side Applications (1997--1998).....	11
1.3.3 Independent EMs (1999-2000).....	12
1.3.4 Consortia-Based EMs and Private Exchanges (2000-2002).....	12
1.3.5 Shakeout and Consolidation (2001-2002).....	13
1.4 Implications and Research Motivation.....	15
1.5 Research Questions.....	18
1.6 Thesis Outline.....	19
CHAPTER 2. LITERATURE REVIEW: BUYER-SUPPLIER RELATIONSHIPS AND RELATED CONCEPTS AND ISSUES.....	22
2.1 Economic Concepts: Markets and Hierarchies.....	22
2.1.1 Markets.....	22
2.1.2 Hierarchies.....	23
2.2 Transaction Cost Theory (TCT).....	24
2.3 Inter-organizational System (IOS) Literature: the Influence of Information Technology on Organizational Governance Structure and Buyer-Supplier Relationships.....	29
2.3.1 Electronic Markets and Electronic Hierarchies.....	29
2.3.2 Move to the Middle and Network Organizations.....	31
2.3.3 Mixed Mode Network Structure.....	34
2.4 Supply Chain Management.....	34
2.5 Power, Politics and MIS implementation.....	36
2.6 Summary of the Literature Review.....	38
CHAPTER 3. BUYER-SUPPLIER RELATIONSHIPS AND ELECTRONIC MARKETPLACES: A FRAMEWORK FOR ADOPTION AND IMPACT.....	40
3.1 Electronic Marketplace Functionalities and Relationship Dimensions.....	40
3.1.1 Buyer-Supplier Relationships Defined.....	40
3.1.2 EM Functionalities.....	41

3.2 Buyer-Supplier Relationships and Electronic Marketplaces: A Theoretical Framework	48
3.3 Summary	63
CHAPTER 4. METHODOLOGY	65
4.1 Suitability of Case Research	65
4.2 Philosophical Perspectives	68
4.3 Research Design	69
4.3.1 Unit of Analysis and Case Selection	70
4.3.2 Sample and Data Collection	71
4.3.3 Data Analysis and Reporting	77
4.3 Research Quality	80
4.4 Summary	83
CHAPTER 5. INDIVIDUAL ELECTRONIC MARKETPLACES	84
5.1 Electronic Marketplace A	84
5.1.1 EM A Industry Setting	84
5.1.2 Functionalities and Relationships	85
5.2 Electronic Marketplace B	87
5.2.1 EM B Industry Setting	87
5.2.2 Functionalities and Relationships	87
5.3 Electronic Marketplace C	88
5.3.1 EM C Industry Setting	89
5.3.2 Functionalities and Relationships	89
5.4 Electronic Marketplace D	90
5.4.1 EM D Industry Setting	91
5.4.2 Functionalities and Relationships	91
5.5 Electronic Marketplace E	93
5.5.1 EM E Industry Setting	93
5.5.2 Functionalities and Relationships	94
5.6 Discussion: A Continuum of Functionality	95
5.7 Summary	98
CHAPTER 6. DATA ANALYSIS	100
6.1 How Buyer-Supplier Relationships Affect the Adoption of EMs: Power (RQ I: P1, P7a)	100
6.1.1 Individual Case Reports	100
6.1.2 Aggregated Report and Proposition Validation	104
6.2 Market Structure and the Adoption of EMs (RQ III: P7b)	106
6.3 How Buyer-Supplier Relationships Affect the Strategic Choice of Different Functionalities (RQ II: P2-P6)	109

6.3.1 Transaction Uncertainty	110
6.3.2 Transaction Specific Investment	117
6.3.3 Transaction Frequency	121
6.3.4 Complexity of Product Description	126
6.3.5 Non-Contractible Factors	132
6.4 How Does the Use of EMs Affect Buyer-Supplier Relationships? (RQ IV: P8, P9a and P9b)	137
6.4.1 Market Efficiency vs. Long-term Relationship Effectiveness	141
6.4.2 Satisfaction	156
6.5 Discussion	159
6.6 Summary	167
 CHAPTER 7. CONCLUSIONS AND FUTURE RESEARCH	 170
7.1 Thesis Review	170
7.2 Future Research	173
7.3 Contribution to Theory	175
7.4 Contribution to Management	176
7.5 Conclusions	178
 BIBLIOGRAPHY	 179
GLOSSARY	197
APPENDICES	200

LIST OF FIGURES AND TABLES

Tables

Table 1.1	EM as a Governance Structure and as a Business Model
Table 2.1	Contractible Factors vs. Non-Contractible Factors
Table 2.2	Comparison of Hierarchies, Networks and Markets
Table 3.1	Functions of Electronic Marketplaces
Table 3.2	Summary of Propositions
Table 4.1	Case Selection
Table 4.2	Guidelines for Inquiry
Table 4.3	Sample Distributions
Table 5.1	The Use of EM C Functionality
Table 5.2	EM D Functionalities and Relationship Involved
Table 5.3	Summary of EM Functionalities and Relationships
Table 6.1	Power Measures for Electronic Marketplaces (Coding Results)
Table 6.2	Market Structure and the Adoption of EMs
Table 6.3	Transaction Uncertainty in EMs
Table 6.4	Complexity of Product Description (Survey Results)
Table 6.5	Complexity of Product Description: Wilcoxon Signed Rank Test
Table 6.6	The Impact of EMs on Buyer-Supplier Relationships (Survey Results)
Table 6.7	The Impact of EMs on Buyer-Supplier Relationships (Coding results)
Table 6.8	Supplier Dissatisfaction: Wilcoxon Signed Rank Test
Table 6.9	Buyer and Supplier Satisfaction in Collaboration-Oriented Functionalities
Table 6.10	Summary of Proposition Validation

Figures

Figure 1.1	Pyramid of Electronic Marketplaces by Degree of Centralization
Figure 1.2	EM Classification and Correlations
Figure 1.3	The Development and Consolidation of B2B Electronic Marketplaces

Figure 1.4	An Illustration of Research Questions
Figure 1.5	The Structure of the Thesis
Figure 2.1	Intangible Transaction Costs
Figure 2.2	Asset Specificity and Governance Structure
Figure 2.3	Increased Scope for Electronic Markets
Figure 3.1	Integration and EM Functionalities
Figure 3.2	The Interaction Between Buyer-supplier Relationships and Electronic Marketplaces
Figure 4.1	Participant Position Overview
Figure 4.2	Company Size Distribution
Figure 5.1	EM Functionalities and Relationships: An Overview
Figure 6.1	Power Measures for Each Electronic Marketplace (Survey Results)
Figure 6.2	Influences Grouped by Buyers/Suppliers (Coding Results)
Figure 6.3	Cost Benefit Comparison Among Different Functionalities (Survey Results)
Figure 6.4	The Strategic Choice of Different Functionalities: Key Constructs
Figure 6.5	Transaction Uncertainty: An Overview
Figure 6.6	Asset Specificity (Survey Results)
Figure 6.7	Transaction Specific Investment: An Overview
Figure 6.8	Transaction Frequency: An Overview
Figure 6.9	Complexity of Product Description: An Overview
Figure 6.10	Non-Contractible Factors (Survey Results)
Figure 6.11	Non-Contractible Factors: An Overview
Figure 6.12	The Impact of EMs on Buyer-Supplier Relationships: An Overview
Figure 6.13	Buyer-Supplier Relationships and Electronic Marketplaces (Revised Model)

LIST OF APPENDICES

- Appendix A: Summary of EM Definitions (Ordered by Time)
- Appendix B: Examples of Different Types of EMs
- Appendix C: Intercoder Agreement for Text Segmentation
- Appendix D: Intercoder Agreement for Power Construct
- Appendix E: Code Definitions and Coding Instructions
- Appendix F: Inter-coder Agreement for EM Impact on Buyer-Supplier Relationships
- Appendix G: Main Reasons for First Time Coding Disagreements
- Appendix H: Questionnaire

ACRONYMS

AHS	American Hospital Supply
B2B	Business to Business
B2C	Business to Consumer
C2C	Consumer to Consumer
CIA	Critical Incident Analysis
CPFR	Collaborative Planning, Forecasting and Replenishment
EDI	Electronic Data Interchange
EM	Electronic Marketplace
ERP	Enterprise Resource Planning
GPOs	Group Purchasing Organizations
IOS	Inter-Organizational Systems
IPO	Initial Public Offering
IS	Information System
MRO	Maintenance, Repair and Operation
PDA	Personal Digital Assistant
PO	Purchasing Order
RFx	Requests for Quote, Requests for Information, Requests for Bid, etc.
SME	Small and Medium Enterprise
TCT	Transaction Cost Theory
VICS	Voluntary Inter-industry Commerce Standards

CHAPTER 1. INTRODUCTION

Business-to-Business Electronic Marketplaces (EMs) are electronic network platforms through which buyers and suppliers conduct transactions and interact with each other. Internet-based EMs are currently the main stream of EMs¹. Internet-based EMs appeared mostly after 1995, and have undergone significant changes since that time. These changes include the introduction of public EMs, consortia-based EMs, and private EMs (the definitions of these terms are provided in section 1.2). Although not all forms of EMs will be included in this study, these particular concepts will be used for the time being.

After the failure of the dot com revolution, marked by the sharp drop of dot com stock prices in 2000, business-to-business (B2B) electronic commerce was believed to be “where the big money will be” (in excess of one-third of total potential eCommerce value) (Phillips and Meeker 2000). Among the various electronic B2B applications, especially via the Internet, EMs were believed to be “the password to success on the World Wide Web”(Berryman and Heck 2001). Despite all the hype, EMs did not prosper as expected, and the adoption of their use turned out to be an evolution, rather than a revolution (Coltman, Devinney et al. 2000). EMs still have difficulty in attracting enough participants to be viable (Memishi 2001). There are many reasons for the low adoption rate of EMs, such as market power, transaction risk (Chircu and Kauffman 2000), delivery problems, online security, etc. Among these issues, of special interest is the role of buyer-supplier relationships on the adoption of EMs, and the impact of EMs on buyer-supplier relationships. This thesis will analyze the adoption and impact of EMs from a buyer-supplier relationship perspective. Before discussing the framework of how buyer-supplier relationships and the adoption of EMs influence and are influenced by each other, an introduction will be given to Internet-based EMs, the relevant research questions and motivations, and the organization of the thesis.

¹ The definition of EMs can include EMs based on all kinds of electronic interactions, just as eCommerce can include commerce conducted by email, EDI (Electronic Data Interchange), EFT (Electronic Fund Transfer), and proprietary networks, etc (Cunningham, C. and C. Tynan 1993; Faverie, M. and G. Vickery 2001).

1.1 Definitions of Electronic Marketplaces: Reflections and Clarifications

Despite the proliferation of research about EMs, there is no agreement on the definition and classification of EMs. Like the study of any new and quickly changing phenomena, the terms used to address these new phenomena are often evolving and confusing. EDI (Electronic Data Interchange) technology has also suffered from this problem (the new tower of Babel (Benjamin, Long et al. 1990)), as has the terminology for electronic marketplaces (“Jargon jungle” (Sculley and Woods 2001) (Grieger 2003)). Much of the research conducted under the umbrella term of “Electronic Marketplaces”, involves many very different things. Grieger (2003) commented on this EM terminology confusion:

“ Within the ‘e-Hub name game’, the name electronic marketplace barely prevails over other terms and concepts like B2B marketplaces, e-hubs, e-markets, exchanges, auction, portals seem to overlap and mean different things to different people. Unlike the proverbial elephant, we may not be able to tell one when we see one!”

In order to make sense of what researchers mean by “Electronic Marketplace”, a summary of 24 EM definitions has been developed from both journal articles and major industry reports and appears in Appendix A. Some terms are not well-defined, but their meaning can be interpreted from their usage. This summary shows that EMs are represented by different terms, such as e-hubs (Lenz, Zimmermann et al. 2002) (Chow, Ghani et al. 2000), exchanges (Dai and Kauffman 2002) (Kenjale and Phatak 2001), market-makers (Blodget and McCabe 2000), electronic markets (Bakos 1991; Bailey and Bakos 1997), and auctions (Mithas, Jones et al. 2002), and they can be defined as inter-organizational systems (IOSs) (Bakos 1991; Choudhury and Hartzel 1998; Grewal, Corner et al. 2001), communities (Zhu 2002; Grieger 2003), electronic platforms (Thoung 2002), meeting places (Laseter, Long et al. 2001; Ariba October 19, 2000), virtual locations (Gulledge 2002; Grieger 2003), and infrastructure (Zhu 2002), etc.

Researchers do not agree on the meaning of these terms. Take the term “hub” as an example. Sometimes researchers have equated EMs with hubs (Chow, Ghani et al. 2000), but others have emphasized the differences between them. *“A hub is a more specialized concept, providing document exchange among organizations”*(Gulledge

2002). Another example is the term “exchange”. Some authors have equated EMs with exchanges (Phillips and Meeker 2000), but some have treated exchanges as only a kind of market mechanism characterized by real time bid and ask pricing (Chow, Ghani et al. 2000).

Although the summary in Appendix A shows that the term “Electronic Marketplace” is the most widely used by researchers, this is not without problems. The biggest problem is that an EM as a governance structure tends to be confused with an EM as a business model (see Table 1.1). The examples of EMs as a governance structure (Malone, Yates et al. 1987; Malone, Yates et al. 1989; Bakos 1991) frequently equate them with “pure markets”. In the governance structure literature, they are counterparts of “hierarchies”, e.g., hierarchical relationships between trading partners. An EM as a kind of governance structure is rooted in microeconomics and particularly transaction cost theory (Bärwolff 2003). The basic human assumption in this theory is rationality and profit maximization, and market design is mainly focused on how to intensify competition and create a “perfect market”. An EM as a kind of business model comes mostly from describing what the widely mentioned EMs are doing, rooted in network organization theory and supply chain management in the strategic management literature, as well as transaction cost theory in the economics literature (Christiaanse and Markus 2002; 2003).

A direct consequence of this confusion is the different treatment of a “private exchange”, a type of EM maintained by a single supplier or buyer. In EMs as business models, private exchanges are considered as a kind of EM (Christiaanse and Markus 2003); (Holzmuller and Schlichter 2002; Grieger 2003), while in EMs as a governance structure (Malone 1987; Steinfield, Kraut et al. 1995; Chan, Steinfield et al. 1999), private exchanges maintained by single suppliers are the most frequently cited examples of electronic hierarchies. For example, the American Hospital Supply (AHS, now known as Baxter Healthcare) ASAP ordering system was a frequently cited example of how an electronic hierarchy was transformed to an EM (Malone, Yates et al. 1989; Short and Venkatraman 1992). AHS is a hospital supply distributor and manufacturer. In 1980,

AHS aggressively implemented its ordering system onsite in many big hospitals and successfully seized monopoly profits for a while. Later on, AHS was forced to open its network to other distributors and suppliers, and hence became an EM. However, on the other hand, many single distributor Websites are referred to as EMs, such as *Li & Fung* (a Hong-Kong based international trade company), *Grainger.com* (an office supply distributor), and *Dell.com* (a computer manufacturer).

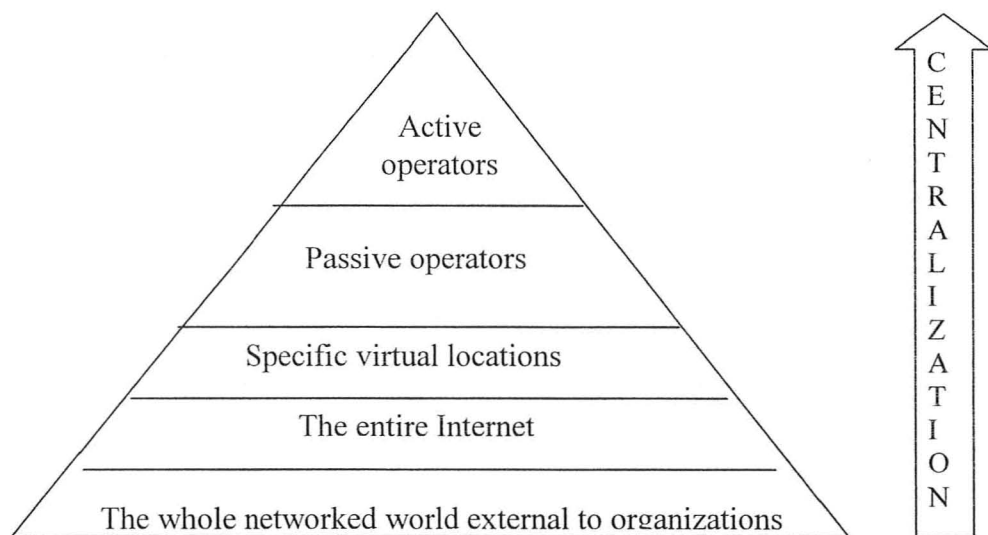
Table 1.1 EM as a Governance Structure and as a Business Model

Facet	EM as a Governance Structure	EM as a Business Model
Basic human assumptions	Rational	Both rational and trusting
Number of participants	Many-to-many	One-to-many and many-to-many
Market-mechanism	Competition	Competition and collaboration co-exist
Pricing	Market pricing (price set by market supply and demand)	Relational pricing and market pricing co-exist
Focus of market design	Reducing search cost; Facilitating negotiation	Reducing search cost; Facilitating negotiation; Facilitating business processes; Facilitating collaboration
Theory foundation	Microeconomic theory, mainly economic theory of perfect competition	Transaction cost theory; Network organization theory; Supply chain management

In addition, the term EM is used for both centralized and decentralized markets (Babin, Crainic et al. 2001). A pyramid of EMs is provided in Figure 1.1 in ascending order of degree of centralization. The bottom of the pyramid includes the least centralized definition of an EM. In this definition, markets are not recognized as physical places but conceptual places. “*An electronic market exists when a supplier provides goods and services to a customer in a transaction partially or fully automated by information technology*”(Bailey and Bakos 1997). By this definition, EDI (Electronic Data Interchange) could be said to be a type of EM. This definition acknowledges that a market exists because of “human action instead of a human design”(Hayek 1945). The

next level in the pyramid is the Internet, which is sometimes referred to as an EM (Giaglis, Klein et al.2002; Benjamin and Wigand 1995; Bärwolff 2003). It differs from the least centralized EMs in that the electronic infrastructure has to be the Internet.

Figure 1.1 Pyramid of Electronic Marketplaces by Degree of Centralization



The third level of EMs refers to the marketplaces maintained by an operator(s) and bounded by a physical electronic system (virtual location). Most researcher definitions fall into this category. Many other terms have the same meaning of “virtual location”, such as Internet sites (Ariba October 19, 2000), central databases (Malone, Yates et al. 1987), or intermediaries (Christiaanse and Markus 2003) (since an intermediary needs a location and identity to prove that it exists).

There are differences in terms of centralization between EMs with a virtual identity. Lee and Clark (1996) differentiated EMs supporting decentralized market structures (direct interactions among buyers and sellers) from those supporting centralized market structures (broker, dealer, or auction platforms)(Lucking-Reiley and Spulber 2000). In more centralized EMs, EM operators are more active and get involved with pricing, matching buyers and sellers, or taking ownership of products. In less centralized EMs, EM operators are very passive. They only provide an infrastructure, and

leave actual transactions up to buyers and sellers, such as in online flea markets, Web forums, or product listings.

Adopted Definition of Electronic Marketplace

It would not be wise to restrict this study strictly to pure markets (EM as a governance structure), since the perspective of interest is buyer-supplier relationships. The pure market concept that originated from neoclassical microeconomic theory is dominated by adversarial short-term business relationships (Babin, Crainic et al. 2001). It cannot describe all exchange situations since most exchanges occur in “domesticated markets”(Arndt 1979) or network organizations (Thorelli 1986; Powell 1990). These exchanges are characterized by trusted and cooperative long-term relationships.

So for the purpose of the thesis, EMs are defined as *business models facilitating multiple buyers and suppliers in conducting transactions and interacting with each other through centralized online marketplaces*. By this definition, it is clear that an EM: 1) is a business model, 2) is a centralized electronic market, and 3) has many buyers and suppliers transacting on its platform. EMs are defined as business models. Both centralized and decentralized EMs are included, but the thesis will only focus on many-to-many EMs to avoid confusion with the treatment of some private EMs. Conclusions based on the study of many-to-many EMs can be generalized to some private EMs, especially buyer-centric private EMs. However, caution should be exercised when generalizing them to seller-centric private EMs, which are more likely to be hierarchies than markets.

1.2 Classification of EMs

Based on a thorough search of the literature, the nine most accepted EM classifications are summarized in Figure 1.2. These classifications are grouped according to whether the classification criteria are related to participants or operators. Most of the classifications are correlated, and some are frequently treated in the literature as if they were the same. In this section, we will provide a brief description for each classification.

Correlation between EM classifications is a research topic in itself, but it diverts from the main purpose of the thesis, and is not addressed here.

(1) Number of Participants

The most intuitive way to classify an EM is according to the number of participants it has (Barnes-Vieyra and Claycomb 2001; Paviou and Sawy 2002). Many-to-many, many-to-few, many-to-one, and one-to-one (few) are the most frequently seen scenarios. Resembling market structure in economics, many-to-many EMs are also called markets, many-to-few are called oligopolies, and many-to-one are called monopolies or monopsonies (Paviou and Sawy 2002).

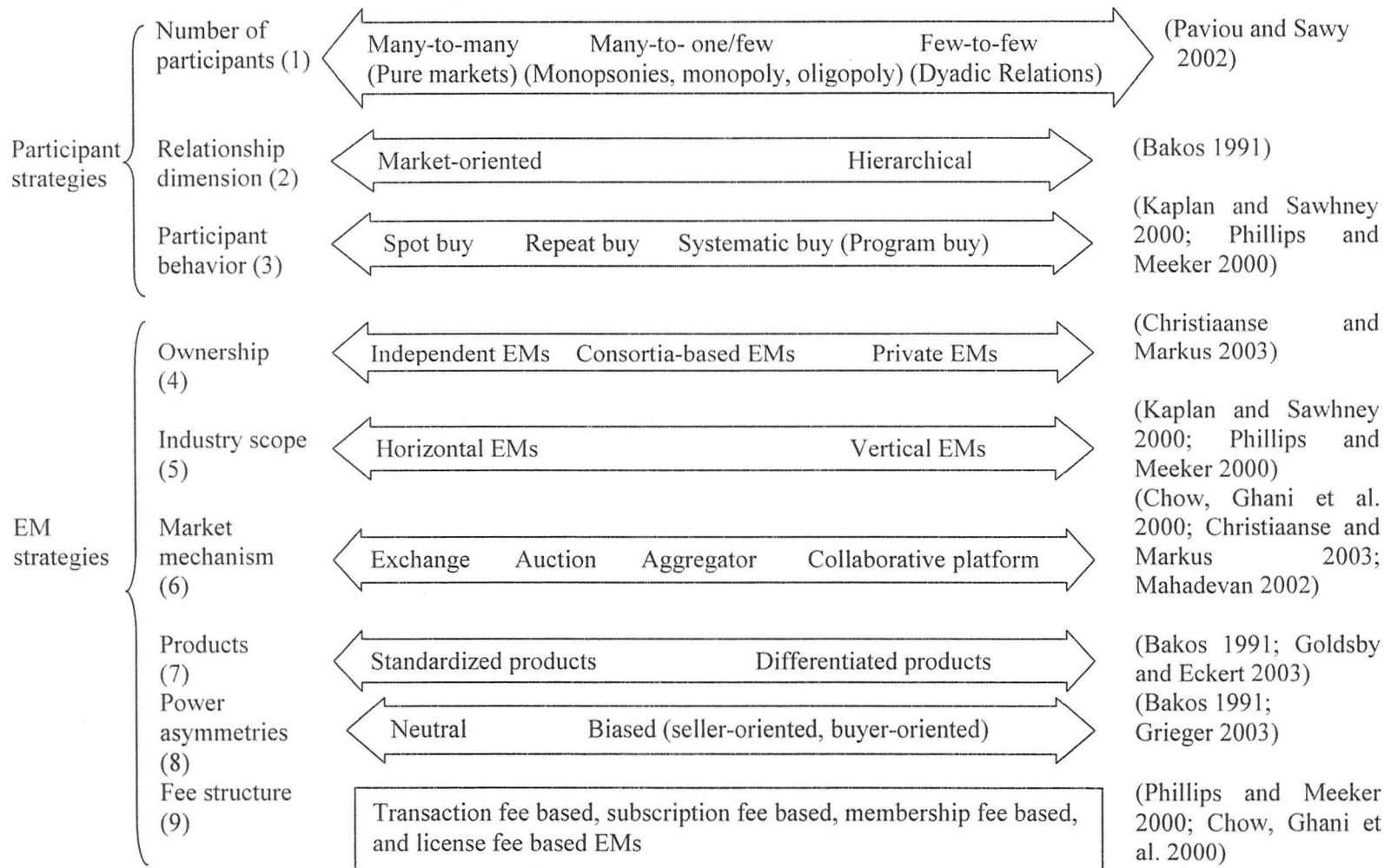
(2) Relationship Dimensions

When businesses trade products online, they use different relationship strategies with their trading partners. These can be market or hierarchical relationships (Bakos 1991; Paviou and Sawy 2002), but these relationships require different supporting technologies. For example, in order to support market relationships, search facilitation and price setting are key. For hierarchical relationship support, workflow management and business process optimization is the key technology. EMs focusing on particular technological support to facilitate these two types of relationships may be referred to as market or hierarchical EMs.

(3) Participant Behavior

The participant behavior criterion is similar to the relationship dimension, except that this classification originates from empirical observation, while the EM classification based on relationship dimensions is more theoretically based (Soh and Markus 2002). Spot buys involve mainly one-off relationships, such as those involved in forward auctions (Choudhury 1997; Kaplan and Sawhney 2000; Phillips and Meeker 2000). In repeat buys, buyers purchase from preferred supplier e-catalogues repetitively. In program buys, buyers purchase from a single source supplier. Sometimes more information sharing and collaboration than just transaction exchange is involved in program buys (Jap and Mohr 2002).

Figure 1.2 EM Classification and Correlation



(4) Ownership

The most recognized and cited EM classification is: independent EMs; consortia-based EMs; and private EMs (Kenjale and Phatak 2001; Laseter, Long et al. 2001; Christiaanse and Markus 2003). Independent EMs are also called public or open EMs, because they are open to all participants, except for minor qualification requirements (Latham 2000). They are usually established by neutral third parties, such as venture capitalists. Consortia-based EMs are normally formed by several big buying or selling companies. One of the best known is *Covisint*, an EM founded initially by the Big Three auto manufacturers (Ford, GM, and DaimlerChrysler). Private EMs are set up by a single big company to facilitate its own procurement or selling. One of the earliest private EMs was *Retailink* of Walmart.

(5) Industry Scope

Depending on the industry an EM serves, EMs can be classified as vertical or horizontal (Kaplan and Sawhney 2000; Phillips and Meeker 2000). Horizontal EMs focus on indirect products such as office supplies and MRO (Maintenance, Repair and Operation) products, which can be used by many industries. Vertical EMs serve the needs of a particular industry, no matter whether they need indirect or direct products (the latter are used as direct inputs in production).

(6) Market Mechanism

According to how economic activities are coordinated in an EM, it can be classified as an aggregator, exchange, auction site, or collaboration platform (Anonymous 1999; Chow, Ghani et al. 2000; Mahadevan 2002; Bakos 1998; Andrew, Blackburn et al. 2000; Christiaanse and Markus 2003). Aggregators, exchanges and auctions focus on aggregating traders and setting prices, but collaboration platforms focus on streamlining business processes.

(7) Products

Bakos made a distinction between EMs specializing in standardized products and EMs specializing in differentiated products (Bakos 1991; 1997; Goldsby and Eckert 2003). Different degrees of product standardization can result in different market designs.

For example, highly standardized products make real time bid and ask types of price setting possible.

(8) Power Asymmetries

Sometimes EMs serve the interests of one set of participants more than the others. These EMs are called biased EMs (Bakos 1991). They can be either buyer-oriented or seller-oriented EMs (Grieger 2003). Private and consortia EMs are always treated as biased EMs because they serve the interests of EM founding members, which are big companies with substantial market power. Although most independent EMs are neutral, some may be biased (Kaplan and Sawhney 2000). Some EMs focus on aggregating small company needs and negotiate contracts with suppliers on behalf of these small buyers (called reverse aggregation in (Kaplan and Sawhney 2000)).

(9) Fee Structure

EMs can generate income in many ways: charging a percentage of the transaction (usually 1-10% of the transaction value)(Chow, Ghani et al. 2000); a lump sum subscription charge; or an annual membership fee (Phillips and Meeker 2000). Some EMs also sell their own management software and charge a licensing fee. These fee structures can be used by any type of EM, depending on its revenue model (Kerrigan, Roegner et al. 2001).

In this thesis, the EM classification adopted will be similar to the classifications by relationship dimension and participant behavior. However, these criteria will be used to classify EM functionalities and not EMs (Section 3.1.2), since relationships are more related to functionalities and not the entire EM. This is especially true since many EMs offer more than one kind of functionality and support more than one type of relationship.

1.3 A Brief Review of EM History

The history of EMs is closely related to that of business-to-business (B2B) eCommerce. A review of the background of B2B eCommerce will give us a better understanding of EM adoption, especially from a buyer-supplier relationship perspective.

In the following background review, the time period listed for each phase is not the time it appeared and disappeared, but its peak period.

1.3.1 Proprietary Networks and EDI (1960s- Current)

B2B operations originated when EDI (Electronic Data Interchange) was used commercially in the 1960's. EDI refers to the "*electronic transfer from computer to computer of business information using a standardized data format*" (Hutcheson 1990). EDI technology automates the transactions between buyers and sellers, resulting in large cost savings. However, its high installation and operational costs and inflexibility of the technology impaired its diffusion, especially for small and medium-sized companies (Schwandt 1997).

The 1980s and early 1990s were the golden years for EDI. In 1980, approximately 2000 U.S. companies were using EDI (Sandra 1996). By 1994, over 25,000 users participated in EDI activities in North America, with another 15,000 participants around the globe (Sandra 1996). Although the commercialization of the Internet disrupted the development of EDI after 1995, EDI still represents the dominant portion of B2B eCommerce in terms of sales and transaction volume², because of the high cost of switching to Internet-based B2B tools, including EMs.

1.3.2 Buy-Side and Sell-Side Applications (1997--1998)

Internet B2B initially started from buy- and sell-side applications. Sell-side applications in B2B are similar to B2C retail stores, with businesses building their own Websites, displaying catalogue content, and publishing marketing advertisements on the Web. For buy-side applications, big companies worked with their major suppliers to install electronic catalogues inside company firewalls. Clients in buying companies could place orders online, and orders were transferred to suppliers either through the Internet or through proprietary networks.

The biggest winners at this stage were application providers, instead of individual companies who used applications. IBM, Oracle, Microsoft, and other software vendors

² According to US Census Bureau eCommerce Surveys in 2000 and 2001, B2B was still dominated by EDI (EDI accounted for 88% of total wholesale eCommerce in 2000, for example) (Anonymous March 18, 2002)(Anonymous March 19, 2003).

excelled in sell side applications, while Ariba, CommerceOne, Agile, and others occupied the market for buy side applications (Phillips and Meeker 2000). Since separate buy- or sell-side applications did not contribute much to information transparency, attention began to switch to EMs. AMR Research at that time claimed that independent trading exchanges would be “the next wave of B2B eCommerce”(Latham 2000).

1.3.3 Independent EMs (1999-2000)

The year 2000 was the golden year of independent EMs. At the end of 1999, 280 non-private North American EMs were in business and a year later, a peak of 1520 was reached (Laseter, Long et al. 2001), among which 92% were independent EMs (Day, Fein et al. 2003). The earliest independent EMs were horizontal, focusing on commodities and indirect products (Anonymous 2000).

Soon after horizontal EMs became prevalent, more and more EMs “went vertical” (Sawhney 1999) by providing in-depth industry content and more customized offerings. This allowed relatively complex and industry-specific products to move online. Some ambitious EMs started with vertical operations, and then extended their operations to serve the needs of all industries. *Ventro* and *FreeMarkets* were such examples. *Ventro* had adopted a build/buy/invest approach to expand beyond its core life-science efforts, and *FreeMarkets* had rapidly expanded its auction service offering to a number of vertical markets (Phillips and Meeker 2000).

Although the number of B2B EMs was impressive, most of them did not offer what they claimed. Most were designed to cash out through an IPO (Initial Public Offering) of stock, instead of providing real value to businesses. For some real EMs, liquidity was a big problem because they could not attract enough customers to their sites to become viable (Garicano and Kaplan 2001). By the end of 2001, with equity prices of these companies collapsing, many of them “went bust” (Luening and Kane 2001).

1.3.4 Consortia-Based EMs and Private Exchanges (2000-2002)

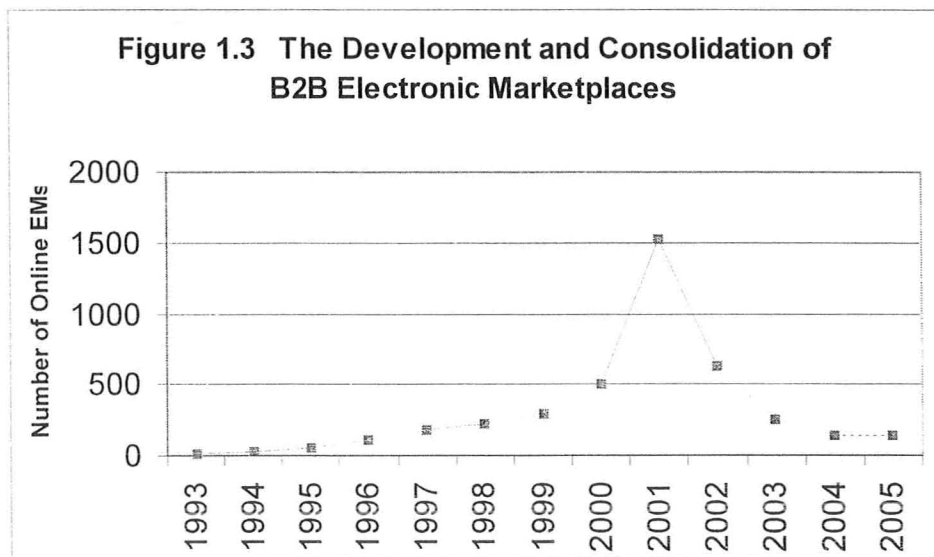
After the dot com failures, two directions evolved in the development of EMs. On the one hand, big companies organized their own private trading platforms, dedicated to

their own procurement or sales. On the other hand, several groups of big companies joined forces to create consortia-based EMs.

The focus of researchers and practitioners was on consortia-based EMs and private exchanges (Laseter, Long et al. 2001; Young 2002). These EMs were considered to be offering real value in streamlining purchasing processes, supporting industry-specific business processes and workflow, and providing collaborative commerce. Building private EMs was becoming more and more popular (Anonymous 2001), and it was estimated that one of five transactions would soon be conducted through private exchanges by 2004(Gazzi 2002). Although consortia-based EMs and private exchanges were receiving the most interest, most EMs (in terms of the total number operating) were still independent (Day, Fein et al. 2003).

1.3.5 Shakeout and Consolidation (2001-2002)

Various predictions of the future number of EMs were made (Gazzi 2002), (Andrew, Blackburn et al. 2000). Booz Allen Hamilton tracked 1820 North American EMs, and graphed their overall growth pattern (Laseter, Long et al. 2001) (see Figure 1.3). EMs first experienced explosion and proliferation (1999-2001), and then went through a period of consolidation (2001-2002). The speed of consolidation was



Source: Deloitte & Touche; Pembroke Consulting and Booz, Allen and Hamilton (Day, Fein et al. 2003)

impressive. A large number of EMs simply disappeared either by acquisition or exit, with a survival rate of only 20%, according to a survey by Day, Fein and Ruppertsberger (Day, Fein et al. 2003)

The functionalities provided by EMs also underwent significant change during the consolidation period. Early EMs mainly provided information about sellers and their products, and left the actual transactions up to buyers and sellers. The purpose of such EMs was to create a more competitive market and “frictionless commerce” (Anderson 1997; Kuttner 1998; Anonymous 2000), but they did not do well in attracting enough participants to be profitable. In a search for more feasible business models, some EMs switched their main focus to transaction fulfillment. Transaction fulfillment includes placing and tracking orders online and, possibly, arranging transportation online through EM resources. However, many customers were still not willing to pay enough to cover the cost of these services, and the services offered were not enough to provide a competitive advantage that would attract a viable customer population.

EM operators began to search for answers to the question “is a perfect marketplace welcomed by most companies, and where is the big money in using the Internet to facilitate transactions between companies?” (Phillips and Meeker 2000). Research suggests that, although the concept of an enhanced competitive marketplace was intuitively attractive, it did not appeal to most business customers (MacDuffie and Helper 2003), and was particularly a problem for suppliers. In addition, long-term inter-company relationships and trust are very important to potential participants. Most firms would not change their dominant way of procurement in order to cater to the concept of competitive EMs, and were likely to choose EMs that enhance current purchasing practices. As a result, EMs began to add collaboration functionalities that are compatible with corporate needs, to maintain long-term relationships with business partners, such as project management in the construction industry, Collaborative Planning, Forecasting and Replenishment (CPFR) in the retail industry, and collaborative product development in the aerospace industry (Phillips and Meeker 2000; Alt and Cäsar 2002; Christiaanse and

Markus 2003; MacDuffie and Helper 2003). Collaboration functionalities were increasingly being seen as the competitive advantage of an EM.

1.4 Implications and Research Motivation

There are three implications of the above review of EM history. First, some new forms of EMs supporting collaboration and pre-existing relationships between trading partners appeared during and after the consolidation of EMs, and these variants have values that can not be ignored. The consolidation of EMs implies that investors and participants are more rational about the value of EMs. After the shakeout, only those EMs that promised profitability could survive and attract more investor funding. EMs could not survive without adapting continuously to the changing environment, and without searching for sustaining revenue streams (Day, Fein et al. 2003).

The first implication suggests new research is needed to reflect the changes in EMs and that considers the new EM forms. A review of the limited literature of EM adoption reveals that most research on EM adoption was tested on pure markets, supporting only spot purchases. Five published papers marked two stages of EM adoption analysis. (Kollmann 2001), (Grewal, Corner et al. 2001) and (Mithas, Jones et al. 2002) were the first generation of research to analyze EM adoption. In their work, they used widely different variables to investigate EMs. Kollman (2001) studied the importance of readiness to use, database quality, intermediation service, transformation rate, and intermediation costs on the acceptance of EMs. Grewal et al (2001) investigated the effects of motivation, ability, and environmental dynamism on the adoption of EMs, and Mithas, Jones, and Mitchell (2002) focused on non-contractible factors such as trust and quality on EM adoption decisions. Despite distinct variables and approaches, these papers have one point in common: they all studied market-oriented EMs and ignored EMs which support collaboration. Kollman studied a used car trading system (*AutoScout24*), Grewal surveyed a market-oriented electronic market for jewelry and related products (*www.polygon.net*), and Mithas, Jones, and Mitchell equated EMs with auctions, so their results could only be generalized to market-oriented EMs. An explanation of why these

researchers focused exclusively on market oriented EMs is that EMs that supported collaboration and existing business relationships were not widely available at that time.

In the second major stage of research, researchers began to pay more attention to collaboration and long-term buyer-supplier relationships. Christiaanse and Markus (2003) and Grieger (2003) are representative of this stage. Both their papers were literature summaries and call-for-action papers, and both noticed that there was not enough attention to long-term business relationships in analyzing EM adoption. Based on a political economic framework in marketing literature that divided marketing channels into internal- and external-political economics (Reve and Stern 1979), Christiaanse and Markus (2003) suggested that a comprehensive view of EM adoption should include internal-political, economic, and technological factors, and external-political, economic, and technological factors. The purpose of their framework was to include relational exchange theory in EM adoption research. Grieger (2003) suggested the importance of supply chain management in managing EMs. A common characteristic of these two works is that the authors suggested that more attention should be paid to EMs supporting collaboration and existing business relationships, but limited theoretical and empirical research was done, and conclusions were untested.

This thesis will include new variants of EMs when investigating the adoption of EMs. Pure markets are not likely to dominate in the near future, and short- and long-term cooperative relationships are likely to play a role in B2B trading for a long time. This suggests that research results based on EMs that can support both types of relationship will be current and applicable to a wider population of EMs.

The second implication of the EM history and research review is that, despite the hype about B2B eCommerce, EDI still represents the great majority of B2B eCommerce transactions, and many EMs are still struggling to attract participants. The EM adoption issue is still a serious challenge for operators, even including consortia-based EMs. Despite the perceptions suggested by previous research, EM adoption is still a mystery that needs much more investigation from multiple perspectives, including buyer-supplier relationships.

The third implication is that the trend towards private and consortia EMs implies that buyers and sellers still prefer to do business with their existing trading partners. The biggest difference among consortia, private, and independent EMs is that consortia and private EMs are built by leveraging existing relationships between buyers and sellers (Young 2002). As a result, independent EMs are now increasingly offering collaboration platforms to support existing buyer-supplier relationships (Ariba October 19, 2000). In terms of the relationships underlying the technology, it could be said to be a return to EDI, since EDI focuses on automating existing relationships between buyers and sellers.

The third implication above indicates that buyer-supplier relationships are very important in EM research. Pre-existing buyer-supplier relationships can be the driving force for EM adoption (if EMs enhance existing relationships, or big companies exercise power to force adoption), but they can also be barriers to EM adoption (if EMs disturb existing relationships). In fact some researchers have already pointed out the importance of buyer-supplier relationships in EM adoption research (Dai and Kauffman 2000; Christiaanse and Markus 2002), but questions have been posed without a clear answer. There has been no systematic analysis of how buyer-supplier relationships affect the adoption of EMs.

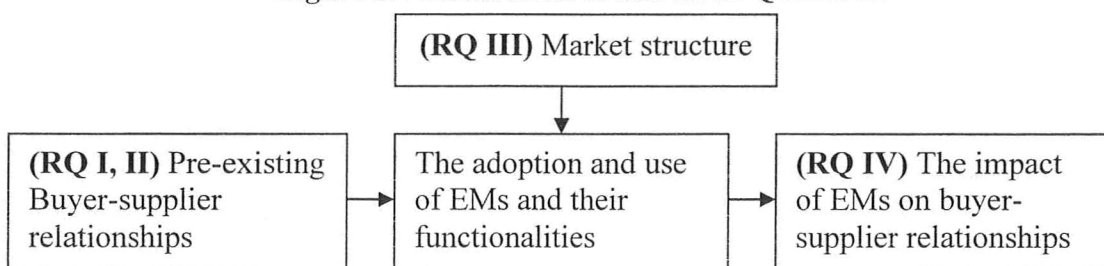
The impact of IOSs and EMs on buyer-supplier relationships has been of interest to many researchers (Gurbaxani and Whang 1991; Clemons, Reddi et al. 1993; Steinfield, Kraut et al. 1995; Lee and Clark 1996; Chan, Steinfield et al. 1999; Garicano and Kaplan 2001; Jap 2001; Haller 2002). The debate on the shift toward electronic markets, electronic hierarchies and network organizations as a result of IOS adoption is a reflection of this interest. The phenomena of EMs are frequently used as evidence of moving toward “markets”. However, due to the fact that EMs appear to support existing buyer-supplier relationships, EMs would be expected to increase both market-efficiency (a synonym for “markets”), and long-term relationship effectiveness (a synonym for “network organizations” and “hierarchies”). So it makes sense to clarify these impacts. Since the impact of EMs on buyer-supplier relationships also affects the adoption of EMs

by affecting the perceptions of potential participants, it is important to examine this issue in order to develop a better understanding of EM adoption.

1.5 Research Questions

Motivated by the above observations, this research targets four research questions related to buyer-supplier relationships and EM adoption (Figure 1.4).

Figure 1.4 Illustration of Research Questions³



RQ I. How do pre-existing relationships with business partners affect the adoption of EMs? Pre-existing relationships are buyer-supplier relationships existing between companies before they adopt an EM. Power imbalance, an important aspect of buyer-supplier relationships, is expected to affect a firm’s adoption decision.

RQ II. What are the important factors underlying pre-existing relationships affecting the choice of EM functionalities, given that different functionalities support different types of buyer-supplier relationships? When companies decide to adopt an EM, they must decide which functionality to adopt, or which EM to adopt according to the EM’s focus on different functionalities. The contingencies underlying buyer-supplier relationships are expected to play an important role in choosing functionalities. Buyer-supplier relationships do not play a direct role in this issue, but serve as a bridge in the analysis of contingencies to the adoption of different functionalities.

RQ III. How does market structure affect the adoption of EMs? Aside from the three main research questions (I, II, and IV), the “market structure” construct is also studied due to its close association with buyer-supplier relationships and EM adoption.

³ RQ stands for Research Question throughout this thesis.

RQ IV. How does the use of different functionalities affect buyer-supplier relationships?

The economic impacts of buyer-supplier relationships, as a consequence of the use of EMs, will be examined.

The above questions are logically connected. First, pre-existing buyer-supplier relationships affect the adoption of EMs. When a company decides to adopt an EM, it faces the question of which functionalities to adopt at that time. Finally, the impact of the use of EM functionalities should be investigated as an outcome of their use. The three questions are connected by buyer-supplier relationships: the direct role (RQ I) and indirect role (RQ II) of buyer-supplier relationships in the adoption of an EM and its functionalities, and the impact (RQ IV) of EMs on buyer-supplier relationships. Due to the important association between market structure, buyer-supplier relationships, and the adoption of EMs, market structure will also be considered in the theoretical framework development.

Not all of the factors affecting the adoption of EMs will be considered, but adoption will be examined primarily from the buyer-supplier relationship perspective. Other factors that could affect the adoption of EMs have been considered by a number of authors (Dagenais and Gautschi 2001; Grewal, Corner et al. 2001; Kollmann 2001; Koch 2002; Stochdale and Standing 2002; Thoung 2002; Yau 2002; Christiaanse and Markus 2003). When we addressed the first implication of the EM history review, we mentioned some of the factors. Examples of other factors affecting the adoption of EMs include lack of participant trust in EMs, system incompatibility, lack of economic benefits, high adoption cost etc., but these factors are outside the scope of this study.

1.6 Thesis Outline

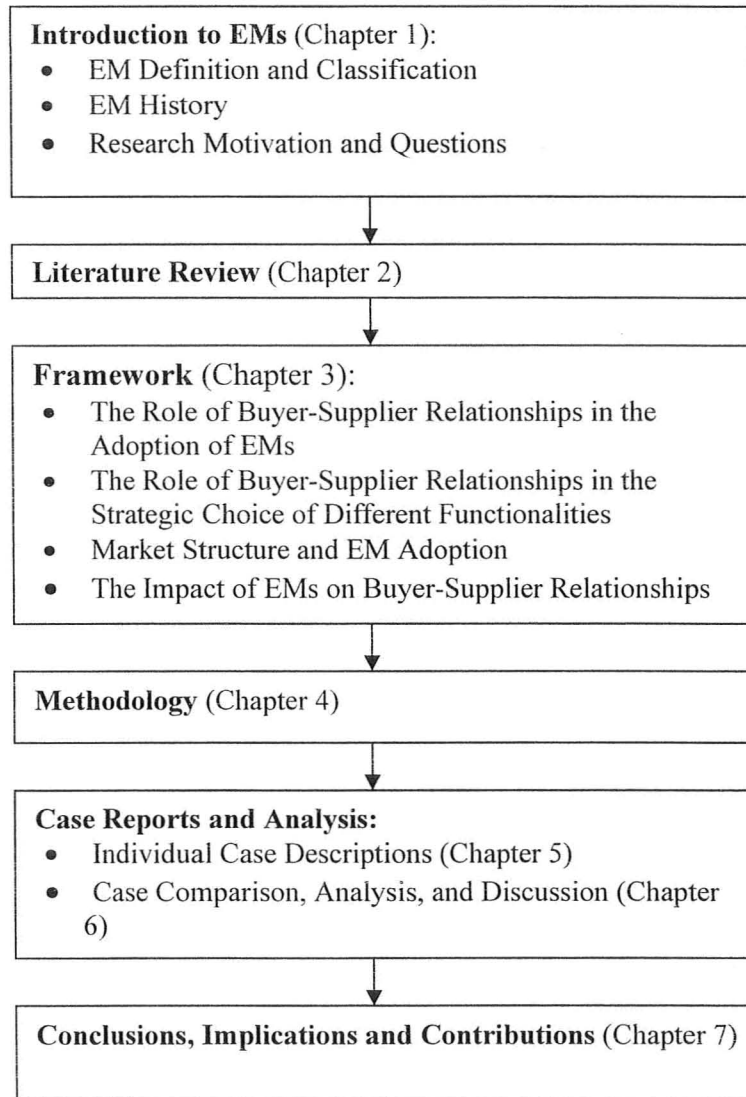
This thesis is organized as follows (Figure 1.5). **Chapter One** provides an introduction to EMs, research motivation and questions, and the structure of the thesis. **Chapter Two** reviews relevant literature. Transaction cost theory, the impact of IT (Information Technology) on organizational governance structure, supply chain

management, and the theory of market power, are significant in this study. The most important constructs in our framework come from the related literature.

Chapter Three will describe the research framework. This framework will discuss the four research questions and the related propositions. **Chapter Four** will address the methodology used to confirm the framework. This includes the case study approach that is adopted due to the exploratory nature of the research, with quantitative analysis (nonparametric statistics) as a supplement where possible.

In the thesis, the case write-ups will consist of two parts. **Chapter Five** will describe the five individual EM cases, including the basic facts and the functionalities they offer. **Chapter Six** will focus on pattern search and matching, and on confirming the propositions derived in the framework. The framework will be refined according to case research results. **Chapter Seven** will conclude the thesis with a summary of the thesis, its contributions, theoretical and managerial implications, and future research.

Figure 1.5 Structure of the Thesis



CHAPTER 2. LITERATURE REVIEW: BUYER-SUPPLIER RELATIONSHIPS AND RELATED CONCEPTS AND ISSUES

2.1 Economic Concepts: Markets and Hierarchies

Transaction Cost Theory (TCT) is widely used in the analysis of EMs since EMs act to reduce transaction costs. Some predictions of firm governance structure are based on a transaction cost rationale (Malone, Yates et al. 1987). The main purpose of TCT is to justify two kinds of firm governance structure, markets and hierarchies, and to define boundaries between them. The following will introduce some important concepts in TCT that will be used in later framework development, and to explain how TCT is used to justify the structure of firms.

2.1.1 Markets

A market is generally acknowledged to be a means by which the exchange of goods and services takes place, as buyers and sellers interact with each other, either directly or through mediating agents and institutions (Selz 1999). The basic mechanism for a competitive market as a governance structure includes:

- 1) voluntary exchange of goods and services between two or more parties;
- 2) the price mechanism as the central feature of the market. In a perfect market, price conveys all the information necessary for a transaction, including market demand and supply information, and price is considered to be the most effective instrument for coordinating and allocating information (Milgrom 1992). Market coordination, as a governance structure, can also be regarded as a result of human actions instead of human design (Hayek 1945);
- 3) the market is open to everybody. After a transaction is completed, each agent is free from any future obligation;
- 4) the market mechanism facilitates straightforward, volatile, and non-repetitive transactions that require no transaction-specific investment (Williamson 1985);
- 5) trust is not a prerequisite of a market exchange;
- 6) the value of the exchange is more important than the relationships among parties.

2.1.2 Hierarchies

A hierarchy is an internal organization with certain characteristics: division of tasks, a pyramidal organizational structure, an authority mechanism, and limits to autonomy (Thompson 1971). Hierarchies can be defined by ownership, vertical integration, or hierarchical relationships. The definition of hierarchies by Malone et al (1987) is relational: *“Thus buyers do not select a supplier from a group of potential suppliers; they simply work with a single predetermined one. In many cases the hierarchy is simply a firm, while in others it may span two legally separate firms in a close, perhaps electronically mediated, sole supplier relationship.”* From this definition, we see that a hierarchy refers to a single firm under sole ownership, or an organization consisting of buyer and supplier firms who form one-to-one hierarchical relationships.

As another economic coordination form, hierarchies differ from market mechanisms in that price is no longer the coordinator of economic activities, but central planners are. Price mechanisms can be used as motivation in organizations, but price is not entirely based on market supply and demand, but on authority decisions. These decisions involve multiple factors, such as costs, market demand and supply, incentives and motivations, and internal power balance. The strengths of hierarchical organizations lie in their ability to adapt in the face of opportunism, uncertainty, and transaction specific investments, because hierarchies have better monitoring and control mechanisms (Williamson 1975). However, hierarchies also have their own costs and limitations, such as bureaucracy and the incentive limits to employment relations. Sunk cost, internal politics, organizational history, and information constraints of management contribute to these limitations (Hannan and Freeman 1977). Sociologists have also criticized hierarchical organizational adaptation ability, since organizational inertia limits organizational reactions to rapid changes (Hannan and Freeman 1984). Hannan and Freeman (1984) argued that hierarchies were in fact strong in their reliability (capability of producing large quantities of goods and services of a given quality repeatedly), and accountability (ability to document resources that have been used). Hence, hierarchies are

well suited for stable mass production and distribution because the requirement for high volume and high-speed operations demands the constant attention of a managerial team.

2.2 Transaction Cost Theory (TCT)

Transaction cost, which includes both the cost of organizing a marketplace exchange and the cost of coordinating exchanges within a firm, is incurred when transactions happen. Transaction cost usually consists of *ex ante* and *ex post* costs. The *ex ante* costs include the expense of searching for a trading partner, specifying the products to be traded, and negotiating the price and contract. The *ex post* transaction costs are incurred after the contract has been signed but before completed, including fulfillment costs, late delivery, non-payment or non-delivery charges, and problems of quality control (Coase 1937).

Williamson (Williamson 1975) extended Coase's theory by suggesting that transaction cost includes both the direct costs of a transaction and the possible opportunity costs of inferior governance decisions. Some factors may cause high transaction costs in the market and these costs can be mitigated if the transaction is handled in a hierarchy. According to Williamson, these factors include both human behavior factors (bounded rationality and opportunism) and environmental factors (uncertainty/ complexity and small numbers).

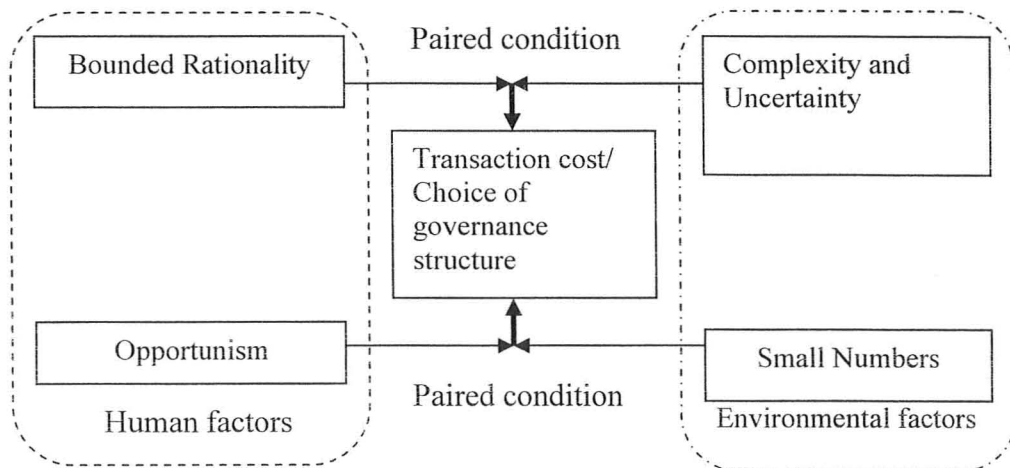
Bounded Rationality refers to limited human ability to be rational due to human neuropsychological and language limitations. **Opportunism** assumes economic agents make allowance for strategic behaviors in seeking self-interest. Two behaviors are regarded as opportunistic: selective or distorted information disclosure (the strategic manipulation of information) and self-disbelieved promises regarding future conduct (misrepresentation of intentions).

Uncertainty means that some aspects of transactions or the environment are unknown to decision makers. **Complexity** refers to the situation that the entire picture about a transaction is known to decision makers, but is too complex to be considered in its entirety. Uncertainty and complexity contribute to the bounded rationality of humans.

Small Numbers is a kind of market condition where organizations have limited alternative trading partners to choose from. Compared with small numbers, a perfect competitive market is a large number market condition.

Williamson (1975) argued that intangible transaction cost occurs when there is both bounded rationality and a complex/uncertain environment, or when both opportunism and small number market conditions are present in the exchange relationships (Figure 2.1). Bounded rationality and opportunism cannot lead to significant transaction cost by themselves alone. They need to be paired with environmental factors to be effective. First, if the environment is simple, there will be little transaction cost related to writing contracts since human beings have complete knowledge of the transaction and can specify all possible contingencies in advance. Second, without the presence of the small number condition, opportunism will not threaten the transaction either since the large number condition will curb opportunism through “voting with feet” and switching to other reliable trading partners.

Figure 2.1 Intangible Transaction Costs



Source: Adapted from Williamson “Organizational Failure Framework” (Williamson 1975)

With the presence of the two **paired conditions** mentioned above, hierarchical coordination is a better choice than the marketplace. When the environment is uncertain and complex, and writing a complete contract is impossible, hierarchies can alleviate

bounded rationality by professional management and central information processing. If a small number condition exists, opportunism can be curbed by better monitoring, dispute resolution, motivation mechanisms, and convergence of organizational goals. When both conditions are present (bounded rationality and the small number condition), organizations can overcome them by facilitating adaptive, sequential decision-making without incurring the same opportunism that market contracting would pose. This reduces the need to specify all the contingencies exhaustively in advance, and limits attention only to actual outcomes rather than all possible outcomes.

Williamson (1985) introduced three principle factors that guided the choice of different governance structures: uncertainty, asset specificity and transaction frequency. There are two kinds of *uncertainty*: *environmental* and *behavior* uncertainty. *Environmental uncertainty* is caused by a volatile environment and has already been addressed above. *Behavioral uncertainty* is due to a human tendency towards opportunism. When the environment changes, there is uncertainty about a trading partner's behavior in the execution and re-adapting of contracts. Hierarchical governance structure eliminates this uncertainty by aligning transaction goals and better monitoring of trading partner behavior.

Asset specificity is the requirement for *transaction-specific investments*, which refers to the transferability of assets that support a given transaction. A firm is highly asset specific if the input used by the firm cannot be used readily by other firms. Due to low transferability of highly specific assets, the switching costs of the party who makes this transaction-specific investment is very high, and the other party may exploit this high switching cost opportunistically if pure market coordination is employed. High asset specificity makes the realization of potential opportunism and moral hazard possible and creditable. Four kinds of asset specificity (Williamson 1983) and the corresponding examples are:

- *Site specificity*

A natural resource available at a certain location and movable only at great cost is site specific

- *Physical asset specificity*

A specialized machine tool or complex computer system designed for a single purpose is physically specific

- *Human asset specificity*

Highly specialized human skills such as skills for repairing a specific kind of car (not a general purpose mental skill)

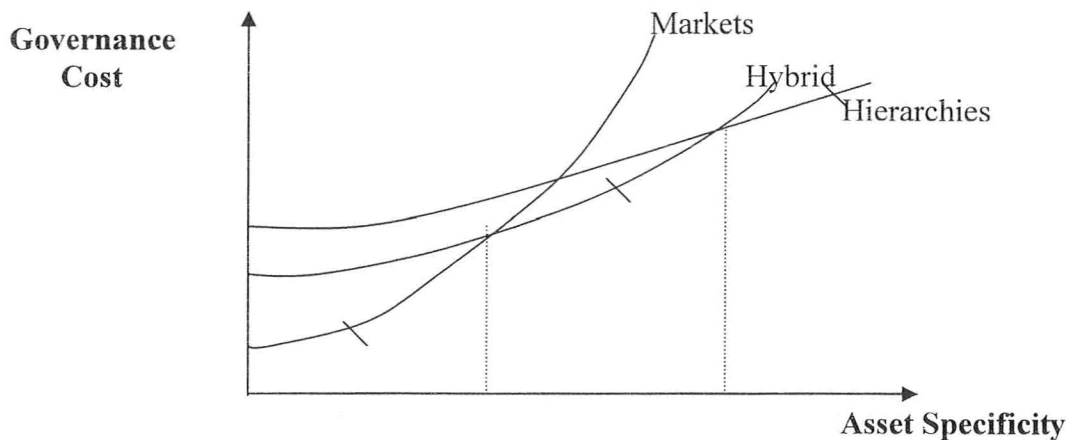
- *Dedicated assets*

General investments by a supplier that would not otherwise be made, except for the prospect of selling a significant amount of product to a particular customer. If the contract were terminated prematurely it would leave the supplier with significant excess capacity.

High asset specificity favors hierarchies (Williamson 1991) (See Figure 2.2). When asset specificity is low, there is little potential for opportunistic behavior of the trading partners. So there is a minimum requirement for safeguarding the specific asset, and the transaction cost caused by opportunism is low. If a special governance structure (hierarchy/hybrid) is used, the high setup cost of this special governance structure can not be justified by the low cost of opportunism. So a market mechanism is the most economic and optimal. When asset specificity deepens, the transaction cost of hierarchies is the lowest, because increases in the need for transaction-specific investments cause high opportunism, and hierarchies are the most efficient in curbing opportunistic behaviors by internalization (better monitoring and goal convergence). The setup cost and bureaucratic cost of running a hierarchy will be lower than the cost of conducting the same transaction with a highly specific asset investment in a marketplace. In this case, a hierarchy is a better choice.

Transaction frequency is used to justify the cost of building a specific governance structure (Williamson 1985). When transaction frequency is high, organizations prefer to buy through hierarchical relationships because, in a market, transactions require frequent negotiation of contracts, which can add significantly to transaction costs.

Figure 2.2 Asset Specificity and Governance Structure



Source: Adapted from (Williamson 1991)

TCT has received much attention outside the area of economics, and has had a great influence on developments in organization theory, strategic management, marketing research and political economics (Carroll and Teece 1999). Concepts from this theory such as opportunism, asset specificity, uncertainty, and transaction frequency are frequently applied and operationalized in these areas, and improvements in TCT continue to be made. Empirical research on transaction cost economics has focused mainly on “make or buy” decisions (Shelanski and Klein 1999). The mathematical economics theory of markets and hierarchies has translated these ideas into non-cooperative game theory (Kreps 1999). Highly relevant to this thesis, TCT lends itself to the literature of information systems, especially inter-organizational networks, and has been used to analyze the influence of information technology on organizational governance structures, as discussed below.

2.3 Inter-organizational System (IOS) Literature: the Influence of Information Technology on Organizational Governance Structure and Buyer-Supplier Relationships

2.3.1 Electronic Markets and Electronic Hierarchies

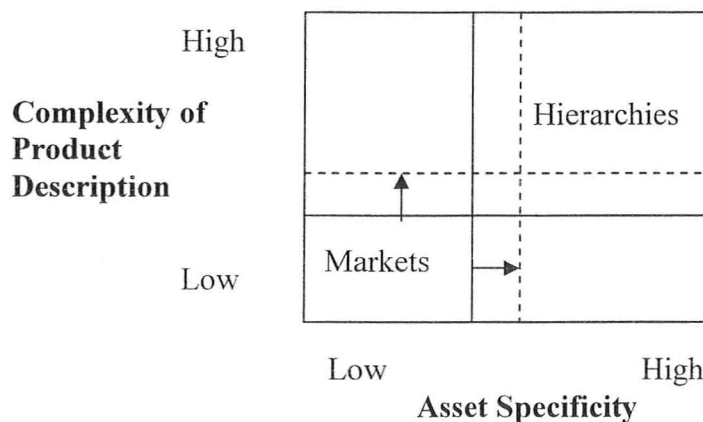
Inter-organizational systems (IOSs) are information systems (IS) built to support inter-organizational economic activities. Examples of IOSs include EDI (Electronic Data Interchange) and networked B2B applications. In recent years the IS literature has experienced an ongoing debate on the impact of IOSs on buyer-supplier relationships and organizational governance structure (Cunningham and Tynan 1993; Choudhury and Hartzel 1998). The focus has been on whether IOSs support market or hierarchical governance structure.

Early researchers argued that IOSs favored market-like relationships between firms since IOSs would reduce coordination costs of market exchanges (Malone, Yates et al. 1987; 1989; Garicano and Kaplan 2001); (Evans and Wurster 1997). Malone and Yates (1987) introduced the concept of electronic markets and electronic hierarchies. IT-enabled markets and hierarchies are called electronic markets and electronic hierarchies, respectively. Researchers have generally concluded that there is more reduction of transaction costs in markets than in hierarchies, causing a shift from electronic hierarchies to electronic markets. Two important factors, *asset specificity* and the *complexity of product description*, have been used to justify why electronic markets are favoured over electronic hierarchies. Since the concept of asset specificity was already introduced in the previous section, we will focus here on complexity of product description.

Complexity of product description refers to the amount of information needed to specify the attributes of products, which are needed by buyers to make a selection. For example, the description of a car is more complicated than a share of stock, for which the description is highly standardized and relatively simple. When the product description is complex, it is more easily acquired through hierarchies, due to closer communication and coordination in hierarchies, and the lack of coordination in markets.

The shift to electronic markets has happened due to reduced transaction costs in markets in handling high asset specificity and complex product description. First, IT makes possible general-purpose equipment and IT investment, flexible manufacturing technology such as modularized production, and mass production, so asset specificity is less of a problem. Second, databases, high-bandwidth communications, and rich media alleviate the problem of high product information communication needs for complex products. In this way, an electronic marketplace solution is able to handle more asset specificity and product complexity without incurring significant transaction cost (see Figure 2.3).

Figure 2.3 Increased Scope for Electronic Markets



Malone and Yates (1987) also suggested three effects of electronic linkages: electronic communication effects, electronic brokerage effects, and electronic integration. Electronic communication effects refer to the reduction in time and cost of communication; electronic brokerage effects refer to the ability of electronic intermediaries to match buyers and sellers at a lower cost, higher quality and speed; and electronic integration refers to improved business processes. They argued that both electronic communication and brokerage effects would favour market-like relationships, and electronic integration would favour hierarchies. They argued that, since the former two effects were more significant than electronic integration effects, EMs should lead to a more market-like structure for inter-firm relationships.

Evans and Wurster (1997) predicted the demise of hierarchies using the notions of “reach and richness”. Reach refers to the number of people who are exchanging information. Richness refers to the depth of information itself, defined by bandwidth, customization, and interactivity. Traditional markets facilitate reach at the sacrifice of richness, and vice versa for hierarchies. Electronic markets enable organizations to extend their reach, often with a negligible sacrifice of richness, thus making hierarchies less attractive.

By exploiting the benefits of IT, more and more firms have outsourced some of their activities and focused more on the firms’ comparative advantages (Porter and Millar 1985; Bakos and Treacy 1986; Benjamin and Wigand 1995). Increased outsourcing is often accepted as evidence in favour of EMs. However, as we will see later, outsourcing activities did not lead to electronic markets, but instead to increased reliance on business partners and network organizations.

2.3.2 Move to the Middle and Network Organizations

Coincidentally with the prediction of a shift from electronic hierarchies to electronic markets, there was an observed phenomenon that firms now tend to use a reduced number of suppliers (Bakos and Brynjolfsson 1993; Clemons, Reddi et al. 1993). Clemons and Reddi (1993) proposed a “move to the middle” hypothesis to explain this change. The move to the middle is a double move: away from the vertically integrated organization to a higher degree of outsourcing, and at the same time away from markets towards a situation that relies on fewer cooperative partners. Even Williamson admitted that “*transactions in the middle are much more common*” (Williamson 1985).

Although markets have the benefits of finding more buyers and suppliers and lower prices, the changing economic environment (Vengerov 2001) (quickly changing technology, reduced product life cycles, increased new entrants, etc.) and new business practices such as Just-In-Time (JIT) and Total Quality Management (TQM) are addressed more to quality than to price. In transaction cost language, although the large numbers condition of electronic markets is already at hand and will benefit some firms with lower transaction costs and more bargaining power, they still choose a small numbers condition

that will reduce their bargaining power automatically. Why? The secret lies in the *non-contractible factors* (Bakos and Brynjolfsson 1993). In Bakos and Brynjolfsson’s work, contractible factors (contingencies that can be specified in contracts) are identified as price and fit (non-price attributes that can be specified in contracts). Non-contractible factors are those contingencies that cannot be specified in contracts, and cooperation of suppliers is required if changes are needed during contract execution. Most non-contractible factors are not quantitative in nature, and some examples are summarized in table 2.1. In order to access these non-contractible factors, buyers have to provide incentives for suppliers to make the necessary investments, since they typically require trading partners to make relationship-specific investments. These incentives can be affected by moving to a small numbers condition – that is, keeping only a few suppliers but maintaining long-term relationships with them. For buyers, when this happens, suppliers are not only suppliers; they are partners, and this change is gained through a self-reduction in buyer bargaining power.

Table 2.1 Contractible Factors vs. Non-Contractible Factors

Contractible Factors	Non-Contractible Factors
Price	Quality
Volume	Trust
Other attributes of “fit”	Responsiveness
	Information Sharing
	Innovation

Source: (Bakos and Brynjolfsson 1993)

Most of the non-contractible factors mentioned in the table are self-evident. A detailed explanation is needed for one factor, trust, since there are different types of trust, and certain types are more relevant to this thesis than others. Kini and Choobineh (1998) summarized three types of trust in eCommerce research: individual trust (people have a natural tendency to trust); impersonal trust (also called institution-based trust, such as control mechanisms built by an EM operator, or eCommerce laws) and relationship trust (trust depending on the expectation that an event will occur). Individual trust is about a person’s general attitude toward trust. Individual trust is less relevant to this paper since

our focus is business-to-business transactions. Impersonal trust arises when no familiarity between firms is available but some structural arrangements allow subjective expectations of a firm's credibility (Pavlou 2003). It is mostly seen in exchanges characterized by discrete transactions. Relationship trust is built on high familiarity, interdependency, shared value, and continuity of interaction, and fostered by repetitive transactions. Many authors have argued that trust is only embedded in repetitive transactions and ongoing relationships, essentially arguing that impersonal trust is not a true form of trust but a functional substitute for it (Granovetter 1985). In this thesis, trust as a non-contractible factor is defined as relationship trust. Impersonal trust may also be involved in addressing market-oriented functionalities in EMs (a definition is provided in Chapter 3), which are characterized by discrete transactions and, in some cases, anonymous traders.

The "move to the middle" suggested by Clemons and Reddi results in another type of governance structure: network organizations. Network organizations link two or more organizations together by outsourcing certain non-core activities such as manufacturing, distribution, etc., often resulting in tight and strategic relationships among the partners (Gulati 1998). The concept of network organizations is not directly on the continuum between markets and hierarchies. The network organization is a new form of organization, different from "*both the familiar alternative of arms' length market contracting and the former ideal of vertical integration.*" (Powell 1990). In markets and hierarchies, trust is assumed to be low and opportunistic behavior is curbed by relatively complete contracts or an internal audit mechanism. However, in a network organizational structure, mutual benefit and the desire for good reputations tend to curb opportunistic behavior, and trust is assumed to be high. There has been a phenomenal growth in applications of network organizations during the last decade (Gulati and Gargiulo 1999), with the number of U.S. business alliances increasing at the rate of 25% per year during much of the 1990s (Harbison and Pekar 1998). More detailed characteristics of network structures are compared with markets and hierarchies in table 2.2.

The “move to the middle” and network organization argument is further confirmed by empirical evidence. Through the examination of some open network-based IOSs in France and the United States, Steinfield et al showed evidence that even open networks were typically used to support hierarchical relationships (Steinfield, Kraut et al. 1995; 1996). These authors then suggested that the electronic integration effect of IOSs was greater than electronic communication and brokerage effects, favouring hierarchical relationships over market relationships. Their definition of hierarchal relationships includes network organizations as well.

2.3.3 Mixed Mode Network Structure

Holland and Lockett (1997) complemented the network organization theory by suggesting that the use of pure hierarchies, markets, or network organizations suffers from being too simple and unable to be mapped into the real world. Their work extended the idea of these pure forms of markets, hierarchies or network organizations into a mixed mode network structure, which blended the components of classic organizational design. This dynamic model suggests that, based on the degree of market complexity and asset specificity, a firm chooses its coordination strategy, which may be a hybrid of markets, hierarchies and all possible network forms of organizations.

2.4 Supply Chain Management

The supply chain management literature indicates that there is a trend towards building supply networks linking all relevant suppliers together, and supply chain integration. Supply chain integration has two aspects: a) integration of the supply chain into the firm’s own internal business processes (intra-organizational integration) and b) integration of the supply chain with other firms (inter-organizational integration) (Horvath 2001). A properly implemented supply chain strategy requires consideration of the entire firm, from marketing to product design groups, all the way through to the accounts payable department. Inter-organizational supply chain integration is not secured

Table 2.2 Comparison of Hierarchies, Networks and Markets

Firm Attributes	Hierarchies	Networks	Markets
Purpose	<ul style="list-style-type: none"> • Advance the interest of a central executive • Reduce transaction costs 	<ul style="list-style-type: none"> • Advance the interest of cooperative groups of organizations • Complementary resources and strengths • Gain comparative advantage 	<ul style="list-style-type: none"> • Individual interest conflicts and compromises • Forum for transactions
Asset and resources	<ul style="list-style-type: none"> • Highly asset specific, not easily traded • Slack resources, buffer stock • Fixed, largely tangible assets 	<ul style="list-style-type: none"> • Moderate to high asset specificity • Few slack resources • Flexible, more tangible assets 	<ul style="list-style-type: none"> • Low asset specificity • Easily traded
Conflict resolution	<ul style="list-style-type: none"> • Administrative fiat 	<ul style="list-style-type: none"> • Reciprocity considerations: reputation and recurring contracts 	<ul style="list-style-type: none"> • Courts, legal system • Market norm
Relationship	<ul style="list-style-type: none"> • Ownership or long-term • Low trust • Dependent, fixed 	<ul style="list-style-type: none"> • Interdependent, long-term • Flexible • High trust 	<ul style="list-style-type: none"> • One time ties • Short-lived • Low trust
Communication	<ul style="list-style-type: none"> • Routine, through vertical channels • One-to-many • Total cost is low 	<ul style="list-style-type: none"> • Relational, direct communication as needed • Many to many • Total cost is medium to high 	<ul style="list-style-type: none"> • Through price mechanism • Many to many • Total cost is high
Motivation	<ul style="list-style-type: none"> • Low: fixed wage • Central control 	<ul style="list-style-type: none"> • High: benefit from reciprocity or exit from partnership • Partnership, complementary expertise 	<ul style="list-style-type: none"> • High: survival or exit the market • Competition

Source: adapted from Alstyn (1997) and Powell (1990)

through the traditional vertical integration (forward and backward integration). Traditional vertical integration only covers a limited span of the supply chain. However, through outsourcing and collaboration, firms can now focus both on their competitive advantages and benefits from integrated supply chains (Archer 2001). This new type of inter-organizational supply chain integration demands closer supplier and buyer relationships (Cox, Sanderson et al. 2001; Dainty, Briscoe et al. 2001), where there are information needs from both demand and supply chains. The traditional competition scenario between firms has been changed into a competition between supply chains (Hughes, Ralf et al. 1999).

The trend towards integration in supply chain management also coincides with the trend towards networked structures. In fact the need for integrated supply chains results in a network organization (supply network) characterized by organizational learning and collaboration, information sharing, and shared risks and opportunities.

2.5 Power, Politics and MIS implementation

When network organizations and IOSs are considered, power is too important to be ignored (Thorelli 1986). Many researchers suggest that there are both *economic* and *political* aspects of inter-organizational relationships (Benson 1975; Stern and Reve 1980). TCT and network organization theory focus on explaining the economic side of inter-organizational relationships: why a firm chooses different governance structures. The political aspect of inter-organizational relationships explains the role of power in the management of a governance structure, including the adoption decision of an information system to support such a governance structure. A review of power and its applications in IS research will enrich an understanding of inter-organizational relationships and their role in EM adoption.

There is no agreement on the definition of power and, most of the time, power holds the same meaning as influence, dominance, submission, status, centrality and authority. Emerson (1962) defines power as a concept coexisting with dependency. “*The power of actor A over actor B is the amount of resistance on the part of B which can be*

potentially overcome by A” (Emerson 1962). Emerson also argued that power could exist without dominance (imbalanced power), and reciprocal interdependent relationships could also have power (balanced power), which meant power could be operative in both directions.

Jasperson et al (2002) also suggested that researchers used different concepts and approaches to analyze power. They adopted a different approach from Emerson that promotes a common definition of power, by summarizing and categorizing all power-related concepts, and describing power in five common themes: authority, centralization and decision rights, influence, politics, and others such as institutional power and interpretive power. This thesis adopts the definition that power is the ability to control the decisions of others (Wrong 1968; Provan, Beyer et al. 1980), since all five themes mentioned in Jasperson et al’s paper can fit under this definition.

There are different ways to explain the sources of power, some of which are theoretical, and some of which are for the purpose of operationalizing the power construct. Emerson’s definition of power (Emerson 1962) has already suggested a source of power: dependence on others, but the problem is where the dependency comes from. Porter (1980) suggested different sources of power for buyers and sellers when analyzing the attractiveness of an industry. **Buyer power** comes from buyer concentration and dominance, price sensitivity, volume of purchasing, substitute suppliers to choose from, switching cost, and threats of backward integration. **Seller power** comes from seller concentration and dominance, volume of sales, product differentiation, switching cost, and threats of forward integration and buyer information.

To identify the sources of power from an operationalization perspective, there are two approaches (Frazier and Rody 1991): the sales and profit approach (Kale 1986), and the role performance approach (Frazier 1983). The sales and profit approach is reflected by (1) a firm’s current contribution to its trading partner’s sales and profit, (2) the firm’s expected contribution to its trading partner’s sales and profit in the future, and (3) the availability of alternatives to replace the supplier. The role performance approach is reflected by a firm’s perception of its trading partner’s performance. The higher the

firm's perception of trading partner performance, the higher the power of this trading partner.

The concept of power and its role in Management Information Systems (MIS) research, especially MIS implementation, has been widely studied. Power has also been studied in both organizational and inter-organizational settings. Markus' classic case study (Markus 1983) compared three theories in an organizational setting: technology determinism, human determinism, and interaction theory, to determine why employees resisted the implementation of a Financial Information System (FIS), and found that interaction theory was the best explanation. When people changed their positions, their interests changed, and their attitudes toward the FIS changed from resisters to advocates, because advocating the FIS would now reinforce their position and power. The fact that information technology (IT) can cause power changes, leading to significant resistance by the parties who would lose their power, has been seen in many industries (Burkhardt and Brass 1990; Hart and Estrin 1991; Clemons and Row 1993).

The increasing attention to power occurred with the increased advent of network organizations and implementation of IOSs. Power has been studied widely in the adoption of IOSs, mainly EDI. Premkumar et al's (1995) study found strong evidence for competitive pressure and exercised power in affecting a firm's decision to adopt EDI. Other works that support the influence of power in affecting EDI adoption include (Iacovou, Benbasat et al. 1995), (Iskandar, Kurokawa et al. 2001), (Hart and Saunders 1997) and (Teo, Wei et al. 2003).

2.6 Summary of the Literature Review

We started this chapter by introducing two economic concepts, markets and hierarchies, followed by a brief explanation of TCT. Three important constructs: uncertainty, asset specificity, and transaction frequency, were introduced. We explained how these three factors could affect an organization's decision to use markets or hierarchies.

The impact of IT on organizational governance structure was addressed. The conclusion was that network organizations were favoured over pure markets and hierarchies. The literature on network organizations and supply chain management was then introduced to explain the current trends in buyer-supplier relationships. Network organization literature suggests another important construct that can affect a company choice of governance structure: non-contractible factors. Finally the power perspective of buyer-supplier relationships was studied to explore its role in MIS implementation research.

CHAPTER 3. BUYER-SUPPLIER RELATIONSHIPS AND ELECTRONIC MARKETPLACES: A FRAMEWORK FOR ADOPTION AND IMPACT

In this chapter, a theoretical framework is developed that generates all the propositions related to the research questions in this study. Before presenting such a framework, the functionalities of EMs are described, according to the relationships they support. Since the issue of EM adoption and impact from the buyer-supplier relationship perspective is being examined, it is natural to classify these functionalities according to the relationships they support. This classification of EM functionalities builds the foundation for the framework.

3.1 Electronic Marketplace Functionalities and Relationship Dimensions

3.1.1 Buyer-Supplier Relationships Defined

Since the discussion in this section is based on buyer-supplier relationships, it will first provide an explanation of buyer-supplier relationships. Buyer-supplier relationships are inter-organizational strategies employed by buyers and suppliers to exchange goods and services. Based on the literature review of governance structure, buyer-supplier relationships can be classified as either short-term or long-term. Short-term relationships are adversarial and arms-length (MacDuffie and Helper 2003). These relationships are characterized by price reduction, low relationship-specific investment, little trust, little information sharing, and little commitment from both parties to the relationship. Long-term relationships are collaborative partnership-like relationships (MacDuffie and Helper 2003). These relationships are usually characterized by resource dependency, much information sharing, high relationship specific investments, and high commitment from both parties (Buvik and Gronhaug 2000; Jap 2001; Cousins 2002).

Described by the language of the literature, short-term relationships rank close to true marketplaces on the continuum of governance structure, while long-term relationships are closer to network organizations and hierarchies, and rank high on the continuum of governance structure. A buyer that is constantly purchasing goods or

services from a supplier on a spot basis, without a continuing contractual relationship⁴ of any type is not involved in a long-term relationship. This buyer is not committed to the relationship, and maintains the option of switching to other suppliers at any time. On the other hand, if there is a long-term relationship between the buyer and supplier, there is a negotiated contract for some specified period, and both parties collaborate from time to time to develop plans and forecasts, and to resolve problems related to products, delivery, or costs.

3.1.2 EM Functionalities

Functionalities are the solutions that an EM operator offers to its clients in order to facilitate transactions and interactions between them. Functionalities of EMs have been discussed widely. Archer and Gebauer (2002) provided some examples of market functions such as aggregation, catalog management, protocol/format translation, sourcing solutions, and providing market information. Choudhury and Hartzel (1998) suggested that an EM could support the following functions: identification (identifying a set of potential trading partners), selection (accessing price and product information, and contacting sellers or buyers), and execution (facilitating the transaction). Bailey and Bakos (1997) grouped functions of intermediaries into aggregation, matching, facilitation, and trust. Bakos (1998) provided a slightly different classification: matching buyers and sellers, facilitation of transactions, and building institutional infrastructure.

None of these summaries of EM functionalities capture the importance of buyer-supplier relationships, so a slightly different classification of EM functionalities will be investigated. Currently, EMs may offer functionalities supporting either or both short-term and long-term relationships, and these can be defined as market-oriented and collaboration-oriented functionalities, respectively. A distinction between major services and supporting services will be that a major service must be provided to qualify the operation as an EM, while supporting services are optional. Supporting services, sometimes called value added services, can add value to an EM, and sometimes can even

⁴ These contracts are not necessarily legally binding contracts. It can also be an oral agreement or relational contract (The term “relational contract” was first conceptualized by Simons (Simons, H. 1951), and characterized by informal agreements and unwritten codes of conduct that powerfully affect the behaviors of firms (Baker, G., R. Gibbons, et al. 2002)).

become an EM’s major revenue source. Examples of these functionalities are provided in Table 3.1 and explained in the following.

Table 3.1 Functions of Electronic Marketplaces

Functions		Major Services	Supporting Services
Market-oriented functionalities	Aggregation	<ol style="list-style-type: none"> 1. Aggregating multiple buyers and suppliers 2. Providing product catalogues (Accessible to all participants) 3. Product listing 	<ol style="list-style-type: none"> 1. Information such as directories, news 2. Catalog management 3. Product suggestion and purchasing decision support 4. Negotiation: contract management 5. Transaction support: payment, transportation, order tracking and order management 6. Data integration 7. Trust and legal enforcement
	Match-making	<ol style="list-style-type: none"> 1. Matching buyers and suppliers 2. Price discovery; dynamic pricing such as auctions and reverse auctions 	
Collaboration-oriented functionalities	Collaboration (Transaction level)	<ol style="list-style-type: none"> 1. Private catalogues in public network (Restricted access, always coupled with transaction facilitation) 	
	Collaboration (Strategic level)	<ol style="list-style-type: none"> 1. Product life cycle management 2. Supply chain collaboration 3. Project management 	

(1) Market-Oriented Functionalities

Market-oriented functionalities focus on creating a competitive market. These functionalities may include facilitating search, making market information available to

competitive buyers and sellers, helping contract negotiations, and providing pricing mechanisms. Such activities support arms-length, adversarial relationships between buyers and sellers. There are two kinds of market-oriented functionalities: aggregation and market matching (Bakos 1998; Andrew, Blackburn et al. 2000; Kerrigan, Roegner et al. 2001). In aggregation, EMs support the aggregation of multiple buyers and suppliers in one online site, including product catalogues and search facilitation. Examples of such applications include company directories, product listings, and public product catalogues that can be accessed by all participants of an EM.

Market matching functionalities are supported by EM operators to leverage better knowledge about market demand and supply, in helping participants to locate appropriate trading partners (Bakos 1998). EMs can also offer price discovery mechanisms such as dynamic pricing. Compared with aggregation, market matching implies a more active role in EM operations. Applications that support this market matching include forward and reverse auctions, RFX (Requests for Quote, Requests for Information, Requests for Bid, etc.), and real-time bid and ask (Andrew, Blackburn et al. 2000). However, we also use a dashed line in table 3.1 between market-oriented and collaboration functionalities, since market-oriented functionalities such as reverse auctions and RFX are sometimes also used to support long-term relationships.

There are numerous supporting services focusing on purchasing decision support, transaction fulfillment, transaction negotiation, and building trusted environments. Table 3.1 lists such supporting services according to the transaction phases. The first phase of a purchase is information gathering, so EMs provide supplier directories, industry news, and quotes to help participating organizations to gather market intelligence. Product catalogs always contain critical information and need to be cleaned, digitized, published, and updated. If a company does not have the expertise to do product content publishing and updating, EM operators can help them with this.

In the purchasing decision phase, some EMs provide suggestions on product selection. This service is especially important for heavily engineered products, complex products, and complex inputs required in production processes. *Partminer*⁵ is such an EM. It provides a bill of materials management service to keep users updated on which parts are needed and what parts are suitable to choose.

In the contract negotiation phase, an EM can support contract management services, such as providing standard terms, and reminding participants of special legal issues (such as *Broadlane*⁶). After each transaction is agreed, the next step is to execute it. Transaction fulfillment includes the ability to place an order online, arranging bill payments and transportation, and order tracking. Some EMs also offer order management and reporting services based on a participant's order history. Transaction fulfillment is more and more seen as an essential function of a good EM.

Trust can be a problem in the use of market-oriented functionalities, since participants may not know each other's history and credit rating, and some transactions are anonymous in nature. These include financial instrument trading, commodities trading as with agricultural products and metals, and some auctions where participants do not want to expose their identity. Relationship trust does not exist between trading partners using market-oriented functionalities. In these cases, EMs enhance impersonal trust as a substitute for relationship trust by providing participant credit ratings (e.g. *Alibaba.com*), asking for deposits to enforce contracts, arranging payments in a secure way, and inspecting used products being offered for sale.

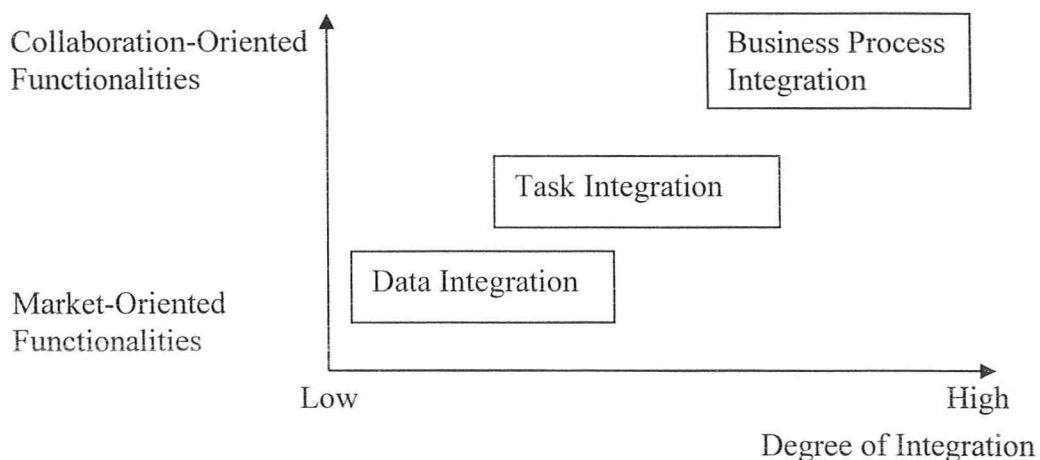
Integration is an important aspect of supporting activity, and it has been claimed that it will be a key success factor for EMs in the future (Samtami 2002). Integration is defined as "*the degree to which a transaction flow or business interaction through a network reaches its intended destination without impairment of its function, content or meaning*" (Samtami 2002). The benefits of participant system integration with an EM are lower implementation costs (compared with private networks) and reduced switching costs within this EM environment due to the adoption of the EM system as a standard.

⁵ www.partminer.com

⁶ www.broadlane.com (An EM in the healthcare industry that provides contract management).

Different functionalities require different level of integration. There are three levels of integration: data integration, task integration and business process integration (Stelzer 2001). **Data integration** focuses on integrating multi-supplier product catalogs, requests for quotations, purchase orders and invoices, and requires agreements on syntax and semantics of business documents. **Task integration** enables automated update of multi-supplier product catalogs, online availability checks, and requires agreements on mechanisms to execute business tasks. **Business process integration** requires agreements on management of business processes, and is often used in supply chain management, JIT production, and collaborative product development. The degree of integration increases from data integration to task integration to business process integration, as does the cost of integration and the commitment needed in making integration successful. Data integration is more suitable for market-oriented functionalities, since the requirement for investment is less and companies are more autonomous in this approach (Figure 3.1). Business process integration and task integration require high upfront investment, but once this capability is built, it will be more robust, flexible, and will give trading partners more competitive advantage. So business process integration is more suitable for the collaboration-oriented functionalities that will be addressed shortly.

Figure 3.1 Integration and EM Functionalities



(2) Collaboration-Oriented Functionalities⁷

Collaboration-oriented functionalities focus on streamlining business processes between business partners (Andrew, Blackburn et al. 2000; Phillips and Meeker 2000). These functionalities are mostly used to facilitate collaborative long-term relationships, because streamlining business processes requires trust, investment, and commitment that are only available in long-term relationships. There are two levels of collaboration-oriented functionalities: transactional level and strategic level (Phillips and Meeker 2000). Transactional level collaboration functionalities focus on streamlining the order fulfillment process, such as order placement, order management, payment, and order tracking. This functionality is currently offered by most EMs, and it is frequently seen in *private catalogues*. Private catalogue applications differ from the public catalogues mentioned above in market-oriented functionalities, due to their pricing and access restrictions. In public catalogues, every member of the marketplace has access, and prices are the same for all members. A private catalogue is built specifically for a buyer and the suppliers it specifies. Custom prices, contract terms, and ordering rules may be built into business processes supported by an EM (Arvin, Beall et al. 2002). A private catalogue is also called a private aggregation (Dai and Kauffman 2000) and must be coupled with transaction facilitation and integration to be effective. Through private catalogues, buyers pursue operational efficiency and reduced administrative costs, while forgoing the benefits of searching. But public catalogues can benefit users by facilitating search for lower prices or specific product characteristics among potential trading partners.

Strategic level collaboration functionality also facilitates business processes between trading partners. Since different industries have different collaboration needs, the applications of such functionalities differ from one EM to another (Andrew, Blackburn et al. 2000; Phillips and Meeker 2000). For example: collaborative planning, forecasting and replenishment (CPFR) is offered by EMs in the retail industry to reduce out-of-stock risk while at the same time reducing inventories; project management is

⁷ Some of the materials in this section are based on the researcher's published work, Wang, S. and N. P. Archer (2004). *Supporting Collaboration in Business-to-Business Electronic Marketplaces*. Information Systems and E-Business Management 2(2), 271-288. Due to limited space, only a brief description of EM collaboration functionalities is provided in this section. Interested readers can refer to this work for more information.

offered in the construction industry to coordinate building activities; collaborative product development is offered in the aerospace and defense industry to facilitate the design of aircraft and parts; quality management is offered in the automotive industry to control the quality of thousands of parts from hundreds of suppliers; and private logistic networks are offered in the transportation industry to keep carriers and forwarders informed of the status of shipments. The detailed design of these functions depends on specific industries, and demands a high degree of domain expertise (Andrew, Blackburn et al. 2000; Chow, Ghani et al. 2000; Phillips and Meeker 2000; Arvin, Beall et al. 2002). Currently, market-oriented functionalities are increasingly seen as a necessity for EMs, while collaboration-oriented functionalities provide opportunities for EMs to gain competitive advantage (Andrew, Blackburn et al. 2000).

There are several supporting activities for collaboration-oriented functionalities, such as business process integration and task integration, document management, and protocol/format translation. Business process integration and task integration require high upfront investments, but once this capability is built, it will be more robust, flexible, and will give trading partners more competitive advantage (Samtami 2002)(Figure 3.1). Document management is used in portal-type and project-type applications to help participants to structure document creation and usage activities.

Many EMs offer both market-oriented and collaboration-oriented functionalities, thus forming a kind of hybrid EM. Appendix B provides examples of three types of EMs in 22 industries. All these EMs were chosen from *Forbes*⁸ and *Line56.com*⁹ corporate profiles. This review found that market-oriented EMs are the most common, and pure collaboration EMs are the least common. There are 9 industries where only pure market-oriented EMs exist, and interestingly their products fall into three categories: commodities or highly standardized products (such as computers, metals, MRO, telecommunication, and financial trading industries), highly customized products (such as real estate) and special products such as excess inventory and industrial equipment.

⁸ www.forbes.com/bow/b2b/main.jhtml

⁹ www.line56.com

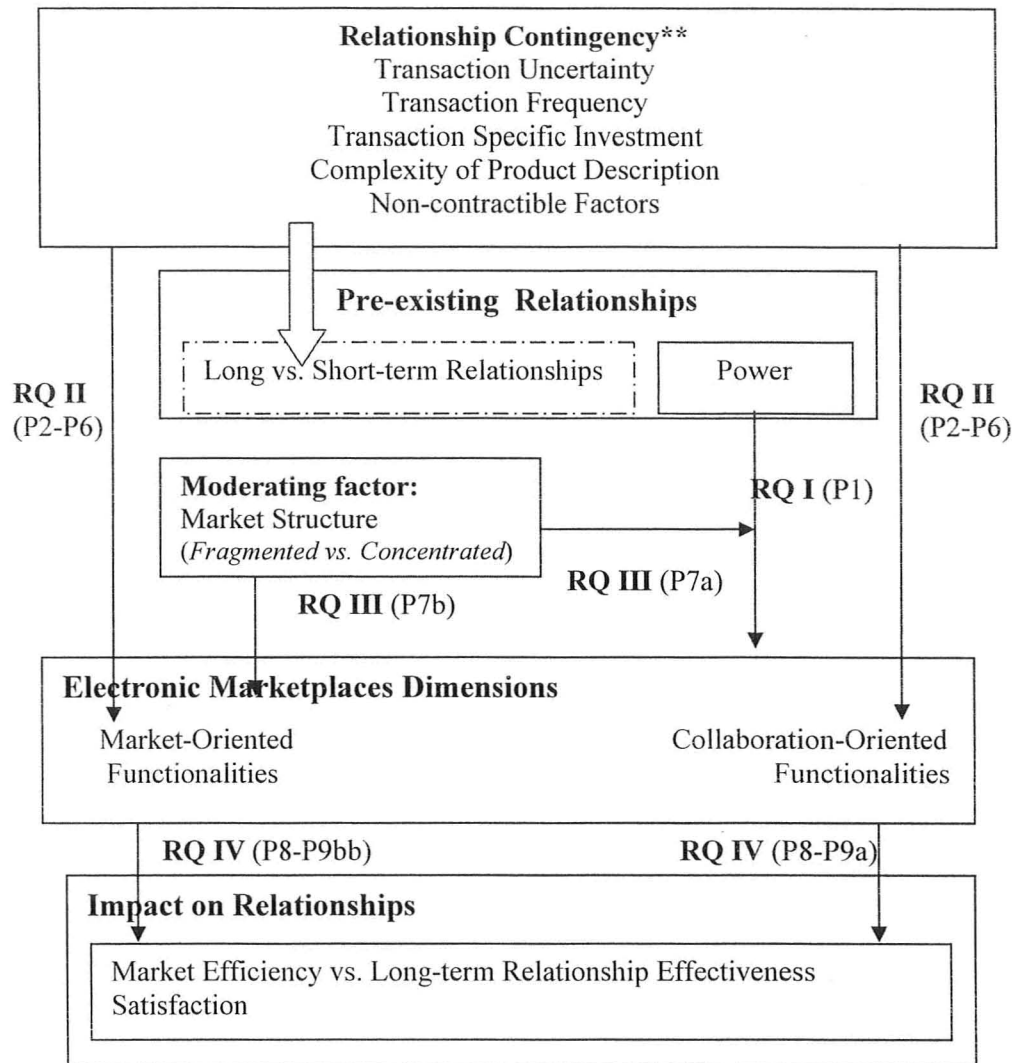
There is also a pattern in EMs that offer pure collaboration, such as EMs in the automotive, construction, logistics & transportation, and retailing industries. The common characteristic of these industries is that many suppliers, engineers or other third parties get involved in the supply chain. In a sequential supply chain such as the automotive and retailing industry, the number of suppliers involved make it uneconomic to negotiate contracts every time when there is a need, thus encouraging these companies to streamline their contractual businesses. In project-oriented supply chains, such as in construction, logistics and transportation industries, both ad hoc collaboration and long-term collaboration are possible with EM facilitation. This research will focus on major functionalities and services and industries with sequential supply chains, and will explore the factors underlying decisions to adopt market-oriented and collaboration-oriented functionalities in more detail in the following section.

3.2 Buyer-Supplier Relationships and Electronic Marketplaces: A Theoretical Framework

Figure 3.2 presents an overview of the framework that is proposed around the four research questions to this research. In Figure 3.2, the Roman numbers represent research questions, and the numbers in the brackets are the corresponding propositions that state the relationships between relevant constructs, which are provided in the box. These constructs and their proposed relationships serve as answers to the research questions.

- RQ I. How do pre-existing relationships with business partners affect the adoption of an EM?
- RQ II. What are the important factors affecting the choice of EM functionalities, given that different functionalities support different types of buyer-supplier relationships?
- RQ III. How does market structure affect the adoption of an EM and its functionalities?
- RQ IV. How does the use of different functionalities affect buyer-supplier relationships?

Figure 3.2 The Interaction Between Buyer-Supplier Relationships and Electronic Marketplaces¹⁰



¹⁰ RQ I) How do pre-existing relationships with business partners affect the adoption of an EM? (This question is addressed by Propositions 2 through 6)

RQ II) What are important factors affecting the choice of EM functionalities, given different functionalities supporting different types of buyer-supplier relationships? (This question is addressed by Proposition 1)

RQ III) How does market structure affect the adoption of an EM and its functionalities? (This question is addressed by Propositions 7a and 7b)

RQ IV) How does the use of different functionalities affect buyer-supplier relationships? (This question is addressed by Propositions 8, 9a and 9b)

** These constructs can also determine what kind of relationships (governance structure) are chosen by companies before the adoption of EMs, but the connection between constructs and types of relationships is not considered in this thesis.

This figure presents a comprehensive view of the interaction between buyer-supplier relationships and EM adoption: how buyer-supplier relationships affect the adoption of EMs and the choice of different functionalities, and how the use of EMs impacts buyer-supplier relationships. It is expected that power imbalance within pre-existing buyer-supplier relationships will affect the adoption of EMs. Some contingencies of buyer-supplier relationships, such as transaction uncertainty, transaction specific investment, transaction frequency, complexity of product description, and non-contractible factors affect the choice of different functionalities. It is also expected that the use of different functionalities will impact buyer-supplier relationships by increasing relationship efficiency and effectiveness, resulting in different levels of satisfaction among trading partners. In the following sections, a series of propositions will be introduced that relate to the interactions shown in Figure 3.2, and the remainder of the thesis will discuss the validation of these propositions through data gathered from five electronic marketplaces and their participants.

RQ I. How Do Pre-existing Relationships Affect the Adoption of Electronic Marketplaces?

Before a company adopts an EM, it has already built various types of trading relationships with its business partners. These pre-existing relationships are often characterized by power imbalance. Power significantly affects the management of buyer-supplier relationships (Benson 1975; Reve and Stern 1979; Stern and Reve 1980), since power is the distribution of authority by which one can influence management decisions among networked trading partners.

Power

Power is an important driving force in the adoption of inter-organizational systems (IOS), including EMs (Markus 1983; Jasperson, Butler et al. 2002; Christiaanse and Markus 2003). Power is defined as the capacity to control the decisions of others. The sources of power are dependence, the availability of substitutes, authority, dominance, centralization and linguistic influence (Emerson 1962; Jasperson, Butler et al.

2002). As a characteristic of buyer-supplier relationships, inter-organizational power can greatly speed the adoption of IOSs (Iacovou, Benbasat et al. 1995; Hart and Estrin 1991; Clemons and Row 1993).

Two forms of power can affect the adoption of IOSs: *potential power* and *exercised power* (Provan, Beyer et al. 1980; Premkumar and Ramamurthy 1995). Although power is defined as the capacity to control the decisions of others, power does not have to be exercised to exist (Hart and Saunders 1997). The presence of potential power may be enough to affect a subject company's adoption decision. Potential power can exist between trading partners with direct business relationships, or with potential relationships where there is a hope of developing business with the more powerful companies in the future (Frazier 1983; Frazier and Rody 1991).

In EM adoption, potential power can come from two sources: dominance and buying power. Companies with significant power are also called key players in EM adoption decisions (Koch 2002). With the presence of dominant companies in an EM, even subject companies without direct business relationships will join in the hope of attracting future business. Buying power and dominance are in fact reflected by liquidity and critical mass, and measured by transaction volume (Somasundaram 2004). Normally, liquidity and critical mass are measured by the number of participants. In this sense, power stimulates the adoption of an EM by increasing the overall value of the EM, which is characterized by network externalities: the value of an EM increases when the purchases conducted through this EM increase. This increase in EM value is likely to influence the decisions of subject companies who may wish to attract more business from powerful companies who are already participants.

Powerful companies may also exercise power to influence a subject company's IOS adoption, including both persuasive power and coercive power (Boyle, Dwyer et al. 1992; Hart and Saunders 1997; Teo, Wei et al. 2003). Persuasive power focuses on the rewards or benefits of making a change desired by the more powerful companies, while coercive power focuses on the penalty of not following their suggestions. In the adoption of IOSs, persuasive power is measured by the perceived quality of the more powerful

company's assistance. Financial support and promise of more business are the most effective ways to motivate subject companies. For example, powerful companies can send experts to subject companies to help them deploy information infrastructures, or negotiate with EM operators to lower the prices charged to their smaller partners.

EMs aggressively recruit large companies. For example, EMs in the healthcare industry recruit buying power by signing contracts with Group Purchasing Organizations (GPOs) (Anonymous 2003). The proliferation of consortia-based and private EMs also suggests the importance of leveraging power to achieve relatively high adoption in a short period of time. A study based on a market-oriented jewellery EM showed that, although suppliers had increased suspicion of opportunistic behaviors by buyers (Grewal, Corner et al. 2001), they still chose to join the EM because they were afraid of losing business, and hoped to develop long-term relationships with big buyers that also participated.

***Proposition 1:** Subject companies are more likely to adopt an EM if companies that exhibit power of any kind are already participating.*

RQ II. How Do Contingencies Underlying Buyer-Supplier Relationships Affect the Strategic Choice of Electronic Marketplace Functionalities?

The introduction to this thesis argued that companies normally do not want to change their existing business relationships in order to adopt an EM. So it is intuitive to think that companies who use long/short-term relationships will perceive collaboration/market-oriented functionalities compatible with their relationship strategy, respectively. Based on this compatibility implication, it may be possible to predict when companies would choose market or collaboration-oriented functionalities, since a company's choice of long/short-term relationships will very likely affect its adoption of different functionalities. Dai and Kauffman (2002) also pointed out that, due to the diverse functions offered by EMs, the choice of functionalities stands out. "*The fundamental issue here (in EMs) is to be able to tell when you will need exchanges and when you will need explicit channel coordination*" (Dai and Kauffman 2002).

In this section, the focus is on the process of how some underlying factors of buyer-supplier relationships affect the adoption of an EM's functionalities (Figure 3.2). Buyer-supplier relationships do not play a direct role here, but serve as a bridge in the analysis of the two sides of the discussion: contingencies and the choice of different functionalities.

The contingencies that justify the formation of long/short-term relationships are applicable in predicting the adoption of different functionalities, since different functionalities support different types of relationships (Christiaanse and Markus 2002; Mahadevan 2002). A literature review of TCT shows that some transaction and product attributes, such as transaction uncertainty, transaction frequency, transaction-specific investment and complexity of product description, can affect a company's choice of governance structure (Williamson 1991). However, because of its human rationality assumption, TCT alone cannot explain why companies form long-term relationships. We therefore include non-contractible factors in the analysis, such as trust, information sharing, quality, supplier innovativeness and responsiveness, which can play an important role in a company's choice of long-/short-term relationships.

Transaction Uncertainty

Uncertainty refers to "*environmental uncertainties, when these become so enormous that they cannot all be considered, presumably exceeding the data processing capabilities of the parties*" (Williamson 1975). Transaction uncertainty represents an important contingency in company governance structure selection. When inter-firm transactions are complex, not all transaction contingencies can be forecasted and specified in contracts, which leaves room for possible future opportunistic haggling if such transactions are conducted in a market environment. In this case, incomplete contracts and long-term relationships with suppliers are more desirable to avoid such haggling and to be adaptive to environmental changes by aligning supportive inter-firm co-ordination (Buvik and Gronhaug 2000). Market uncertainty, including supplier, price and demand variability (Lieberman 1991) (Robertson and Gatignon 1998), production technology (Noordewier, John et al. 1990; Buvik and John 2000) (Robertson and

Gatignon 1998), and product variability (Noordewier, John et al. 1990; Buvik and Gronhaug 2000) are recognized as three important aspects of transaction uncertainty that lead companies to choose long-term relationships.

There is some controversy regarding the effects of transaction uncertainty, (especially market uncertainty), on the adoption of EMs. Some researchers suggest that products with highly variable demand and supply are especially suitable for market-oriented EMs, such as used products and AOG (Airplane on Ground) parts (Choudhury and Hartzel 1998; Dai and Kauffman 2000; Kaplan and Sawhney 2000). However, according to TCT, when faced with highly variable demand, companies tend to develop long-term relationships with their business partners (Buvik and Gronhaug 2000). By this logic, companies facing high transaction uncertainty will tend to choose collaboration-oriented functionalities.

A reasonable speculation is that some uncertainties will lead to the use of market-oriented functionalities, and some uncertainties will lead to the use of collaboration-oriented functionalities. Choudhury (1997) observed that there were three kinds of market uncertainties: technological uncertainty (predictability of what products to purchase), demand uncertainty (predictability of how many to order), and market variability (the rate of supplier and price change). If a company cannot predict what product it needs (for example, the company changes its product specification a lot, or tends to buy a large range of products with each in small volume), it tends to buy from several long-term suppliers who can cover the range of products that it normally needs. Based on these arguments, high technological uncertainty leads a company to choose collaboration-oriented functionalities. If a company cannot predict how many it is going to purchase, they tend to purchase from single source long-term suppliers to get the benefit of rush orders or JIT inventory fill. Demand uncertainty is also moderated by absolute order volume since, the bigger the volume, the worse the consequences of order fluctuation (such as stock outs and excess inventory). When market variability is high, and price and suppliers change frequently, short-term relationship strategy and market-oriented functionalities are usually employed to handle these uncertainties.

Williamson's TCT (William 1975) provides potential theoretical justification for the arguments above. First, a condition for using long-term relationships to absorb uncertainty is the availability of long-term relationships. However, there are two cases where long-term relationships are not available. In the first case, when a company cannot predict what it needs, it tends to buy from several long-term suppliers who can cover the range of products that it normally needs. But for products that the long-term suppliers do not offer and when these products are only occasionally needed by the company, this company has to purchase from short-term suppliers. In the second case, when market variability is high, there is no stable supplier set (for example, many companies can serve as possible occasional suppliers, such as in the used parts market) and prices are highly volatile (each product price depends on negotiation), the availability of long-term relationships is low since trading parties can not even specify whether the buyer will buy from this supplier and what the product prices will be.

Note that uncertainty is a problem because humans have limited ability to reduce uncertainty (leading to bounded rationality). Market-oriented functionalities can help alleviate bounded rationality compared with traditional markets, so that companies will prefer market-oriented functionalities of EMs when long-term relationships are not available. EMs can help alleviate this problem of market variability by setting prices and supporting the search for new suppliers/buyers. For example, huge fixed-cost assets that cannot be liquidated or acquired on short notice (e.g. utilities, manpower or manufacturing capacity) can be sold or acquired through EMs. This is because an EM may be able to give global access to potential suppliers or buyers (greatly reduced bounded rationality). The above discussion about transaction uncertainty leads to Propositions 2a and 2b:

Proposition 2a: *A company is more likely to adopt market-oriented functionalities when it faces low transaction uncertainties, or when transaction uncertainty is high but no long-term relationships are available to absorb this uncertainty.*

***Proposition 2b:** A company is more likely to adopt collaboration-oriented functionalities when it faces high transaction uncertainties, and long-term relationships are available to absorb this uncertainty.*

Transaction-Specific Investments

Transaction-specific investments sometimes explain why companies enter long-term relationships (Williamson 1975). The low transferability of transaction-specific investment causes significant switching costs for the party that makes such an investment, and there are possible opportunistic behaviors of the other party that has not made such an investment. If transaction-specific investments are needed, parties to the transaction maintain long-term relationships for two reasons: to maintain incentives for the investment, and to guard against opportunistic behavior (Williamson 1975). In this case, companies are more likely to be involved in collaboration-oriented functionalities (Mahadevan 2002). This leads to:

***Proposition 3:** A company involved in relationships that require high transaction-specific investments tends to adopt collaboration-oriented functionalities in an EM. Otherwise, it will prefer market-oriented functionalities.*

Transaction Frequency

If products are sourced using short-term relationships through market-oriented functionalities, high transaction frequencies will result in high transaction costs, including search and negotiation costs. So long-term relationships are likely to be preferred by companies in order to reduce the cost of frequent search and negotiation, thus reducing transaction costs and deriving volume discounts (Williamson 1991). It is a common practice for companies to routinize high volume purchases (Choudhury and Hartzel 1998). High transaction frequencies always imply higher transaction volume, which justifies the higher investment demanded by collaboration-oriented functionalities. This discussion on transaction frequency is summarized in Proposition 4:

Proposition 4: *A company purchasing a product frequently will prefer using collaboration-oriented functionalities in an EM. Otherwise, it will prefer using market-oriented functionalities.*

Complexity of Product Description

Complexity of product description refers to the amount of information required to specify the attributes of a product. Complexity of product description is closely related to the describers' domain knowledge. For example, a machine that is hard to describe for an outsider may be very easy to understand and communicate by a person within the industry. In this thesis, complexity of the product description is the perceived product complexity by a person in the industry. In market-oriented functionalities, product information needs to be communicated frequently to a large number of new partners. In this case, the product description needs to be simple (Kenjale and Phatak 2001; Mahadevan 2002). When product descriptions are complex, companies tend to procure through long-term relationships since the suppliers with long-term relationships already have a good understanding of the idiosyncrasy of the products under consideration, making communication much easier (Truong, Le et al. 2002) (Malone, Yates et al. 1987). The above association between the complexity of product description and EM functionalities is summarized in proposition 5.

Proposition 5: *Companies purchasing products with complex descriptions tend to adopt collaboration-oriented functionalities. Otherwise, they will adopt market-oriented functionalities.*

It worth mentioning that EMs can reduce the perceived complexity of product description and allow more complex products to be traded online due to the availability of greater computational and processing power (Malone, Yates et al. 1987). A multiple attribute auction provides an example. In traditional auctions, only the prices of single items can be considered due to the complexity of computing the winning bids. However, online tools can allow for more complex auctions of packages of goods. An online multiple attribute auction can include many product attributes such as quantity and

different quality specifications. Winning bids are calculated according to the utilities of the different bid packages (Bichler 2001). Standards developed or promoted by EMs can also ease the problem of communicating information about complex products using market-oriented functionalities. However, the products are still transacted through collaboration-oriented functionalities when a company perceives its products to be complex and hard to communicate, even with the help of EMs.

Non-Contractible Factors

TCT itself alone cannot explain entirely, based on its human rationality assumption, why companies form long-term relationships. Bakos and Brynjolfsson (1993) suggested that non-contractible factors could explain why companies formed and maintained long-term relationships with business partners. Non-contractible factors are those contingencies that cannot be specified in contracts, and cooperation of suppliers is required if changes are needed in contract execution. Examples of non-contractible factors include trust, quality, information sharing, supplier innovativeness and responsiveness. Mithas et al (2002; 2003) found that non-contractible factors were more important than transaction-specific investments in explaining why companies do not like using reverse e-auctions. Since reverse auctions were treated as a major market oriented functionality in Mithas' paper, the application of non-contractible factors is extended here to explain their adoption in EMs and to propose:

***Proposition 6:** Companies for which non-contractible factors are important will prefer collaboration-oriented functionalities. Otherwise they will tend to adopt market-oriented functionalities.*

RQ III. How Does Market Structure Affect the Adoption of Electronic Marketplaces and Their Functionalities?

Although market structure is not a dimension of business relationships, it is a very important concept in EM development (Phillips and Meeker 2000; Faverie and Vickery 2001; Holzmuller and Schlchter 2002; Mahadevan 2002), and correlates with the

development of buyer-supplier relationships. The most commonly used measurement of market structure is market concentration, gauged by the market concentration ratio, or the proportion of total output in a market that is produced by the four or eight largest companies in the market (VanHoose 2003). For example, the automotive industry is concentrated increasingly towards tier one suppliers and automakers (Fine and Raff 2000), while the construction industry is very fragmented in all the layers of the supply chain (Dainty, Briscoe et al. 2001).

Market structure significantly mediates the effects of power on the adoption of EMs since, when the degree of concentration increases, individual subject companies will face greater market pressures. The effects of power on the adoption of EMs will also increase. This leads to:

Proposition 7a: *Companies in concentrated industries are more likely to be affected by power than companies in fragmented industries, when deciding to adopt an EM.*

From a cost benefit perspective, market structure also affects the adoption of different functionalities. First, from the real benefits that different functionalities can bring to companies in different markets, a fragmented market is more suitable for market-oriented EMs (Phillips and Meeker 2000; Faverie and Vickery 2001; Holzmuller and Schlichter 2002). The major problem in fragmented markets is low information transparency. Companies in this market are so fragmented that a total picture of the market is not likely to be known to a single company. The search for suitable products or suppliers is difficult and costly, since they are scattered everywhere. Market-oriented functionalities can increase information transparency by providing aggregation and match-making. In concentrated markets, prices and product catalogues are transparent enough so that market-oriented functionalities offer less value in this respect.

Second, cost is a big barrier to the adoption of EMs. Research (Grewal, Corner et al. 2001) (Arvin, Beall et al. 2002) has shown that limited resources (IT and financial resources) and costs are the top barriers to the adoption of an EM solution. In fragmented

industries, companies are more likely to be small and medium sized (SMEs), which tend to have less technology and financial resources. If an SME does not have a computer and digital communication infrastructure in place, the setup and maintenance cost may be unaffordable. Since a significant portion of the installation cost is from integration and resulting organizational changes, and market-oriented EMs demand less integration, companies in fragmented industries are likely able to afford only market-oriented functionalities. Synthesizing the effects of market structure on EM functionality adoption gives rise to the following proposition:

***Proposition 7b:** Companies in fragmented industries are more likely to adopt market-oriented functionalities than companies in concentrated industries.*

RQ IV. How Does the Use of Different Functionalities Affect Buyer-Supplier Relationships?

In this section, two effects of the use of EMs and its functionalities are examined: short-term relationship efficiency vs. long-term relationship effectiveness and overall relationship satisfaction. Relationship efficiency and effectiveness are the economic benefits of using EMs. Traditional wisdom suggests that EMs are mainly for improving short-term relationship efficiency, but it is reasonable to predict that they are increasingly improving long-term relationship effectiveness. Satisfaction is considered to be different from relationship efficiency and effectiveness, since an increase in economic efficiency and effectiveness will not necessarily lead to a greater satisfaction with relationships. This is especially true for the use of market-oriented functionalities.

Economic Efficiency and Relationship Effectiveness

The economic implication of different EM functionalities is that, compared with offline relationships, EMs will benefit both long- and short-term relationships (Garicano and Kaplan 2001; MacDuffie and Helper 2003). Market-oriented functionalities will benefit short-term relationships by increasing market efficiency. A highly efficient market (also known as a perfect market) is characterized by high information transparency, low transaction cost, and pricing that is sensitive to supply and demand,

fluctuations. Through the use of aggregated supplier catalogues, auctions, and e-negotiations (RFx), market efficiency is improved by reduced search cost, reduced procurement prices for buyers due to intensified competition, coverage of new trading partners, and more accurate price signals (Bakos 1997; 2000; Jap 2001; Arvin, Beall et al. 2002; Haller 2002). More accurate price signals give rise to buyer leverage to cut procurement prices, and increased premium charges by suppliers who learn about a lack of supply in the market or that buyers are in urgent need of a particular product (Choudhury and Hartzel 1998; Kwak 2001). More accurate prices come from more transparent demand and supply information.

EMs increasingly offer additional and enhanced collaboration functionalities due to the fact that long-term relationships or network organizations are still the major strategies pursued by companies (Clemons, Reddi et al. 1993; Steinfield, Kraut et al. 1995). Although a wide array of collaboration-supporting technologies exist, such as EDI (Electronic Data Interchange) and ERP (Enterprise Resource Planning) systems, collaboration-oriented functionalities in EMs are superior to these by acting through the EM as an intermediary. EMs can provide more professional services at lower cost. On the one hand, EMs typically adopt industry best practice to build their own competitive advantage (Arvin, Beall et al. 2002), and they own technology and industry expertise that a single company cannot afford. On the other hand, the cost of the IT investment is shared by many participants. The number of communication links is reduced from $n(n-1)/2$ (direct links between every two members) to n (communication through an intermediary), thus reducing communication infrastructure and operating cost. Furthermore, when long-term relationships are executed in an online environment, companies are under more competitive pressure since it is easier for their trading partners to switch to others. In order to survive and maintain their positions, trading partners have to innovate, improve on quality, and reduce costs.

Due to the above benefits of using an EM, long-term relationships are likely to become more effective. This improved relationship effectiveness can be measured by the degree to which long-term relationships supported by collaboration-oriented

functionalities fulfill the company's collaboration goals (Bucklin and Sengupta 1993). Examples are: reduced order administration cost (by using transactional level collaboration functionalities) (Arvin, Beall et al. 2002), improved information sharing (Jap and Mohr 2002), improved product quality, or greater supplier responsiveness and innovativeness (Noordewier, John et al. 1990).

***Proposition 8a:** The use of market-oriented functionalities will increase market efficiency*

***Proposition 8b:** The use of collaboration-oriented functionalities will improve long-term relationship effectiveness.*

Satisfaction

Supplier-buyer relationship benefits from the use of EMs will not necessarily lead to satisfied trading partners. Market-oriented and collaboration-oriented functionalities are different in their ability to satisfy trading partners. Market-oriented functionalities such as e-auctions and e-negotiations have a heavy focus on win-lose situations, and they support zero-sum relationships. However, collaboration-oriented functionalities are a win-win situation, where both parties benefit from newly created values or cost savings (these can be called value shift vs. value creation activities (Andrew, Blackburn et al. 2000)). Based on this discussion, it is reasonable to predict that the parties on the losing side of the situation will feel dissatisfied with their changed relationships. In market-oriented functionalities, suppliers are more likely to be at a disadvantage than buyers, due to the intensified competition (Bakos 1997). This discussion leads to:

***Proposition 9a:** The use of market-oriented functionalities will cause supplier dissatisfaction with the relationship*

***Proposition 9b:** The use of collaboration-oriented functionalities will increase both buyer and seller satisfaction with the relationship*

Note that the degree of satisfaction of buyers who are using market-oriented functionalities is not predicted here. Although buyers are the winners if prices are lower (Bakos 1997), if suppliers do not want to participate because of less satisfaction, the EM

will probably fail. This makes buyer satisfaction with the market-oriented (short term) relationship unpredictable.

3.3 Summary

A framework on EM adoption and impact from a buyer-supplier relationship perspective was presented in this chapter. All the propositions that were derived are summarized in Table 3.2.

The presence of power will increase the speed of adoption of EMs, and the effects of power will be more obvious in concentrated industries than in fragmented industries. When predicting what kind of functionality a firm will choose when adopting EMs, transaction uncertainty, transaction specific investment, transaction frequency, complexity of product description and non-contractible factors play important roles. It is suggested that certain uncertainties will lead a firm to choose collaboration oriented functionalities, but other uncertainties will lead a firm to choose market-oriented functionalities when long-term relationships are not available to absorb this uncertainty. High transaction specific investment, transaction frequency, complexity of product description and the value of non-contractible factors are expected to lead firms to choose collaboration-oriented functionalities; otherwise, they will prefer market-oriented functionalities.

It is also expected that EMs will impact buyer-supplier relationships by increasing short-term relationship efficiency (market efficiency) and long-term relationship effectiveness, leading to different levels of satisfaction as a consequence of using different functionalities.

Table 3.2 Summary of Propositions

Research Questions and Constructs	Propositions
RQ I) Adoption: Power	Proposition 1: Subject companies are more likely to adopt an EM if companies that exhibit power of any kind are already participating.
RQ II) Strategic Choice of Functionalities: Transaction uncertainty	Proposition 2a: A company is more likely to adopt market-oriented functionalities when it faces low transaction uncertainties, or when transaction uncertainty is high but no long-term relationships are available to absorb this uncertainty. Proposition 2b: A company is more likely to adopt collaboration-oriented functionalities when it faces high transaction uncertainties, and long-term relationships are available to absorb this uncertainty.
Transaction specific investment	Proposition 3: A company involved in relationships that require high transaction-specific investments tends to adopt collaboration-oriented functionalities in an EM. Otherwise, it will prefer market-oriented functionalities.
Transaction frequency	Proposition 4: A company purchasing a product frequently will prefer using collaboration-oriented functionalities in an EM. Otherwise, it will prefer using market-oriented functionalities.
Complexity of product description	Proposition 5: Companies purchasing products with highly complex descriptions tend to adopt collaboration-oriented functionalities. Otherwise, they will adopt market-oriented functionalities.
Non-contractible factors	Proposition 6: Companies for which non-contractible factors are important will prefer collaboration-oriented functionalities. Otherwise they will tend to adopt market-oriented functionalities.
RQ III) Market Structure:	Proposition 7a: Companies in concentrated industries are more likely to be affected by power than companies in fragmented industries, when deciding to adopt an EM. Proposition 7b: Companies in fragmented industries are more likely to adopt market-oriented functionalities than companies in concentrated industries.
RQ IV) Impact of EMs on Buyer-Supplier Relationships: Relationship efficiency and effectiveness	Proposition 8a: The use of market-oriented functionalities will increase market efficiency Proposition 8b: The use of collaboration-oriented functionalities will improve long-term relationship effectiveness.
Satisfaction	Proposition 9a: The use of market-oriented functionalities will cause supplier dissatisfaction with the relationship Proposition 9b: The use of collaboration-oriented functionalities will increase both buyer and seller satisfaction with the relationship

CHAPTER 4. METHODOLOGY

The primary tool for examining constructs and propositions in this research will be the case research method. Case research is “an *empirical inquiry that investigates a contemporary phenomenon within its real-life context, especially when the boundaries between phenomenon and context are not clearly evident*” (Yin 1994). It is the most suitable method for new phenomena for which new theories need to be generated, or when constructs need to be polished in a real life setting. Case research has evolved from bring ad hoc story telling into a valid research methodology where a set of research design procedures, data presentation methods, and quality control suggestions are available to guide the case inquiry (Benbasat, Goldstein et al. 1987; Lee 1989; Miles and Huberman 1994; Yin 1994; Eisenhardt 1999; Spencer, Ritchie et al. 2003). Case research has gained popularity in information systems (IS) research recently because IS researchers have found that a technology-centric method was not enough to explain many phenomena, and that their organizational settings also needed to be studied (Myers 2002). Another reason for its popularity is that the quickly changing nature of technology demands more new theory generation.

This section on methodology is organized as follows. First, a justification for this choice of methodology is provided. In order to reinforce this justification, the case method will be compared with the survey approach by reporting the results from a trial experience using a survey. This was not a pilot study, but the author’s initial attempt to validate the framework, using a survey method. Secondly, the case research design is provided in detail, including site selection, data collection methods, data analysis, and reporting. Finally, the limitations of case research are addressed, and efforts to overcome these weaknesses and ensure the quality of the research are described.

4.1 Suitability of Case Research

Many researchers have offered “guidelines” for choosing a case study (Benbasat, Goldstein et al. 1987; Yin 1994). Benbasat, Goldstein et al (1987) suggested four criteria for choosing the case method. First, the phenomenon of interest cannot be studied outside

its natural setting. Second, the study must focus on contemporary events. Third, the control or manipulation of subjects or events is not necessary. Fourth, the phenomenon of interest does not enjoy an established theoretical base. Based on these four criteria, the case method is appropriate for this research.

EMs are new and evolving quickly. There is little prior theory to instruct the study of this phenomenon. As mentioned in Section 1.5, few formal research papers on EM adoption exist, and each builds upon very different variables and theories that are borrowed from different disciplines, such as economics, marketing, the diffusion of innovation, and user interface literature. As a result, there is little comparability between their conclusions since they used quite different variables, so it is not possible to determine whether there is agreement among these studies, especially since each seems to measure different types of EM. Some only studied competitive EMs, and some focused on both competitive and collaboration EMs. There has also been no paper investigating EM adoption and impact from the buyer-supplier relationship perspective, despite the fact that EMs link buyers and suppliers, leveraging and influencing buyer-supplier relationships. This lack of prior theory suggests the exploratory nature of the study and the appropriateness of the case method.

In order to study EM adoption and impact, they must be studied in their natural setting. Since EMs are IOSs, their natural setting is in the inter-organizational environment. If participants are asked for opinions about an EM, their opinions will be tightly associated with organizational purchasing practices, relationships with their trading partners, and their organization's position in the EM's entire network. It is impossible to do an experiment to mimic the complexity of these realities. The control or manipulation of subjects is neither desirable nor possible.

Results from empirical research conducted through interviews with industry managers have also shown that the case method would be most suitable for this study. An original trial that used the survey method for Canadian EMs encountered several difficulties.

First, it is difficult to create a structure and template that is suitable for all EMs because there are many variants and different terms for EMs, so that “*when you see it, you can not recognize it*”(Grieger 2003). Sometimes researchers have different views on whether an operation should be classified as an EM. If questionnaires are distributed to potential participants, it is not certain whether the EMs identified can fit the structure that is to be studied.

Second, if the subjects are EMs, there are only about 20 EMs in Canada (Rosson and Davis 2001). This does not satisfy the minimum of 30 cases for a valid statistical analysis. If the study is instead oriented to study participating buying and selling firms as subjects, since the adoption of EM is still a relatively new phenomenon and not many companies are using it, responses will be biased. The CeBI project that surveyed Canadian SMEs (Small and Medium Enterprises) (Archer and Wang 2003) showed that only 20 out of 178 SMEs were using an EM. After excluding those who adopted B2C and C2C EMs¹¹, there would be very few who have adopted B2B EMs, the subject of this study. Thus, there would be little chance of collecting statistically valid results from a Canadian survey. Since this survey was sponsored by Industry Canada, the sample was restricted to Canadian companies. But we expect that such a survey from North American or international companies would not overcome the problem of low response rate because EMs are still a new phenomenon that is not in use by many companies.

Third, the adoption of EMs is a very complex issue, and many aspects need to be considered (Christiaanse and Markus 2003). This complexity would force a survey to focus either on EM operators, buyers, or suppliers (Choudhury and Hartzel 1998; Grewal, Corner et al. 2001; Kollmann 2001). Most practically, the survey would be done within one EM, which is, of course, a case study. Focusing on EMs, buyers, or suppliers in a survey, would lose the opinions of two of the participant classes, even if good data were available.

Therefore, from a theoretical and empirical point of view, the case method is suitable for this study, since it allows the study of EM adoption and impact in a natural,

¹¹ From feedback data, the adopted EMs were almost exclusively eBay—a major C2C EM.

inter-organizational context, during this early period of the evolution of collaboration functionality support by EMs.

A combination of qualitative and quantitative methods has been advocated by some researchers (Kaplan and Duchon 1988; Creswell 1994). Quantitative data can be used to provide *a quick view of the constructs* and their associations, followed by a justification from qualitative data, or it can be used to triangulate the qualitative data (Kaplan and Duchon 1988). This approach was followed in the design of a telephone questionnaire that was used for the case interviews. The questionnaire had a semi-structured component from which qualitative data were extracted, and used for triangulation with a structured component of the questionnaire that gathered quantitative data. Nonparametric statistical methods were used when possible to analyze the quantitative data, due to limited sample sizes and the likely lack of normality in the data (Kohler 1994; StatSoft 2004). Due to data limitations, statistical analysis methods were not always suitable, since there were sometimes fewer than 4 or 5 observations. *In these cases, only median values of the constructs are reported.* In several situations, aggregation resulting in larger sample sizes allowed an analysis of patterns found through qualitative data analysis that could be confirmed by non-parametric analysis of the quantitative results.

4.2 Philosophical Perspectives

Orlikowski and Baroudi (1991) suggested three categories of philosophical assumptions that a researcher could adopt when doing qualitative research: positivist, interpretive and critical. *Positivist* assumes that reality is objectively given and can be described by measurable properties that are independent of the observer (researcher) and his/her instruments. *Interpretivist* assumes that access to reality is only through the interpretation of social constructions such as language, consciousness and shared meanings. *Critical research* assumes that social reality is historically constituted by people and people can change their social and economic circumstances, but only to a limited extent due to social, cultural and political constraints (Myers 2002). Critical

research focuses on opposition, conflict and contradiction in contemporary society, and is not particularly relevant to this study because this research looks for adoption drivers (such as power), and impacts of successful EMs, instead of looking at conflict that causes unsuccessful EMs. So the third of these was discarded and the research focused on the first two approaches: positivist and interpretivist.

The difference between positivist and interpretivist approaches is that formal propositions and well-defined variables are sometimes considered evidence of positivism. So for the positivist, there are some constructs in the researcher's mind that can guide data collection and analysis. But for an interpretivist, the variables are deduced from iterative interpretation of data (Lee 1991). Interpretivists often need to unlearn what they learned first, and then immerse themselves in the data. Only after the categories (variables) emerge from the data, do the researchers go to the literature and compare their results with the literature (Glaser and Strauss 1967).

A positivist philosophy approach was assumed for this study. However, interpretivist approaches were incorporated in a complementary manner, since it has been suggested that positivist and interpretivist approaches can be used together to reinforce or complement each other (Lee 1991; Trauth and Jessup 2000). The interpretivist philosophy was used only when it was found that prior constructs derived from the literature could not fully capture the phenomena. This is used later in the thesis, in answering the question "how the use of EMs impacts buyer-supplier relationships" when it was found that the measures designed to justify the propositions were not sufficient.

4.3 Research Design

A research design is an action plan for getting from here to there, where *here* may be defined as the initial set of questions to be answered, and *there* is some set of conclusions to be reached (Yin 1994). A good research design can guarantee the quality of the research. Generally there are seven elements of a research design: study questions, study propositions, unit of analysis, single vs. multi-case design, case selection, data collection, data analysis and reporting (Benbasat, Goldstein et al. 1987; Creswell 1994;

Yin 1994; Eisenhardt 1999). Research questions have been provided in Chapter 1 and study propositions were developed in Chapter 3. Other issues will be addressed as follows.

4.3.1 Unit of Analysis and Case Selection

Since some EMs offer only one kind of functionality, in order to include both market-oriented and collaboration-oriented functionalities in the study, a multi-case design was used, and five EMs in five industries were studied. Five EMs are considered enough for this research because 1) these five EMs cover both market-oriented and collaboration-oriented functionalities evenly; 2) the industries in which these EMs are found varied in their degree of concentration, which made the study of the effects of market structure on EM adoption possible; 3) For each market structure (fragmented and concentrated industry), a minimum of two cases allow case replication, thus increasing the generalizability of the research. For each EM, three subunits were involved: EM operators, buyers, and suppliers. At least one EM operator, 2-3 buyers and 2-3 suppliers for each EMs were interviewed. In this way, opinions were gathered from a sample of all the subunits.

Cases were selected according to the following criteria (Table 4.1). First of all, the EM must be in operation and be performing relatively well. Unsuccessful EMs were not investigated, but not because they are less desirable for this research. This thesis is rooted in transaction cost, and most empirical tests of TCT are based on “survivor analysis” (Pint and Baldwin 1997). Such analysis assumes that inefficient governance structures are weeded out by competitive pressures, and remaining structures should be efficient. This research also adopted the idea of survivor analysis, and assumed that inefficient choice of different EM functionalities should be weeded out over time. Successful EMs have a larger pool of participants with efficient functionality choices. This allows conclusions about the predictability of relationship contingencies in determining the choice of functionalities to be more accurate. Studying unsuccessful EMs might also offer some interesting insights. But these EMs would be difficult to contact and less willing to cooperate in the study, so it would be less efficient to talk to them. However, although the

focus was on successful EMs, unsuccessful individual cases were seen during the study. For example, one participant changed from an active user to a passive user due to unsuitable product properties, and one participant reported that some of its products were doing well and some were not. These insights are reported in the Chapter Six data analysis. On the other hand, successful EMs are likely to have more impact on buyer-supplier relationships due to their more active usage. Unsuccessful EMs have either a passive presence or have disappeared due to lack of participation and usage, so they have less impact on buyer-supplier relationships. In fact, as readers will see in Chapter Six, even successful EMs were not perfect, and some moderating factors were found that constrain the proposed efficiency and effectiveness gain of EMs.

The criteria used to judge the eligibility of EMs were that, firstly, they were listed in Forbes “Best of the Web”, and secondly they must have a certain market share; *or* they must have received second round funding. Any EM that satisfied these requirements was considered to be a qualified candidate. Initially EMs were identified by media search, colleague recommendations, and discussions with industry people. This resulted in a short list of possible candidates (EM operators, buyers and sellers). In order to avoid bias in choosing the sample, we used different sources: EM websites, participant referrals, database search, and published papers, etc (Table 4.1). Participant agreement was obtained by cold calls and emails.

4.3.2 Sample Data Collection

Telephone interviews were the major source of primary data collection. The literature survey for this research started at the beginning of 2002. But intensive primary data collection started in early April, 2004 and ended in June, 2004. Before this intensive data collection, pilot interviews were conducted with two EM operators for the purpose of demonstrating the models in the thesis proposal, and testing the feasibility of the questionnaire.

Instruments

A questionnaire consisting of two parts: semi-structured and structured, was used to guide the inquiry (Appendix I) (the structured part is summarized in Table 4.2). In both

the structured and semi-structured questionnaire, there are three sections, covering the three main research questions: adoption, strategic choice, and impact of EMs. In

Table 4.1 EM Case Selection

Name	Industry	Performance	Sources for EM and Subject Identification
EM A	Fragmented	<ul style="list-style-type: none"> • Self supporting • The biggest EM in this industry in terms of the number of participants • 1/3 market share 	<ul style="list-style-type: none"> • Discussions with industry people • EM A website • Google search
EM B	Fragmented	<ul style="list-style-type: none"> • Received \$10 million initial funding • Received \$36 million second round funding • Listed in Forbes Best of the Web 	<ul style="list-style-type: none"> • EM B website • Participant referrals • Media search
EM C	Concentrated	<ul style="list-style-type: none"> • Equity members' continuous support • Solicited government funding • Listed in Forbes Best of the Web 	<ul style="list-style-type: none"> • EM C website • Participant referrals • INFORMS database search
EM D	Concentrated	<ul style="list-style-type: none"> • Received \$50 million initial funding • Extending equity memberships for additional funding support • Listed in Forbes Best of the Web 	<ul style="list-style-type: none"> • Colleague recommendations • EM D website (pool of suppliers and buyers)
EM E	Concentrated	<ul style="list-style-type: none"> • Received \$50 million initial funding • Extending equity memberships for additional funding support • Listed in Forbes Best of the Web 	<ul style="list-style-type: none"> • EM E website • Participant referrals • News articles, conference papers

designing the semi-structured questionnaire, the 12 recommendations of question design in qualitative research suggested by Foddy (Foddy 1994; Burgess 2001) were followed. Critical Incident Analysis (CIA) methodology (Flanagan 1954) was helpful when designing the semi-structured questionnaire. The CIA method was not used due to its requirements for sample size, but CIA inquiry focuses on details and exactness, which helped reduce misunderstanding of the questions by interviewees. For example, interviewees were asked for examples of trading partner influence on the adoption of

Table 4.2 Guidelines for Inquiry

Constructs	Measurement	References
Adoption:		
Power	<ul style="list-style-type: none"> • Major industry players' potential influence • Influence on others • Being influenced by others (Questions 1.2-1.4)	(Frazier and Rody 1991; Hart and Estrin 1991; Iacovou, Benbasat et al. 1995)
Strategic choice of functionalities:		
Relationships	<ul style="list-style-type: none"> • Long-term or short-term (Long-term are contractual relationships over 6 months) • Contract involved or not (Introduction part of the questionnaire)	(Hughes, Ralf et al. 1999; Cousins 2002)
Functionalities used to support this relationship	<ul style="list-style-type: none"> • General question (Question 2)	
Products transacted with a specific online trading partner	<ul style="list-style-type: none"> • General question (Question 3)	
Transaction frequency	<ul style="list-style-type: none"> • General question (Question 4.1)	(Choudhury and Hartzel 1998; Kraut, Steinfield et al. 1998)
Transaction uncertainty	<ul style="list-style-type: none"> • Predictability of types of product needed • Predictability of the quantity of products need • Order fluctuations • Order size • Price changes • Supplier changes (Questions 4.2-4.5, 5.3-5.4)	(Choudhury 1997; Kraut, Steinfield et al. 1998) (Lieberman 1991; Robertson and Gatignon 1998; Bensaou and Anderson 1999; Buvik and Gronhaug 2000; Buvik and John 2000)
Complexity of product description	<ul style="list-style-type: none"> • Product or service standardization • Ease of product description (Questions 5.1-5.2)	(Choudhury and Hartzel 1998; Kraut, Steinfield et al. 1998)
Transaction specific investment	<ul style="list-style-type: none"> • Information system specificity • Human asset specificity • Others (Physical asset specificity, dedicated assets, location specificity, etc) (Questions 5.5-5.7)	(Joskow 1991; Lieberman 1991; Murray, Kotabe et al. 1995; Robertson and Gatignon 1998; Bensaou and Anderson 1999; Brown, Dev et al. 2000; Buvik and Gronhaug 2000; Buvik and John 2000; Jap 2001; Lonsdale 2001)

<p>Non-contractible factors</p>	<ul style="list-style-type: none"> • Trust • Information sharing • Innovation • Quality • Responsiveness <p>(Questions 6.8-5.12)</p>	<p>(Mithas, Jones et al. 2002; Mithas, Jones et al. 2003)</p>
<p>Market structure (Size related problems)</p>	<ul style="list-style-type: none"> • Benefits from aggregation • Cost: setup cost and process change cost • Business process changes • Limited resources <p>(Questions 1.1, 1.5-1.7)</p>	<p>(Faverie and Vickery 2001)</p>
<p>Impact of EMs on buyer-supplier relationships</p>		
<p>Market efficiency vs. long-term effectiveness</p>	<p>Long-term relationship effectiveness:</p> <ul style="list-style-type: none"> • Better fulfillment of collaborative goals • Share more information with suppliers • Higher quality of shared information • More responsive and innovative suppliers. <p>Short-term relationship efficiency</p> <ul style="list-style-type: none"> • Lower search cost for new products and customers • Lower product price • Increased competition among suppliers • More information for negotiation <p>(Questions 6.1-6.8)</p>	<p>(Almeida, Jr. et al. 1999; Andrew, Blackburn et al. 2000; Anonymous 2000; Amit and Zott 2001; Faverie and Vickery 2001) (Iacovou, Benbasat et al. 1995; MacDuffie and Helper 2003) (Choudhury and Hartzel 1998) (Bucklin and Sengupta 1993) (Arvin, Beall et al. 2002)</p>
<p>Satisfaction</p>	<ul style="list-style-type: none"> • Satisfied with online business partner relationships. • More productive online relationships <p>(Questions 6.9-6.10)</p>	<p>(Anderson and Narus 1990; Wilson and Viosky 1998)</p>

EMs (Question 7). The applications offered/used by participants (Question 8, 9, 10 in Appendix I) were discussed one by one to avoid any confusion in the interviews.

The design of the structured part of the questionnaire relied on the literature survey. The constructs used have been outlined in the framework development (see Chapter 3). The items used to measure these constructs were identified from the literature review (Table 4.2). A five point Likert scale was used to measure these items since it is used in most of the relevant literature. Another construct of interest, the market structure, was investigated in the “general information” section of the semi-structured part and the adoption part of the structured questionnaire (Questions 1.1, 1.4-1.6).

Each telephone interview lasted 30-45 minutes. Two interviewers were present during each interview. After getting each participant’s permission, conversations were recorded for transcription purposes. Interviewers also took notes during the interview, to record any important points and their own thoughts. Because most of the interviews were done during an intensive time span of 3 months (April to June, 2004), an undergraduate student was hired to transcribe the interviews. These transcriptions were checked carefully later for errors.

Besides formal interviews, in some situations opinions were gathered from some participants who were willing to talk to us but unable due to time constraints to participate in a formal interview. Other sources of data included: documents sent to us by interviewees, published case studies relating to the EMs studied, and news articles. All of the subject EMs had a significant amount of information posted online, also an important data source. For example, some EMs posted their application demonstrations online, allowing the researchers to get a better understanding of how these applications worked.

Participants

36 people were interviewed. Among them, one barely used the targeted EM, and one dropped out of the study. As a result, there were 34 completed interviews, including 5 EM operators, 16 buyers, and 13 suppliers (Table 4.3). EM operators were not asked to complete the structured questionnaire, and the structured questionnaires from one buyer

and one supplier were not complete, so there were 27 completed structured questionnaires in total.

An eligibility requirement was that the interviewees had to be familiar with the use of the targeted EM and that their (buyer or supplier) company must have used the EM frequently. The potential study participants were initially contacted by cold telephone calls, with the aim of talking to the managers for participating EM buyers, sales and marketing managers of participating EM sellers, and operating officers of EM intermediaries. In some cases, if the name and contact of the targeted person could be found in the media, this person was contacted directly. If not, the targeted person was identified by calling the corporate switchboard. Sometimes, the calls were transferred to persons not knowledgeable about the topic of interest, but who could provide the name of the person in charge of EM operations. After an explanation of the research purpose on the phone, if the person agreed to participate in the study, an appointment was then made immediately or through follow-up email. Sometimes emails explaining the purpose of the research in more detail and a copy of the questionnaire were sent to the participants.

The resulting interviewee positions are included in Figure 4.1. They mainly consisted of marketing, purchasing, product, and eBusiness program managers, and were employees either using or taking care of the EM program application for the company. We did not have a common criterion to judge whether the frequency of use was acceptable, since many factors such as overall market size, transaction type (for example, inventory liquidation vs. regularly used consumables), and whether the EM involved actual transactions or not, made a common criterion impossible. However, in our contacts with participants, we tried to ensure that they judged themselves to be active users.

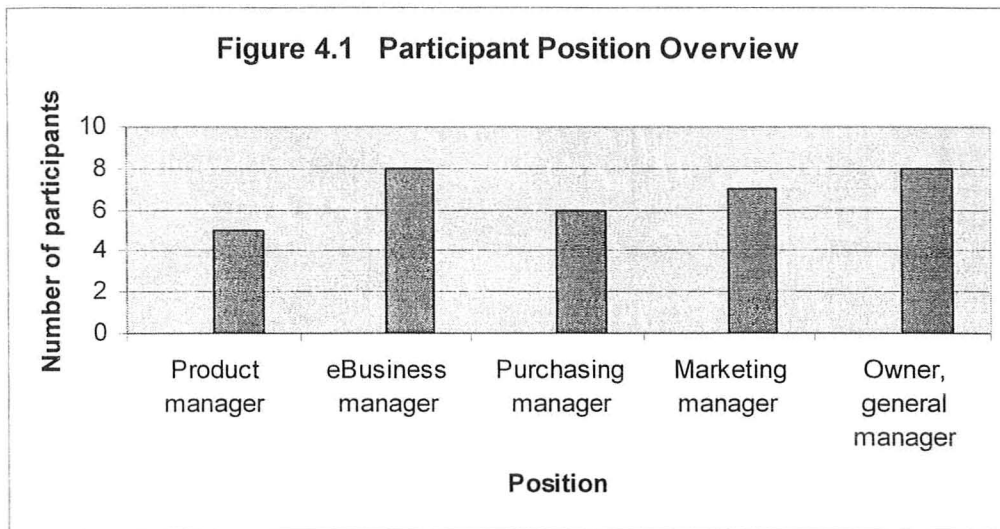
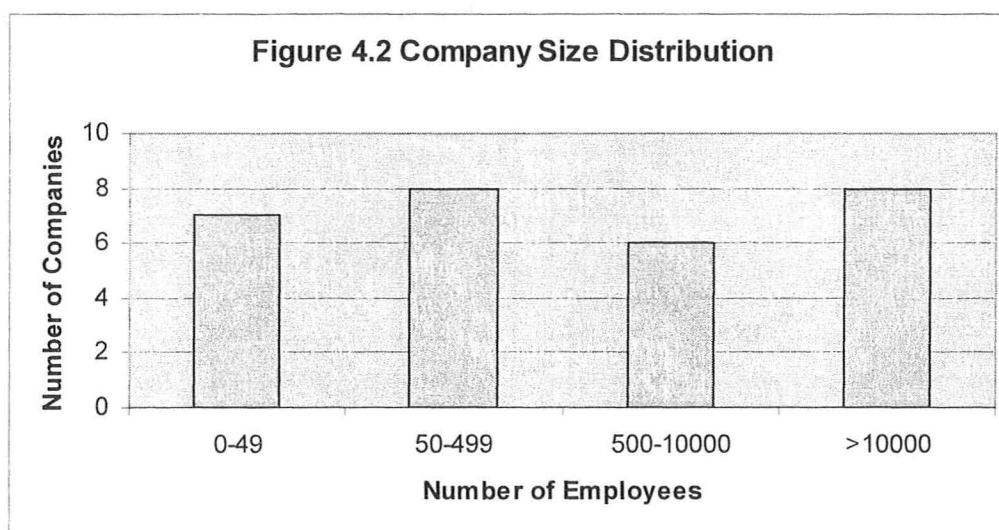


Table 4.3 Sample Distributions

	Buyers	Suppliers	Intermediary	Total
EM A	4	2	1	7
EM B	2	3	1	6
EM C	3	2	1	6
EM D	3	3	1	7
EM E	4	3	1	8
Total	16	13	5	34

The size of the participating (buyer or supplier) companies varied from small to very large organizations (Figure 4.2). Approximately a quarter of the companies were small (1-49 employees) and another quarter were medium sized (50-499 employees). The remainder were large (500 or more employees). Three of the five EMs in our study were consortia-based EMs, and this meant that only big companies participated as either buyers or suppliers of this specific EM. Big companies were also important to the study, since collaboration-oriented functionalities are mostly used by big companies. For these reasons, this sample size distribution seems reasonable.



4.3.3 Data Analysis and Reporting

Nvivo, a qualitative data analysis package, was used to support the data analysis. *Nvivo* is widely used by qualitative researchers to organize and analyze their qualitative data (Miles and Huberman 1994; Gibbs 2002). Document organization, coding, searching, and modeling are four major capacities of *Nvivo*. After each interview was transcribed, the transcription was imported into the *Nvivo* document set (this set was built by the researcher, with its basic structure categorized by EM).

Familiarization

Data analysis was conducted in parallel with data collection. With the aid of *Nvivo*, the first important step of data analysis is familiarization with data (Lacey and Luff 2001). The transcription was read carefully many times. While reading these documents, the researcher recorded any thoughts in “DataBite”, which is a convenient function offered by *Nvivo* to record small memos. These thoughts include *unclear points* that need to be clarified, *new interests* developed that could be asked in the next interview, *important findings* that strongly supported the propositions, or *exceptions* that needed further attention. A mini-summary of each interview was written as a memo and linked to the interview transcription through “DocLink”. The researcher coded and searched for patterns from the very early stages of data collection. Although conclusions

could not be reached at an early stage, this process helped the researcher to become more familiar with the data.

Coding Process

Coding is a useful tool for qualitative data analysis, and it is recommended for both positivist (Yin 1994) and interpretivist research (Glaser and Strauss 1967; Orlikowski and Baroudi 1991). MacQueen, McLellan et al (1998) suggest that, when in-depth transcribed interviews cover many research issues, coding text should begin according to the specific research questions used to frame the interview. This process is called “text segmentation” or “structural coding”. This was necessary in the study, since there were hundreds of pages of interviews that resulted from the semi-structured interviews. It is not necessary to read all the material when only one research topic is being coded. Text was segmented into five categories: General information, EM adoption, Strategic choice, EM impact, and Others. General information includes participating company information such as size and EM usage. EM adoption, Strategic choice, and EM impact correspond to the three research topics that were addressed in Chapters 1 and 3. All other information that could not be coded in the above categories was coded as “Other”. The unit of coding was “one question, one response”. Two coders coded the text independently. One coder was the researcher. The other coder, also a Ph.D candidate in Management Information Systems, had significant background on business-to-business EMs. Structural coding by the two coders resulted in a total of 938 units. As the questions were well organized and structured, there was high inter-coder agreement (see Appendix D). We used the Kappa coefficient to measure inter-coder agreement, and a kappa coefficient greater than 0.7 was suggested as acceptable (Neuendorf 2002; MacQueen, McLellan et al. 1998).

An in-depth analysis (MacQueen, McLellan et al. 1998) was conducted within each research topic. Here, the unit of coding was the participating companies, and predefined constructs were used to code the cases. For example, in the adoption part, the power construct was used to code all the adoption issues related to power. The results are reported in Chapter 6. Inter-coder agreement was not calculated for the “Strategic

Choice” construct, since this is very structured, and the question number indicates the code that it should be assigned to. However, the two coders did discuss some related issues, with the result that another construct (supplier power) was found that should also be considered in “Strategic Choice”. This result is reported in Chapter 6.

For the in-depth analysis on the impact of EMs on buyer-supplier relationships, an inductive approach was found to be better suited (see Chapter 6), so open coding was used for this part. The first step of the open coding process is to develop a codebook (MacQueen, McLellan et al. 1998). The main researcher first read all the materials and developed 39 codes for both the negative and positive effects of the use of EMs. The second coder reviewed these codes against the materials, and then the two researchers discussed these codes. After the discussion, the 39 codes were merged in a logical manner into 19 larger categories. The inter-coder agreement was poor on the first independent attempt at coding (Appendix G). Most of the disagreement was due to misunderstanding the codes, so additional code re-analysis and merging was done. A detailed code-by-code examination of this stage can be found in Appendix H. The repeated coding resulted in satisfactory results, with improvement on every code. All the kappa coefficients were higher than 0.7 and about half of the codes were in perfect agreement. The final codebook and inter-coder agreement results can be found in appendices F and G, and the coding results are reported in Chapter 6.

Data reporting

Multi-case design results in two-part case reports: within-case analysis and cross-case analysis. Within-case analysis “*typically involves detailed case study write-ups for each site. These write-ups are often simply pure descriptions, but they are central to the generation of insight*”(Eisenhardt 1999). If the individual case write-up builds the foundation for later analysis, the cross-case comparison normally focuses on searching for cross-case patterns. These cross-case patterns are then checked against researcher propositions to see whether there is a match or not. This matching process is also called pattern matching, a method suitable for testing theory (Miles and Huberman 1994). Individual case write-ups on the five EMs are presented in Chapter 5. They represent the

basic knowledge about an EM, but are important to the analysis. Cross-case pattern searching actually starts in the Chapter 5 discussion section, and then continues in Chapter 6. Chapter 6 focuses on tracking cross-case patterns and confirming propositions. Visual presentation, tabulation, and *Nvivo* tree node modeling were the main data presentation techniques used.

4.3 Research Quality

Reliability and validity are important issues in all research, including case research. Case research is sometimes criticized as a non-scientific research method, because there are no rules to follow in making logical deductions, and it relies very much on the interpretative power of researchers. Although subjectivity exists in the research process, this can be minimized and rigor ensured in every step of the study by following some recommendations from the case research literature.

Yin has addressed four quality issues for case studies: construct validity, internal validity, external validity, and reliability. **Construct validity** is “*establishing correct operational measures for the concepts being studied*” (Yin 1994). The purpose of verifying construct validity is to make sure that the items used to measure a construct reflect the real meaning of the constructs. **Internal validity** is used to examine whether the causal relationships established by the researcher are correct. Internal validity is a concern only for causal case studies, in which a researcher is trying to determine whether event x leads to event y. **External validity** deals with the problem of whether the study findings can be generalizable beyond the immediate case study. The objective of a **reliability** test is to assure that researchers take measures to minimize errors and biases in a study.

In order to enforce the validity and reliability of the research, two techniques, **triangulation** and **respondent validation** were used, as recommended by many researchers (Yin 1994; Lacey and Luff 2001). Multiple sources of evidence were gathered, such as interviews, company Websites, other research papers, and online resources. Materials from one source can be used to triangulate materials from other

sources. First, the EM website was checked to validate the functionality part of the interview data. By reading the website information and any associated online demos, it was possible to check for consistency between the website and interview data. Inconsistencies were resolved by checking other interview information, or by communicating with the interviewee. Second, other materials such as participant presentation materials and other research papers were used to validate the relevance of data on functionalities. For example, an interviewee in one industry mentioned that reverse auctions were doing well in a particular region and there had been little resistance from suppliers. A news article on some operations in this region was used to cross check this comment, and it was found that this region had a purchasing culture very similar to reverse auctions even before the adoption of the EM. Triangulation had shown that companies had grown familiar to a form of reverse auctions in the past, which was why they were causing little disturbance in buyer-supplier relationships through the EM. Another application of triangulation in the case writeups was the triangulation of qualitative data and quantitative data. We searched for agreement and discrepancies between the two types of data. If there was a discrepancy between them, it could be caused by data from one source that opposed data from the other source, or data missing from one source. In this case, discrepancies were explained or the missing data was checked and cleared in a logical manner.

Qualitative researchers frequently use feedback to check the findings from their research with their participants. Feedback to respondents has been seen as important in involving participants in the research process and in addressing key concerns about the researcher having the sole power of interpretation. *“Many reviewers consider respondent validation of qualitative research to be a mark of quality, and evidence of respondent validation of findings is increasingly seen as a way of demonstrating rigour”* (Lacey and Luff 2001). In order to maintain accuracy of the interview notes, the interviews were taped and transcribed. A four or five page summary for each EM was written, based on interviews that were conducted with its operators, buyers and suppliers. This summary included all the important non-confidential findings related to this EM and its

participants' trading behavior. The summary was emailed to the participants involved with this specific EM, in order to solicit their comments and feedback. Feedback was received by emails or phone calls.

The distributed summaries received mostly positive and little negative feedback. The participants mostly agreed with the findings about how the contingencies of buyer-supplier relationships determined the choice of different functionalities, and how the use of the EMs affected them and their relationships with trading partners. Negative feedback mostly concerned minor mistakes about EM functionalities in the summary. For example, the EM E operator mentioned that 1) Promotional Planning was not different from general CPFR, and most people using CPFR used only a component of it, and 2) RFQ was customized, and elements other than prices were also considered in RFQ. The EM D operator suggested that most of their services were in private catalogue and transaction facilitation, which they called "between the firewalls" operations. There was some misunderstanding of the special terms, private catalogue and transaction facilitation, which encouraged the author to present the definitions clearly in the thesis. An additional comment by an EM E buyer was that that they used CPFR with bigger suppliers due to the resources (special investments) needed. The feedback from interviewees improved the research quality. For example, the EM E buyer's comment on special investments further enhanced the finding that asset specificity is important in determining the choice of collaboration-oriented functionalities. The EM D operator's comment that most of their supporting activities are "between the firewall" helped to confirm the proposition that EMs make long-term relationships effective.

In order to enhance the validity and reliability of the study, other techniques that were used included discussion with other researchers and colleagues, the calculation of inter-coder agreement, and the use of the *Nvivo* database and *Excel* spreadsheets to record results from every step of the research. Discussion with colleagues was used mainly for confirming the logic the researcher used to draw inferences or make conclusions. Increases in inter-coder agreement also increase the validity of the text interpretation, and

the use of the database opens the possibility that, if another researcher followed the built-in audit trail, a similar result would be found.

Lack of generalizability has been criticized as a limitation of case studies, due to the limited number of cases involved. In order to achieve generalizability, multiple case studies were chosen, and they were grouped into three categories: supplier-concentrated, buyer-concentrated, and fragmented industries. Two similar cases were chosen in two categories: fragmented industries and buyer-concentrated industries, to allow for a minimum amount of replication. However, there were few supplier-concentrated EMs online and only one supplier-concentrated EM could be contacted, so replication was not possible in this category. On the other hand, since this EM was also buyer-concentrated, it can also be regarded as a replication of buyer-concentrated EMs.

4.4 Summary

The case method was chosen for this study due to its exploratory nature, and no prior theories existed to instruct the study. Experience from a survey trial also suggested that the case method was the most suitable. The research design, including data collection, data analysis, and case write-up were provided in great detail. Validity and reliability are two important issues in controlling the quality of the research. Techniques of triangulation and respondent validation were used to address these issues. Other techniques that were used to enforce research validity and reliability included feedback from interviewees, discussions with other researchers and colleagues, the calculation of inter-coder agreements, and the use of the *Nvivo* database and *Excel* spreadsheets to record results from every step of the research.

CHAPTER 5. INDIVIDUAL ELECTRONIC MARKETPLACES

This chapter will present an introduction to the individual electronic marketplaces that were studied, including their basic information, industry setting, functionalities offered, and the buyer-supplier relationships they support. This chapter builds a foundation for validating the propositions outlined in Chapter Three. All the constructs will be described and tested, using both quantitative and qualitative data derived from the study, in the next chapter. In describing each EM, a table listing how its participants use it is provided. Since in EM A, B and E, participants use the same functionality in the same manner, a summary table is not provided, in order to avoid repetition. But a general description of their functionalities can be found in each case under the associated heading “Functionalities and Relationships”.

5.1 Electronic Marketplace A

EM A was established by an influential promotional product association to support its supplier and distributor members in the promotional products industry. Each member pays a monthly fee to EM A for its Web services. This EM is essentially an electronic marketplace that dispenses promotional product information only.

5.1.1 EM A Industry Setting

Promotional products are symbolic products that are used in advertising and communication as communication vehicles, goodwill reminders, signs, gifts, and incentives. Promotional products consist of two parts: the base part, and the symbolic part. Most of the base parts are small value items such as clocks, pens, wearables, and sportswear. However, sometimes they can be goods such as expensive watches, TVs, etc. The symbolic parts involve company logos, special art designs, or event symbols. The base part is standard and simple, and the symbolic part is customized to each client and event.

The promotional products industry is highly fragmented. In Canada (2002), there were 3,714 distributors and 1,025 suppliers in this business¹². In the U.S. there were

¹² <http://www.promocan.com/Dispstpg.htm?ID=125>

20,874 distributors, and 20,024 of them were small distributors with less than \$2 million U.S. annual sales¹³. No big companies dominate the market. The three major parties involved in the promotional products supply chain are: suppliers (manufacturers), distributors, and end users. Usually the end users place orders through distributors, and distributors submit orders to relevant suppliers (manufacturers). Manufacturers then custom process the products according to client orders. Sometimes manufacturers make both base and symbolic components, but sometimes they purchase the base components and only add the symbolic components. Screen-printing, embroidery, and welding are some of the major technologies used for customizing base items. Some distributors have their own printing equipment to do the customization, so for them their suppliers are manufacturers of base components only.

In this industry, suppliers normally do not sell to end users due to the high cost of marketing (Perryman 2003). They sell by building a network of distributors through franchises or strategic long-term relationships with independent distributors. These strategic long-term relationships are not necessarily contractual. Distributors normally do not maintain inventories, so catalogue selling is the major method of selling products to end-users.

5.1.2 Functionalities and Relationships

EM A is “*basically a big catalogue*”(An EM A distributor)¹⁴. There are two layers of catalogues in EM A: one layer is the supplier-distributor catalogue, and the other is the distributor-end user catalogue. Suppliers publish their catalogues on EM A, which are accessible to all distributors, but not end-users. EM A also builds a customized website for each distributor. In this customized website, end users can see distributor catalogues, which in fact are embedded and customized supplier catalogues. Since distributor and supplier catalogues are linked together, when a supplier updates its EM A catalogue, all of its associated distributor catalogues are updated simultaneously.

¹³ <http://www.ppai.org/mediainformation/IndustryStatistics/SalesVolumeEstimates/>

¹⁴ All quotations in italic style in Chapter 5, 6 and 7 are original quotations from telephone interviews. The content in the bracket following the quotation indicates its source.

Both supplier and distributor catalogues may have product pictures, product names, descriptions, and prices. However, the prices in the supplier-distributor layer are different from prices in the distributor-end user layer in that the former are wholesale prices and the latter are retail prices. Both distributors and end users can browse or search products from different suppliers, and send inquiries online. EM A is currently developing the ability for distributors to download logos to clients for use as images, to show on potential product displays. However, EM A does not support transactions due to the customized nature of the products. End users still need to submit orders to distributors offline, and then distributors contact suppliers by phone or fax.

Among the participants we talked to, we found that the suppliers tend to be more passive in their use of EM A than are the distributors. Suppliers provide all the information that EM A requires, and update their information from time to time. The distributors we talked to use EM A both as an “*information/sourcing tool*” (an EM A distributor) and a “*sales tool*” (an EM A supplier). As an information tool, it is used to search for new products and/or suppliers. As a sales tool, it serves as a soft copy of the catalogue, and is used by distributors to show to their customers. “*They (distributors) say to their customers, well, go to “EM A” now, so that as you go there, I will go there also, and walk them through the information that they need*” (an EM A distributor).

As far as distributor-supplier relationships are involved, we found that the EM A catalogue **supported both long- and short-term relationships**. These long and short-term relationships are not managed by a control mechanism, but **by voluntary behavior of distributors**. When a distributor is using the EM A catalogue to search for new suppliers, it is obviously supporting potential short-term relationships. However, distributors do not always search for new products or suppliers. Most of the time what they want are digital pictures of products from known suppliers to show to their end-customers. In terms of ordering, distributors still appear to prefer ordering directly from suppliers with whom they have long-term relationships by telephone or fax. EM A does not support much direct interaction between distributors and suppliers, yet it saves the production and

mailing cost of catalogues, and allows distributors to have instant access to catalogues online.

5.2 Electronic Marketplace B

EM B is an online auction website for purchasing and selling used heavy construction equipment. The participants that work through this EM include used equipment dealers, retailers, distributors, contractors, construction companies, financial institutions, and rental companies. These companies, especially dealers and distributors, could be either sellers or buyers. In our study, we gathered information on the (buyer/seller) role that the interviewees were most familiar with. This EM continues to gain popularity in this niche market. It currently has many thousands of registered users, thousands of potential bidders, and hundreds of active users.

5.2.1 EM B Industry Setting

The heavy construction equipment manufacturing industry is quite concentrated. According to the 1997 economic census of the United States Census Bureau, construction machinery manufacturing has a four firm concentration ratio of 49.6%. Caterpillar, Volvo, and Komatsu are among the largest manufacturers of heavy construction equipment. But as far as heavy used equipment is concerned, the industry is fragmented. For each construction machinery manufacturer, there are many distributors, dealers, and rental companies dedicated to buying and selling their products. Financial institutions also play a role. Since they support the purchasing and renting of equipment, if the buyer defaults on payments, the financial institution must liquidate the equipment. Heavy construction equipment is usually very expensive, and used equipment can be worth tens of thousands of dollars.

5.2.2 Functionalities and Relationships

The major functionality offered by EM B is the standard forward auction. Auctions are hosted every two weeks. Auction information is posted two weeks prior to the auction date, so that buyers can review the inspection report and decide whether or not to bid.

One of the major value-added services offered by EM B is its guaranteed inspection report. EM B maintains a network of inspectors. If individuals or companies want to sell equipment, they can call the nearest EM B sales representative. The sales representative will send an inspector to the site to check and test the equipment. The inspector will complete a standard but detailed inspection report for the equipment. EM B takes responsibility for what is included in the inspection report. Most buyers welcome this inspection service. But sellers tend to have different views of the inspection reports. First, they think that sometimes the inspectors over-inspect and exaggerate problems with the machines, which may reduce the number of potential bidders. Second, they may prefer that potential buyers come to inspect the machine on-site (this is also a preference of some buyers, provided that they do not have to travel too far). Different people will have different views on the value of any given unit of used equipment. But despite these drawbacks, the inspection report is still a welcomed service. EM B also offers transportation, payment and financing, so some sellers call their service a “*get ready auction*”.

EM B operates as a pure competitive marketplace. It supports only spot purchases, so buyer-supplier relationships through this EM are *one off relationships*. Auctions are conducted anonymously and buyers and sellers do not necessarily know each other.

5.3 Electronic Marketplace C

EM C was founded by several major medical surgical suppliers, and began providing service in 2000. It has a presence in both Canada and the U.S. Currently many Canadian hospitals and a majority of the large medical surgical suppliers participate with this EM. Less than 50% of the suppliers but a large fraction of the hospitals that subscribe to its services are active users. Its suppliers represent 70% of the Canadian med-surgical market.

5.3.1 EM C Industry Setting

EM C is targeted mainly on medical surgical products, but is gradually expanding to cover a wider product spectrum such as food, pharmaceuticals, and lab instruments. Medical surgical suppliers and the buyers of these supplies (healthcare providers) are the two classes of participants in EM C. The buy side has a well-defined market structure. There are 950 hospitals in Canada. About 20% of the hospitals drive 80% of its transaction volume. The current trend towards purchasing through Group Purchasing Organizations (GPO) is increasing the buy side concentration. Another trend that is increasing buy side concentration is the movement in several provinces towards regionalization of hospitals and the associated standardization of procurement processes in these regions. Outside of the hospitals, there are some social healthcare providers such as nursing homes and medical clinics, but these are extremely fragmented. EM C mainly focuses on the hospital market, *“where the ballpark supply chain activity seems to occur, and also the greatest opportunity for savings and reduction of errors in the supply chain”*(an EM C operator). The supplier side is concentrated and, in Canada, 10% of the suppliers supply 60%-70% of the total hospital supplies.

5.3.2 Functionalities and Relationships

The functionality offered by EM C is mainly private catalogues & transaction facilitation. The catalogues are not open sourcing catalogues but are mainly used to validate orders transmitted to suppliers. Suppliers have full control of their catalogues. It is a private catalogue application because only certain specified buyers are allowed to access supplier catalogues. Transaction facilitation, or “reporting tools”, consists of order placement, order acknowledgement, order tracking, invoicing and payment, etc. It also provides participants the option of integration and connectivity. In order to prepare participants for system connection, EM C helps suppliers to clean their data and standardize their catalogues, and helps hospitals to clean the item masters in their ERP or other inventory/purchasing/accounting systems.

Almost all participants in this study used transaction facilitation functionality to transmit orders (Table 5.1). Some are more or less integrated with the EM C system. All

EM C buyers that we interviewed *pursue a long-term relationship strategy with suppliers*. A number of important strategic suppliers are involved in these relationships. Long-term contracts are negotiated offline and executed online. These contracts normally last 3-5 years. In a few cases, contracts are re-negotiated on a yearly base. This may happen when hospitals have contracts for purchasing U.S. products where exchange rate fluctuation is a concern.

Table 5.1 The Use of EM C Functionality

Participants	Functionality Used
1 (Buyer)	Purchase orders generated through the legacy system, and electronically transmitted to suppliers through EM C. Also interested in order acknowledgement, electronic invoicing
2 (Supplier)	Sending order information back to customers, and order confirmation, including delivery, status of the orders and backorders, updating transaction status and order changes in real time
3 (Buyer)	Automated process from order placement using PDAs (Personal Digital Assistants) to the order receiving process.
4 (buyer)	Purchase orders, purchase order acknowledgement, checking discrepancies in pricing and back orders; a non-integrated web-based application
5 (Supplier)	Sending order information back to customers

5.4 Electronic Marketplace D

EM D is a private company founded by some large mining, mineral and metal companies as a one-stop solution to specifically meet the e-procurement needs of the natural resource industry. Now it has developed into a fully functional global EM, with a substantial number of employees world wide, major mining corporations as shareholders, thousands of active suppliers, and several thousand invisible suppliers who can be brought active upon request. Since there is no direct input needed for mining company production, their purchasing needs focus on mostly indirect product purchases. The following are some examples of mining supplies:

- Heavy equipment such as earth moving equipment and underground vehicles

- Small machinery and equipment: cap lamps, pumps and pipes, valves, hoses, sensors and switches. Numerous small tools for all purposes are also included, such as wrenches with different specifications, blasting supplies and chain saws.
- Parts such as drill bits, couplers and replacement parts for machinery.
- Consumables: this is the “soft” supply in mining industry. Unlike tools and machinery, consumables cannot be re-used. Examples include mining chemicals (reagents and flocculants for processing raw materials), explosives for earth moving, and fuel for daily energy supplies.

5.4.1 EM D Industry Setting

The mining supply market is concentrated on the demand side. The average concentration ratio of the producers of mineral & metal products such as iron ore and aluminium is 59.75% (Labys 1980). Large multinational mining firms own and control a substantial share of world metal production capacity. These multinational firms are relatively few in number and are headquartered in the USA, Canada, Australia, South Africa or one of the European countries (Mikesell and Whitney 1987). The dominance of big companies on the buy side is because of the huge exploration costs, high initial set-up costs, limited natural resources available, and government regulations on exploration. The high cost of entry needs to be justified by the scale of operations.

The supply side of EM D is characterized by a large number of smaller suppliers, and some are “mom and pop” companies. A big mining company may need to deal with up to 35,000 suppliers throughout the multiple countries and regions in which it operates. Mining supplies come from not just the mining industry, but also other industries, such as chemicals. This makes the supplier side even more scattered and fragmented.

5.4.2 Functionalities and Relationships

The following functionalities are offered at EM D. 1) e-Catalogue. Some value added services are offered to support this function, such as catalogue management and content management. 2) Reverse auctions, and RFX, including RFQ (Request for Quotes) and RFP (Request for Proposal). 3) Transaction facilitation: users can place and receive orders online. EM D makes this a “*procurement to pay*” application. System inter-

connection and integration help participants to automate and streamline their procurement activities.

From Table 5.2, we see that EM D participants mainly use two kinds of functionalities: private catalogue and transaction facilitation, and reverse auctions. Transaction facilitation is based on offline-negotiated contracts and mainly used to streamline the ordering process. Most of the companies interviewed have used order placement, order receiving, order acknowledgement, and order change functions. However, none of these companies handle order payments online. The catalogue, a necessary tool for placing orders, can be a standard catalogue posted in EM D (in this case, only contractual trading partners can access catalogue information), or the supplier’s own catalogue residing in its legacy system. The suppliers’ own catalogues are always simpler than the catalogue posted online, since internal catalogues are more practical and convenient for ordering, but online catalogues may use visual presentations

Table 5.2 EM D Functionalities and Relationships

Participants	Functionalities used	Relationships involved /studied
1 (Supplier)	Private catalogue with product, pricing and availability, accepting processing, integrated or non-integrated system, depending on buyers	Long-term relationships
2 (Supplier)	Private catalogue, receiving POs from the customer (non-integrated)	Long term relationships (anchor customer)
3 (buyer)	Mainly reverse auctions	Long-term relationships
4 (buyer)	1. Order placement, acknowledgements and changes (integrated system), private catalogue	Long term relationships, important suppliers
	2. Reverse auction	Long-term relationships (minimum three year term)
5 (buyer)	Reverse auctions	Both long- and short-term relationships
6 (Supplier)	Reverse auctions and order processing	Both long-term and short-term relationships (randomly receiving orders without contracts)

to attract customers. Different levels of system integration and connectivity exist. It can be automated, where a buyer can see the supplier stock levels as the supplier fills an order. Or it can be a manual process, where buyers log in to place orders, and suppliers log in to print orders. A companion component of transaction facilitation is that buyers and suppliers are usually involved in contractual long-term relationships.

All three buyers interviewed in EM D use reverse auctions. Since a reverse auction is a new type of purchasing tool, both suppliers and buyers face a significant amount of uncertainty about this tool. These reverse auctions are by invitation only. *“We screen people very carefully up front, and we do a lot of work after the auction to make sure that people can deliver, and that they are people that we want to deal with”* (an EM D buyer). Findings were that reverse auctions, unlike forward auctions, were being used to support both long- and short-term business partner relationships. The trend is toward more use of reverse auctions as a support for long-term relationships, since setting up reverse auctions is time consuming. If transaction volume is not high enough, neither EM operators nor buyers will be interested in using reverse auctions.

5.5 Electronic Marketplace E

EM E was established in 2000 and sponsored by several big retailers. It is a very successful EM in the retail industry, and offers a wide spectrum of services. Currently it has offices across many countries, including North America, Europe and Asia. It has many thousands of active users.

5.5.1 EM E Industry Setting

The retail industry is highly concentrated. The four firm concentration ratio for general merchandise stores is 55.9% and the eight firm concentration ratio is 74.1% in the United States. A few big retailers dominate the market, such as mass merchandisers (Wal-Mart, Target), discount clubs (Costco), so-called category killers (Home Depot, Barnes & Noble, Staples), specialty retailers (J. Crew, Coach) and traditional department stores, like Sears and Federated Department Stores. In the general merchandising segment, competition is fierce, as evidenced by Kmart’s bankruptcy in 2002. So in order

to gain competitive advantage, or to maintain market share, many companies have launched or joined eCommerce initiatives, including both private and public EMs.

5.5.2 Functionalities and Relationships

EM E offers three major functionalities. The first is eNegotiation, including reverse auctions and RFP/RFQ. Both functionalities involve suppliers bidding on customer requests. The difference between them is the standardization of product specifications. In reverse auctions, buyers provide specifications on exactly what they want. But in applications of RFP, buyers sometimes do not know exactly what they want, and suppliers can provide customized offers. Buyers then decide which supplier to choose, based on a comprehensive evaluation of offers from all the suppliers. The eNegotiations conducted through EM E are mostly by invitation only, and it also provides training to suppliers on how to use these tools. eNegotiation functionalities generally involve both long- and short-term relationships between buyers and suppliers. This means that both one off purchasing and long-term contracts can be handled through eNegotiation.

The second functionality offered by EM E is collaborative planning, forecasting, and replenishment (CPFR). Promotional planning, a CPFR process especially designed for promotion products, is also part of the EM E CPFR functionality. CPFR is a standard collaborative process for the retail industry advocated by the VICS (Voluntary Interindustry Commerce Standards) committee¹⁵. This suggests nine steps for CPFR, including: developing collaborative arrangements, creating joint business plans, creating sales and order forecasts, etc¹⁶. However, in EM E, CPFR is more tailored to customer requests and does not necessarily follow the nine rigid steps recommended by the VICS committee. *“You look at it (nine step recommendation) and think ‘God I don’t want to do all these things’. Only some of them are important to me, and I just can’t be bothered. And, when you break it down into some of its components, it just gets a lot more manageable and the benefits are a lot easier to see”* (EM E operator). So the CPFR applications are restricted to exchanging demand forecasts, order forecasts, and inventory

¹⁵ <http://www.cufr.org/>

¹⁶ http://www.cufr.org/documents/pdf/CPFR_Tab_2.pdf

information for specific product lines, and some clients may use only one component of CPFR for forecasting, replenishment, etc.

The third functionality that EM E offers is collaborative product development. This functionality is currently in use by a limited number of users. A supermarket and its suppliers can use it in order to exchange product development information on private label products, such as nutrition and label information. Collaborative product development is normally used by buyers and suppliers who have long-term relationships. CPFR involves long-term and sometimes strategic relationships between trading partners. In some cases there can be competition in the CPFR, especially in promotional planning process, since suppliers need to compete for buyer promotion slots.

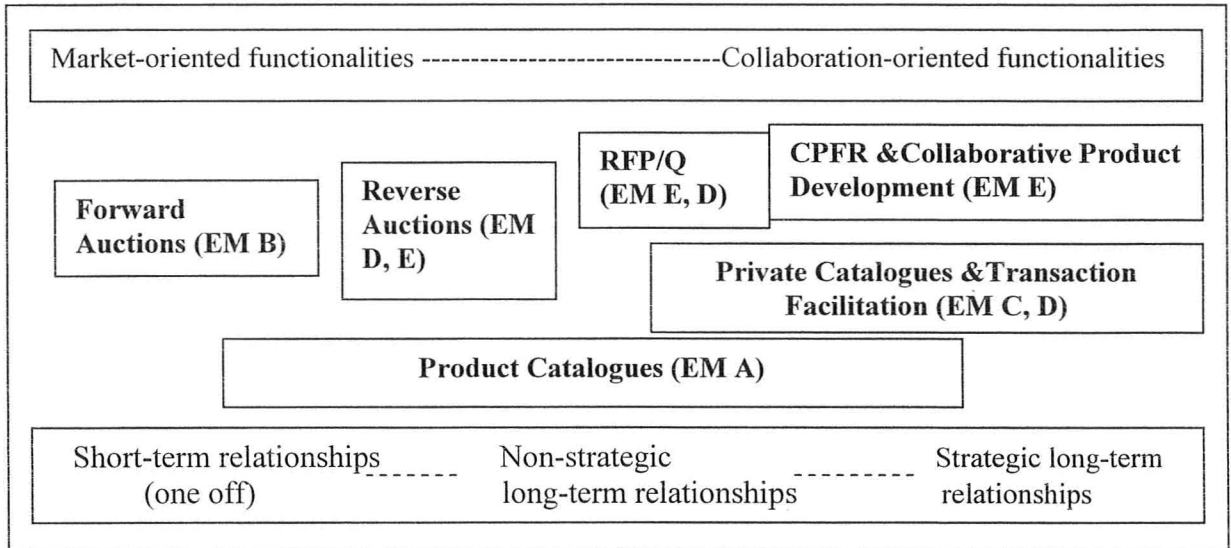
5.6 Discussion: A Continuum of Functionality

Graphing together the functionalities provided by all the EMs, shows that they are not dichotomous and exclusive categories of market-oriented and collaboration-oriented functionalities. All the functionalities together consist of a continuum, with extremely market-oriented functionalities located at one end of the continuum, and pure collaboration-oriented functionalities located at the other end of the continuum. This matches well the continuum of governance structure with markets and hierarchies at the two extremes, as indicated in Figure 5.1.

On the left hand of the continuum are the forward auctions used in EM B. Forward auctions only support one off relationships between buyers and sellers. All the auctions are conducted anonymously so that it is impossible for sellers and buyers to know each other and form long-term relationships online. Next to the EM B forward auctions is the EM A product catalogue. A product catalogue covers the entire range of relationships from one off to strategic ones. As mentioned before, in the EM A situation, if a product desired by a client is carried by a long-term supplier, distributors will always order from this supplier. In this situation, distributor use of EM A is just to get digital pictures of the products and email them to end-users. But if the product ordered by clients is unusual, or

not carried by long-term suppliers, such as “a pencil sharpener in the shape of light balls”, the distributor will search EM A to find a new supplier.

Figure 5.1 EM Functionalities and Relationships: An Overview



Next to the forward auctions of EM B, and partly in parallel with EM A, are the reverse auctions that tend to inspire extreme reactions from buyers (they tend to like them), and suppliers (they tend to dislike them). Reverse auctions can support both short-term relationships, including one off purchases, and influential long-term relationships.

“What we do then is we gather together the product specifications and put that in one file, and we determine what period of time we’re going to do the auction for, like whether its going to be a one time buy, or lets say a one year commitment, not a contract but a commitment, and typically its been about a one year commitment.”(An EM E buyer)

“And that type of product, vendor changes can be very easy, so I don’t think we have long-term relationship with vendors, but all the other vendors are long term vendors and they’re very important.” (An EM E buyer)

“If you want to measure by strategic significance, there are a number of players here that are very important, because the balance of sale for that merchandise represents quality of sale in a certain department. It’s very important.” (An EM E buyer)

However, compared with transaction facilitation and CPFR on the right hand side of Figure 5.1, the long-term relationships that reverse auctions support are not as strategic

as those supported by transaction facilitation and CPFR. The following is an original quotation from an EM D buyer who is using reverse auctions:

“We have selected our portfolio. Let’s say you put them on two axes. Some commodities, real commodities, fit very well with reverse auctions. Strategic quadrant means a lot of value, but this is stuff that is strategic to our operation. The aspect that is not correct or whatever could close down one of our plants. We do not do reverse auctions with all partners. We prefer to have different relationships with them”. (An EM D buyer)

The RFP/Q functionality that falls between CPFR and reverse auctions is less competitive than reverse auctions, but less collaborative than CPFR. Compared with reverse auctions, it involves fewer bidders and allows for customized offers from suppliers. RFP/Qs can be used to purchase very complex products. Compared with CPFR, it is still competitive and CPFR, as mentioned, does not appear to involve the level of competition that is seen in RFP/Qs.

Transaction facilitation, CPFR, and collaborative product development involve influential and strategic suppliers. In EM C, buyers moved their single source contracts with important suppliers online. The products involved are always “*high volume movers*” that are used on a daily basis. CPFR and collaborative product development are used for strategic suppliers only. “*The CPFR relationships tend to go on over a long period of time*”. Usually retailers “*prioritize who are the suppliers that you want to have this deep collaborative relationship with*”. So a supplier “*numbered twenty down the list*” usually does not get invited to participate in CPFR. One of the companies that was studied used both CPFR and reverse auctions, and when they compared supplier importance between CPFR and reverse auctions, they suggested that suppliers involved in CPFR are “*the ball game*” and “*we’re specifically picking our tier one suppliers*” (an EM E buyer).

These findings about the continuum of functionalities do not invalidate the propositions formulated in Chapter 3, which were based on a suggested dichotomy of functionality classifications. Market-oriented and collaboration-oriented functionalities are still valid classifications, and they are used as in Figure 5.1 to represent the location of functionalities on the continuum. These propositions will be validated using this continuum in Chapter 6. At the same time, noting that reverse auctions tend to be in the

middle of the continuum, it is expected that this will be a transitional area for most relationship contingencies. Although RFP/Qs and collaborative product development were mentioned in Figure 5.1, they will not be included in the analysis of Chapter 6 due to limited participant usage.

5.7 Summary

This chapter provided an introduction to all the subject EMs and their functionalities, which are summarized in Table 5.2. EM A, a promotional products EM, offers product catalogue supporting both long- and short-term relationships. EM B auctions used heavy construction equipment and involves only one off relationships. EM C helps facilitate the execution of offline negotiated long-term contracts between healthcare vendors and providers. Since EM A, B and C only offer one kind of functionality, all their participants use the same functionality. EM D participants use transaction facilitation and reverse auctions to handle both long-term and short-term contracts, among which most are long-term. EM E participants use reverse auctions (4 participants) and CFPR (3 participants) to handle/facilitate long-term contracts.

One important finding from aggregating all the functionalities together is that they consist of a continuum, instead of falling into two dichotomous categories of market-oriented and collaboration-oriented functionalities. This happens because some of the competitive functionalities, such as reverse auctions, RFPs and even product catalogues, tend to support/facilitate long-term relationships. The proposition validation in Chapter 6 will be based on this continuum of functionalities.

Table 5.3 Summary of EM Functionalities and Relationships

EM	Industry	Functionalities	Relationships Supported	Number of participants
A	Promotional products	Product catalogue	Both long and short-term relationships	6
B	Used heavy construction equipment	Forward auctions	One off relationships	5
C	Healthcare products	Transaction facilitation	Long-term relationships	5
D	Mining	Transaction facilitation	Long-term relationships	2
		Reverse auctions	Short-term relationships	1
		Reverse auctions*	Long-term relationships	3
E	Retail	Reverse auctions*	Long-term relationships	4
		CPFR	Long-term relationships	3
Total	5 (industries)	5 (functionalities)		29

* Participants may use reverse auctions to do one off purchasing, but this study focused more on reverse auctions used to handle long-term contracts.

CHAPTER 6. DATA ANALYSIS

Based on the previous introduction of individual EMs, this chapter will focus on confirming the propositions developed in Chapter 3. As mentioned in the methodology chapter (Chapter 4), coding was used to organize the information gathered for each construct. Pattern matching and the triangulation of qualitative and quantitative data will be employed to test the propositions. This chapter is organized according to propositions and their related constructs. For each construct and proposition, the properties of the construct are examined EM by EM, or functionality by functionality, and then evaluated according to the aggregated evidence.

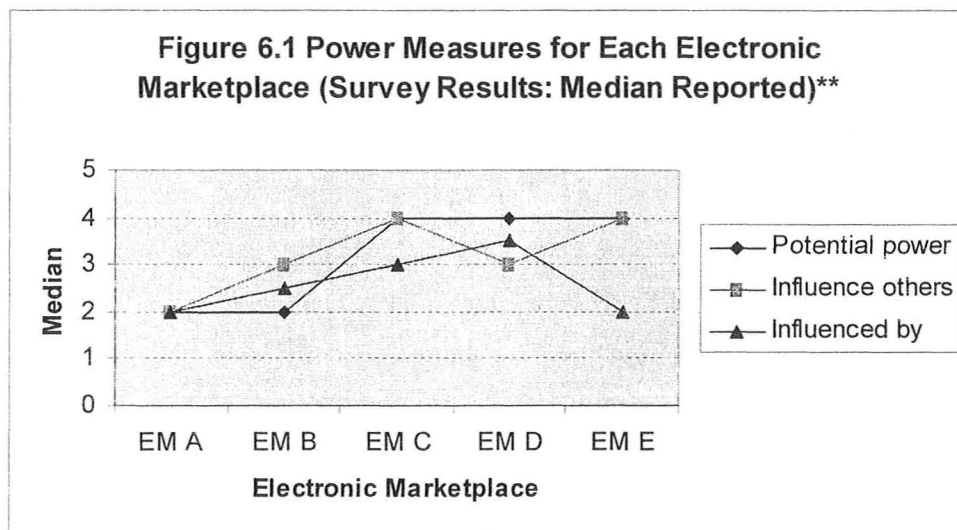
6.1 How Buyer-Supplier Relationships Affect the Adoption of EMs: Power (RQ I: P1, P7a)¹⁷

6.1.1 Individual Case Reports

Proposition 1 proposes that, in EM adoption, a relatively powerful company can either potentially affect trading partner adoption of an EM, or explicitly ask its trading partners to participate with them through an EM. In order to test this proposition, the data are presented from both the structured questionnaire (Figure 6.1) and coding results from interview transcriptions (Table 6.1). In Figure 6.1, the median of one of the three items used to characterize power is provided: potential power, influence over others, or influenced by others. *Potential power* refers to the situation where a company influences other companies' EM adoption decisions, even if this company does not make an explicit invitation. In comparison to potential power is the concept of *explicit power* where the powerful company exercises either coercive or persuasive power to drive other companies to adopt an EM. A company can either *influence others'* EM adoption, or *be influenced by* others explicitly or implicitly. Figure 6.1 provides a quick preview of the effects of power. Notice that the effects of power in EM A and B are less than those of EM C, D and E. The low median value of "influenced by" in EM E does not indicate no

¹⁷ The notation in the bracket indicates that the following section will explain research question I and the related proposition 1. P7a belongs to research question III, but due to the content relevance it is validated in this section. The same notation will apply to the remaining sections in this chapter.

power, but that the majority of the participating companies influenced others and were not influenced by others.



** Items are measured on five point likert scales (1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, 5 = strongly agree).

Table 6.1 Power Measures for Electronic Marketplaces (Coding Results)**

	EM A	EM B	EM C	EM D	EM E	Total
Total number of companies coded	6	5	5	6	7	29
Potential power	1	1	3	2	0 ¹⁸	7
Explicit power	0	1	2	4	6	13
Total	1	2	5	6	6	20
Influence others	0	0	2	3	3	8
Influenced by	1	2	3	3	3	12
Total	1	2	5	6	6	20

** The values given are the number of participating companies that mentioned the effect.

Table 6.1 reports the qualitative coding results. Two parallel classifications of power were derived for the semi-structured questionnaire data: explicit vs. potential power, and influencing others vs. being influenced by others. There were a total of 29

¹⁸ This data contradicts Figure 6.1, where the potential influence from major trading partners is high. This happens because, in semi-structured interviews, the participants' attention focused on explicit power, and they did not articulate their potential influence over others/influenced by others. These two measures complement each other in this case.

EM participants interviewed, and 20 reported influence of some kind. This leads to the conclusion that power is a strong factor in the adoption of EMs. In the following, data from both the semi-structured interviews and the structured questionnaires will be used to explain, EM by EM, how power affects their adoption. Notice again that the effects of power in EM A and B are less than those in EM C, D and E.

EM A: From Table 6.1, we see that power is a weak factor in the adoption of EM A. Most participants adopted this EM because it was offered as a part of the association's membership package, making enrollment automatic. *"It was free with the PPAC membership"* (an EM A distributor). Some participants did their own research on whether to join or not. *"We did research on our own... I believe that we come across it on our desk, and we dug into it"* (An EM supplier). Only one supplier reported that its decision to join EM A was implicitly influenced by its distributors using this EM.

EM B: We witnessed two kinds of indirect power: major industry player influence, and sister company requests. One dealer joined EM B because one of the major industry players sponsored this EM and this company was the dealer's major supplier. *"Some of our suppliers, actually our main supplier, invested in EM B"* (an EM B dealer). This supplier did not explicitly ask this dealer to join EM B, but it recommended EM B to them. Another dealer adopted the EM because its sister dealer insisted they should use this EM to liquidate their inventory. *"Actually, ..., had insisted on auctioning used equipment, that sort of prodded the rest of us to put a package together"* (An EM B dealer)

EM C: We saw both potential influence from key suppliers and explicit influence by hospitals in EM C. In two cases, hospitals influenced supplier participation. They either made the participation in EM C a requirement of the contract, or asked suppliers to join. The following are some original quotations from participants:

"In a couple of cases, the customers came to us and wanted to know if we were EM C compatible or able to do work with them on EM C, because they were themselves trying to do it...." (An EM C supplier)

"We recently negotiated a prime vendor agreement. As part of that prime vendor agreement, we had a term in there that they had to get hooked up with EM C, and they

agreed to those terms. We gave them a timeline, and they worked on that, and actually it seems to be going pretty good.” (An EM C hospital)

“The influence probably came from the suppliers, because quite frankly they say they’re working with EM C, and there’s some synergies there, ... There’s no question that their experiences would influence our decision.” (An EM C hospital) (Note: this is one of a few buyers whose EM adoption decision was affected by their suppliers.)

“And the supplier had to be really involved, and in some cases we had to push the supplier quite hard to participate.” (An EM C hospital)

EM D: Three buyers explicitly asked their suppliers to join EM D, and one supplier received a letter from its buyer asking them to use EM D to deal with them. Two suppliers adopted its use because of the presence of key industry players or trading partners. The common characteristic of these two suppliers was that both were early adopters of EM D and took its adoption as a strategic approach. Both adopted EM D proactively without the requests of key trading partners, but the outcomes of the adoptions by these two companies were quite different. One company is doing well through EM D, but the other one became a passive member just to satisfy its current customers. The following are some original quotations from participants:

“Work with the key mining customers on a common technology base”, ...“And if customers like company I and company II have come into it a hundred percent, it’s clearly a winning strategy. Customers like (company III) who deal with hundreds of eMarketplaces, you have to watch your investment”. (An EM D supplier)

“Because we thought our customers were gonna go in that direction”. (An EM D supplier)

“We’re reacting to customers’ requests. In this case we got the letter from the customer saying we like your business, and we appreciate what you do for us, but from now on we would like to transact with you this way.” (An EM D supplier)

“We have a lot of influence on them to go with EM D, because we have told them that we have selected that platform, more and more we are going to use it. If you decided to go with a platform, let’s go with that one.” (An EM D buyer)

Commenting on the difference between influencing suppliers to join reverse auction and transaction facilitation: *“Since we are talking about reverse auctions, there are different kinds of influencing. When you talk about the adopting of transactions on EM D, it is a very different level of suppliers on board, because you need the suppliers to sign up to EM D, you need them to pay transaction fees, you need them to be on board to very different type of arrangements. When you are talking about doing reverse auctions with a group of suppliers, it is a one-time event. For that reverse auction, you just need to get them approved to participate; you just need to do some one-time training. Though it is very different, you know supplier on*

boarding process is critical when you are talking about the transaction side”. (An EM D buyer)

EM E: All the EM E suppliers interviewed reported that they joined EM E because of buyer requests, and all buyers admitted that they influenced their customers to use EM E. Buyers realized that in some cases, they had to use strong arguments to persuade suppliers to join reverse auctions. *“In general, very few suppliers are interested in doing this (reverse auction) at all, so our suppliers are no exception”.* The following are some original quotations from EM E participants:

“It was under the request of our customer.” (An EM E supplier)

“It was imposed on us by two retailers...”, “So A said if you want to do CPFR with us, then it has to be on EM E”. (An EM E supplier)

“And, we picked out these strategic suppliers, and then we’ve gone through and approached them with executive sponsorship. We approach them with this idea, and we walk them through what it is, how we’ve used it with other suppliers, what we would do with CPFR, how our business process would change, and then they kind of decide yes or no if they want to go forward. And the other thing that we’ll do that’s quite effective is that we’ll have them talk to other non-competitor suppliers as references. Now when those discussions take place, if there was resistance, which typically there is, it goes away.” (An EM E buyer)

6.1.2 Aggregated Report and Proposition Validation

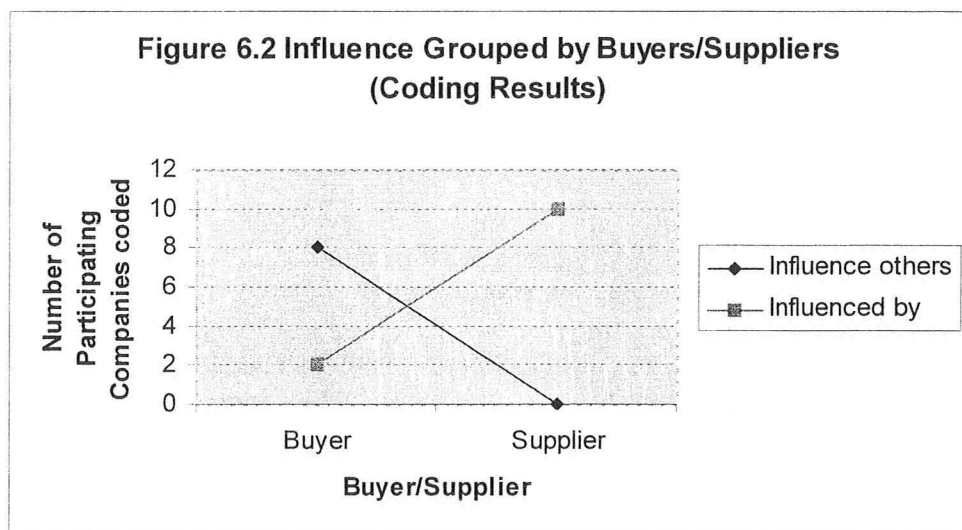
Proposition 1: Subject companies are more likely to adopt an EM if companies that exhibit power of any kind are already participating.

Proposition 7a: Companies in concentrated industries are more likely to be affected by power than companies in fragmented industries, when deciding to adopt an EM.

Proposition 1 on the effect of power on the adoption of EMs is repeated in the box above. It is convenient to test proposition 7a related to market structure in this section, so it is also included in the box.

Table 6.1 above shows that, out of 29 participants, 20 participants have either been influenced or influenced others’ EM adoption decisions. Notice that, in most cases, buyers are the driving force for this influence, while suppliers react to these influences (see Figure 6.2 below). This is understandable since buyers appear to be gaining more

and more power over suppliers in today’s business environment. Among the five EMs chosen, two EMs (A and B) are in fragmented industries, two (C and D) are in buyer-concentrated industries and one (E) is in an industry with both buyer and supplier concentration. In these settings, the conclusion is that suppliers are the less powerful side of the market. So Proposition 1 is confirmed, and subject companies, which are very likely to be suppliers, are more likely to adopt an EM if companies exhibiting power of any kind are already participating.



The number of buyer and supplier interviews conducted for each EM was roughly the same. However, from table 6.1, the number of participants who have been influenced by or influenced others is much higher in EM C, D, and E than in EM A and B. In fact, in EM C, D, and E, almost every participant witnessed power of some kind, but in EM A and B, trading partner influence was less common. The information in table 6.1 is confirmed by Figure 6.1, where on average EM C, D and E in concentrated industries had higher median measures than EM A and B in fragmented industries. So the conclusion is that, as Proposition 7a predicted, market structure is a strong moderating factor on the effects of power.

6.2 Market Structure and the Adoption of EMs (RQ III: P7b)

Proposition 7b: Companies in fragmented industries are more likely to adopt market-oriented functionalities than companies in concentrated industries.

Two effects of market structure on the adoption of EMs have been proposed. One was confirmed in the above section. In this section, the focus will be on Proposition 7b, which states that companies in fragmented industries are more likely to adopt market-oriented functionality because of the cost/benefit balance of aggregation. In the quantitative survey results (see Figure 6.3), one item was used to measure the benefit from aggregation (whether their purpose of adopting this EM was to search or not), and three items to measure costs, such as setup and maintenance, and requirements for dedicated resources and major business process changes. As noted, the *benefits of aggregation* from using collaboration-oriented functionalities are less than those from

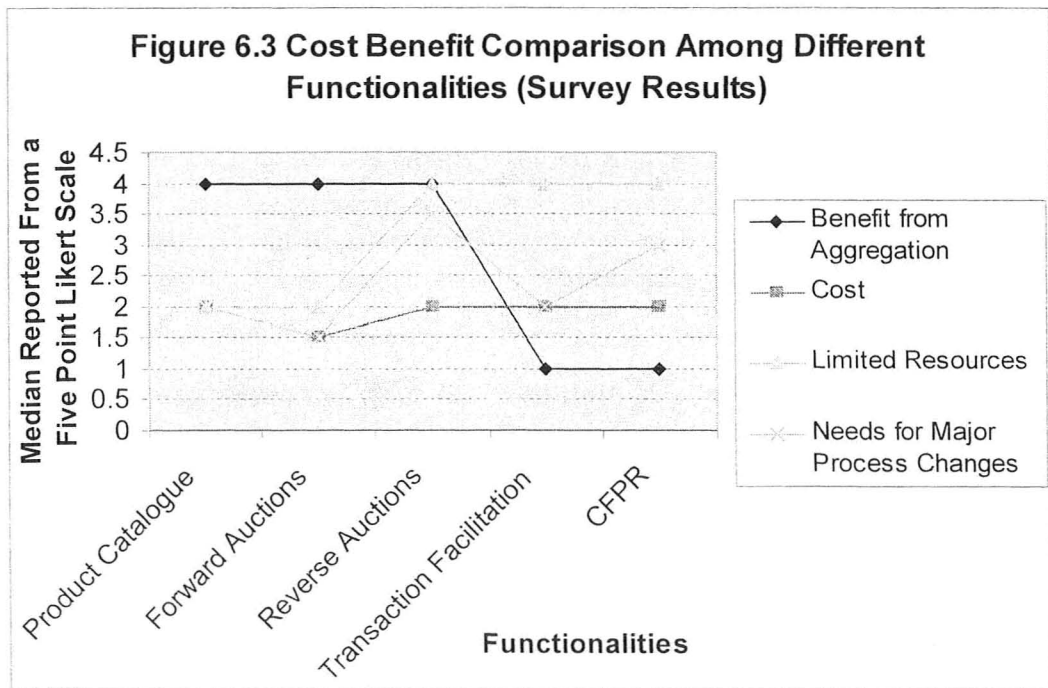


Table 6.2 Market Structure and the Adoption of EMs

Functionalities and EMs	<ol style="list-style-type: none"> 1. Product catalogues (EM A) 2. Forward auctions (EM B) 	<ol style="list-style-type: none"> 3. Reverse auctions (EM D and E) 	<ol style="list-style-type: none"> 4. Transaction facilitation (EM C, D) 5. CPFR (EM E)
Industry property:	Fragmented	Concentrated	Concentrated
Functionality property:	Market-oriented	Have elements of both competition and collaboration	Collaboration-oriented
Cost	<ul style="list-style-type: none"> • Free service with membership; Free to register; pay inspection fee • Do not need special resources • Do not require business process changes 	<ul style="list-style-type: none"> • Free or small amount to register; pay transaction fee if win • Simple training needed • Need special resources • Require small business process changes 	<ul style="list-style-type: none"> • Pay for transactions • Need business process changes • Need dedicated resources
Benefits from aggregation	<ul style="list-style-type: none"> • Search among a larger pool of trading partners 	<ul style="list-style-type: none"> • Invitation only (Limited benefits from aggregation) 	<ul style="list-style-type: none"> • Known suppliers or buyers, less benefits from aggregation

using market-oriented functionalities, but the *cost* of using collaboration-oriented functionalities is high even for bigger companies. The cost of using collaboration-oriented functionalities comes mainly from the need for dedicated resources and business process changes. This issue will be addressed in the qualitative data from the interviews (Table 6.2).

From a cost benefit balance, companies in the promotional product and used heavy construction equipment industries are more likely to adopt EMs offering market-oriented functionalities (i.e. A and B). The costs of participating in these two EMs are very low. In EM A, the biggest impetus for EM A participants is free enrollment with the purchase of association membership. EM A puts a minimum requirement on suppliers:

timely catalogue updating. Due to the lack of IT expertise, even this small requirement sometimes cannot be fulfilled. *“So from a supplier standpoint, the larger companies that have their own websites that have their IT staff in the back room do all the stuff on a regular basis. It is easy for them to take just whatever they got and transfer them to EM A, but for the small guy who is only carrying 12 golf shirts, he has to get them photographed, have their digital pictures altered. So from their standpoint, I would say the big guys, their stuff is normally up to date”* (An EM A Distributor). In EM B, buyer registration for an auction is free. Sellers need to pay for inspection reports, but this is inexpensive considering the savings on equipment transportation and sales person travel costs. EM A and B do not require any process changes and dedicated resources, which fits the limited financial situation of small firms. But their benefits from using market-oriented functionalities are large, since they can reach a larger pool of buyers inexpensively.

Concentrated industries are characterized by bigger companies, who can afford a market-oriented functionality, but the benefits are limited. In EM C (Healthcare EM), suppliers are very concentrated. For some products there are only four or five competitors. There is not much benefit to a buyer from a wider search capability, since these five suppliers are already well-known. And it is known that participants join EM C mainly to do business with existing trading partners. EM C does not provide a searchable catalogue, and the catalogues are used for validating transactions between contracted buyers and suppliers. For EMs D and E, the buy side is concentrated but the supply side is fragmented. Through a common online marketplace, buyers receive the benefit of searching for more suppliers, but for suppliers, the benefit is less since buyers are well known.

Comparing the benefits of aggregation, the indication is that, in fragmented industries, both suppliers and buyers benefit from aggregation with online market-oriented functionalities, so companies will be less resistant to adopting their use. However, in concentrated industries, the benefits tend to be one sided or small (the latter in the case of industry concentration of both buyers and suppliers). The more fragmented

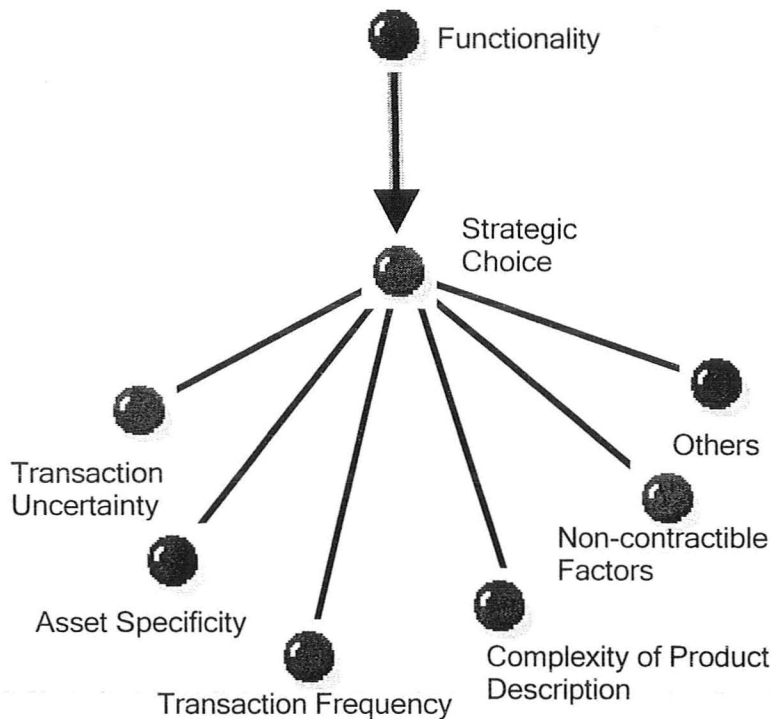
an industry, the greater the benefits of aggregation. Therefore, Proposition 7b is confirmed. The conclusion is that the companies in fragmented industries are more likely to adopt market-oriented functionalities than companies in concentrated industries, due to the low cost of adoption and use, and the greater benefits of using market-oriented functionalities by companies in fragmented industries.

6.3 How Buyer-Supplier Relationships Affect the Strategic Choice of Different Functionalities (RQ II: P2-P6)

This section focuses on examining contingencies of buyer-supplier relationships and how they affect participant choice of different functionalities. EM functionalities and five contingencies (constructs) were coded from the semi-structured interview results and organized through the use of *Nvivo* (Figure 6.4). EM functionality codes included all relevant data about what functionalities are offered by EMs and how participants use them. Since EM functionalities are the foundation of data analysis, including the strategic choice of EM functionalities, this code has already been addressed in detail in Chapter Five. The five contingencies are transaction uncertainty, transaction frequency, asset specificity (transaction specific investment), complexity of product description, and non-contractible factors. These contingencies are proposed to affect company choice of different EM functionalities, and will be explained in this section. Other contingencies not covered by the proposed constructs are included as “Others” and discussed in Chapter 7 under future research.

Although an EM by EM approach was used in confirming Propositions 1, 7a, and 7b (power), a functionality by functionality approach will be used to examine important constructs for the remaining propositions. Since EMs A, B and C each offer only one functionality, and EMs D and E have two functionalities each (for which sufficient data could be gathered), this is similar to an EM by EM approach.

Figure 6.4 The Strategic Choice of Different Functionalities: Key Constructs



6.3.1 Transaction Uncertainty

Proposition 2a: A company is more likely to adopt market-oriented functionalities when it faces low transaction uncertainty, or when transaction uncertainty is high but no long-term relationships are available to absorb this uncertainty.

Proposition 2b: A company is more likely to adopt collaboration-oriented functionalities when it faces high transaction uncertainty, and long-term relationships are available to absorb this uncertainty.

Three kinds of uncertainties for each functionality will be examined: *Predictability of what products to purchase, predictability of how many to purchase*, which is exaggerated by order quantities (since the bigger the quantity, the worse the consequences of order fluctuation) and *market variability*, measured by the rate of price and supplier change, which are often seen in fragmented industries since fragmented industries are more dynamic and less stable than concentrated industries. The first two of these uncertainties are also referred to as *technological uncertainty* and *demand*

uncertainty (Choudhury 1997; Kraut, Steinfield et al. 1998). Among them, market variability suggests a lower likelihood of long-term relationships, and EMs provide opportunities to search for more suppliers and reduce such uncertainties. Technological and demand uncertainty is normally absorbed by forming long-term relationships with suppliers. Table 6.3 provides a comprehensive view of the transaction uncertainty involved in each functionality, and is explained below.

Product Catalogue (EM A): For distributors, predicting what and how many to buy from a supplier is difficult. Since each product is custom made, even if the distributor can predict demand for the base part, the artwork that end-users are going to require for the base component is unpredictable. Distributors are unable to stock anything (unless they have production capacity so that they can stock some base parts). They react only as client end-users place orders. Sometimes, even clients are not sure what they are going to order exactly. They come and ask for distributor suggestions, and then decide what to buy. This causes great uncertainty for distributors.

“We do not do that prediction. It is totally unnecessary. I only buy from the supplier what customers purchase from me. I do not have inventory, or stock. It is not like, ok I will stock some of this, some of that. I do none of that. I buy only when customers order from me”. (An EM A distributor)

At the same time, the size of orders fluctuates a lot from one order to the other, and they are “*all over the place*”, which increases distributor uncertainty. Market variation in the industry is low and suppliers in this industry do not change much, which makes the formation of long-term relationships possible. Suppliers and distributors have different views of price changes. Usually, the purchase of promotional products has a minimum quantity requirement. As more is purchased, the unit price drops. Suppliers think their prices do not change much, since the combination of price and quantity has already been set well in advance and fixed for at least a year. But from the distributor point of view, when they purchase different quantities of products, they see prices fluctuate.

Table 6.3 Transaction Uncertainty in EMs

Functionalities	EM	Predictability of what to buy	Predictability of how many to buy	Market variability
Product catalogue	A	Unpredictable (Products change from one customer to another)	Unpredictable (Depends on end users; order changes can be 50-60%)	Prices and suppliers are stable (Fragmented)
Forward Auction	B	Predictable (Can predict what machine they will buy)	Predictable (The number of machines they are going to buy is controlled by the budget)	Prices and suppliers change frequently (Fragmented)
Transaction facilitation	C	Predictable (All normally used medical-surgical products)	Unpredictable (Daily or weekly prediction) (Fluctuates by numbers of incoming and outgoing patients) (Order size varies)	Prices and suppliers are stable (Concentrated on supply side)
	D	Predictable (Normally used mining supplies such as welding gases, industrial tools)	Unpredictable (Big variation)	Prices and suppliers are stable (Fragmented on supply side)
Reverse auctions (Short-term)	D	Predictable	Predictable	Prices and suppliers are stable (Fragmented on supply side)
Reverse auctions (Long-term)	D	Predictable (6 months)	Some predictable and some unpredictable	Prices and suppliers are stable (Fragmented on supply side)
	E	Predictable (Months-years)	Most are predictable (Months-years out) small order fluctuation, big size orders	Prices and suppliers are stable (Slightly concentrated on supply side)
CPFR	E	Predictable (Months-years out)	Less predictable, (Week- 3 months); huge order fluctuation (25%-300%); big order size	Prices and suppliers are stable (Slightly concentrated on supply side)

The above analysis suggests that promotional product distributors face great uncertainty, which explains why most distributors remain loyal to certain suppliers in order to get their support when they receive “*rush orders*” from end-customers. Although market variability is low, the fragmented nature of the industry suggests that suppliers tend to be small, and cannot carry all the products demanded by end users. So distributors form long-term relationships with suppliers who carry the most frequently ordered products. They need to search on EM A only for products that are not available from their long-term suppliers.

Forward Auctions (EM B): Usually the used equipment dealers’ demand quantity is relatively certain since end-users who buy through dealers are limited by budgets and their forecasted need. Dealers can also predict what model and make they will need to buy. “*It depends on the time of year, ..., we are gonna need N machines, at minimum are five types of these machines over the next seven months*” (an EM B dealer). However, market variability is high. The price of used equipment changes from one machine to another. The suppliers (original equipment manufacturers) in this industry do not change much, but the supplier set of the used heavy construction equipment is not stable. First, many companies can temporarily serve as a supplier when they have used equipment to liquidate. Second, the dealer market is not stable and dealers enter and exit this market frequently. “*The dealers change significantly, although all are ... dealers*” (an EM B dealer). Before dealers and end users actually see a used machine for sale, they are not sure what the price will be and from whom they will buy. Thus they have to search for awhile to find the machine they need. This low product and demand uncertainty and the high market variability suggest a good fit for auctions and spot purchases. Market variability makes long-term relationships difficult, and low demand uncertainty suggests that dealers and end users can search for the product for a relatively long time without worrying too much that there will be unexpected needs.

Transaction Facilitation (EM C and D): In EM C, a hospital can predict what products it is going to need. For example, when it orders baby formula, the brands and specifications for the baby formula are relatively stable. But the order quantity is less

predictable since it is affected by fluctuations in the number and characteristics of patients. Most participants indicated that they only forecast daily or weekly demand. *“We do it daily. We do it on previous day”*(An EM C hospital).

In EM D (mining supplies), two suppliers suggested that their buyers order the same products from them every time, but there is a moderate to high variation in the order quantity. *“It is a huge variation”* (An EM D supplier). *“It is consumables. It depends also on their industrial activities. They ramp up and slow down”* (An EM D supplier). In both EM C and D, the high demand uncertainty is hedged by entering into long-term relationships with suppliers.

Market variation is moderate to low for both EMs. The price is quite stable, and does not change much from year to year. Suppliers do not change much, which makes the formation of long-term relationships possible and likely.

Reverse Auctions (EM D and E): In EM D, a buyer who used reverse auctions to purchase a short-term service contract thought the need for the service was quite predictable. When reverse auctions are used to negotiate long-term contracts with suppliers in EM D and E, buyers can predict what and how many they are going to need at least six months out. In EM D, three of the buyers used reverse auctions. Among them, two used reverse auctions to purchase products consumed daily, and in a few cases, capital products. The need for these products is based on production schedules, and the demand is quite predictable. One buyer in EM D suggested that some products are predictable and some are not predictable:

“For some products, it is easy, for some, it is very difficult. If I am talking about certain products, we have lots of history. This is part of our core business. Based on the history, we can say now on next year, we are going to have a specific range of production, therefore we could have very good forecasts. But for some others, we based our forecast as what is coming, what is history, and we cannot commit ourselves that accurately to basic numbers. The way we try to play the game is with our suppliers. We say next year we are going to need 1 million dollars of whatever stuff. If we achieve 1.3, we would like to have a type of deal with you. If 1.5 we would like to have a type of discount....”(An EM D buyer)

In EM E, the products handled through reverse auctions are quite predictable.

“In most of the buyers that we dealt with, they pretty much know twelve months out, now its time to buy this, now its time to buy that, and this is when I do this kind of item. And so they’ve gotten a general sense of what’s coming down the pipe then.” (An EM E operator)

On average, the transactions are predictable, and transaction uncertainty is low in reverse auctions managed through both EM D and E. Both the product prices and the suppliers in the mining and retail industries are stable.

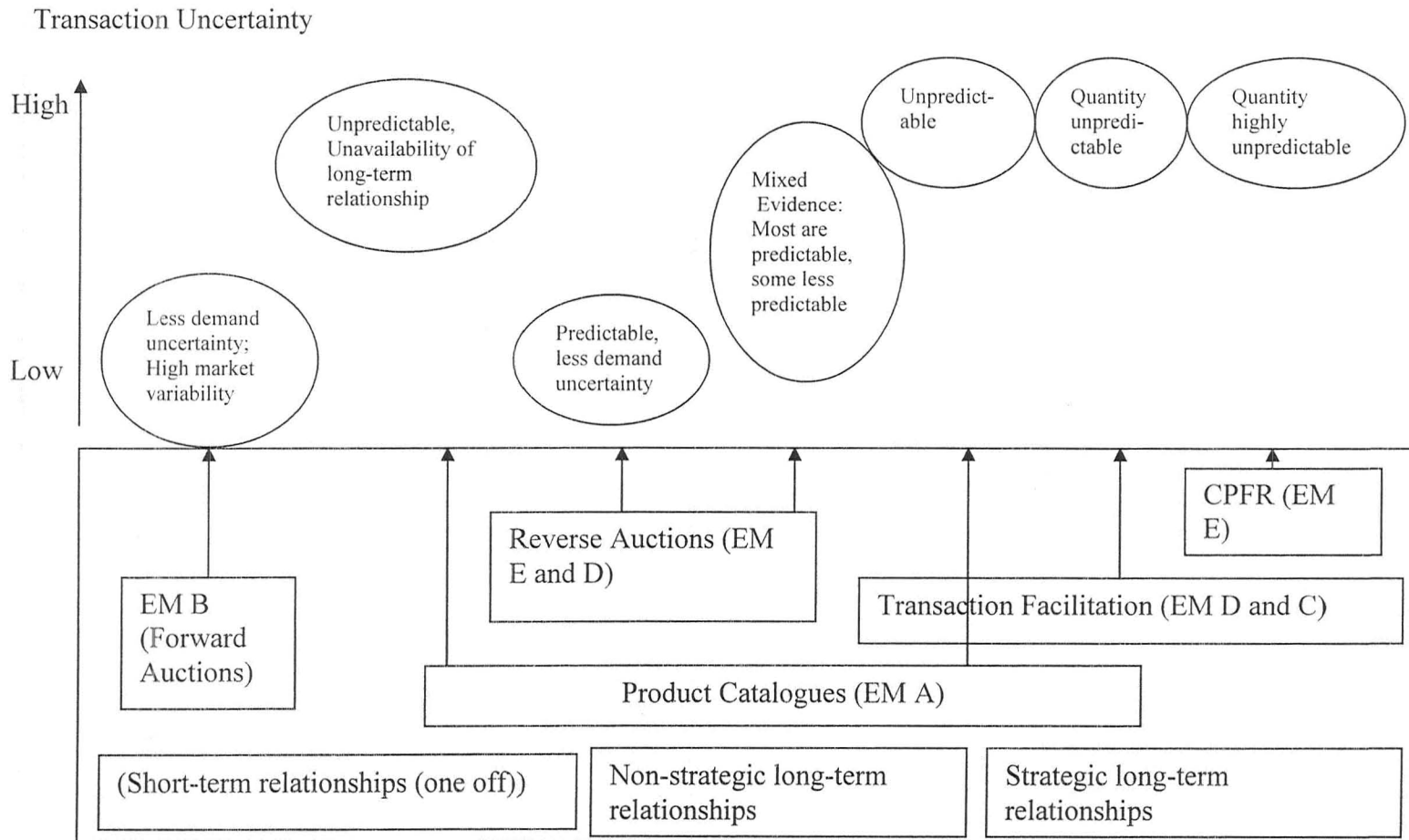
CPFR (EM E): The types of products that would be supported by CPFR are limited and the specifications do not change much, so they are predictable. But there are huge variations in the order quantities, which is why they need accurate forecasts and advanced planning. Two kinds of products, which were both merchandise for resale, were involved in our study of CPFR:

- Promotional products. This type of product results in large fluctuations in order quantity.
- Branded products. This type of product has a higher than normal product flow in the store due to greater demand by consumers. So demand uncertainty is greatly enlarged by order size. This uncertainty is especially high in certain seasons, since seasonality causes further fluctuations.

The supply of the products involved in CPFR is concentrated in only a few branded product makers, so it is quite stable, and strategic long-term relationships are usually formed to absorb the demand uncertainties.

Figure 6.5 presents a visual view of transaction uncertainty. Proposition 2a predicts that a company would choose a market-oriented functionality in two cases: either low uncertainty, where a long-term relationship is less attractive, or high uncertainty but long-term relationships are not available. From this figure we can see that transactions involved in market-oriented functionalities have 1) a low transaction uncertainty (e.g. reverse auctions used to support short term relationships in EM D and forward auctions in EM B), or 2) high demand uncertainty but long-term relationships are not perfectly available since several preferred suppliers can not cover the whole range of the products

Figure 6.5 Transaction Uncertainty: An Overview



(EM A product catalogue), or 3) high market variability which makes long-term relationships difficult to form (EM B forward auctions). Proposition 2b predicts that a company would choose a collaboration-oriented functionality when facing high demand uncertainty and long-term relationships were available. As Figure 6.5 indicates, in collaboration-oriented functionalities, transactions are highly uncertain and the EMs shown (EM C, D, E) are in a stable industry environment, so long-term relationships are more feasible. Since the trend in Figure 6.5 matches Propositions 2a and 2b well, these propositions are confirmed. The data lead to the conclusions that a company is more likely to adopt market-oriented functionalities when it faces low transaction uncertainty, or when transaction uncertainty is high but no long-term relationships are available to absorb this uncertainty. In contrast, a company is more likely to adopt collaboration-oriented functionalities when it faces high transaction uncertainty, and long-term relationships are available to absorb this uncertainty.

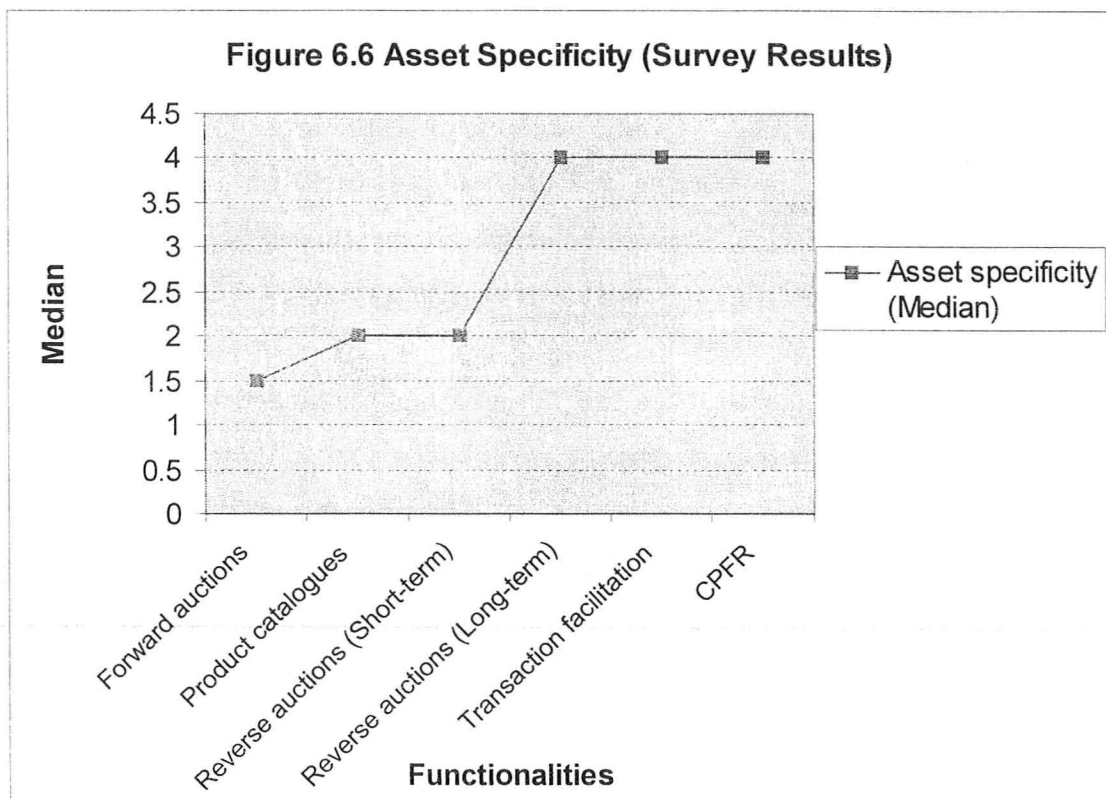
6.3.2 Transaction Specific Investment

Proposition 3: A company involved in relationships that require high transaction-specific investments tends to adopt collaboration-oriented functionalities in an EM. Otherwise, it will prefer market-oriented functionalities.

Proposition 3 indicates that collaboration-oriented functionalities are more likely than market-oriented functionalities to involve transaction-specific investments. Figure 6.6 presents a quick review of asset specificity from the structured questionnaire. Three items were used to measure asset specificity: IS (Information System) specificity (Q5.5¹⁹), knowledge specificity (Q5.6) and Others (including physical, location and dedicated asset specificity, Q5.7). Three items were combined into one to measure overall asset specificity by taking the maximum of three items for each participant, since the interest here is in asset specificity of any kind. The median for each functionality is reported in Figure 6.6. This table shows a difference between the asset specificity in market-oriented functionalities (such as product catalogues and forward auctions) and

¹⁹ Q5.5 refers to Question 5.5 in the structured questionnaire in Appendix I. The same notation is applied to other items mentioned.

that involved in collaboration-oriented functionalities (such as transaction facilitation and CPFR). The transaction specific investment in each functionality is discussed in the following section, and then proposition 3 is evaluated, based on the aggregate of these results (Figure 6.7).



Product Catalogue (EM A): In the structured questionnaire, no participating distributors reported transaction-specific investments in long-term relationships with their suppliers. Although promotional products are customized to each order, and distributors are knowledgeable about their long-term suppliers, this does not mean there is a high specific investment. Supplier production is mass customized so that every distributor can access it without supplier-specific investments. Knowledge about a specific trading partner is not proprietary either, since any distributor can get access to it without significant investment.

Forward Auctions (EM B): No participants reported any transaction-specific investments, since buyers and sellers do not necessarily know each other when

purchasing online. Although dealers usually repair and refurbish equipment before selling, this investment is not specific to any buyers, and just makes the equipment more saleable.

Transaction Facilitation (EM C and D): In EM C, Transaction specific investment is considered to be high within the long-term relationships investigated, and these specific investments mainly involve proprietary knowledge about suppliers. *Four out of five* participants reported such knowledge investments. Supplier-specific information system investments and specific physical asset investments were also reported by two EM C participants. Since specific investments are considered to be high when any kind of specific investment is made, transaction specific investment is high for EM C.

Two companies used the EM D transaction facilitation functionality, and *both made significant transaction specific investments*. One company made both specific human resource and warehouse investments. “We brought in people to specifically work with them through EM D to make this happen” and “yes. Warehousing. And products on consignment, that’s a classic way of doing business with companies in this industry”. This company also developed some specific information systems: the buyer and the supplier integrated their systems through EM D, and this integration was specific only to this buyer. The other company also made specific warehousing investments. The following is a quotation from this participant:

“This particular customer is what we call an anchor customer. That is, we have a location in that city because this customer is there. If that customer wasn’t there maybe we would go to an indirect channel, maybe a distributor, something of the kind. We probably wouldn’t be located there. We would try to find a partner over there that would sell our products”. (An EM D supplier)

Reverse Auction (EM D and E): Transaction-specific investments could be either high or low in transactions supported by reverse auctions through these EMs. In EM D, one case was reported of using a reverse auction to purchase a short-term contract. But their specific investment was very low in this case.

Three participants (one supplier and two buyers) used reverse auctions to negotiate long-term contracts. *Two out of three* of these long-term relationships involved transaction-specific investments. For the suppliers, their products are very specialized and need special production capacity for each customer. One buyer indicated that there were no investments in long-term relationships with companies involved in reverse auctions, and he also commented on the related strategic relationship:

“Depends where the supplier fits. If it fits in the commodity quadrant, the answer is no (No specific investment). But if it fits in the strategic quadrant, let’s say specialized supplier, lot of knowledge, lots of stakes there. If I am changing suppliers, it is a big deal for us. We have to change a lot of our furnaces and our operations. We might end up with a big problem.” (An EM D supplier)

One buyer agreed that their suppliers made specific investments in their relationships.

“We would not, some suppliers might. They integrated their systems with us. For some of the big guys, they have other customers, but for small guys, they just did that for us..., not too much on our side, we tried to push it to suppliers anyway”. (An EM D buyer)

In EM E, (the retail EM) four cases of reverse auctions were studied: three buyers and one supplier, and among these participants, *three cases* involved specific investment and one participant was neutral. The specific investments involved were specialized knowledge and physical investments such as warehousing. One buyer admitted that their suppliers made that investment. *“Yes. Suppliers lose a lot but not our side”.*

In summary, we found that specific investments in the reverse auction-long-term relationship combination were high, since *five out of seven cases* reported such investments. And among them, four cases were investments made by suppliers. We therefore believe that suppliers seem to be at a greater disadvantage in reverse auctions than normally considered. Reverse auctions not only reduce supplier margins, but they also appear to make suppliers even more “captive” to the relationships.

CPFR (EM E): Relationship-specific investment is generally high in transactions supported by CPFR. In CPFR, the dedicated assets are mainly knowledge about the trading partners and their practices, which is accumulated through years of deep interactions and relationships. It is not surprising that, in CPFR, no physical specific

investment is involved. CFPR is a relatively new approach and is being piloted primarily among very big retailers and their branded suppliers, which are often big suppliers too. Their investment in warehousing and information systems can be used to support transactions with many other trading partners, providing substantial economies of scale. But for small suppliers, such as those involved in reverse auctions, investment is specific only to certain retailers/buyers. If suppliers lose customers, their investment risks being wasted since it may be difficult to find other customers needing these specific IT technology/ warehousing facilities.

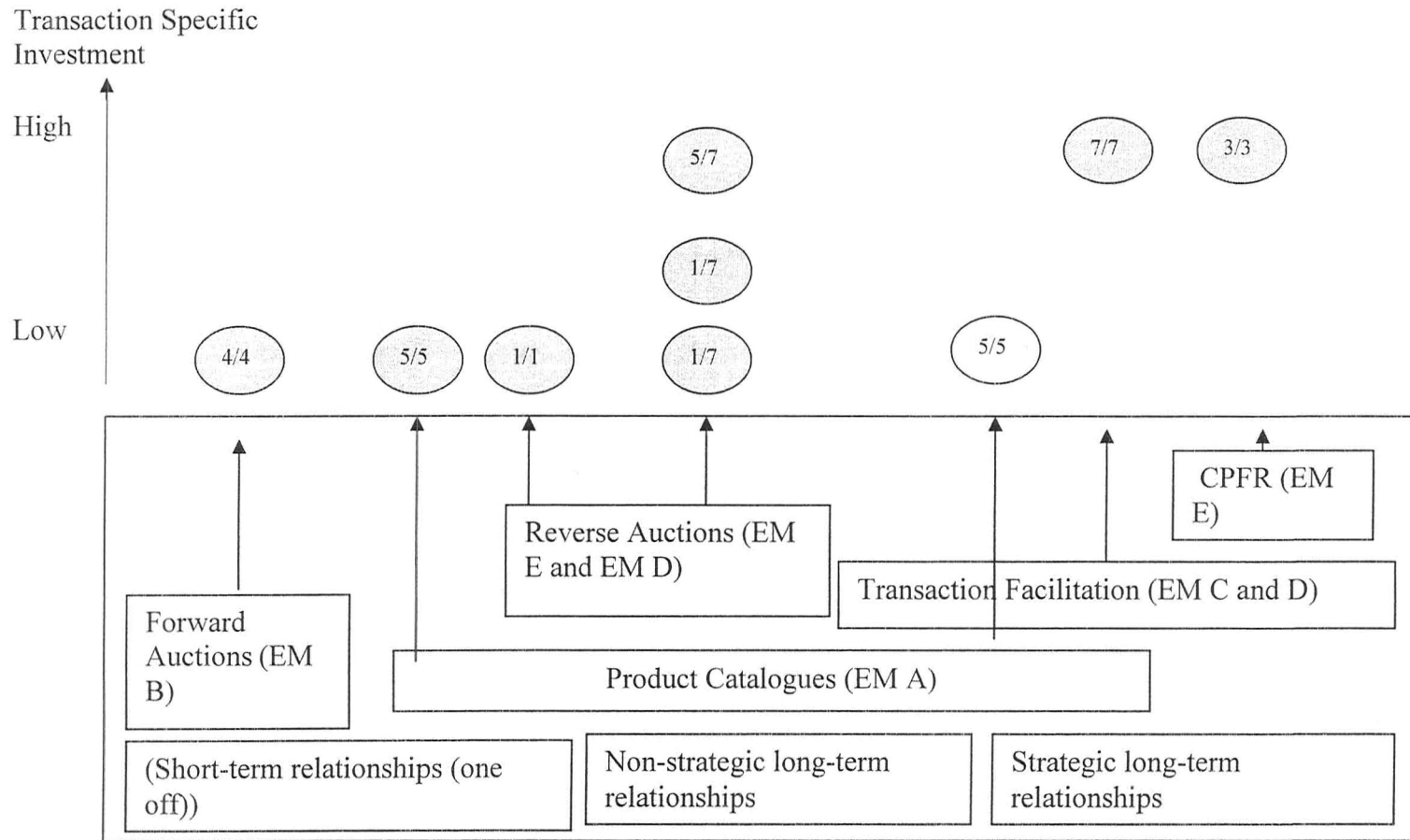
By summarizing all the functionalities (see Figure 6.7), we see that there is an approximate association between functionalities and transaction specific investments. Forward auctions (EM B) and reverse auctions used to support one off relationships (EM D), involve low transaction specific investment. Reverse auctions used to support long term relationships (EM D and E), transaction facilitation (EM D and C) and CPFR (EM E) involve high transaction specific investments. An exception is the product catalogue in EM A, which involves low transaction-specific investment in both long- and short-term relationships. But from the overall trend, Proposition 3 appears to be confirmed. That is, a company involved in relationships that require high transaction-specific investments tends to adopt collaboration-oriented functionalities in an EM. Otherwise, it prefers market-oriented functionalities.

6.3.3 Transaction Frequency

Proposition 4: A company purchasing a product frequently will prefer using collaboration-oriented functionalities in an EM. Otherwise, it will prefer using market-oriented functionalities.

In order to test Proposition 4, the transaction frequency of each functionality and the relationships involved were examined. Participants were asked to identify the transaction frequencies with their major trading partners in the structured questionnaire,

Figure 6.7 Transaction Specific Investment: An Overview²⁰



²⁰ Each circle in the figure indicates the level of transaction specificity involved in each functionality. The fraction within each circle represents the number of cases reporting high/low level of transaction specific investment/ the total number of cases studied. The grey circle indicates the approximate trend of the level of transaction specific investment changing with functionalities. The white circle indicates an exception to the Proposition 3 prediction.

so the following explanation focuses on the data from this question. Comments from interview transcriptions are also used to triangulate the numerical data.

Product Catalogue (EM A): All five interviewees reported long-term relationships with major trading partners. The related transaction frequencies were quite high. *Four out of five* participants transacted at least *twice per week* with one of their long-term trading partners, and the lowest rate was *twice per month*. From the interview transcriptions, we determined that transaction frequency was an important element when promotional products distributors chose to be loyal to their suppliers. Because they order frequently, they always order from one of their long-term suppliers in order to build volume discounts.

“Let’s use an example, an example of a vendor that carries a lot of apparel. So we would basically purchase from that. If we do a large percentage of business, we get very good prices, which we can in turn give to our clients, ... so that they will continue to come back to us.” (An EM A distributor)

Some distributors commented on ordering from short-term trading partners. On average, distributors order from short-term suppliers those products that are not available from their long-term suppliers. For these products, they usually order very infrequently from these suppliers, which could be suppliers that they found online.

“The reason we would have short-term relationships with new suppliers usually would be our long-term supplier does not have specific products.” (An EM A distributor)

“Typically in the promotional industry when you buy wearables, you might also buy a pencil sharpener in the shape of a light ball. There are not many people that carry a pencil sharpener in the shape of light balls, so for those kinds of people I have been doing business for ten years and I have only sold this once. But I sell lots of clothing. So there is a difference in the relationships. When I call the pencil sharpener people, I do not know them” (An EM A distributor)

From the case of the EM A product catalogues, the conclusion is that there is a difference between transaction frequency involved in long-term relationships and those involved in short-term relationships. Long-term relationships appear to involve higher transaction frequencies.

Forward Auctions (EM B): Low transaction frequencies were observed in this EM. Heavy construction equipment is expensive and capital-intensive. For end users, a

few units are enough for a company. So even new equipment is purchased infrequently. In the case of used equipment, the condition of the equipment varies a lot, and a company will purchase used equipment very infrequently from the same supplier. For dealers who buy through EM B to re-sell to end-users, their transaction frequency is obviously limited by the sparse demand. The EM B forward auction tends to be one off spot purchasing.

Transaction Facilitation (EM C and D): For all five participants in EM C, the transaction frequency was quite high. All the participants transacted daily with their trading partners online, and the average order placed by a hospital with its vendor on EM C was approximately 70 per month. From the interviews, we found three reasons why such “*high volume movers*” use transaction facilitation and long-term relationships: (1) This avoids time consuming and frequent negotiations, and saves staff time to do more productive work; (2) It consolidates transactions to fewer strategic suppliers. (3) It motivates buyers to follow company purchasing policy and reduces maverick purchases. The following are selected original quotations from the hospital interviews:

“Where EM C really has value is in the repetitive purchases as opposed to major capital purchases. I mean they require so much interaction between the buyer and the supplier...” (An EM C operator)

“Well it’s part of our purchasing strategy to develop strategic alliances with them, to get the opportunity to consolidate more products, to bid on more products, and generally to provide a fair environment in which to do business with the hospital.” (An EM C supplier)

“They (big strategic suppliers) can handle a number of contracts, and consolidate a number of projects under their product mix. That’s the main reason.” (An EM C buyer)

“We’re trying to get everybody to follow the policies and procedures that get anything ordered for the hospital to go through purchasing (agents)”. (An EM C buyer)

In EM D, both companies that used transaction facilitation reported high transaction frequency. The average number of transactions for participants who used transaction facilitation was 65/month, and one participant selling welding-related products noticed, “*they tend to place frequent small orders*” (an EM D supplier).

The conclusions from this discussion are that both hospitals and mining companies usually move products with high transaction frequency through long-term relationships and adopt transaction facilitation to support these relationships.

Reverse Auctions (EM D and E): In EM D, one participant used a reverse auction to negotiate a one off purchasing contract, so the transaction frequency was low for short-term relationships.

As for reverse auctions used to support long-term relationships, we found mixed evidence for transaction frequencies in reverse auctions, which tended to have a large range. Three participants in EM D were involved in reverse auctions. One supplier commented that the average number of transactions from executing contracts resulting from reverse auctions was one transaction per two months. *“Once a couple of months. It is the kind of business coming once, and nothing for a little while”*. But a buyer commented that *“the more we’re using them on a daily basis, the easier it is for us to be able to roll it into reverse auctions because we’ve got bigger volumes associated with it”* (An EM D supplier). Another buyer interviewed was testing most product lines to see if they were suitable for reverse auctions, except those products and suppliers that lie in the strategic quadrant. For this buyer, the transaction frequency could range from very low to very high.

Mixed evidence was also reported by four EM E participants. One supplier got a contract for selling products for store promotions, and that contract involved only 2 or 3 transactions per year. Three buyers reported diverse transaction frequencies from low to high. Two of three buyers were quite aggressive in pursuing reverse auctions, suggesting, *“everything is possible in reverse auctions”* (An EM E buyer), including both merchandise for resale and indirect merchandise.

In summary, there was mixed evidence of transaction frequency for reverse auctions that were used to support long-term relationships. This appears to be due to the fact that reverse auctions are a new type of tool, and some companies are still experimenting with this tool for handling a diverse range of products.

CPFR (EM E): In CPFR, transactions are handled on a weekly basis for regular products. But for in-store promotional products, orders are placed even more intensively, up to 200 orders per promotion.

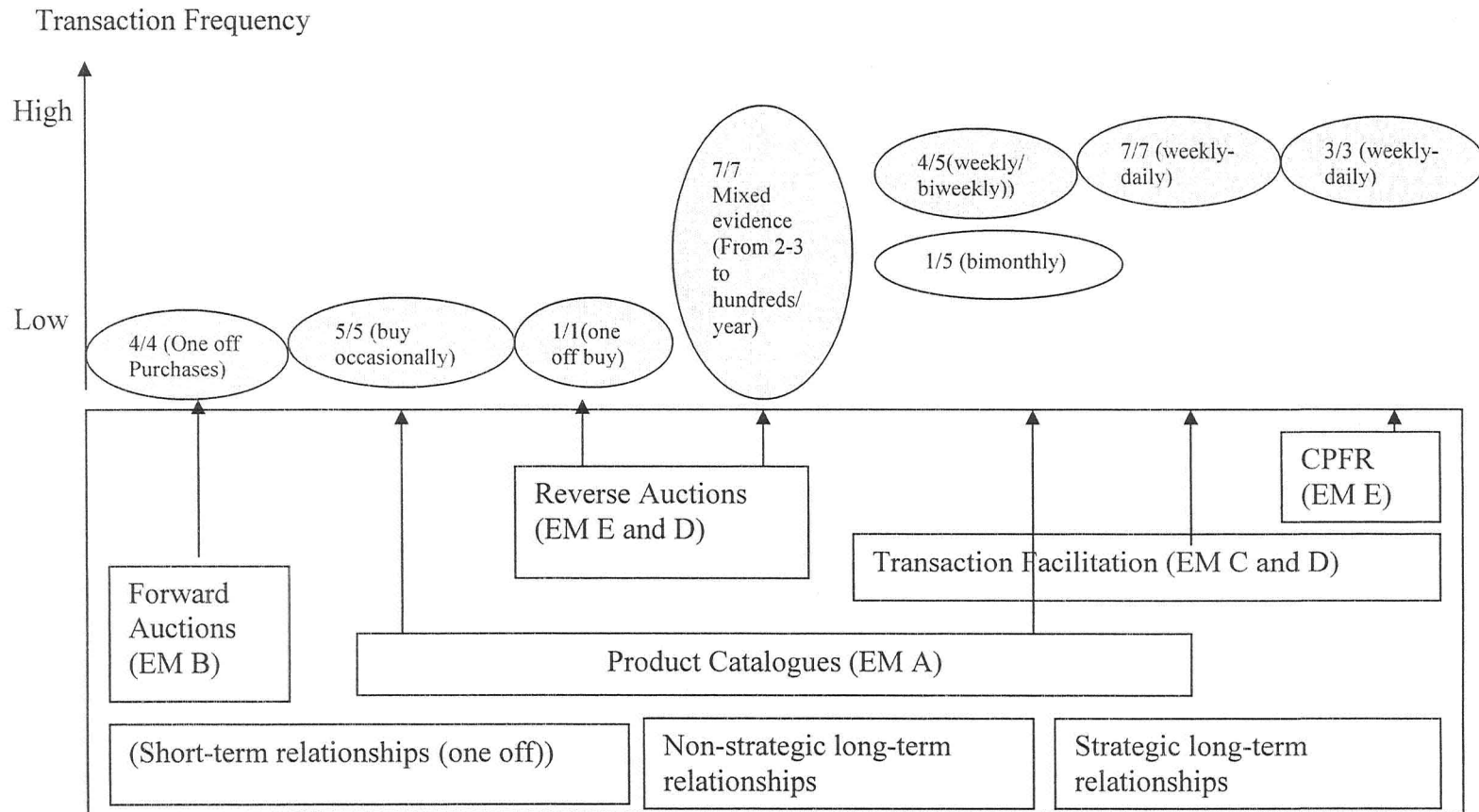
Figure 6.8 presents an overview of the entire picture about transaction frequency. Transaction frequencies tend to be higher in collaboration-oriented functionalities (where transactions are conducted on a daily and weekly basis) than market-oriented functionalities (where transactions are conducted once in a while, or even one off). So Proposition 4 is confirmed, with the conclusion that transaction frequency is a strong indicator of a company's choice of collaboration vs. market-oriented functionalities. Reverse auctions used to manage long-term relationships seem to serve as a transitional area between market-oriented and collaboration-oriented functionalities in terms of transaction frequency. For the purpose of this study, the interpretation of reverse auctions as a "transitional area" is sufficient. But this suggests an important further research opportunity, which will be addressed in Chapter Seven.

6.3.4 Complexity of Product Description

Proposition 5: Companies purchasing products with highly complex descriptions tend to adopt collaboration-oriented functionalities. Otherwise, they will adopt market-oriented functionalities.

Proposition 5 proposes that products with simple descriptions are more likely to be transacted through market-oriented functionalities, and products with complex descriptions will be more likely transacted through collaboration-oriented functionalities. Table 6.4 provides an overview of all the products involved in the structured questionnaire. Two items were used to measure this construct: product standardization, and the ease of describing a product. On average, standard products are easy to describe. Unfortunately, there was no trend in the survey results, since all the functionalities involved products that were standard and easy to describe. Since the structured questionnaire only includes products transacted with a specific trading partner, the search

Figure 6.8 Transaction Frequency: An Overview²¹



²¹ The interpretation of the figure is the same as figure 6.7. A simple explanation of the transaction frequency involved in each functionality has been added, such as one off buy, orders purchased on a weekly basis, or daily basis.

Table 6.4 Complexity of Product Description (Survey Results)
(Median reported)

	Number of Observations	Product Standardization	Ease of Product Description
Product Catalogue	5	4	4
Forward Auctions	4	4	4
Reverse Auctions	8	4	4
Transaction Facilitation	7	4	4
CFPR	3	4	4

Items are measured on a five point likert scale
(1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, 5 = strongly agree)

for patterns continued in the qualitative data analysis. The following examines this product property as before: functionality by functionality.

Product Catalogue (EM A): EM A mainly involves promotional products. Although promotional products tend to be highly customized, the base products advertised on EM A are quite standard and easy to describe. This product property applies for products purchased through both short-term and long-term suppliers.

Forward Auctions (EM B): Although heavy construction equipment involves complex products from the average consumer's point of view, they are standard and easy to describe for dealers and persons who have good knowledge about this industry and its products. The standardized nature of the products makes them suitable for auctions and one off relationships since less communication about the products is needed.

Transaction Facilitation (EM C and D): Among the five participants in EM C, three buyers indicated that the products they purchase, mainly medical surgical products, are standardized and easy to describe. However, the two suppliers supply both standard and nonstandard products.

"I guess it depends on the products. Yes, I guess their catalogues are pretty comprehensive". (An EM C supplier)

"Some are yes, but basically most products are available through their hospital catalogue right now. I mean, in the cardiovascular lines, these products probably turn over within about 18 months, I mean there are always new improved products out there" (An EM C supplier)

Between these two suppliers, one said that products are easy to describe, but the other supplier said that they were not. This supplier suggested that complex products are not suitable for transaction facilitation functionalities.

“If you’re using it just as a standard electronic purchasing tool, there may be some benefit in seeing your products online... The customer can then work with you and they can see what you have, all on their equipment as much as on yours, so that might facilitate some customer service benefits. The other side of it is that commodity items, by and large, are still contracted as well. Specialty products are still very much sold and marketed at a direct level to end-users. They’re very technically complicated at times, they’re surgically detailed, ..., and I don’t think that you could effectively market and sell those products on a web portal or a web interface at all”. (An EM C supplier)

In EM D, most products were standard and easy to describe. Examples of these products are welding gases, electrical products, respiratory products, industrial products, and chemicals. In summary the products transacted through transaction facilitation are standard and easy to describe. More complex products are not doing well currently, because less volume is demanded, and sales are often handled through direct channels, so it is hard for these suppliers to justify an investment in EM D.

Reverse Auctions (EM D and E): In EM D, two buyers reported that their products were standard and easy to describe, but one supplier’s products were customized and complicated. Just as in the case of transaction facilitation addressed above, this supplier also commented that their products are not suitable for EMs, and actually now has a very passive presence on EM D just to satisfy existing customers. One buyer also commented that *“we’ve done a little bit of everything with reverse auctions, we’ve done just the commodity stuff, and we’ve done some of the heavier capital stuff. We tend to do better with the commodity than the capital, the more specialized stuff”* (An EM D buyer). From interview data, the finding was that, despite the large range of products involved in reverse auctions in EM D, most products were standard indirect products such as chemicals, fuels, wood pallets, hand tools, and computers.

In EM E, there was a slightly mixed picture regarding products transacted through reverse auctions. Most of the products were standardized and easy to describe, such as hardware, household goods, and garden tools. But sometimes very complex products are

also auctioned, such as store construction contracts and employee compensation insurance.

In summary, the products involved in reverse auctions can range from very simple to very complicated, but (1) most of the products tend to be simple and standardized, and (2) more complicated products do not lend themselves to reverse auctions as much as standardized and easy to describe products.

CPFR (EM E): Since CPFR is still in the pilot stage or being considered by many companies, the number of products being handled through CPFR was limited. All products handled through CPFR were standard and easy to describe. Due to the depth of the relationships between CPFR trading partners, suppliers may custom-make products for certain trading partners, but the products were still standard since every item supplied to the specific trading partner was the same.

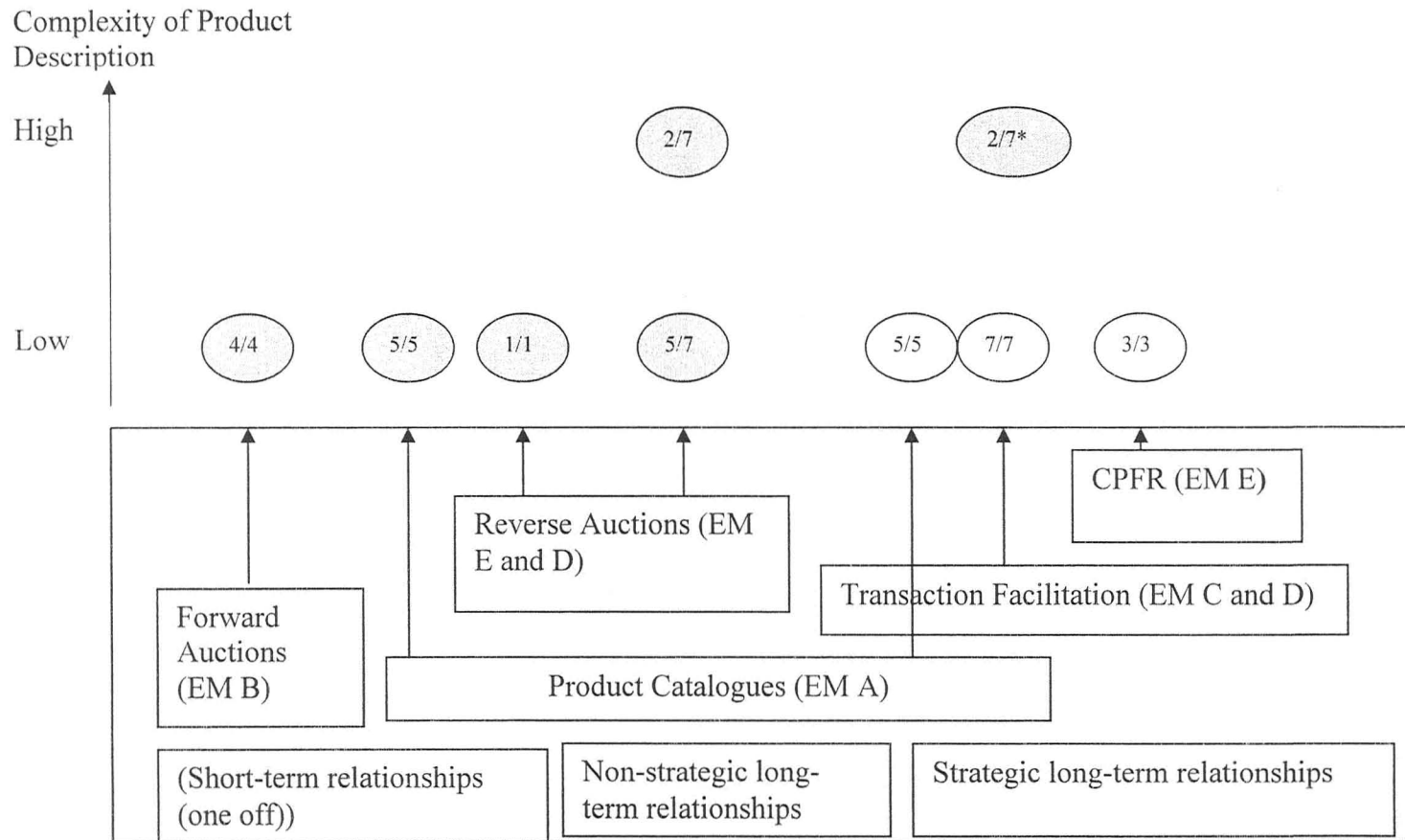
From Figure 6.9, the complexity of product description is low in all cases, so a Wilcoxon signed ranks test was performed on the structured questionnaire data to see whether the two items used to measure product description (product standardization and complexity of product description), were significantly higher than the neutral level of 3 on the five point Likert scale (Table 6.5). The test confirms that two items are both significantly higher than the neutral level of 3, indicating that most products are standard

**Table 6.5 Complexity of Product Description:
Wilcoxon Signed Rank Test (c)**

	Product Standardization	Complexity of Product Description
Number of Observations	27	27
Z (b)	3.272(a)	4.315(a)
Asymptotic Significance (2-tailed)	.001***	.000***

- a. Based on positive ranks.
- b. Z is the standardized Wilcoxon signed rank test statistics (*W*). The statistic on the differences from a neutral value of 3 is reported.
- c. Items are measured on a five point Likert scale (1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, 5 = strongly agree)

Figure 6.9 Complexity of Product Description: An Overview²²



²² The interpretation of the figure is the same as Figure 6.7, and the white circles indicate that the incidents do not match the proposition well

* Two companies indicated that they transacted simple products online most of the time but also involved a few complex products.

and easy to describe. Proposition 6 about the complexity of product description could therefore not be confirmed. The appropriate conclusion seems that products that are easy to describe are suitable for both market-oriented and collaboration-oriented functionalities. However, little data were collected on two other functionalities, RFP and collaborative product development (from limited data collected, these two functionalities involve mostly complex products), so this conclusion should not be inferred for these functionalities.

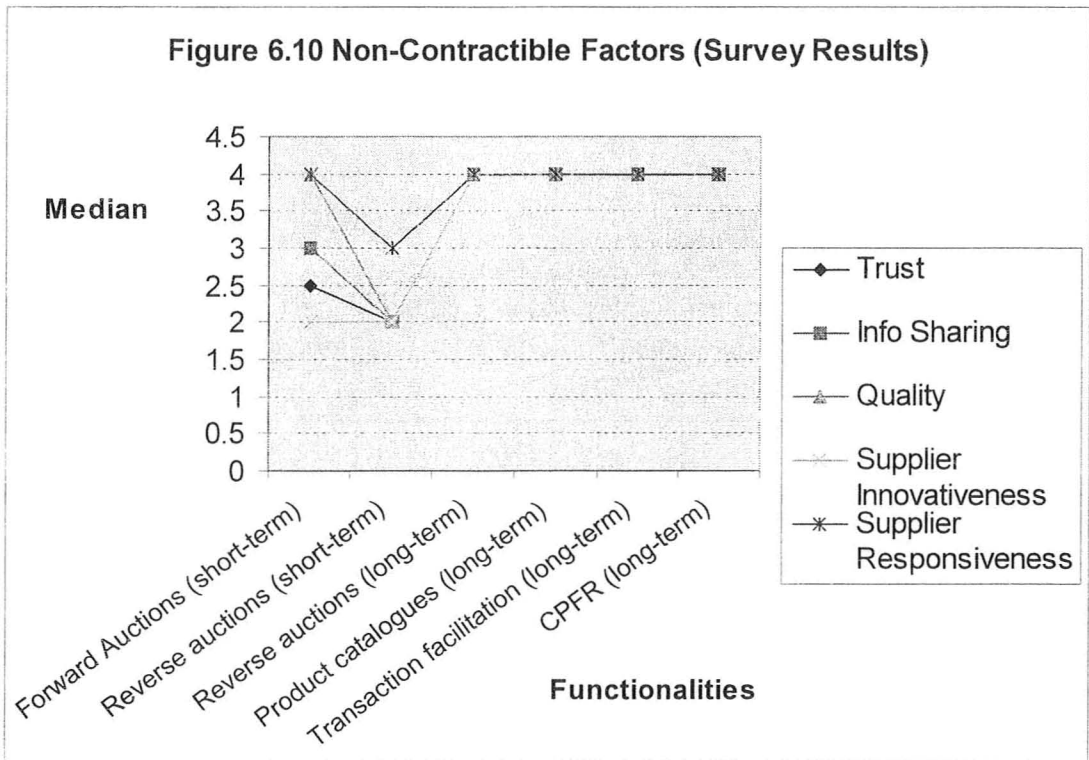
6.3.5 Non-Contractible Factors

Proposition 6: Companies for which non-contractible factors are important will prefer collaboration-driven functionalities. Otherwise they will tend to adopt market-driven functionalities.

Non-contractible factors, such as trust, quality, information sharing, supplier innovativeness, and supplier responsiveness serve as a complementary explanation of why companies use long-term relationships and choose to get involved in collaboration-oriented functionalities. Proposition 6 is concerned with these factors. Figure 6.10 presents an overview of the non-contractible factors for each functionality. From this figure, the levels of non-contractible factors are high in collaboration-oriented functionalities, such as product catalogue (long-term relationships), CPFR, and transaction facilitation, but generally low in market-oriented functionalities such as forward auctions and reverse auctions (short-term relationships), except that supplier responsiveness is high in forward auctions too. Notice that the level of non-contractible factors is high in reverse auctions (long-term relationships). These numerical data will be considered in combination with interview data, functionality by functionality.

Product Catalogue (EM A): On average the median value for non-contractible factors is high. Distributors and suppliers involved in a long-term relationship have a high level of trust and information sharing. They share information about production and product status so that distributors can keep clients updated and assured of the on-time delivery of products. Since this is a fashion-type industry, clients are constantly changing their tastes. Suppliers are very responsive to their important long-term distributor

requirements for product innovations, and can make extra efforts to fulfill their special needs such as rush orders.



The interviews showed that distributors do not always search for new products on EM A, but prefer to stay with certain long-term suppliers for the following reasons:

- **Trust:** trust is important in maintaining long-term relationships. Some distributors think of their suppliers as “*someone you can rely on*” (An EM A distributor), and treat them as a whole “*task force*” (An EM A supplier). This trust is usually developed through years of interaction, and the benefits of trusted relationships are assured quality and special services.
- **Quality:** Some distributors pay attention to their product quality and treat it as a competitive advantage over others. One distributor actually did not sell low quality products even when its clients asked for them. Purchasing from known trusted suppliers is a way of being assured of product quality.

"You have to make sure that at the end of the day, you purchase that, say apparel, then you know your embroidery has to be done, so you want to have a good relationship with your embroiderer. So they do a good job, they know what's going on. So you know that you can rely on them. It is a very task thing, I guess too". (An EM A distributor)

- Special services (supplier responsiveness and flexibility): Distributors normally do not carry inventory. They place orders to suppliers when their clients place orders with them. This causes a problem when clients have a rush order. But if this order is with suppliers with whom they have long-term relationships, they can ask a favour, and suppliers are normally happy to oblige.

"We go to them first, and know, quite often, we would go back to them. Even though we get some price cuts, it is for the economic or time frame...we can call in a favour for a rush order."(An EM A distributor)

- Credit: The credit element can be interpreted as a kind of trust.

"And they also do not know me, which can create some credit issues. Of course, we have such good credit; we are not used to paying in advance. You know what I mean, get on the phone, and call all these people we buy from on a regular basis. There is nothing to say about it, we always get the credit." (An EM A distributor)

Forward Auctions (EM B): Buyers or sellers working with EM B do not value non-contractible factors very much except for quality and supplier responsiveness. In the used heavy construction equipment market, quality is very important since the equipment is very important in day-to-day construction work. Problems with equipment can cause both safety problems and construction delays. In EM B, equipment quality is controlled by EM C inspections or onsite checks, *not a specific governance structure such as long-term relationships*. Suppliers were reported to be responsive to buyer requirements. This result is somewhat surprising because, in one off purchases, suppliers would be expected to react only to the purchase agreement. A preliminary explanation is that in a competitive business environment, where the buyers have more and more power, suppliers are more responsive to customer requirements due to competitive pressures.

Transaction Facilitation (EM C and D): In EM C, the median scores of all non-contractible factors were higher than three. Findings included: (1) suppliers involved in transaction facilitation also have the highest volume of sales to the participating hospitals.

Mutual trust and level of information sharing between these business partners is high. (2) Quality is very important for hospitals since “*hospitals are not dealing with products, but patients*” (an EM C operator). This is also the reason why many hospitals do not pursue an open market strategy in purchasing. The ordering of low quality or legally unproved products could lead to severe consequences. (3) New medical tools and medicines are introduced frequently due to advances in the medical field. One supplier indicated that its products turned over on average every 18 months. Supplier innovativeness is important to hospitals to serve their patients better. (4) Sharing information and synergies with suppliers was important for some of the hospitals. The following quotation from a buyer indicates the importance of this synergy:

“... especially because we represent teaching hospitals, long-term relationships with the key suppliers are critical because there’s a mutual synergy around research and development. And in many of the departments in the teaching hospitals, the doctors themselves are doing research, and are using new technology that’s coming from these long standing suppliers to do their research. Quite frequently they’ll also use technology from new suppliers, so it’s not that we don’t ever do that, but typically the relationships are of long standing and there is, both from a purchasing cost benefit perspective, and also in the relationship with the physicians and surgeons that are some real benefits to those” (An EM C hospital)

In EM D, one supplier reported that it always provided more services to long-term suppliers. “*For some of our long-term contracts, they get better consideration such as emergency delivery, higher frequency of services,...*” (An EM D supplier). These could be interpreted as supplier flexibility and responsiveness. Another supplier shared a lot of information with its long-term buyers. “*We share production schedules and inventory information, but no open book information such as cost structures*” (an EM D supplier).

In summary, the conclusion is that, on average, non-contractible factors are very important in long-term relationships involved in the transaction facilitation functionality.

Reverse Auctions (EM D and E): The levels of trust, information sharing, quality, and supplier responsiveness and innovativeness were relatively low for one participating company in EM D that was using reverse auctions to support shorter-term

relationships. In this case, the buyer bought a service through a reverse auction, as a kind of one off purchase.

Non-contractible factors were otherwise high in reverse auctions that supported long-term relationships. This result is still counter-intuitive since reverse auctions are often treated as a tool that causes distrust and disincentive between buyers and sellers. At the beginning, it appeared that this was caused by a gap between the perceptions of buyers and that of suppliers. However, the data showed no such gap.

The following are some explanations of why these non-contractible factors were high for reverse auctions. First, trust is important to buyers, since reverse auctions are used to buy “*quite important things*”, and they generally value quality highly.

“If you want to measure by strategic significance, there’s a number of players here that are very important, because the balance of sale for that merchandise represents quality of sale in a certain department, it’s very important. We’re very anxious to make sure we’re getting good market pricing, but maintaining good partnerships with people that we have depended on for a long time because of how important they are to the business in our shop.” (An EM E retailer)

Second, suppliers are now more flexible, not because of greater incentives in strategic long-term relationships, but “*more and more, because of squeezing price and pressure*” (An EM D buyer). One buyer commented, “*If you are going to do business with us, if you work with us effectively, at the end of the day, our cost has to be lower*” (An EM D buyer). So he suggested that, despite the price squeeze, suppliers still have to be innovative in hopes of “*doing business with us*”. One supplier we talked to also suggested that they were very responsive and innovative in dealing with customers even when they won contracts through reverse auctions. In some reverse auctions, buyers took into account the disincentives to suppliers in making their decisions. Buyers were found to take the following measures to avoid the problems mentioned above: (1) doing invitation-only reverse auctions; (2) offering longer-term contracts; (3) in evaluating the bids, considering factors other than just pricing.

CPFR (EM E): In CPFR the trust level, information sharing, quality, and supplier responsiveness and innovativeness were all high. CPFR is used only when the business partners have trusting relationships. Information sharing is much higher in CPFR than in

reverse auctions since information sharing is a basic requirement of CPFR. Participating suppliers are usually innovative and responsive to buyer requirements, and they supply higher quality of product to these buyers. The following are some original quotations from EM E interviewees:

“...And one of our criteria (of getting involved in CPFR), is that it has to be a strong relationship to begin with before we start CPFR. And we’re trying to share as much information between each other. There is a high level of trust, and then we want to take that to the next level, and try to automate and have some logic running in the background so they can really be focusing on the results. I would actually not necessarily recommend doing CPFR right off the bat with a new supplier. I think it’s really better for in our case, it’s better for us to be doing it with existing suppliers.” (An EM E retailer)

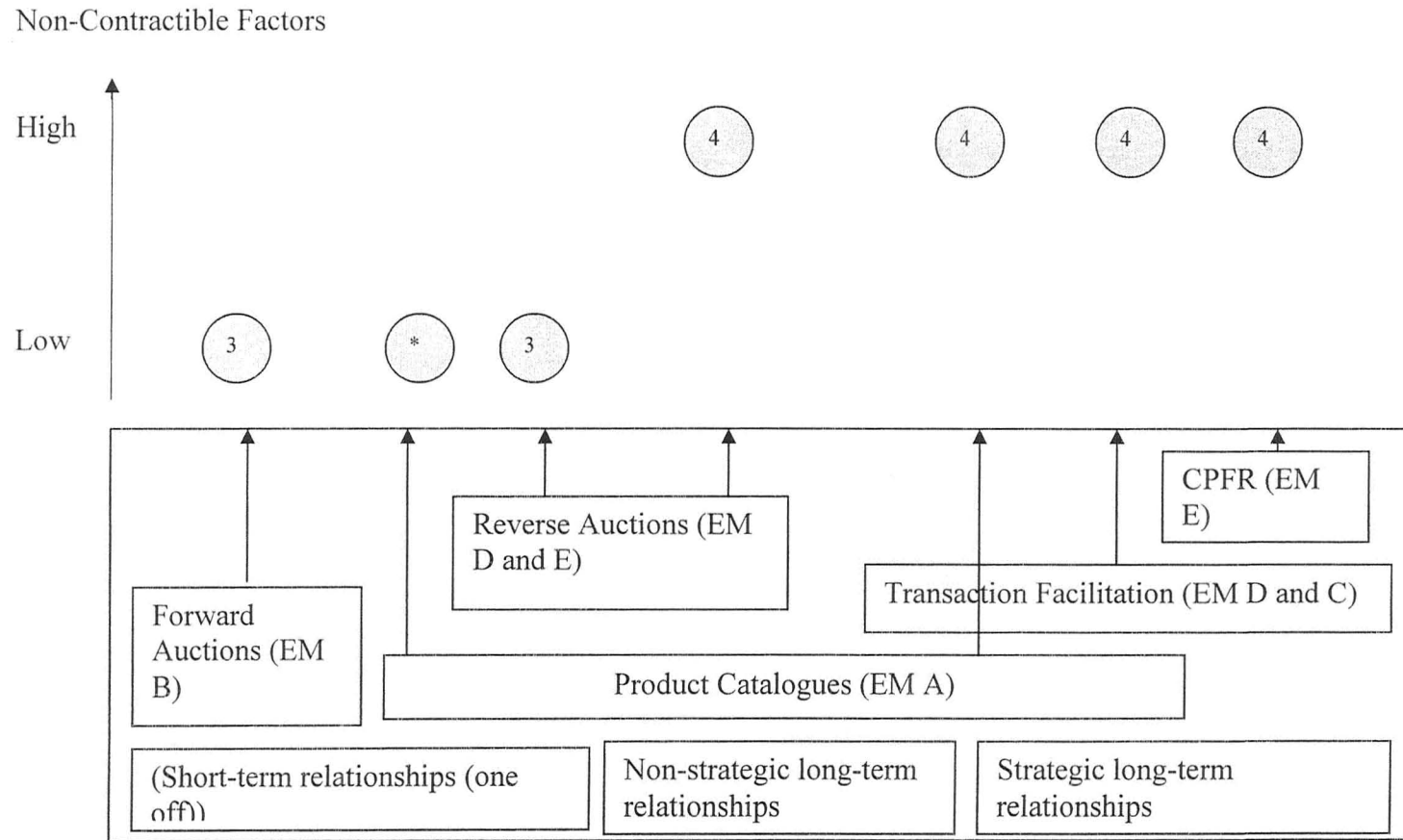
“Manufacturers often hire, they’ve got analytical teams, they’ve got lots of data about how their products sell at different price points, in different retailers, different markets. That’s very good data, a retailer doesn’t necessarily have that. So the manufacturer can often bring very useful information to the party to help plan more successful promotions”. (An EM E operator)

Figure 6.11 presents an overview of the importance of non-contractible factors in different functionalities. In this overview, the level of non-contractible factors is different for market-oriented and collaboration oriented functionalities. The conclusion is, in agreement with Proposition 6, that companies valuing non-contractible factors tend to use collaboration-oriented functionalities. Otherwise, they tend to choose market-oriented functionalities.

6.4 How Does the Use of EMs Affect Buyer-Supplier Relationships? (RQ IV: P8, P9a and P9b)

Two effects have been proposed for the use of EMs on buyer-supplier relationships: short term relationship efficiency (market efficiency) vs. long-term relationship effectiveness, and business partner satisfaction. In the structured questionnaire design, ten items were used to measure these changes (Table 6.6). Among them, four items were used to measure long-term relationship effectiveness (Q6.1-6.4),

Figure 6.11 Non-Contractible Factors: An Overview²³



²³ The position of the circles indicates whether the factors are high or low. This low/high evaluation is from the analysis of both numerical data and interview data. The number in the circle is the overall median of the five items used to measure non-contractible factors for this functionality. In the circle (*) for non-contractible factors of product catalogues used to support short-term relationship, no numerical data are available.

Table 6.6 The Impact of EMs on Buyer-Supplier Relationships (Survey Results)
(Medians Reported*)

Functionality	Forward Auctions	Reverse Auctions (Short-term)	Product Catalogues	Reverse Auctions (Long-term)	Transaction Facilitation	CPFR
Number of Observations	4	1	5	7	7	3
Q6.1 Fulfillment of goals	2	3	4	4	4	4
Q6.2 More info sharing	4	3	4	4	3	4
Q6.3 Quality of info sharing	4	3	3	4	4	4
Q6.4 Greater responsiveness	3	4	4	3	2	4
Q6.5 Easier search	4	2	5	3	2	2
Q6.6 Lower prices	2.5	4	2	4	2	2
Q6.7 Competition	2	4	4	4	3	2
Q6.8 More info for negotiation	4	3	4	4	4	4
Q6.9 Satisfaction	2.5	3	4	3	4	4
Q6.10 Productivity	2	3	3	4	4	4

* Items are measured on a five point Likert scale
(1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, 5 = strongly agree)

four to measure market efficiency (Q6.5-6.8) and two to measure satisfaction (Q6.9-6.10). It was expected that the use of collaboration-oriented functionalities would result in long-term relationship effectiveness, which would be characterized by better fulfillment of collaborative goals, more information sharing, higher quality of information sharing, and higher supplier responsiveness. It was also expected that the use of market-oriented functionalities would result in better search, lower prices, more information for negotiation and greater competition. According to this expectation, with 3 representing the centre of the scale (neutral) the shaded numbers of Table 6.6 should be significantly greater than 3, and the non-shaded numbers of Table 6.6 should be significantly less than 3. But the expected trend is not clear. In fact, the benefits of long-term relationships cannot be readily separated from the benefits for short-term relationships. For example, information sharing can be a benefit of any functionality, no matter whether it is competitive or collaborative, since EMs can make information exchange easier by enforcing standards and facilitating document exchange. In summary these items are not good enough measures of market efficiency vs. long-term relationship effectiveness for the following reasons:

- (1) The benefits listed in the questionnaire were derived from the literature. However, electronic marketplaces represent a new research area, so many of the claimed benefits have not been verified. Caution is therefore advised when using suggestions directly from the literature.
- (2) Some benefits indicated in the semi-structured interviews were not addressed in the structured questionnaire, so triangulation was not always possible.
- (3) There are some significant drawbacks to EMs that can moderate their efficiency gains, and these items were not included in the structured questionnaire.
- (4) The benefits of market and collaboration-oriented functionalities are not exclusive. First, some benefits, such as improved information sharing and cost savings, can support both long-term and short-term relationships and lead to both market efficiency and relationship effectiveness. Second, the use of two functionalities can lead to the same conclusion, such as long-term relationship

effectiveness, but they may lead to this conclusion through different paths, which are their specific benefits. Third, some functionalities, such as product catalogues in EM A and reverse auctions in EM D and E, have both competitive and collaborative elements, depending on how buyers use them. So one functionality may lead to the conclusion that both short-term relationships are efficient and long-term relationships are effective.

Instead of classifying all benefits as short-/long-term relationship efficiency/effectiveness, it is better to first inductively find the benefits of each functionality and then justify how they lead to relationship efficiency/effectiveness. Another advantage of analyzing the impact of EMs inductively in this way is that the context of each EM and its functionality is not lost.

For the above reasons, open coding of text from the semi-structured questionnaires was used to analyze the impact of EMs on buyer-supplier relationships, and the coding results were categorized in each construct of interest. As a result, there were 13 codes for “Market Efficiency vs. Long-term Relationship Effectiveness”, 1 code for “Satisfaction” and 4 codes for “Moderating Factors”(Table 6.7). This will be reported functionality by functionality in the following section. From table 6.7, we see that information benefits, cost saving, improved transaction process and search related benefits are among the biggest benefits of using different functionalities. The numerical data, valid but not complete, were already presented in table 6.6 and will be used to triangulate the arguments, based on the open coding results.

6.4.1. Market Efficiency vs. Long-term Relationship Effectiveness

Proposition 8a: The use of market-oriented functionalities will increase market efficiency

Proposition 8b: The use of collaboration-oriented functionalities will improve long-term relationship effectiveness.

Propositions 8a and 8b (see box) suggest that market-oriented functionalities will increase market efficiency, and collaboration-oriented functionalities will improve long-

Table 6.7 The Impact of EMs on Buyer-Supplier Relationships (Coding results)
(Number of participating companies reported)

	CPFR	Transaction facilitation	Reverse Auctions (Long-term)	Reverse Auctions (Short-term)	Product Catalogue	Forward Auctions	Total number of companies
(Total number of companies coded ²⁴)	4	10	8	1	7	6	
Market Efficiency vs. Long-term Relationship Effectiveness							
INFORMATION BENEFITS	3	7	2		3	3	18
COST SAVING	3	3	3		2	4	15
IMPROVED TRANSACTION PROCESS		9			1	2	12
EASY SEARCH			3		5	2	10
INCREASED COMPETITION	1		4	1	1		7
EM IT COMPARATIVE ADVANTAGE	1	5	1				7
CLOSER RELATIONSHIPS	4	2					6
IMPROVED NEGOTIATION PROCESS			4				4
RISK REDUCTION	1					3	4
IMPROVED INVENTORY MANAGEMENT	2					1	3
IMPROVED FORECAST	3						3
RATIONALIZATION OF PURCHASING		1	2				3
Satisfaction							
DISSATISFACTION	3		5	1			9
Efficiency Moderating Factors							
LOSS OF EXTRA SERVICES			2				2
INTEGRATION PROBLEM	1	1					2
POOR FUNCTIONALITIES	2				3		5
LOSS OF FACE TO FACE INTERACTION		1			2	1	4

²⁴ The total number of documents coded may be greater than the number of participants since some participants responded on more than one functionality in the semi-structured interview. A shaded cell indicates that at least half of the participants mentioned this benefit.

term relationship effectiveness. To confirm these propositions, an explanation is needed of how the use of each functionality increases the efficiency and/or effectiveness gain of the relationships they represent. The following first explains the benefits of using each functionality, and then justifies how these benefits affect market efficiency and long-term relationship effectiveness. Finally, the moderating factors are presented to provide a full picture of the impact of using each functionality. These moderating factors can limit the benefits of using an EM.

Product Catalogue (EM A): EM A can be used both as an “information tool” and a “marketing tool”. Both types of relationships can exist in EM A, depending on how distributors use them. From the structured questionnaire, the benefits of using EM A were better fulfillment of collaborative goals, more information sharing, greater supplier responsiveness, increased competition, and more information for negotiation. These match benefits that were found through open coding in the following:

- Search related benefits: EM A aggregates multiple distributors, suppliers and end users in a central place, providing each party instant access to information from others. This puts within easy reach a larger pool of customers.
- The information benefits are that: (1) EM A distributors can have instant access to supplier catalogue information, which they can share with their customers; (2) More information can be used by distributors for negotiation. Following are some original quotations from distributors:

“You know often times, customers come and say, we are looking for a widget. Then we ask, do you have any idea of price. Of course that’s what we do in the promotional product industry: how many do you want, and how much do you want to spend. ...Before I would have to do a lot of digging to get it out of the client. Now I go to EM A, I source it, I find all the products about that widget on EM A, and then I email the link to them to that exact sourcing client. They are your options. Let me know which one you like. They just double click and it takes them to what I have already just sourced. That’s fabulous.” (An EM A distributor)

“If I am looking for something like a pencil sharpener in the shape of light balls, and I find two. The price from the manufacturer I normally deal with is a little higher. I can call them and say, you know what, Joe has the same light ball pencil sharpener but their price is ten cents less. The people that I normally buy from will be more than likely to give me Joe’s price. I can prove that by saying, go to EM A, put “light ball

pencil sharpener”. So they do not have to take my word for it any more”. (An EM A distributor)

- Improved transaction process: It is surprising but true that transaction processes in this industry have improved despite the fact that EM A does not support transactions. Although an implicit collaboration using EM A is not articulated between suppliers and distributors, the product turnaround time from suppliers to end-users is reduced due to the use of the digital catalogue. Distributors can access supplier catalogues in real time. End users can access distributor catalogues in real time. The result is “*it saves a huge amount of time*” (An EM A distributor) for products to be delivered to end-users.
- Cost savings: since there is less need for printing and mailing catalogues, both suppliers and distributors save a significant amount. “*Suppliers put their catalogue on it, so rather than sending me 20 catalogues, they will send me two or three, and then you can go on web and find their stuff in EM A*” (An EM A distributor). “*Certainly the financial benefit is that it does not cost me money anymore to send catalogues (to end users)*” (An EM A distributor).
- Increased competition: The presence of many suppliers and distributors in one place puts competitive pressure on both suppliers and distributors. Most suppliers have their own websites, which are more up to date than their EM A catalogues. Distributors normally do not ask their customers to go to EM A just by themselves. They prefer to “walk” their customers through their catalogue, or email them a direct link to the product picture. “*I don’t like it when customers call and say, do you have a website? And we just give them our website number, and let them go. You do not know what they are doing. I do not like that, because you lose the customer.*” (An EM distributor)

EM A increases long-term relationship efficiency by providing information benefits between existing distributors and suppliers, saving costs, and reducing the product turnaround time. It also increases market efficiency by facilitating distributor search for different products, providing more information for distributor negotiation, and increases

competition among suppliers and distributors. Two factors moderate the efficiency gain of EM A to a great extent:

- Poor EM A functionalities. There are two weaknesses in EM A. The first is outdated catalogues: *“If you rely on it solely then you run a risk”* (An EM A distributor). This causes problems especially around “turnover” time during February of each year, when suppliers bring their new catalogues out for the annual trade show. Second, EM A search functions are poor. The information returned from a search is not as relevant as it could be, and sometimes product information cannot be found. *“The information you get from them is sometimes a little irritating, ...unless you know where to go, then you have a hard time to find it”* (An EM A distributor).
- Loss of face-to-face interaction: people in the promotional products industry value personal relationships highly, since this helps them to build their business networks. However, Internet technology itself does not foster personal relationships.

According to comments from participants it appears that, despite these drawbacks, compared with business without EM A, *“basically it seems to be a marketing tool that works well”* (An EM A distributor), and *“It is a good tool, but only starting. It is not the end”* (An EM A distributor). Based on the above findings, it can be concluded that EM A has had a slightly positive effect on both short-term and long-term relationships.

Forward Auctions (EM B) The use of EM B has increased the market efficiency of purchasing and selling heavy used equipment. From the structured questionnaire, more information sharing, higher quality of information, and more information for negotiation were the biggest benefits of using EM B. This can be explained by the strategy used by EM B. Since all the benefits reflected in the structured questionnaire were also covered in the open coding results, these are explained together:

- Information benefits: EM B’s guaranteed inspection report provides buyers more information than offline auctions. Since EM B takes responsibility for its inspection report, the information is reliable. Also buyers have more information available for

negotiation. Used heavy construction equipment is a niche market. Although neither buyers nor sellers are identified, often both the seller and dealer identities can be guessed. This may cause difficulties with the parties involved in the auction. For example, a dealer commented that

“(We) bought it cheap, we sold it for about a hundred thousand below market value, and the other person made a whole lot of money. Now, because there’s only a select group of people who have the capital to buy this type of machine, everybody automatically knew, as soon as I told the serial number, where we got it, and what we paid for it. I mean that’s not proprietary data. It makes it difficult sometimes for negotiating.” (An EM B dealer) When one party loses negotiating power, another party gains it.

- Improved transaction process: EM B takes care of equipment transportation, payments and financing, so there is improvement in transaction fulfillment process.
- Cost savings: EM B saves both buyer and seller costs. Sellers need not pay transportation cost to an auction site, and buyers need not travel to see the equipment.
- Risk reduction: Since the EM B inspection report is guaranteed, and written by highly qualified inspectors, the buyer’s risk is reduced. Even when buyers have direct access to the physical equipment, they would not necessarily come to the same conclusion as the inspection report about the condition of the machine, especially if their knowledge about equipment is limited.
- Improved inventory management. Dealers and financial institutions normally use EM B to liquidate inventory. For them, *“It was a way to infuse a certain amount of capital into the use of the equipment inventory that we had, or to make room for new inventory. There was no waiting to try and dispose of equipment, to deal with a number you were guaranteed to get...”* (An EM B dealer).
- Easy search: Buyers can search for more equipment and sellers online, and sellers can reach a larger audience on EM B. EM B makes it possible to sell outside a dealer’s territory, and buyers can now easily buy from distant dealers.

A drawback to using EM B is the loss of face-to-face interaction. Some dealers still prefer to see the equipment, and some dealers wish their customers could come and take a look at the machine, since *“you really have to put your hands on the machine”* (An EM B dealer) to see the quality. However, despite this drawback, the EM B inspection

report is still welcomed by most buyers and sellers, and some buyers in our interview totally accepted purchasing online through EM B, and used it to its full capacity.

EM B increases market efficiency by increasing information transparency (more information available to buyers and sellers), easy search and reach of larger audiences, transaction cost savings resulting from equipment delivery and payment, and reduced risk from open market purchasing (guaranteed report).

Transaction Facilitation (EM C and D): From both structured questionnaire results and qualitative data, transaction facilitation brings the following benefits to the interaction between buyers and suppliers:

- Information benefits: In EM C, vendors now provide more information and more accurate information to hospitals such as backorder information, order confirmation, and updated product delivery information. Buyers also gain instant access to this information. They reported that the quality of the information is higher, and information is now real time and more reliable. Improved information sharing lets them serve their patients better. *“Some of the customers that order orthopedics and are scheduled for surgery, they like to know when they place the order, that it’s coming and that it’s available”*(An EM C hospital). In EM D, suppliers share more information on inventory and production with mining companies by integrating this through EM D.
- Improved transaction process: This is one of the biggest benefits of transaction facilitation. These benefits include *“reducing the time of transactions”*, *“improved item master”*, *“elimination of non-value added activity in the purchasing department”* and *“fewer errors”*(EM C hospitals). As a result, the hospital purchasing department’s productivity increases, and staff can spend more time negotiating better deals for other products. *“(It) improves productivity in departments, both in the purchasing department as well as accounts payable. With time freed up we can focus on some of the more complex projects as well as contracting strategies for non-traditional products in the hospital”* (an EM C hospital).

- EM IT comparative advantage: Before the adoption of EM C, most hospitals and vendors used EDI to transmit orders, but this was relatively inflexible. With the use of EM C, buyers and suppliers can share more information (back order and order delivery information) and some buyers can place orders by PDAs (Personal Digital Assistants). In the case of EM D, one buyer totally shut down its use of EDI because it was not flexible, and expensive to operate.

“ I think one of them would be the limitations of the EDI system that we had in place previously. So there’s a bit of an evolutionary change happening away from that more rigid technology to something that was much more open and would allow us to be more flexible and provide us with more functionality going forward than we thought that EDI might afford us”. (An EM D buyer)

“Well it’s much simpler a process than the old EDI system we had. If something happens to EM D, we’ve got something that’s really just all Internet based and we can plug that in another market place and that’s where we need to go. It’s fairly readily expandable as we add more documents, just more of the same kind. It’s more flexible, we can do more things with it, and it can be customized a little bit more readily.” (An EM D buyer)

Compared with EDI, EM D also allows a supplier to deal with many buyers through one interface. *“So EM D provided an opportunity for us to work with the key mining customers on a common technology base, which is critical”* (An EM D supplier).

- Cost saving: Streamlined online transactions save buyers and sellers transaction costs. *“It’s about reducing a lot of the phone and fax orders that they’re doing today, which has proven to be pretty costly”*(An EM C hospital). *“It drives down supply chain cost for all parties, hospitals, health care providers, as well as suppliers”* (An EM C supplier).
- Closer buyer-supplier relationships: In the case of EM C, hospital and supplier relationships are improved by working together to set up the system.

“To the vast extent, it’s either no change or positive, and more positive just because you’re working closely with some of your major customers to get the thing working, so just by working closely together, you create a positive atmosphere.” (An EM C supplier)

There are two drawbacks that can discount the benefits of using EM D: lack of integration and the loss of face-to-face interaction. The lack of integration can greatly limit the benefit of using transaction facilitation. “*EM D is the right system, I find it easy to deal with, the solution is well built, but it’s just because it’s not integrated with our (ERP), the benefits are not really there for us*”(An EM D supplier). Another mining company that used reverse auctions a lot also hesitated to use transaction facilitation due to their un-integrated internal system, because they thought the benefits would not be significant without an integrated system. However, for buyers/sellers with integrated systems, the cost and time saving can be large. A supplier for EM C was afraid that the loss of face-to-face interaction would make selling difficult. This supplier complained that this solution was hard to apply to the entire EM C population, because they sell customized products, so face-to-face interaction is important to them.

One surprising result from the structured questionnaire was that “more information for negotiation” achieved a higher score. This seems to conflict with a collaborative strategy between buyers and sellers. But from their comments, participants believe they have more information for negotiation, but they do not use it to negotiate against suppliers. In summary, transaction facilitation functionality increases long-term relationship efficiency by facilitating more and better information sharing, providing cheaper and flexible technology, improving the transaction process, and saving buyer/sellers transaction costs. All these benefits make it possible for buyers and suppliers to collaborate better in fulfilling their common goal: delivering products as contracted and serving end-users better.

Reverse Auctions (EM D and E): When reverse auctions are used to support short-term relationships, the impacts observed from both the structured and semi-structured questionnaires were increased supplier competition and easier contact with more suppliers. As a result, suppliers are more responsive and offer lower prices to the buyers due to competitive pressure. The conclusion is that market efficiency was increased by the use of reverse auctions for one off purchases.

When reverse auctions are used to support long-term relationships, the scenario is complicated because it has both competitive and collaborative elements. It is anticipated that there will be both improved market efficiency and improved long-term relationships due to reverse auctions. The following are the benefits of using reverse auctions:

- Cost savings, especially reduced product purchase prices, are the biggest impact of reverse auctions. Reduced purchase cost may be a relative concept. *“It has mitigated a cost increase that the buyer anticipated, and the negotiation approach actually decreased what was going to be an expected cost increase”*(An EM E retailer). For buyers, it is a benefit since they can drive their purchasing costs down significantly. *“It does seem to drive the cost down lower than you would normally see”* (An EM E retailer). However, for suppliers, this price reduction incurs great dissatisfaction. *“the price reduction due to the open competition (online)... we are pushed to the very very bottom line”* (An EM E supplier).
- Improved negotiation process: EM D and E reverse auction services help streamline the negotiation process. The resulting time saving is one of the biggest benefits of the improved negotiation process.

“It would be the speed in terms of turning the process around, that there is a finite end issue I might imagine in a traditional negotiation I think could drag on forever”. (An EM D buyer)

“I’d say a more defined, standardized process, gathering information, or negotiating a line of business, ...The facts that help develop a much better decision, and the competitiveness that comes from suppliers or vendors competing against each other, versus the buyer competing against each supplier individually one by one”. (An EM E retailer)

- EM IT comparative advantage: since EM information technology is more flexible and has greater compatibility with other systems, reverse auction buyers tend to prefer using EM reverse auctions, saving them the costs of purchasing proprietary technology. Buyers can also use the special expertise available from the EM operator to help them to set up reverse auctions, and the EM can also provide supplier training.

- Easy reach to more suppliers/buyers: Reverse auctions can bring suppliers more business opportunities: *“It would bring us a new business opportunity, and with new customers I think it would benefit us...”* (an EM E supplier). Buyers also can interact with more suppliers, including both incumbent and new suppliers. However, due to the nature of invitation-only auctions, the reach-related benefits are not as big as those seen in the product catalogue of EM A.
- Increased competition: Although most buyers use invitation-only auctions, the number of suppliers involved in bidding on a contract still tends to increase. The standardized bidding elements, the ability to see each other’s bids (more information transparency), and the price-focused nature of bidding also intensifies the competition.
- Rationalization of purchasing: some buyers take this opportunity to adjust their purchasing practices, and to re-examine the purchasing strategies for each product.

A drawback to the use of reverse auctions is the potential loss of extra services. Since reverse auctions drive prices down, suppliers are less willing and flexible in going beyond the contract to provide additional services. Sometimes these services cannot be written into a contract since they are difficult to quantify or decide in advance.

“There’s some that are perceived, and we’re not sure, but we expect a lot of extra activities from the vendors, we expect them to be able to work with our stores, perhaps setting the stores up, visiting the stores, taking care of unusual problems that arise. Offering us, lets say we do monthly promotions, although every vendor would not be in a promotion every month, but we’ll be in promotion several times per year, and we expect a very aggressive pricing in order to have these advertised specials that go out into our national ads and are featured in a lot of these stores. So what is one of the problems is, no one can do anything for free. As soon as you drill the prices down, further and further, these soft benefits may be harder to get”. (An EM E retailer)

When buyers start to use reverse auctions, they need to be very specific on what they want. Some buyers who value these “soft benefits” actually reduced their use of reverse auctions: *“well however, in this specific case they didn’t stick to the auction through EM E, they kind of went back to the old way to reveal items, put more other elements into consideration and not totally use the auction to make decisions”* (An EM E supplier).

In summary, reverse auctions increase market efficiency, which can be from: reduced purchasing cost, increased information transparency, easier reach to more buyers and sellers, increased competition, and improved negotiation processes. But EM reverse auctions can increase long-term relationship effectiveness for two reasons: (1) two participants commented that most of the time, their incumbent suppliers managed to keep and continue their contracts. So by infusing the element of competition into long-term relationships, reverse auctions can keep the relationships dynamic and healthy; (2) Reverse auctions are a buyer strategy to use a cheaper way to maintain less important relationships with suppliers. However, buyers have to be cautious in using reverse auctions to purchase products that may require a lot of extra service. Otherwise, the benefits brought by competition will be less than the drawbacks brought by the disincentives to suppliers. The conclusion is therefore that, if reverse auctions are used properly, they will lead to both market efficiency and long-term relationship efficiency.

CFPR (EM E): The use of CFPR results in the following benefits:

- Information benefits, including real time information sharing, and more information sharing. Before using CFPR, retailers and suppliers do not share information in such an intensive way. So in this sense it increases the horizon of collaboration.
- Improved inventory management, including improved in-stock levels, better inventory control, improved marketing support, and retail product promotion management.
- Improved forecast accuracy, which was the original aim of developing CPFR.
- Risk reduction: Suppliers now take less risk in production and filling orders.
- Setting up CPFR improves buyer-supplier relationships and more tightly couples them together.

The following are some original quotations from participants about these benefits:

“The main one is really in stock. In stock and inventory control. So those are the two main benefits. But for us it’s really about in stock. We want the right product, right place, and right time. And so if we go and spend the money to advertise for it, that when the customer shows up, it’s going to be there for him. That’s the huge advantage for us”.
(An EM E retailer)

“We’ve seen improvements with forecast accuracy, if you want to quantify it I think we can say up to X percent improvement....” (An EM E retailer).

“By taking this view of what are the projected stocks against targets, it has helped us to identify areas of risk on fill rate, we have been able to in a lot of cases prevent.” (An EM E supplier)

“It’s not that they tell us or we tell them, its that we both recognize that we’ve got a problem and we look at all the options and how to sort that out. And in that regard, it helps build the trust and make the relationship stronger, because you’re dealing with facts”. (An EM E supplier)

“The only thing that you have to focus on is the risk. And you work together on trying to define what those risks are. And in some cases we will tell the buyer that we can’t reduce that risk. You need to go and talk to another vendor, as an option to help reduce that risk. Because our goal is to help the buyer sell more (X products), not just more our products. Because if we can help them sell more X products in total, then they will pay more market share, they gain more market share, and we’ll gain a higher share of that, or they’ll give us more business”. (An EM E supplier)

“I would say that there definitely are positive changes. And one of them that’s hard to quantify is just to improve communication, because we do a weekly collaboration call.... The other thing that we find with CPFR is we really lengthen the horizon of collaboration. Whereas we might be (giving them) X weeks of data before CPFR, now we might be giving them up to Y weeks of data through CPFR, so that they can really do a better job with production planning and things like that. So I would definitely say it’s a huge improvement in our relationship. Not to mention we see things like X percent reduction sales forecast error, Y percent reduction order forecast error, in stock going up, procuring costs going down. Now suppliers typically won’t classify for us how much inventory they’re taking out, because they know we’ll come and get it from them. But anecdotally anyway, we know that they are taking it out”. (An EM E retailer)

Obviously, CPFR increases the effectiveness of long-term relationships by facilitating the collaboration between buyers and suppliers. However, CPFR is still at its early stages in most companies. Its business processes are still not as smooth as imagined, and CPFR functionality is still not strong, which limits user benefits. It was also reported that CPFR is a time consuming process. Two factors seem to cause this: first, the setup process is slow because the parties may not agree on the processes to use. Second, some companies did not have such a process in place previously, so some people think it brings an additional workload.

“It has been that it’s taken too long, and because it’s taken so long, there’s a lot of frustration, that you’re not accomplishing what you set out to accomplish. And that’s our concern, that we’ve only done one out of three things in the X years.... and I hope

that before the month's out, we will have Y's sponsorship, or reconfirmation of their sponsorship to do what we originally intended to do". (An EM E supplier)

"There's a lot of turnover, and every time there's turn over you've got to start not completely all over again, but you can put in several months of delays". (An EM E supplier)

"They think it adds to their workload, because in a lot of cases they're not creating a formal sales forecast for X customer". (An EM E retailer)

"Well it's time consuming, so you need people to have time to spend on this, because you really need to analyze the promotion, and look at previous promotions, and think about how much you think you can sell for this promotion". (An EM E supplier)

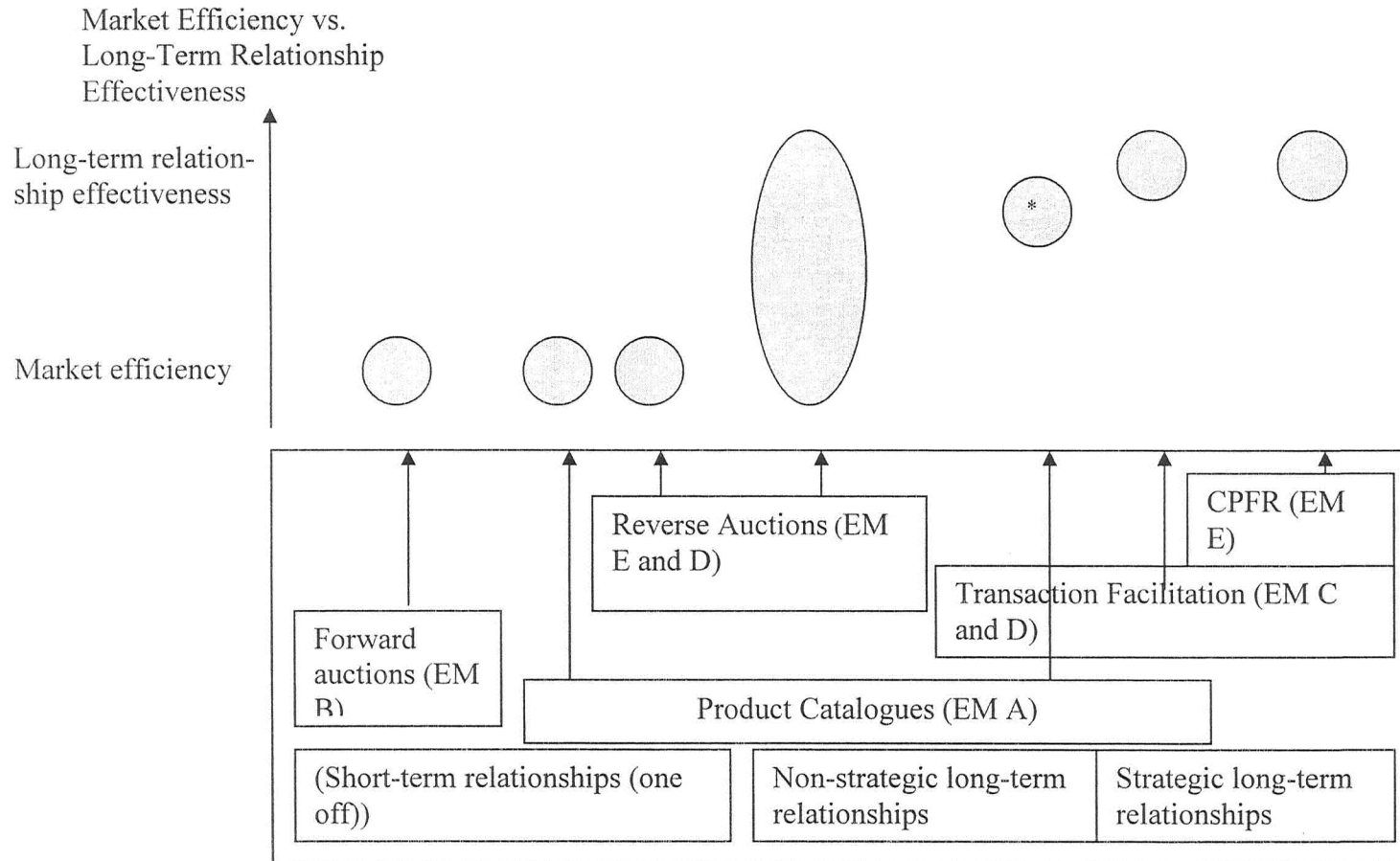
But despite the above limitations of the process, participants still think that setting up CPFR has *"always been worth the effort"*. The conclusion is that CPFR increases long-term relationship effectiveness. Another impact from using CPFR is that buyers try to add a sense of competition through CPFR. In promotional planning, buyers let suppliers compete for promotional slots before entering into CPFR. This is what suppliers called *"auction-like direction"*.

"We feel that it's going to put us commercially in a difficult position, now company X negotiates with each partner individually, and I think once you go towards auctioning, they can just put everybody on the same line and really compare in detail the different offers. And we're afraid that that's just going to (push) prices down". (An EM E supplier)

This observation actually confirmed to us the conclusion we derived from the reverse auction studies, that competition elements can get involved in long-term relationships to make them more healthy and dynamic.

By aggregating the results from the individual functionality analysis, the general finding is that there is a trend in market-oriented functionalities that increases market efficiency, and collaboration oriented functionalities that increases the effectiveness of long-term relationships (Figure 6.13). Reverse auctions, a functionality that is hard to classify as either collaboration-oriented or market-oriented, stands in the middle as a transitional area. However, by looking at the patterns, Propositions 8a and 8b on the impact of the use of EMs on buyer-supplier relationships can be confirmed.

Figure 6.12 The Impact of EMs on Buyer-Supplier Relationships: An Overview²⁵



²⁵ A circle or ellipse indicates whether the functionality leads to market efficiency or long-term relationship effectiveness, which have already been analysed in Section 6.4.1.

*Note: the level of long-term relationship efficiency and effectiveness resulting from product catalogues is lower than normal level, since product catalogues in EM A are mainly for facilitating sourcing, and collaboration between buyers and suppliers is only implicitly supported. So its support for long-term relationship effectiveness is limited.

6.4.2 Satisfaction

Proposition 9a: The use of market-oriented functionalities will cause supplier dissatisfaction with the relationship
Proposition 9b: The use of collaboration-oriented functionalities will increase both buyer and seller satisfaction with the relationship

Proposition 9a (see above) proposes that market-oriented functionalities will cause supplier dissatisfaction. However, these effects were found only in reverse auctions. Two items were used to measure participant satisfaction with online relationships: satisfaction (Q6.9) and improved productivity (Q6.10). In order to test Proposition 9a, a Wilcoxon signed rank test was used to check whether the level of supplier satisfaction is significantly different than the mid-range neutral value of 3 on the data collected from all six suppliers who were using market-oriented functionalities (including reverse auctions). The result of the test is given in table 6.8. We found that, even after including reverse auctions, supplier satisfaction did not significantly differ from the neutral value of 3. This suggests that the use of market-oriented functionalities will not cause supplier dissatisfaction/satisfaction. However, since we have only a sample size of 6, the power of the test is low. So we need to rely on qualitative data to search for more evidence.

**Table 6.8 Supplier Dissatisfaction
 Wilcoxon Signed Rank Test (c)**

	Satisfaction	Improved productivity
Number of Observations	6	6
Z (b)	-1.190(a)	-1.518(a)
Asymptotic Significance (2-tailed)	.234	.129

- a. Based on positive ranks
- b. Z is the standardized Wilcoxon signed rank test statistics (*W*). The statistic on the differences from a neutral value of 3 is reported.
- c. Items are measured on a five point Likert scale
 (1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, 5 = strongly agree)

When the data were checked case by case, it turned out that suppliers to EM A were quite satisfied with their relationships. The suppliers in forward auctions had a

mixed view, with some satisfied, and some not. This could happen since EMs are still in their early stage, and the increase in competition is still minor. From the qualitative interview data, EMs A and B seem still to be regarded by suppliers as a minor adjunct to their business. In the case of EM A, distributors are still loyal to their suppliers when placing orders. And in the case of EM B, dealers only use it to liquidate excess inventory, and 90% of their business is still done through previous channels such as physical auctions. Selling prices were still relatively unchanged through the use of EM A and B. In the case of EM B, suppliers can sometimes get a better price through auctions. So if supplier benefits are not reduced, it is understandable that they are not dissatisfied.

However, reverse auctions present a totally different picture. Two suppliers that were interviewed were quite dissatisfied. In fact, supplier unhappiness about reverse auctions is a well-documented issue (Jap 2001; Memishi 2001). In EM E, suppliers indicated several sources of their dissatisfaction. First, suppliers are squeezed down to their lowest price. Second, suppliers who have made specific investments are still not sure about the next term contract. They are sometimes referred to as “captive suppliers”. Third, putting suppliers into a reverse auction as an even playing field, is not as fair as buyers thought. The following are quotations from participants about the three issues above:

“I’d say it this way, a couple of vendors afterwards have been very unhappy about it. I think, one of the vendors I was thinking to try and get to see if they’ll agree to talk to you is, they’ll spend money to set up a factory to produce, invest with their own money into this factory, and now they’re going to go through an auction where they may lose the business and where thirty or forty percent of their business is in this factory. So now they need to bid, and for whatever reason, another vendor wants that business, perhaps they’ve just lost a customer, and they are going to bid a much lower price than they would normally bid, and that drives down our original vendor’s price. So now they’re bidding below some of their, lets say they’re cutting into their cost, so they’re slightly below their production cost.” (An EM E retailer)

“ If they stick to the EM E auction to make a (purchase) decision it will damage our relationship”. (An EM E supplier)

We also found that supplier dissatisfaction increases if there is disruption to accustomed practice. For example, reverse auctions can be treated as a disruption to face-to-face negotiations, where suppliers could provide customized offers. Reverse auctions

incur less resistance when they are applied to companies that are accustomed to auctions and tendering. For example, reverse auctions in Brazil work well for EM D because it is a regulation that mining company purchasing must go through tendering and auctions, so Brazilian mining suppliers are more used to this intense competition.

Proposition 9b suggests that both suppliers and buyers would be more satisfied by using collaboration-oriented functionalities, so a Wilcoxon statistical test was used to determine whether the satisfaction level of these participants is higher than the neutral level of 3. The results are reported in table 6.9. Since some functionalities have both competitive and collaboration elements, functionalities with more competitive elements were added step-wise into the test. The first step is a test on whether the satisfaction of using transaction facilitation and CPFR is higher than average or not. The result showed that satisfaction was significantly higher, but productivity neutral. We believe that little improvement on productivity may be caused by the limitation of the CPFR implementation. Adding product catalogues in the next step did not change the result significantly. It appears that the poor functionalities and limited support by EM A of interaction between suppliers and buyers limit improvements to productivity. Next, reverse auction buyers were added to the test, (since these suppliers were known not to be satisfied), and there is the sense from interviews that reverse auction buyers are satisfied. This returned significant values on both items, putting less limitation on the productivity improvement measure. Proposition 9b is therefore confirmed, and the conclusion is that collaboration-oriented functionalities increase both buyer and supplier satisfaction.

Table 6.9 Buyer and Supplier Satisfaction in Collaboration-Oriented Functionalities (Wilcoxon Signed Ranks Test) (c)

Functionalities Added	Number of Observations		Improved Productivity	Satisfaction
Transaction facilitation; CPFR	10	Z (b)	1.414(a)	2.646(a)
		Asymptotic Significance (2-tailed)	.157	.008**
Transaction facilitation ; CPFR ; Product catalogue	15	Z (b)	1.155(a)	2.887(a)
		Asymptotic Significance (2-tailed)	.248	.004**
Transaction facilitation; CPFR; Product catalogue; Reverse auctions (long-term relationship buyer)	22	Z (b)	3.357(a)	2.000(a)
		Asymptotic Significance (2-tailed)	.046*	.001**

- a. Based on positive ranks.
- b. Z is the standardized Wilcoxon signed rank test statistic (*W*). The differences from a neutral value of 3 are measured.
- c. Items are measured on a five point Likert scale
(1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, 5 = strongly agree)

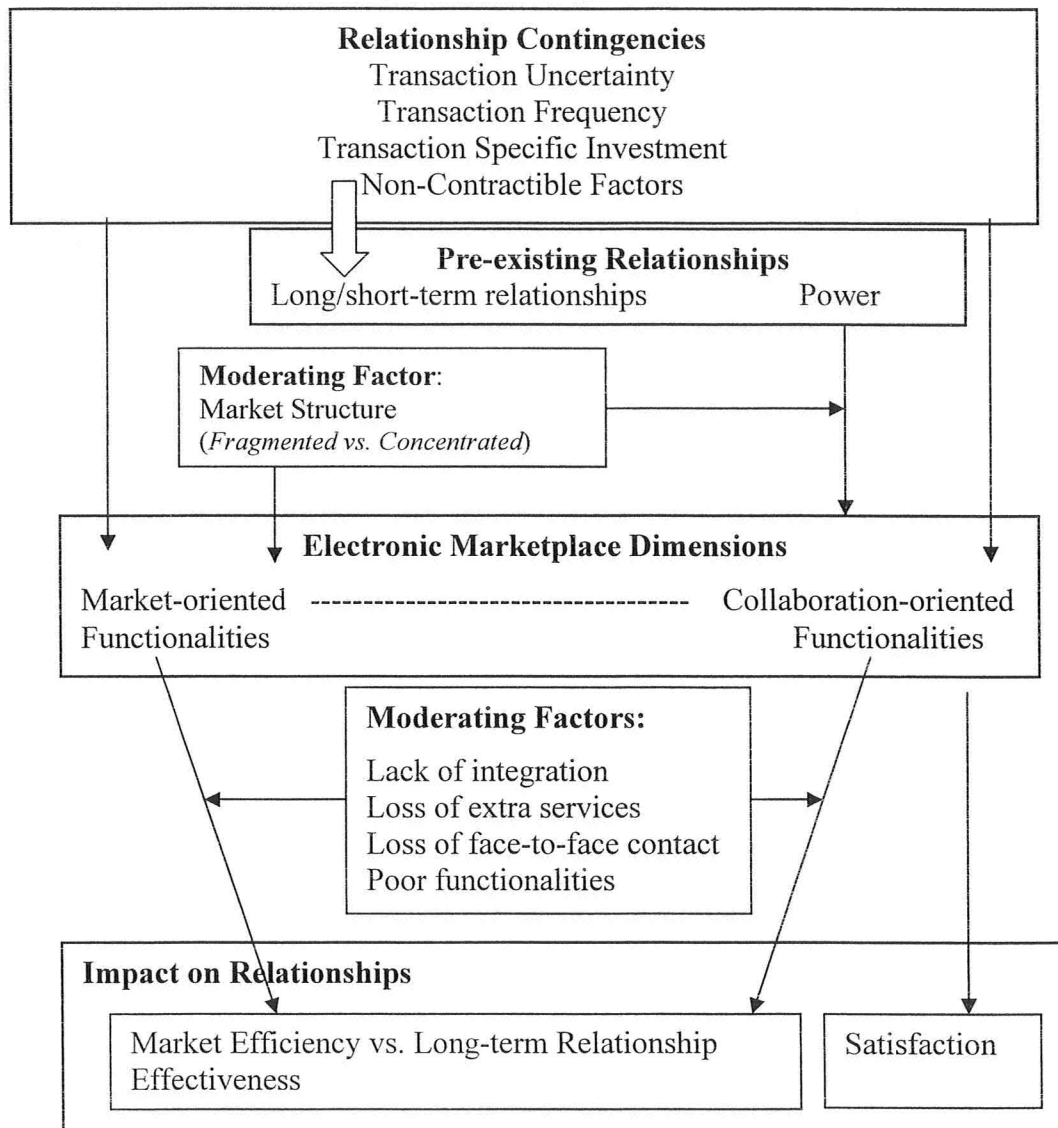
6.5 Discussion

Based on the foregoing analysis, a revised framework is presented in Figure 6.16. All the findings are explained and compared with the literature in this section, and some important issues are addressed.

EM Functionalities and Relationships

The first general finding is that *EM functionalities* cannot be classified as dichotomous or exclusive categories. They should be treated as being positioned on a continuum between market-oriented and collaboration-oriented functionalities. In Figure 6.13, this continuum is reflected by the dashed line between two functionalities. As a functionality is located closer to the market-oriented extreme, it has a more competitive element to it.

Figure 6.13 Buyer-Supplier Relationships and Electronic Marketplaces (Revised Model)



Reverse auctions are not a pure market-oriented functionality as expected, and also not as suggested by most of the literature. Reverse auctions have a strong competitive element, and a heavy focus on price reduction. Among all the functionalities studied, reverse auctions were the only functionality causing reduced product prices. But they are being used more and more to support long-term contract negotiations. Buyers in reverse

auctions still pay attention to non-contractible factors such as trust and quality. So reverse auctions can be treated as a hybrid functionality.

Another general finding is that, depending on participant behaviour, the same functionality can be used to support both long-term and short-term relationships. An example is the product catalogue in EM A. In this case, enrolment in long-term or short-term relationships is controlled by participants' voluntary behaviour, without any technical restrictions such as access rules and trading partner agreements to use an EM.

The above findings differ from the EM literature. First, as discussed in Chapter 1, two categories of EM classification have been proposed in the literature, according to the relationships an EM supports: market-oriented/ hierarchical (Bakos 1991), and spot/repeat/program buys (Kaplan 2000; Philips 2000). The tendency is to show these categories are being mutually exclusive, but this research shows they are not. An EM, and even a functionality, can support a continuum of relationships. The support for long-term/short-term relationships is sometimes combined and is hard to separate in order to study it in detail. Although the continuum of buyer-supplier relationships is well known, the essence has not yet been applied to EM research. For example, many researchers treat the reverse auction as a pure market-oriented functionality (Mithas et al, 2003), but this research suggests it is a hybrid functionality with elements of competition and collaboration. Jap (2003) also recognized the role of reverse auctions in supporting long-term relationships. Public product catalogues, such as those appearing in EM A, support more than short-term relationships and search. This also differs somewhat from the literature, since the aggregation of many product catalogues is considered to be a reflection of increased market efficiency (Bakos 1998; Anonymous 2000)

The Role of Buyer-Supplier Relationships in the Adoption of EMs

Most of the propositions were confirmed in the case analysis and comparisons. *Power* is a dominant factor in the adoption of the EMs (Proposition 1), and this effect is moderated by the degree of concentration of the market (Proposition 7a). Findings also indicated that *buyers* were the driving forces of using power to push the adoption of EMs, even in a supplier-concentrated industry (EM C). This conclusion is in accordance with

most literature on the role of power in the adoption of EMs and other electronic networks (Iacovou, Benbasat et al. 1995).

The cost benefit analysis from the case data shows that *market structure* is associated with functionalities that are most welcomed by companies in the market. Companies in fragmented industries will tend to adopt market-oriented functionalities since the cost/benefit balance favours such functionalities (proposition 7b). The findings on market structure are in agreement with (Anonymous 2000; Phillips and Meeker 2000), which suggested that market-oriented EMs were more suitable for fragmented industries.

The Strategic Choice of Functionalities

When investigating how buyer-supplier relationships affect the adoption of EMs, five constructs were studied: transaction uncertainty, transaction frequency, transaction specific investment, complexity of product description, and non-contractible factors. Proposition 2 about *transaction uncertainty* was confirmed, that buyers tended to adopt collaboration-oriented functionalities when transaction uncertainty was high and long-term relationships were available. Otherwise, they tend to adopt market-oriented functionalities. This is in accordance with (Kraut, Steinfield et al. 1998), (Choudhury 1997) and (Kaplan and Sawhney 2000) about market volatility. Confirmation of Proposition 2 about transaction uncertainty also matches the trend in transaction cost research, which suggests that different uncertainties give rise to different results for governance structures (Lieberman 1991; Robertson and Gatignon 1998).

Transaction specific investment (Proposition 3) was confirmed with less confidence since there was one exception (EM A product catalogue). This is still an indicator, albeit a weak one, of which functionalities a company will choose according to transaction properties. The conclusion of transaction asset specificity as a factor in the choice of functionality is in accordance with (Bensaou and Anderson 1999), (Mahadevan 2002) and (Garcia-Dastugue and Lambert 2003) but not Chouldhury (1997). Chouldhury did not think low asset specificity products were likely to be transacted through market-driven EMs. He gave the example of used parts in the aeroplane industry and its market. Choudhury equated product standardization with low asset specificity (Choudhury 1997),

but they were not the same concept (Malone, Yates et al. 1987). Although used parts are non-standardized, these products do not involve relationship-specific investments. The preliminary conclusion from this study is still that transactions with high asset specificity are more likely to be conducted through collaboration functionalities.

Transaction frequency is a strong indicator of what kind of functionality to choose (Proposition 4). High transaction frequency leads a company to choose collaboration-oriented functionalities. This is in accordance with (Choudhury and Hartzel 1998) and (Garcia-Dastugue and Lambert 2003). High transaction frequency justifies the cost of building a specific governance structure and the use of EM collaboration-oriented functionalities to support such one-to-one relationships.

The complexity of product description proposition (Proposition 5) was not confirmed. It seems that simple products tend to be transacted in all the functionalities, instead of just market-oriented functionalities (Figure 6.9). However, RFP, a functionality that appeared in the study, involves complex products. RFPs are frequently used to negotiate design and manufacture of complex products, and have both a strong competitive element and collaborative element, since collaboration is critical for new product design in the automotive, aerospace, and high tech industries, for example. When existing products that are relatively simple to design are being traded, there is no difference in product description between collaboration and the open market, and all products are relatively easy to specify in advance.

Disconfirmation of Proposition 5 does not agree with some of the literature such as Mahadevan (2002), who argued that complex products tended to be traded in collaboration-oriented functionalities and simple products tended to be traded in market-oriented functionalities. Our study suggests that complexity of product description is not a good indicator, since only functionalities that are both competitive and collaborative (RFP) involve complex products. All other functionalities involved only simple products. Our observation is in accordance with (Garcia-Dastugue and Lambert 2003) who argued that closed auctions involved complex products and most other functionalities only dealt with simple products.

The conclusion about the complexity of product description construct is reasonable. Simple products can enter into collaboration-oriented functionalities because of other factors such as non-contractible factors and transaction specific investment. Complex products can enter into a relatively competitive functionality due to the fact that EMs can reduce the complexity of product description, and companies can introduce more competition into the long-term relationships for purchasing these products.

Non-contractible factors, such as trust, information sharing, quality, supplier responsiveness and innovativeness, were confirmed as strong indicators of which functionalities to choose (Proposition 6). On average, firms choose to use collaboration-oriented functionalities because they value non-contractible factors, and want to keep the long-term relationships with suppliers who can “offer” these non-contractible factors. This finding is in accordance with (Bakos and Brynjolfsson 1993) and is different from (Mithas, Jones et al. 2003).

Mithas studied the explanation power of asset specificity and non-contractible factors in firm choices of using or not using reverse auctions, and concluded, “*even after controlling for asset specificity, buyers prefer to avoid reverse auctions if they value supplier investments in non-contractible factors such as quality, supplier innovation, information sharing, trust and flexibility*”. However, the current study showed that, even if buyers valued these non-contractible factors, sometimes they still preferred reverse auctions.

This discrepancy can be explained by:

(1) Reverse auctions are a new type of tool that buyers are in the process of testing. Most reverse auction buyers seemed to be using pilots through EMs, and were among the first movers in using reverse auctions. They could be optimistic about the value of non-contractible factors in their relationships with suppliers.

(2) Some buyers may attempt to use reverse auctions due to their benefits, even if they value non-contractible factors.

(3) Some buyers appear to be taking cautious measures to control the incentive aspects of reverse auctions, such as providing longer-term contracts and considering factors other than price. As a result, most of the time, incumbents win the contracts.

(4) Reverse auctions have a strong competition element, but it is not necessarily a pure competitive functionality, and they are being used more and more with long-term relationships (Jap 2003). Even in promotional planning in CPFR, more and more buyers introduce competitive elements in their collaboration with strategic suppliers. Because of the competitive pressure on suppliers in reverse auctions, they have to provide non-contractible benefits to buyers. In this study of the transaction specificity proposition, many cases of “captive” suppliers were found, and some reverse auction suppliers even made heavy specific investments such as IT systems and warehouses. This could happen to non-contractible factors as well. Reverse auctions may imply a lower importance for non-contractible factors, but non-contractible factors may still play a role in reverse auctions. These non-contractible factors arise, not from maintaining incentives for suppliers, but by putting pressure on suppliers.

However, another conclusion from this study is in accordance with (Mithas, Jones et al. 2003) that non-contractible factors are stronger indicators of the functionality choice than asset specificity. This conclusion arises from the transaction specificity proposition (Proposition 3) that was confirmed with less confidence.

The Impact of EMs on Buyer-Supplier Relationships

Proposition 8 suggests that the use of market-oriented/collaboration-oriented functionalities would increase market efficiency and long-term relationship effectiveness, respectively. This proposition was confirmed from the qualitative data and it was also found that the use of EMs will increase both market efficiency and long-term relationship effectiveness. As confirmed by Proposition 9b, the use of collaboration-oriented functionalities will also increase the satisfaction of both buyers and suppliers, including buyers in reverse auctions. But this differs from Proposition 9a, which was not confirmed, since the use of market-oriented functionalities does not appear to cause supplier dissatisfaction, except for suppliers in reverse auctions. These suggest that the

well-cited issue “supplier reluctance to join due to increased competition” is only for reverse auctions. In other functionalities, one needs to search for other reasons for “supplier reluctance to join”. Market efficiency and long-term relationship effectiveness also appear to be moderated by several limitations of EMs, such as lack of integration, the loss of personal relationships, poor functionalities provided by the EMs, and the loss of extra services (the latter was mostly seen in reverse auctions).

Markets, Hierarchies or Network Organizations

It is always in a researcher’s interest to observe how IT can cause changes in governance structures and buyer-supplier relationships: Is this resulting in a move towards markets, hierarchies or network organizations? EMs are traditionally treated as evidence of moving more towards markets. By focusing on the EM as a business model, it appears that EMs could not only support “market” governance structure by making markets more efficient, but they also support “hierarchical and networked structure” types of governance structure by making long-term relationships more effective. It seems that there is a slight movement toward the “market” by EMs, but the dominant modes are still network organization and hierarchical structure.

This slight movement is confirmed due to the fact that 1) some buyers in EM B were aggressively moving to purchase heavy used equipment online. 2) Reverse auctions are increasingly used to purchase products that were purchased previously through less competitive offline negotiation and long-term relationships. 3) Cases were observed in this study that were connecting reverse auctions and CPFR (especially promotional planning), a movement that participants called “*direction of auctions*”.

Despite the above “movement towards markets”, network organizations and hierarchical structures are still dominant. Use of the two market-oriented functionalities, forward auction (EM B) and product catalogue (EM A), indicated that the use of market-type governance is still unimportant to participants. In EM B, 90% of the purchasing/selling of heavy used equipment is still done through dealer-to-dealer networks. In EM A, even when aggregated promotional product catalogues can be accessed online and search is made easier, distributors still voluntarily purchase from

long-term suppliers. They search online only when clients request a product that is not carried by their long-term suppliers.

In terms of transaction volume, the majority of online transactions were still conducted through collaboration-oriented functionalities such as transaction facilitation and CPFR. When an EM supports only one off purchasing, the transaction volume of its participants is normally quite moderate. But in more collaboration-oriented functionalities the transaction rates were a very high proportion of total purchases by the buyers.

The use of collaboration-oriented functionalities also moves buyer-supplier relationships further in the direction of more trust. The process of setting up EM functionalities and the need for more communication in using collaboration-oriented functionalities actually enhanced buyer-supplier relationships, linking buyers and suppliers more tightly together.

Overall the current EM landscape is very dynamic. There will be more and more competitive elements applied to long-term relationships, but this does not mean long-term relationships will become less important. EMs are still in their infancy, many companies are still experimenting with them, and the majority of transactions are still done through EDI or offline. It is hard to predict how and when structural changes will occur in the movement among markets, network organizations or hierarchies. But it is in the interest of researchers to monitor this issue, and to contemplate future related research.

6.6 Summary

Table 6.10 summarizes the conclusions about proposition validation. Most of the propositions were confirmed in this study except Proposition 5 (the complexity of product description) and Proposition 9a (supplier dissatisfaction with market functionalities). It seems that all the functionalities are appropriate for handling products that are simple to describe, and not just market-oriented functionalities. EM functionalities have not caused significant supplier dissatisfaction, except suppliers involved in reverse auctions.

In the discussion of the propositions, the concept of a continuum has been applied throughout. One special functionality, reverse auctions used to support long-term relationships, exhibits diverse properties in most contingencies, such as transaction frequency and non-contractible factors. This appears to be a transitional part of the continuum, so diverse properties for this functionality seem to be logical.

Table 6.14 Summary of Proposition Validation

Research Questions	Propositions:	Conclusions
RQ I) Adoption: Power	Proposition 1: Subject companies are more likely to adopt an EM if companies that exhibit power of any kind are already participating.	Confirmed
RQ II) Strategic Choice of Functionalities: Transaction uncertainty	Proposition 2a: A company is more likely to adopt market-oriented functionalities when it faces low transaction uncertainties, or when transaction uncertainty is high but no long-term relationships are available to absorb this uncertainty. Proposition 2b: A company is more likely to adopt collaboration-oriented functionalities when it faces high transaction uncertainties, and long-term relationships are available to absorb this uncertainty.	Confirmed Confirmed
Transaction specific investment	Proposition 3: A company involved in relationships that require high transaction-specific investments tends to adopt collaboration-oriented functionalities in an EM. Otherwise, it will prefer market-oriented functionalities.	Confirmed
Transaction frequency	Proposition 4: A company purchasing a product frequently will prefer using collaboration-oriented functionalities in an EM. Otherwise, it will prefer using market-oriented functionalities.	Confirmed
Complexity of product description	Proposition 5: Companies purchasing products with highly complex descriptions tend to adopt collaboration-oriented functionalities. Otherwise, they will adopt market-oriented functionalities.	Not confirmed
Non-contractible factors	Proposition 6: Companies for which non-contractible factors are important will prefer collaboration-oriented functionalities. Otherwise they will tend to adopt market-oriented functionalities.	Confirmed
RQ III) Market Structure:	Proposition 7a: Companies in concentrated industries are more likely to be affected by power than companies in fragmented industries, when deciding to adopt an EM. Proposition 7b: Companies in fragmented industries are more likely to adopt market-oriented functionalities than companies in concentrated industries.	Confirmed Confirmed
RQ IV) Impact of EMs on Buyer-Supplier Relationships: Relationship efficiency and effectiveness	Proposition 8a: The use of market-oriented functionalities will increase market efficiency Proposition 8b: The use of collaboration-oriented functionalities will improve long-term relationship effectiveness.	Confirmed Confirmed
Satisfaction	Proposition 9a: The use of market-oriented functionalities will cause supplier dissatisfaction with the relationship Proposition 9b: The use of collaboration-oriented functionalities will increase both buyer and seller satisfaction with the relationship	Not confirmed Confirmed

CHAPTER 7. CONCLUSIONS AND FUTURE RESEARCH

Business to business electronic marketplaces (EMs) are an increasingly important phenomenon in today's business world. Although the dot com disaster in 2000 and 2001 destroyed investor faith in EMs, they were not dead (Hellweg April 8, 2002). After shakeout and consolidation, surviving EMs are more healthy, and appear to be moving in the right direction in terms of offering real value to business. Market-oriented functionalities are becoming a necessary EM offering, and collaboration-oriented functionalities are more and more popular in EM service offerings.

The boundary between market-oriented and collaboration-oriented functionalities appears to be blurring. Some companies began to introduce competition into their long-term relationships when adopting EM collaboration-oriented functionalities (e.g., connecting reverse auctions with CPFR). On the other hand, some functionalities that appear to be market-oriented are being used to facilitate long-term relationships. Reverse auctions, a highly competitive functionality, is more and more being used to negotiate long-term contracts. Public catalogues (e.g. in EM A) are actually used partially to facilitate long-term relationships between suppliers and distributors. Overall, buyer-supplier relationships supported by EMs and their functionalities are becoming more dynamic and complicated.

7.1 Thesis Review

This thesis provided a comprehensive view of EM history, definitions, classification, functionalities, and the literature of buyer-supplier relationships with EM phenomena. Buyer-supplier relationships that an EM functionality can support were initially classified as either market-oriented or collaboration-oriented. However, this classification was found to be too simple, and it could not capture the reality of EM functionalities. For this reason the original model was modified to include a continuum of functionalities ranging from the most competitive to the most collaborative ones, and reverse auctions in the middle as a transition stage, combining both strong competitive and strong collaborative

elements. This continuum was used as a basis to verify the propositions and framework. The framework addressed the following four questions:

RQ I) How do pre-existing relationships with business partners affect the adoption of EMs?

The study confirmed that power imbalance, an important aspect of buyer-supplier relationships, had a strong influence on a subject firm's adoption decision. Both implicit power (potential power) and explicit power affect EM adoption, and buyer power is much more significant in EM adoption than supplier power.

RQ II) What are the important factors affecting the choice of EM functionalities, given different functionalities supporting different types of buyer-supplier relationships?

It was expected that the contingencies underlying buyer-supplier relationships would play an important role in choosing different functionalities, such as transaction uncertainties, transaction frequency, transaction specific investment, complexity of product description, and non-contractible factors. Study findings are summarized as follows.

As proposed, some transaction uncertainties lead to companies using market-oriented functionalities, and some lead to companies using collaboration-oriented functionalities. When a company cannot predict what it wants from a supplier, it tends to purchase from several preferred suppliers constantly, based on the assumption that preferred suppliers cover most of the products needed. For the products that are not covered by long-term relationship suppliers, a buyer tends to search for new suppliers. When a company faces high demand volume uncertainty, it tends to enter long-term relationships to purchase these products. As a result, it will choose collaboration-oriented functionalities to facilitate this relationship. However, if the market is dynamic, the price changes all the time, suppliers enter and exit frequently, and a company will tend to use market-oriented functionalities. This is because market-oriented functionalities can help decide product pricing, or search for new suppliers if old suppliers exit.

It was proposed that high transaction specific investment leads a company to choose collaboration-oriented functionalities, and low transaction specific investment leads a company to choose market-oriented functionalities. The case studies indicated weak support for this proposition. High transaction-specific investment leads to a company choosing collaboration-oriented functionalities, but some companies still choose them when transaction-specific investment is low. Other factors, such as transaction frequency and non-contractible factors, complement transaction-specific investment to justify the choice of collaboration-oriented functionalities.

When a company faces a high transaction frequency, it tends to choose collaboration-oriented functionalities; otherwise, it will choose market-oriented functionalities. The rationale is that the purchasing of frequently needed products from a contractual long-term relationship can reduce the need for frequent searching and negotiation, and the high transaction volume can justify the investment made to adopt collaboration-oriented functionalities.

Complexity of product description is supposed to be a factor that leads to a company using different functionalities. However, supporting evidence for this was not found. The overall complexity of product description was low, and suppliers commented that complex products resulted in low performance through EMs. Even if highly complex products are involved, they are not always involved in functionalities with more collaboration elements. For example, RFPs are more competitive than CPFR, but the products involved in RFPs are more complex than those in CPFR. This may be because EMs can help reduce the complexity of product description, so that a competitive functionality can handle more complex products.

It was suggested that the emphasis on non-contractible factors would encourage a firm to choose collaboration functionalities. Otherwise, they would choose market-driven functionalities. There was strong evidence in support of this. The level of non-contractible factors such as trust, information sharing, supplier innovativeness and supplier flexibility is higher in collaboration-oriented functionalities than in market-oriented functionalities.

RQ III) How does market structure affect the adoption of EMs?

Market structure strongly moderates the effects of power on the adoption of EMs, and the effects of power are more frequently seen in concentrated industries than in fragmented industries. Based on a cost benefit analysis of using market-oriented functionalities, we also conclude that companies in fragmented industries are more likely to adopt market-oriented functionalities than companies in concentrated industries.

RQ IV) How does the use of different functionalities affect buyer-supplier relationships?

The study confirmed that the use of EMs would increase both market efficiency and long-term relationship effectiveness, and would cause different degrees of satisfaction among users. Market efficiency and long-term relationship effectiveness suggests that EMs will not necessarily lead to the wider use of markets, but to a coexistence of markets, hierarchies or middle forms of organizations (e.g. network organizations), and the latter is still the dominant mode of exchanges.

7.2 Future Research

This research was limited in several aspects, which are left to future research. Some new phenomena were found, but due to the limited focus of the research, these could not be addressed fully. For example, the phenomenon of reverse auctions should stimulate future research because of the great uncertainty and practitioner interest in reverse auctions. Reverse auctions are being used more and more to facilitate the negotiation of long-term contracts. The problem here is that reverse auctions are known for the supplier disincentives they cause, and for buyer intentions to do more of their purchasing through reverse auctions. Buyers are currently more involved in testing for the best kinds of goods that can be purchased through reverse auctions, how to increase supplier incentives in participating, and how to receive better service in the contractual period. These considerations are complex issues that could be fruitful areas of research.

Five factors have been used in explaining company choice of different functionalities in the research framework: transaction frequency, transaction uncertainty, transaction specific investment, complexity of product description, and non-contractible factors. However, these are not the only reasons why companies choose to involve certain suppliers in market/ collaboration-oriented functionalities. During coding of the interview text (Figure 6.4), all other criteria used by participants in choosing a functionality were included in the “others” category, and from this category, supplier power appears important in explaining why companies choose different functionalities in EMs. For all the participants studied, supplier power comes from two aspects: brand image, and the supplier’s volume of sales to the buyer (Porter 1980). In CPFR, brand image is a big consideration of buyers with whom to implement CPFR, because branded suppliers and products are important to competitive advantage. However, in reverse auctions, buyers always appear to choose those suppliers that can be replaced easily without significant loss.

“It’s a bit different from that, the online negotiation (auctions) is usually used for things where you’ve got a couple of different possibilities for who you’re going to buy it from. Whereas the more CPFR like applications are entirely focused on branded goods”. (An EM E buyer)

“Ordinarily a big driver is how much of my business is with this supplier, and how important is this supplier to my performance in this category. So there’s a revenue number that starts it out, and then within that, the retailer will usually look at how well do I collaborate with this supplier today” (an EM E operator)

EM C companies adopted transaction facilitation and EM A distributors chose not to use product catalogues for searching because their suppliers carry a broad range of product lines, and buyers could consolidate their orders with one supplier. From this, it is easy to get the impression that the supplier in these two EMs sells a large amount of products to the buyer. The more a supplier sells to its customer, the more power it gains, and the more likely the buyer will try to move with this supplier to collaboration-oriented functionalities. So a future research opportunity is to investigate the importance of supplier power on the adoption of EM functionalities.

Another issue that was touched on, without any conclusions, is the movement toward markets, hierarchies or network organizations, as structural changes in EM network governance structure. As more and more companies use EMs to deal with the bulk of their transactions, data will become available that will help in the investigation of this issue. Currently private EMs may provide a better platform to investigate structural changes, since they involve large companies' bulk purchases, and also increasingly offer a complete range of functionalities. For example, Walmart's *Retallink* includes reverse auctions as one of its functionalities.

7.3 Contribution to Theory

There are three main theoretical contributions from this research:

- Clarifying EM definitions and classifications. The jargon jungle of EMs causes confusion among researchers. So our analysis of EM definitions and classifications will bring clarification to what researchers mean by “Electronic Marketplace” and which categories EMs fall into.
- This research has made an important contribution to the theory of EM adoption. Most EM adoption research has focused on why a company adopts an EM, but has left the choice of different functionalities out. In fact, companies not only adopt an EM, but adopt its functionalities. Some may argue that many EMs only offer one kind of functionality, and there is no issue of choice. But there is a choice, since a company can choose to adopt another EM that offers a functionality that it wants, or not to adopt an EM if no EM currently offers the functionality, until the EMs with the desired functionalities appear. Some factors are valid in explaining all the functionalities are adopted, but certain specific factors can distinguish why a company adopts a particular functionality. By focusing on buyer-supplier relationships, we were able to make a distinction between those factors. So the contributions of the thesis to EM theory are 1) including both collaboration and market-oriented functionalities in the analysis, as opposed to previous work that focuses on either market-oriented or collaboration oriented EMs, and 2),

differentiating among EMs according to the factors affecting the adoption of different functionalities.

- Investigating the impact of using EMs on buyer-supplier relationships. EMs make both long- and short- term relationships efficient and long-term relationships dynamic and healthy. In the EM environment, structural changes in governance structure are too early to predict, but the conclusion is that there is more emphasis on network organizations and hierarchies than on markets.

7.4 Contribution to Management

One of the benefits of doing a case study is its relevance to the practice(Lee 1999) (Benbasat and Zmud 1999). Opinions were gathered from practitioners, and then after reviewing all their ideas, managerial implications can be offered that are of practitioner interest.

For EM operators, the research shows the importance of leveraging business relationships to increase the adoption of EMs. Market power is a very important source of driving EM adoption, and buyer power is much more important than supplier power. So recruiting companies with substantial market power into the EM can help increase the adoption rate of EMs. EMs need to provide incentives for big players to make deeper commitments.

When choosing what type of functionalities to offer, EM operators should not try to change the way that firms currently do business, but respect these ways and help businesses to improve on them, and offer functionalities that are compatible with businesses' preferred purchasing strategies. Trying to break existing relationships, even if moving in the right direction, will encounter resistance from potential participants. Although some EMs in our case study offer collaboration functionalities, these collaboration functionalities tend to differ among EMs. For example, collaboration functionalities in the retail industry are different from those in the healthcare industry. So it is very important to offer collaboration functionalities that can best fit an industry's specific supply chain structure. Understanding business processes of the industry and the

client companies can help EM operators to pick the most suitable collaboration-oriented functionalities to offer. When implementing collaboration-oriented functionalities, working closely with clients and understanding and tailoring to their business processes will attract more clients.

Although the research concluded that EMs could increase both market efficiency and long-term relationship effectiveness, as well as increase the degree of satisfaction of some participants, there are still not imperfections in functionalities. For example, the use of collaboration-oriented functionalities increases satisfaction with relationships, but if functionalities offered little benefit, participants were considering dropping them. The quality of the functionality is related to a company's continued intention to use it. So for EM operators, industry expertise is important in offering a useful functionality. Following industry association recommendations on best practices is not enough. Understanding the industry and corporate clients demands deep industry expertise.

When participants adopt an EM, the most important aspects are market and functionality selection. Transaction frequency, transaction uncertainty, transaction specific investment and non-contractible factors, can be used as guidelines in choosing EM functionalities. Due to the increasing power of buyers, the choice seems to be more likely the buyers' choice. However, in some cases suppliers were also aggressive and took the adoption of the EM as a strategic approach. Different outcomes can result if these early mover suppliers have products of different characteristics. On average, simple products are more suitable for EMs than capital goods. For buyers, for example, a suggestion would be that products needing lots of service are not suitable for reverse auctions.

Some other suggestions are: (1) in using collaboration oriented functionalities, system integration between the EM and its trading partners is the key to reaping full benefits; (2) when buyers want to move their suppliers online, there is a difference between getting a "*supplier on board*" (e.g. an EM D buyer) for market-oriented functionalities as compared to collaboration oriented functionalities. On average, implementing collaboration-oriented functionalities for suppliers needs more contribution

and work from the buyer than implementing market-oriented functionalities; (3) the use of EMs will reduce personal contact, which is seen as key by many suppliers in the selling process. In this case, suppliers should not totally rely on EMs and should use other means to strength personal relationships.

7.5 Conclusions

This thesis depicts a broad picture of how buyer-supplier relationships affect the adoption of EMs, and how EMs impact buyer-supplier relationships. EMs, as a kind of eCommerce application, were originally considered as an exciting revolution that would change the business world. But it turned out to be an evolution. Businesses do not want to make significant changes in their business relationships. Supply, demand, price, trust, and relationships still dominate the business world. The more rational and practical EM approaches focus on enhancing existing buyer-supplier relationships, which is an evolution instead of a revolution. However, changes in business relationships can occur through EMs, where more efficient, healthy, and fluid relationships can develop.

“Technology changes, but the basic economic rule does not” (Shapiro and Varian 1999). The underlying factors that decide business relationships and purchasing strategies change very little. Most transaction attributes and non-contractible factors still play an important role in firm decisions on what kind of business relationships to enter in trading and hence what kind of functionalities EMs should adopt. Power is still the main catalyst for the adoption of EMs, as in many other technologies.

In the business world, relationships are everything. Many interviewees made similar comments in our case interviews. EM operators should leverage such relationships to increase the adoption of EMs, by offering functionalities that are compatible with dominant relationships, by providing incentives to attract big players, and by pushing these players to bring more trading partners online.

BIBLIOGRAPHY

- Almeida, A. F., W. Meira, V. F. Ribeiro and N. Ziviani (1999). *Efficiency Analysis of Brokers in the Electronic Marketplace*. *Computer Networks* 31, 1079-1090.
- Alstyne, M. V. (1997). *The State of Network Organization: A Survey in Three Frameworks*. *Journal of Organizational Computing & Electronic Commerce* 7(3), 83-151.
- Alt, R. and M. A. Cäsar (2002). *Collaboration in the Consumer Product Goods Industry- Analysis of Marketplaces*. ECIS, Gdańsk, Poland.
- Amit, R. and C. Zott (2001). *Value Creation in eBusiness*. *Strategic Management Journal* 22(6-7), 493-520.
- Anderson, C. (1997). *In Search of the Perfect Market*. *The Economist* 343(8016), E3.
- Anderson, J. C. and J. A. Narus (1990). *A Model of Distributor Firm and Manufacturer Firm Working Partnerships*. *Journal of Marketing* 54(January), 42-58.
- Andrew, J. P., A. Blackburn and H. L. Sirkin (2000). *The B2B Opportunity: Creating Advantage through e-Marketplaces*. The Boston Consulting Group Report. <http://faculty.darden.edu/gbus885-00/files/b2b.pdf> Accessed in June, 2004
- Anonymous (1999). *Online B2B Exchanges: The New Economics of Markets*. Deloitte Research. <http://www.deloitte.com/dtt/cda/doc/content/onlineb2b.pdf> Accessed in June, 2004
- Anonymous (2000). *The Economic and Social Impacts of Electronic Commerce: Preliminary Findings and Research Agenda*. Organization for Economic and Co-operation Development (OECD) Report. <http://www.oecd.org/dsti/sti/it/ec/> Accessed in May, 2001
- Anonymous (2000). *Efficiencies of B2B Electronic Marketplaces*. Competition Policy in the World of B2B Electronic Marketplaces: A Report by Federal Trade Commission Staff. <http://www.ftc.gov/os/2000/10/part2.pdf> Accessed in June, 2004
- Anonymous (2001). *An Economic Analysis of Electronic Marketplaces*. Report for OGC By Europe Economics. http://www.ogc.gov.uk/sdtoolkit/reference/ogc_library/procurement/elecmarket.pdf Accessed in September 2002

- Anonymous (2001). *E-Markets: Realism, Not Pessimism. Addressing the Challenges of E-markets*. PriceWaterhouseCoopers Report.
http://www.pwcglobal.com/gx/eng/inssol/survey-rep/etrust/pwc_emarkets.pdf
Accessed in June, 2004
- Anonymous (2003). *Internet Use for Buying Reaches 'Critical Mass'*. Hospital Materials Management 28(10), 2.
- Anonymous (March 18, 2002). *E-Commerce 2000 Highlights*. United States Department of Commerce. <http://www.census.gov/eos/www/papers/estatstext.pdf> Accessed in October, 2003
- Anonymous (March 19, 2003). *E-Commerce 2001 Highlights*. United States Department of Ecommerce eStats.
<http://www.census.gov/eos/www/papers/2001/2001estatstext.pdf> Accessed in October, 2003
- Archer, N. (2001). *The New Economy: Some Issues and Impacts of Electronic Commerce*. Working paper #450, Michael G. DeGroote School of Business, Mcmaster Univeristy, Canada.
- Archer, N. and J. Gebauer (2002). *B2B Applications to Support Business Transactions: Overview and Management Consideration*. In: M. Warkentin (Eds.), *Business-to-Business Electronic Commerce: Challenges and Solutions*. Idea Group Publishing, 19-44.
- Archer, N. and S. Wang (2003). *Barriers to Adopting Online Supply Chain Solutions by Small and Medium Sized Enterprises*. First Annual Symposium on Supply Chain Management, Toronto, Canada.
- Ariba (October 19, 2000). *B2B Marketplaces in the New Economy*. Ariba Inc. White Paper http://www.ariba.com/pdf/B2B_Mkts_white_paper.pdf Accessed in June, 2004
- Arndt, J. (1979). *Toward a Concept of Domesticated Markets*. Journal of Marketing 43(Fall), 69-75.
- Arvin, J., S. Beall, P. Carter and B. Hoffman (2002). *E-Commerce Exchanges: Making Informed Decisions*. McKinsey &Caps Research eCommerce Paper.
<http://www.capsresearch.org/publications/reports.cfm?Section=3> Accessed in June, 2004
- Babin, G., T. G. Crainic, M. Gendreau, R. K. Keller, P. Kropf and J. Robert (2001). *Toward Electronic Marketplaces: a Progressive Report*. International Journal of

Electronic Commerce Research (ICECR-4), Dallas, TX.
<http://www.iro.umontreal.ca/~kropf/articles/a01-7.pdf> Accessed in October, 2002

- Bailey, J. P. and Y. Bakos (1997). *An Exploratory Study of the Emerging Role of Electronic Intermediaries*. International Journal of Electronic Commerce 1(3), 7-20.
- Baker, G., R. Gibbons and K. Murphy (2002). *Relational Contracts and the Theory of the Firm*. The Quarterly Journal of Economics 117(1), 39-84.
- Bakos, J. Y. (1991). *A Strategic Analysis of Electronic Marketplaces*. MIS Quarterly 15(September), 295-310.
- Bakos, J. Y. (1997). *Reducing Buyer Search Cost: Implications for Electronic Marketplace*. Management Science 43(12), 1976-93.
- Bakos, J. Y. and M. E. Treacy (1986). *Information Technology and Corporate Strategy: A Research Perspective*. MIS Quarterly 10(2), 107-119.
- Bakos, Y. (1998). *The Emerging Role of Electronic Marketplaces on the Internet*. Communications of the ACM 41(8), 35-42.
- Bakos, Y. and E. Brynjolfsson (1993). *From Vendors to Partners: Information Technology and Incomplete Contracts in Buyer-Supplier Relationships*. Journal of Organizational Computing 3(3), 301-328.
- Barnes-Vieyra, P. and C. Claycomb (2001). *Business-to-Business E-Commerce: Models and Managerial Decisions*. Business Horizon 44(3), 13-20.
- Benbasat, I., D. K. Goldstein and M. Mead (1987). *The Case Research Strategy in Studies of Information System*. MIS Quarterly 11(3), 369-386.
- Benbasat, I. and R. W. Zmud (1999). *Empirical Research in Information Systems: the Practice of Relevance*. MIS Quarterly 23(1), 3-16.
- Benjamin, R. and R. Wigand (1995). *Electronic Markets and Virtual Value Chains on the Information Superhighway*. Sloan Management Review 36(2), 62-72.
- Benjamin, R. I., D. W. d. Long and M. S. S. Morton (1990). *Electronic Data Interchange: How Much Competitive Advantage*. Long Range Planning 23(1), 29-40.

- Bensaou, M. and E. Anderson (1999). *Buyer-Supplier Relations in Industrial Markets: When Do Buyers Risk Making Idiosyncratic Investments*. *Organization Science* 10(4), 460-481.
- Benson, J. K. (1975). *The Interorganizational Network as a Political Economy*. *Administrative Science Quarterly* 20(2), 229-249.
- Bichler, M. (2001). *The Future of EMarkets: Multi-dimensional Market Mechanisms*. Cambridge, New York, Cambridge University Press.
- Blodgett, H. and E. McCabe (2000). *The B2B Market-maker Book*. Merrill Lynch Indepth Report. Merrill Lynch & Co. February 3.
<http://www.nmm.com/documents/merrill.pdf> Accessed in October 2003
- Boyle, B., F. R. Dwyer, R. A. Robicheaux and J. T. Simpson (1992). *Influence Strategies in Marketing Channels: Measures and Use in Different Relationship Structure*. *Journal of Marketing Research* XXIX(November), 462-73.
- Brown, J. R., C. S. Dev and D.-J. Lee (2000). *Managing Marketing Channel Opportunism: The Efficacy of Alternative Governance Mechanism*. *Journal of Marketing* 64(2), 51-65.
- Bucklin, L. P. and S. Sengupta (1993). *Organizing Successful Co-Marketing Alliance*. *Journal of Marketing* 57(2), 32.
- Burgess, T. F. (2001). *A General Introduction to the design of Questionnaires for Survey Research*. University of Leeds Working Paper.
<http://www.leeds.ac.uk/iss/documentation/top/top2/top2.html> Accessed in February 2004
- Burkhardt, M. E. and D. J. Brass (1990). *Changing Patterns or Patterns of Change: The Effects of a Change in Technology on Social Network Structure and Power*. *Administrative Science Quarterly* 35(1), 104-127.
- Buvik, A. and K. Gronhaug (2000). *Inter-Firm Dependence, Environmental Uncertainty and Vertical Co-ordination in Industrial Buyer-seller Relationships*. *Omega* 28, 445-454.
- Buvik, A. and G. John (2000). *When does Vertical Coordination Improve Industrial Purchasing Relationships?* *Journal of Marketing* 64(4), 52-64.
- Bärwolff, M. (2003). *State and Prospects of Electronic Marketplaces*. <http://ig.cs.tu-berlin.de/ma/mb/ap/papers/Baerwolff-EMarkets-2003.pdf> Accessed in February 2004

- Carroll, C. R. and D. J. Teece (1999). *Firms, Markets and Hierarchies*. In: C. R. Carroll and D. J. Teece (Eds.), *Firms, Markets, and Hierarchies: The Transaction Cost Economics Perspective*. Oxford; New York: Oxford University Press.
- Chan, A. P., C. W. Steinfield and R. E. Kraut (1999). *Do Open Networks Favor Electronic Markets?* IMP: Information Impacts Magazine, April. <http://www-2.cs.cmu.edu/~kraut/RKraut.site.files/pubs/articles.html> Accessed in May 2002
- Chircu, A. M. and R. J. Kauffman (2000). *Limits to Value in Electronic Commerce-Related IT Investments*. *Journal of Management Information Systems* 17(2), 59-80.
- Choudhury, V. (1997). *Strategic Choice in the Development of Inter-organization Information System*. *Information Systems Research* 8(1), 1-24.
- Choudhury, V. and K. S. Hartzel (1998). *Uses and Consequences of Electronic Markets: An Empirical Investigation in the Aircraft Parts Industry*. *MIS Quarterly* 22(4), 471-503.
- Chow, D., A. Ghani, M. Miller, G. Takeda and S. Ziffra (2000). *B2B: Beyond the Market Hubs*. Kellogg Graduate School of Management Working Paper, Northwestern University.
- Chow, D., A. Ghani, M. Miller, G. Takeda and S. Ziffra (2000). *Let's Forget Vertical! Beyond the B2B Market Hubs*. Kellogg Tech Ventures Anthology 2000, 258. <http://www.ranjaygulati.com/teaching/tv2000toc.html> Accessed in October 2003
- Christiaanse, E. and M. L. Markus (2002). *B2B Electronic Marketplaces and the Structure of Channel Relationships*. Proceedings of the International Conference on Information Systems, Barcelona, Spain.
- Christiaanse, E. and M. L. Markus (2003). *Participation in Collaboration Electronic Marketplaces*. Hawaii International Conference on System Science, Hilton Waikoloa Village, Island of Hawaii.
- Clemons, E. K., S. Reddi, P. and M. C. Row (1993). *The Impact of Information Technology on the Organization of Economic Activity: The "Move to the Middle" Hypothesis*. *Journal of Management Information Systems* 10(2), 9-35.
- Clemons, E. K. and M. C. Row (1993). *Limits to Interfirm Coordination through Information Technology: Results of a Field Study in Consumer Packaged Goods Distribution*. *Journal of Management Information Systems* 10(1), 73.

- Coase, R.H. (1937). *The Nature of the Firm*. *Economica* 4: 386-485
- Coltman, T., T. M. Devinney and A. Latukefu (2000). *E-business: Revolution, Evolution or Hype?*, eCommerce Research Forum Working Papers 2002.
<http://www.agsm.unsw.edu.au/~timdev/research/ECOM1.PDF> Accessed in November 2001
- Cousins, P. D. (2002). *A Conceptual Model for Managing Long-Term Inter-organizational Relationships*. *European Journal for Purchasing and Supply Management* 8(2), 71-82.
- Cox, A., J. Sanderson and G. Watson (2001). *Supply Chains and Power Regimes: Toward an Analytic Framework for Management Networks of Buyer and Supplier Relationships*. *Journal of Supply Chain Management* 37(2), 28-35.
- Creswell, J. W. (1994). *Research Design: Qualitative and Quantitative Approaches*. Thousand Oaks, CA, Sage.
- Cunningham, C. and C. Tynan (1993). *Electronic Trading, Interorganizational Systems and the Nature of Buyer-Seller Relationships: The Need for a Network Perspective*. *International Journal of Electronic Commerce* 13(1), 3-28.
- Dagenais, T. and D. Gautschi (2001). *Net Markets: Driving Success in the B2B Networked Economy*. McGraw-Hill Ryerson Limited.
- Dai, Q. and R. J. Kauffman (2000). *Business Models for Internet-Based E-Procurement Systems and B2B Electronic Markets: An Exploratory Assessment*. 34th Hawaii International Conference on Systems Science, Maui, HI.
- Dai, Q. and R. J. Kauffman (2002). *B2B E-Commerce Revisited: Leading Perspectives on the Key Issues and Research Directions*. *Electronic Markets* 12(2).
- Dainty, A. R. J., G. H. Briscoe and S. J. Millett (2001). *New Perspectives on Construction Supply Chain Integration*. *Supply Chain Management: An International Journal* 6(4), 163-173.
- Day, G. S., A. J. Fein and G. Ruppertsberger (2003). *Shakeouts in Digital Markets: Lessons from B2B Exchanges*. *California Management Review*, 45 (2), 131-150.
- Eisenhardt, K. M. (1999). *Building Theories from Case Study Research*. *Academy of Management Review* 14(4), 532-550.
- Emerson, R. M. (1962). *Power-Dependence Relations*. *American Sociological Review* 27(1), 31-41.

- Evans, P. B. and T. S. Wurster (1997). *Strategy and the New Economics of Information*. Harvard Business Review 75 (September/October), 71-82.
- Faverie, M. and G. Vickery (2001). *Business-to-Business Electronic Commerce in Publishing, Retail Distribution and Pharmaceuticals Distribution in France*. Organization for Economic Co-operation and Development (OECD Report): DSTI/ICCP/IE(99)9/FINAL. http://www1.oecd.org/dsti/sti/it/infosoc/prod/e_99-9.pdf Accessed in November 2002
- Fine, C. H. and D. M. G. Raff (2000). *Internet Driven Innovation and Economic Performance in the American Automobile Industry*. International Motor Vehicle Program(IMVP) Working Paper. <http://imvp.mit.edu/papers/0001/fineraff2.pdf> Accessed in November 2002
- Flanagan, J. C. (1954). *The Critical Incident Technique*. Psychological Bulletin 51(4), 327-358.
- Foddy, W. (1994). *Constructing Questions for Interviews and Questionnaires*. Cambridge University Press.
- Frazier, G. L. (1983). *On the Measurement of Interfirm Power in Channels of Distribution*. Journal of marketing Research 20(May), 158-266.
- Frazier, G. L. and R. C. Rody (1991). *The Use of Influence Strategies in Interfirm Relationships in Industrial Product Channels*. Journal of Marketing 55(January), 52-69.
- Garcia-Dastugue, S. J. and D. M. Lambert (2003). *Internet-enabled Coordination in the Supply Chain*. Journal of Marketing Management 32, 251-263.
- Garicano, L. and S. N. Kaplan (2001). *The Effect of Business-to-Business E-commerce on Transaction Costs*. Journal of Industrial Economics 49(4), 463-485.
- Gazzi, J. (2002). *e-Marketplaces-- After the Hype*. Business Briefing: Global Automotive Manufacturing & Technology May. <http://www.wmrc.com/businessbriefing/pdf/auto2002/book/gaazi.pdf> Accessed in October 2004
- Giaglis, G. M., S. Klein and R. M. O'Keefe (2002). *The Role of Intermediaries in Electronic Marketplaces: Developing a Contingency Model*. Information Systems Journal 12(3), 231-246.

- Gibbs, G. (2002). *Qualitative Data Analysis: Explorations with NVivo*. Open University Press, London,
- Glaser, B. G. and A. L. Strauss (1967). *The Discovery of Grounded Theory: Strategies for Qualitative Research*. Chicago: Aldine.
- Goldsby, T. J. and J. A. Eckert (2003). *Electronic Transportation Marketplaces: A Transaction Cost Perspective*. *Industrial Marketing Management* 32(3), 187-198.
- Granovetter, M. (1985). *Economic Action and Social Structure: The Problem of Embeddedness*. *American Journal of Sociology* 91(3), 481-510.
- Grewal, R., J. M. Corner and R. Mehta (2001). *An Investigation into the Antecedents of Organizational Participation in Business-to-Business Electronic Markets*. *Journal of Marketing* 65(3), 17-33.
- Grieger, M. (2003). *Electronic Marketplaces: A Literature Review and a Call for Supply Chain Management Research*. *European Journal of Operational Research* 144(2), 280-194.
- Gulati, R. (1998). *Alliances and Networks*. *Strategic Management Journal* 19(4), 293-317.
- Gulledge, T. (2002). *B2B eMarketplaces and Small- and Medium-sized Enterprises*. *Computers in Industry* 49(1), 47-58.
- Gurbaxani, V. and S. Whang (1991). *The Impact of Information Systems on Organizations and Markets*. *Communications of the ACM* 34(1), 59-73.
- Haller, J. (2002). *The Impact of Electronic Marketplaces on B2B Relationships*. eCommerce Research Forum Working Papers. <http://ecommerce.mit.edu/cgi-bin/viewpaper?id=207> Accessed in January 2003
- Hannan, M. T. and J. Freeman (1977). *The Population Ecology of Organizations*. *The American Journal of Sociology* 82(5), 929-964.
- Hannan, M. T. and J. Freeman (1984). *Structural Inertia and Organizational Changes*. *American Sociology Review* 49(2), 149-164.
- Hart, P. and D. Estrin (1991). *Inter-Organization Networks, Computer Integration, and Shifts in Interdependence: The Case of the Semiconductor Industry*. *ACM Transactions on Information Systems* 9(4), 370-398.

- Hart, P. J. and C. S. Saunders (1997). *Power and Trust: Critical Factors in the Adoption and Use of Electronic Data Interchange*. *Organization Science* 8(1), 23-42.
- Hayek, F. (1945). *The Use of Knowledge in Society*. *American Economic Review* 35(4), 519-530.
- Hellweg, E. (April 8, 2002). *B2B is Back From the Dead: Don't Look Now, But Business-to-business e-Commerce is Enjoying a Healthy Renaissance*. CNN/Money. <http://money.cnn.com/2002/04/08/technology/techinvestor/hellweg/> Accessed in October 2003
- Holland, C. P. and A. G. Lockett (1997). *Mixed Mode Network Structures: The Strategic Use of Electronic Communication By Organization*. *Organization Science* 8(5), 475-488.
- Holzmuller, H. H. and J. Schlichter (2002). *Delphi Study about the Future of B2B Marketplaces in Germany*. *Electronic Commerce Research and Applications* 1(1), 2-19.
- Horvath, L. (2001). *Collaboration: The Key to Value Creation in Supply Chain Management*. *Supply Chain Management: An International Journal* 6(5), 205-207.
- Hughes, J., M. Ralf and B. Michels (1999). *Transform Your Supply Chain: Releasing Value in Business*. London, UK, International Thomson Business Press.
- Hutcheson, K. R. (1990). *Trends and Strategies in ASC X.12*. *Information Standards Quarterly*, 13-14.
- Iacovou, C. L., I. Benbasat and A. S. Dexter (1995). *Electronic Data Interchange and Small Organizations: Adoption and Impact of Technology*. *MIS Quarterly* 19(4), 465-485.
- Iskandar, B. Y., S. Kurokawa and L. J. LeBlanc (2001). *Adoption of Electronic Data Interchange: The Role of Buyer-Supplier Relationships*. *IEEE Transactions on Engineering Management* 48(4), 505-517.
- Jap, S. D. (2001). *The Impact of Online, Reverse Auctions on Buyer-Supplier Relationships*. Goizueta Business School Paper Series at Emory University, Paper Number: GBS-MKT-2001-001.
- Jap, S. D. (2001). *Perspectives on Joint Competitive Advantages in Buyer-Supplier Relationships*. *International Journal of Research in Marketing* 18(1/2), 19-35.

- Jap, S. D. (2003). *An Exploratory Study of the Introduction of Online Reverse Auctions*. Journal of Marketing 67(July), 96-107.
- Jap, S. D. and J. J. Mohr (2002). *Leveraging Internet Technologies in B2B Relationships*. California Management Review 44(4), 24-38.
- Jaspersen, J., B. S. Butler, T. A. Carte, H. J. P. Croes, C. S. Saunders and W. Zheng (2002). *Review: Power and Information Technology Research: A Metatriangulation Review*. MIS Quarterly 26(4), 397-459.
- Joskow, P. L. (1991). *Asset Specificity and the Structure of Vertical Relationships: Empirical Evidence*. In: O. E. Williamson and S. G. Winter. (Eds.), *The Nature of the Firm: Origins, Evolution, and Development*. New York: Oxford University Press.
- Kale, S. (1986). *Dealer Perceptions of Manufacturer Power and Influence Strategies in a Developing Country*. Journal of Marketing Research 23(November), 387-93.
- Kaplan, B. and D. Duchon (1988). *Combining Qualitative and Quantitative Methods in Information Systems Research: A Case Study*. MIS Quarterly 12(4), 571-586.
- Kaplan, S. and M. Sawhney (2000). *E-hubs: The New B2B Marketplaces*. Harvard Business Review 78(May-June), 97.
- Kenjale, K. and A. Phatak (2001). *B2B Exchanges: Now That We Know Better*. Syntel Report. <http://whitepapers.zdnet.co.uk/0,39025942,60038637p,00.htm> Accessed in October 2003
- Kerrigan, R., E. V. Roegner, Dennis D. Swinford and C. C. Zawada (2001). *B2Basic*. The McKinsey Quarterly 1.
- Kini, A. and J. Choobineh (1998). *Trust in Electronic Commerce: Definition and Theoretical Considerations*. Proceedings of the Thirty-First Hawaii International Conference on System Sciences, Kohala Coast, HI, USA.
- Koch, H. (2002). *Business-to-Business Electronic Commerce Marketplaces: Participation and Use Drivers*. 23th International Conference on Information Systems Doctoral Consortium, Barcelona, Spain.
- Kohler, H. (1994). *Statistics for Business and Economics*. New York, Harper Collins.
- Kollmann, T. (2001). *Measuring the Acceptance of Electronic Marketplaces: A Study Based on a Used Car Trading Site*. Journal of Computer Mediated Communication 6(2).

- Kraut, R., C. Steinfield, A. Chan, B. Butler and A. Hoag (1998). *Coordination and Virtualization: The Role of Electronic Networks and Personal Relationships*. *Organization Science* 10(6), 722-740.
- Kreps, D. M. (1999). *Markets and Hierarchies and (Mathematical) Economic Theory*. In: C. R. Carroll and D. J. Teece (Eds.), *Firms, Markets, and Hierarchies: the Transaction Cost Economics Perspective*. Oxford; New York: Oxford University Press.
- Kuttner, R. (1998). *The Net: A Market Too Perfect for Profits*. *Business Week* 3577, 20.
- Kwak, M. (2001). *Searching for search costs*. *MIT Sloan Management Review*, 42(3), 8-9.
- Labys, W. C. (1980). *Market Structure, Bargaining Power, and Resource Price Formation*. D.C. Health and Company.
- Lacey, A. and D. Luff (2001). *Trent Focus for Research and Development in Primary Health Care: An Introduction to Qualitative Analysis*. Trent Focus Group. http://www.trentfocus.org.uk/Resources/introduction_qualitative_research.htm Accessed in February 2004
- Laseter, T., B. Long and C. Capers (2001). *B2B Benchmark: The State of Electronic Exchanges*. *Strategic + Business First Quarter* (25), 33-42. <http://www.vectec.org/researchcenter/list.html?category=66> Accessed in October 2003
- Latham, S. (2000). *Independent Trading Exchanges-The Next Wave of B2B eCommerce*. AMR Research
- Lee, A. (1991). *Integrating Positivist and Interpretivist Approaches to Organizational Research*. *Organizational Science* 2(4), 342-365.
- Lee, A. S. (1989). *A Scientific Methodology for MIS Case Studies*. *MIS Quarterly* 13(1), 33-50.
- Lee, A. S. (1999). *Rigor and Relevance in MIS Research: Beyond the Approach of Positivism Alone*. *MIS Quarterly* 23(1), 29-34.
- Lee, H. G. and T. H. Clark (1996). *Impacts of the Electronic Marketplace on Transaction Cost and Market Structure*. *International Journal of Electronic Commerce* 1(1), 127-149.

- Lenz, M., H.-D. Zimmermann and M. Heitmann (2002). *Strategic Partnerships and Competitiveness of Business-to-Business E-Marketplaces*. *Electronic Markets* 12(2)
- Lieberman, M. B. (1991). *Determinants of Vertical Integration: An Empirical Test*. *Journal of Industrial Economics* 39(5), 451-466.
- Lonsdale, C. (2001). *Locked-in to Supplier Dominance: On the Dangers of Asset Specificity for the Outsourcing Decision*. *Journal of Supply Chain Management* 37(2), 22-27.
- Lucking-Reiley, D. and D. F. Spulber (2000). *Business-to-Business Electronic Commerce*. eCommerce Research Forum Working Papers 2001. <http://ecommerce.mit.edu/forum/> Accessed in July 2001
- Luening, E. and M. Kane (2001). *Leap of Faith: Why B2B Went Bust*. CNET News. <http://news.cnet.com/news/0-1007-200-5829246.htm/tag=prntfr> Accessed in September 2003
- MacDuffie, J. P. and S. Helper (2003). *B2B and Mode of Exchange: Evolutionary and Transformative Effects*. In: B. Kogut (Eds.), *The Global Internet Economy*. MIT Press.
- MacQueen, K. M., E. McLellan, K. Kay and B. Milstein (1998). *Codebook Development for Team-Based Qualitative Analysis*. *Cultural Anthropology Methods* 10(2), 31-36.
- Mahadevan, B. (2002). *Emerging Market Mechanisms in Business-to-Business E-Commerce: A Framework*. International Conference on Advances in Infrastructure for e-Business, eEducation, e-Science, and e-Medicine on the Internet (SSGRR), Rome, ITALY.
- Malone, T. W. (1987). *Modeling Coordination in Organizations and Markets*. *Management Science* 33(10), 1317-1332.
- Malone, T. W., J. Yates and R. I. Benjamin (1987). *Electronic Markets and Electronic Hierarchies*. *Communications of the ACM* 30(6), 484-497.
- Malone, T. W., J. Yates and R. I. Benjamin (1989). *The Logic of Electronic Markets*. *Harvard Business Review* 67(3), 166-170.
- Markus, M. L. (1983). *Power, Politics and MIS Implementation*. *Communications of the ACM* 26(6), 430.

- Memishi, R. (2001). *B2B Exchanges Survival Guide*. Internet World 7(1), 48-55.
- Mikesell, R. F. and J. W. Whitney (1987). *The World Mining Industry: Investment Strategy and Public Policy*. Winchester, Mass, Allen & Unwin, Inc.
- Miles, M. and M. Huberman (1994). *Qualitative Data Analysis*. Beverly Hills CA: Sage.
- Milgrom, P., and Roberts, John (1992). *Economics, Organization, and Management*. Prentice-Hall.
- Mithas, S., J. L. Jones and W. Mitchell (2002). *Noncontractible Factors as Determinants of Electronic Market Adoption*. Twenty-Third International Conference on Information Systems, Barcelona, Spain.
- Mithas, S., J. L. Jones and W. Mitchell (2003). *Non-contractibility and Asset Specificity in Reverse Auctions: "Move to the Middle" or "Efficient Markets"*. University of Michigan Business School Working Paper Series.
- Murray, J. Y., M. Kotabe and A. R. Wildt (1995). *Strategic and Financial Performance Implications of Global Sourcing Strategy: A Contingency Analysis*. Journal of International Business Studies 26(1), 181-202
- Myers, M. (2002). *Qualitative Research in Information Systems*. ISWorld Web site. <http://www.qual.auckland.ac.nz/> Accessed in October 2002
- Neuendorf, K. A. (2002). *The Content Analysis Guidebook*. Sage Publications.
- Noordewier, T. G., G. John and J. R. Nevin (1990). *Performance Outcomes of Purchasing Arrangements in Industrial Buyer-Vendor Relationships*. Journal of Marketing 54(October), 80-93.
- Nyshadham, E. A. and S. Raghavan (2001). *The Failure of Electronic Markets in the Air Cargo Industry: A Core Theory Explanation*. Electronic Markets December. http://electronicmarkets.org/netacademy/publications.nsf/all_pk.1975
- Orlikowski, W. J. and Baroudi (1991). *Studying Information Technology in Organizations: Research Approaches and Assumptions*. Information Systems Research 2(1), 1-28.
- Palencia, R. G. (2002). *B2B Electronic Marketplaces: Competition issues in the E-Distribution Channel*. The Bullet "iln" Newsletter 2(2). http://www.ag-internet.com/bullet_iln_two_two/iberforo_article.htm Accessed in February 2004

- Pavlou, P. A. (2003). *Impersonal Trust in B2B Electronic Commerce: A Process View*. In: S. Lubbe (Eds.), *The Economic and Social Impacts of e-Commerce*. Idea Group Inc.
- Paviou, P. A. and O. A. E. Sawy (2002). *A Classification Scheme for B2B exchanges and Implications for Inter-organizational eCommerce*. In: M. Warkentin (Eds.), *Business to Business Electronic Commerce: Challenges and Solutions*. Idea Group Publishing.
- Perryman, B. (2003). *Chasing Promotional Products*. Stitches Magazine April.
- Phillips, C. and M. Meeker (2000). *The B2B Internet Report: Collaborative Commerce*. Morgan Stanley Dean Witter Research Report.
<http://www.morganstanley.com/institutional/techresearch/b2b.html?page=research> Accessed in July 2001
- Pint, E. M. and L. H. Baldwin (1997). *Strategic Sourcing: Theory and Evidence from Economics and Business Management*. Rand Corporation Research Report,
<http://www.rand.org/publications/MR/MR865/> Accessed in July 2004
- Porter, M. E. (1980). *Competitive Strategy: Techniques for Analyzing Industries and Competitors*. New York, Free Press.
- Porter, M. E. and V. E. Millar (1985). *How Information Gives You Competitive Advantage*. Harvard Business Review 63(4), 149-160.
- Powell, W. W. (1990). *Neither Market nor Hierarchy: Network Forms of Organization*. Research in Organizational Behavior 12, 295-336.
- Premkumar, G. and K. Ramamurthy (1995). *The Role of Interorganizational and Organizational Factors on the Decision Mode for Adoption of Interorganizational Systems*. Decision Sciences 26(3), 303-336.
- Provan, K. G., J. M. Beyer and C. Kruytbosch (1980). *Environmental Linkages and Power in Resource-Dependence Relations Between Organizations*. Administrative Science Quarterly 25(2), 200-225.
- Reve, T. and L. W. Stern (1979). *Interorganizational Relations in Marketing Channel*. The Academy of Management Review 4(3), 405-416.
- Robertson, T. S. and H. Gatignon (1998). *Technology Development Mode: A Transaction Cost Conceptualization*. Strategic Management Journal 19(6), 515-531.

- Rosson, P. and C. Davis (2001). *Electronic Marketplaces: The View from Canada*. Center for International Business Studies Working Paper, Dalhousie University. <http://www.mgmt.dal.ca/sba/cibs/%5B-papers/DP-186.pdf> Accessed June 2003
- Samtami, G. (2002). *B2B Integration: A Practical Guide to Collaborative E-commerce*. Covent Garden, London, Imperial College Press.
- Sandra, R. (1996). *EDI Background Material*. <http://www.bus.okstate.edu/sandra/mba5161> Accessed in June 2001
- Sawhney, M. (1999). *Let's Get Vertical*. Business 2.0. <https://www.business2.com/subscribers/articles/mag/0,1640,13124,00.html>. Accessed in October 2003
- Schwandt, J. (1997). *Electronic Data Interchange: An Overview of its Origins, Status, and Future*. Michael G. Degroote School of Business Working Paper No 422, McMaster University.
- Sculley, A. B. and W. W. A. Woods (2001). *B2B Exchanges: The Killer Application in the Business-to-Business Internet Revolution*. New York, NY, HarperCollinsPublishers.
- Selz, D. (1999). *Value Webs: Emerging Forms of Fluid and Flexible Organization*. Ph.D Dissertation, University of St. Gallen. [http://www.businessmedia.org/netacademy/publications.nsf/all_pk/1305/\\$file/diss_selz_all.pdf?OpenElement&id=1305](http://www.businessmedia.org/netacademy/publications.nsf/all_pk/1305/$file/diss_selz_all.pdf?OpenElement&id=1305) Accessed in July 2001
- Shapiro, C. and H. R. Varian (1999). *Information Rules*. MA:Harvard University Press.
- Shelanski, H. A. and P. G. Klein (1999). *Empirical Research in Transaction Cost Economics*. In: C. R. Carroll and D. J. Teece (Eds.), *Firms, Markets, and Hierarchies: The Transaction Cost Economics Perspective*. Oxford; New York: Oxford University Press.
- Short, J. E. and N. Venkatraman (1992). *Beyond Business Process Redesign: Redefining Baxter's Business Network*. MIT Sloan Management Review 34(1), 7-21.
- Simons, H. (1951). *A Formal Theory Model of the Employment Relationships*. *Econometrica* 19, 293-305.
- Soh, C. and M. L. Markus (2002). *B2B E-Marketplaces— A Strategic Archetypes Approach*. International Conference on Information Systems (ICIS), Barcelona, Spain. [http://web.bentley.edu/empl/m/lmarkus/Markus_Web_Documents_\(pdf\)/B2B_EM_Archetypes.pdf](http://web.bentley.edu/empl/m/lmarkus/Markus_Web_Documents_(pdf)/B2B_EM_Archetypes.pdf) Accessed in August 2003

- Soh, C. and M. L. Markus (2002). *B2B Marketplaces Interconnection Effects, Strategic Positioning, and Performance*. *Systèmes d'Information et Management* 1(7), 77 - 103.
- Somasundaram, R. (2004). *Electronic Market as a Collective Action - A Framework for Explaining Critical Mass Attainment*. Aalborg University Working Paper.
- Spencer, L., j. Ritchie, J. Lewis and L. Dillon (2003). *Quality in Qualitative Evaluation: A Framework for Assessing Research Evidence*. Government Chief Social Researcher's Office-- Cabinet Office Report.
- StatSoft, I. (2004). *Electronic Statistics Textbook*.
<http://www.statsoft.com/textbook/stathome.html> Accessed in October 2003
- Steinfeld, C., R. Kraut, and A. Plummer. (1995). *The Impact Of Interorganizational Networks on Buyer-Seller Relationships*. *Journal of Computer-Mediated Communication* 1(3). <http://www.ascusc.org/jcmc/vol1/issue3/steinfld.html> Accessed in October 2001
- Stelzer, D. (2001). *Success Factors of Electronic Marketplaces*. Workshop: B2B E-Markets - Beyond MRO, Zurich, Switzerland.
- Stern, L. W. and T. Reve (1980). *Distribution Channels as Political Economies: A Framework for Comparative Analysis*. *Journal of Marketing* 44(Summer), 52-64.
- Stochdale, R. and C. Standing (2002). *A Framework for the Selection of Electronic Marketplaces: A Content Analysis Approach*. *Internet Research: Electronic Networking Applications and Policy* 12(3), 221-234.
- Streeter, L. A., R. E. Kraut, H. C. Lucas and L. Caby (1996). *How Open Data Networks Influence Business Performance and Market Structure*. *Communications of the ACM* 39(7), 62-73.
- Teo, H. H., K. K. Wei and I. Benbasat (2003). *Predicting Intention to Adopt Interorganizational Linkages: An Institutional Perspective*. *MIS Quarterly* 27(1), 19-47.
- Thompson, E. F. (1971). *The Moral Economy of the English Crowd in the Eighteenth Century*. *Past and Present* 50, 78-98.
- Thorelli, H. B. (1986). *Networks: Between Markets and Hierarchies*. *Strategic Management Journal* 7(1), 37-51.

- Thoung, T. L. (2002). *Pathways to Leadership for Business-to-Business Electronic Marketplaces*. *Electronic Markets* 12(2).
- Trauth, E. M. and L. M. Jessup (2000). *Understanding Computer-mediated Discussion: Positivist and Interpretive Analyses of Group Support System Use*. *MIS Quarterly* 24(1), 43-79.
- Truong, D., T. T. Le and S. S. Rao (2002). *The Buyer Perspective on Electronic Marketplaces – Interorganizational Information Systems (IOIS)*. Decision Sciences Institute 2002 Annual Meeting Proceedings.
- VanHoose, D. (2003). *E-Commerce Economics*. Mason, Ohio, Southwestern Publishing.
- Vengerov, A. (2001). *Evolution of Electronic Business as Sensitive System*. *eCommerce Research Forum Working Papers*. <http://e-commerce.mit.edu/cgi-bin/viewpaper?id=146> Accessed in November 2001
- Wang, S. and N. P. Archer (2004). *Supporting Collaboration in Business-to-Business Electronic Marketplaces*. *Information Systems and E-Business Management* 2(2), 271-288
- Williamson, O. E. (1975). *Markets and Hierarchies: Analysis and Antitrust Implications*. New York, The Free Press.
- Williamson, O. E. (1983). *Organizational Innovation: The Transaction Cost Approach*. In: J. Ronen (Eds.), *Entrepreneurship*. Lexington, Mass: Health Lexington.
- Williamson, O. E. (1985). *The Economic Institutions of Capitalism: Firms, Markets, Relational Contracting*. New York, The Free Press.
- Williamson, O. E. (1991). *The Logic of Economic Organization*. In: O. E. Williamson (Eds.), *The Nature of the Firm: Origins, Evolution, and Development*. New York, Oxford: Oxford University Press.
- Wilson, D. T. and R. P. Viosky (1998). *Interorganizational Information System Technology and Buyer-Seller Relationships*. *The Journal of Business & Industrial Marketing* 13(3), 215.
- Wrong, D. H. (1968). *Some Problems in Defining Social Power*. *American Sociological Review* 73, 673-681.
- Yau, O. B. (2002). *Adoption of Business-to-business Electronic Commerce: A Case Study of a Hong Kong Jewelry Manufacturer*. MIT eCommerce Research Forum. <http://ecommerce.mit.edu/cgi-bin/viewwallpapers> Accessed in January 2003

- Yin, R. K. (1994). *Case Study Research: Design and Methods*. Thousand Oaks, International Educational and Professional Publisher.
- Young, E. (2002). *Web Marketplaces that Really Work*. *Fortune* 144(10), 78-86.
- Zhu, K. (2002). *Information Transparency in Electronic Marketplaces: Why Data Transparency May Hinder the Adoption of B2B Exchanges*. *Electronic Markets* 12(2).

GLOSSARY

Asset Specificity	The transferability of assets that support a given type of transaction.
Biased Electronic Marketplaces	Electronic Marketplaces serving the interests of one set of participants more than the others
Bounded Rationality	The limited human ability to be rational due to human neuropsychological and language limitations.
Collaboration-oriented Functionalities	Functionalities focusing on streamlining business processes between business partners.
Complexity	The state that the entire picture about a transaction is known to decision makers, but is too complex to be considered in its entirety.
Complexity of Product Description	The amount of information needed to specify the attributes of products.
Consortia-Based Electronic Marketplaces	Electronic Marketplaces formed by several big buying or selling companies.
CPFR	Acronym for Collaborative Planning, Forecasting and Replenishment. CPFR is a concept that allows collaborative processes across the supply chain, using a set of process and technology models suggested by the Voluntary Inter-industry Commerce Standards Association (VICS).
Critical Research	A philosophical assumption for qualitative research, assuming that social reality is historically constituted by people, who can change their social and economic circumstances to a limited extent.
EDI	Acronym for Electronic Data Interchange. EDI refers to electronic transfer from computer to computer of business information using a standardized data format
Electronic Marketplaces	Business models facilitating multiple buyers and suppliers in Conducting transactions and interacting with trading

partnersthrough centralized marketplaces

Forward Auction	Forward auctions allow selling companies to post items they want to sell and buying companies to compete for the best prices acceptable by the selling companies for those items.
Functionalities	Solutions that an EM operator offers to its clients in order to facilitate transactions and interactions between trading partners.
Hierarchy	An internal organization or hierarchical relationships with certain characteristics: division of tasks, a pyramidal organizational structure, an authority mechanism, and limits to autonomy.
Independent Electronic Marketplaces	Electronic Marketplaces established by neutral third parties, such as venture capitalists. Also called public or open EMs, because they are open to all participants, except for minor qualification requirements.
Integration	The degree to which a transaction flow or business interaction through a network reaches its intended destination without impairment of its function, content or meaning.
Interpretivist	A philosophical assumption for qualitative research, assuming that access to reality is only through the interpretation of social constructions such as language, consciousness and shared meanings.
Market-Oriented Functionalities	Functionalities focusing on creating a competitive market.
Markets	A governance structure characterized by the price mechanism and voluntary exchange of goods and services between two or more parties.
Network Organizations	Two or more organizations linked together by outsourcing certain non-core activities such as manufacturing, distribution, etc., often resulting in tight and strategic relationships among the partners.
Non-contractible Factors	Contingencies that cannot be specified in contracts, and cooperation of suppliers is required to access these factors.
Nvivo	A qualitative data analysis package used to support textual data analysis.

Opportunism	Economic agents' self-interest in seeking to make allowance for strategic behaviors.
Positivist	A philosophical assumption for qualitative research, assuming that reality is objectively given and can be described by measurable properties that are independent of the observer.
Power	The capacity to control the decisions of others.
Private Catalogue & Transaction Facilitation	A private catalogue is characterized by custom prices, contract terms, and ordering rules built specifically for a buyer and the suppliers it specifies. It must be coupled with transaction facilitation and integration to be effective.
Private Electronic Marketplaces	Electronic Marketplaces set up by a single big company to facilitate its own procurement or selling.
Reverse Auction	Reverse auctions allow buying companies to post items they want to buy and selling companies to compete for the lowest prices acceptable by the buying companies for those items.
Small Numbers	A kind of market condition where organizations have limited alternative trading partners to choose from
TCT	Abbreviation for Transaction Cost Theory. TCT is an economic theory used to justify the formation of two kinds of firm governance structure, markets and hierarchies.
Uncertainty	Refers to the situation that some aspects of transactions or the environment are unknown to decision makers

Appendix A

Summary of EM Definitions (Ordered by Time)

Author and Paper	Term Used	Definition
Journal Articles		
Malone, Yates, Benjamin (1987)	Electronic Markets	Electronic markets electronically connect many different buyers and sellers through a central database
Bakos (1991)	Electronic Marketplaces	An inter-organizational information system that allows the participating buyers and sellers to exchange information about prices and product offerings (<i>Emphasizing they are different from electronic markets Mentioned in Malone (1987)</i>)
Bailey and Bakos (Bailey and Bakos 1997)	Electronic Market	An electronic market exists when a supplier provides goods and services to a customer in a transaction partially or fully automated by information technology
Choudhury (Choudhury and Hartzel 1998)	Electronic Markets	An Electronic market is an inter-organizational system through which multiple buyers and suppliers interact to accomplish one or more of the following market-making activities 1) identifying potential trading partners, 2) selecting a specific partner 3) executing the transaction
Chow et al (Chow, Ghani et al. 2000)	B2B Market Hub	B2B market hubs are Internet sites that allow business partners such as suppliers and buyers to communicate and conduct business transactions. Today's B2B marketplaces or hubs can be categorized into three major types: exchange model, auction model and aggregator model.
Grewal, Corner, Mehta (Grewal, Corner et al. 2001)	Electronic Markets	Internet-based business-to-business electronic markets represent an inter-organizational information system that facilitates electronic interactions among multiple buyers and sellers.
Nyshadham and Raghavan (Nyshadham and Raghavan 2001)	Electronic Markets	In the extreme case, firms can substitute one to one or one to few relationships with many to many relationships, called Electronic Markets (EM).
Martin Grieger (Grieger 2003)	Electronic Marketplaces	The unique feature of an electronic market is that it brings multiple buyers and sellers together (in virtual sense) in one central market place. If it also enables them to buy and sell from each other at a dynamic price which is determined in accordance with the rules of the exchange, it is called an electronic exchange, and else it is called a portal.
Archer and Gebauer	Electronic Marketplace	An electronic marketplace is a virtual marketplace where buyers and suppliers

(Archer and Gebauer 2002)		meet to exchange information about prices and product and service offerings, to collaborate, and to negotiate and carry out business transactions.
Rafael G. Palencia (Palencia 2002)	Electronic Marketplace	Internet based electronic markets designed to allow online business-to-business communications and transactions
Gulledge (Gulledge 2002)	EMarketplaces/ Exchange	A marketplace is a virtual location for buyers and sellers to meet to execute a commercial transaction. The exchange could be public (open and neutral) or private (a dedicated supply chain). A hub is a more specialized concept, providing document exchange among organizations.
Zhu (Zhu 2002)	B2B Marketplace	An online B2B marketplace is defined as an infrastructure that creates a trading community linked by the Internet and provides the mechanism for business-to-business interactions using common standard and industry-wide computer systems.
Dai and Kauffman (Dai and Kauffman 2002)	B2B Electronic Exchanges/ e-markets	B2B electronic exchanges that emphasize liquidity are suitable for commodity markets, while channel coordination is more important where there are limited numbers of buyers and sellers.
Soh and Markus (Soh and Markus 2002)	Electronic Marketplaces	EM includes electronic brokerage, communication and integration effects
Lenz et al (Lenz, Zimmermann et al. 2002)	Electronic Marketplaces	Electronic business-to-business (B2B) marketplaces enable the efficient congregation of business partners and exchange of goods and services by serving as an information and coordination hub
Thoung (Thoung 2002)	e-Marketplace	An e-marketplace is a multi-party e-commerce platform intermediating between business buyers and suppliers
Day et al (Day, Fein et al. 2003)	Exchanges	These exchanges offered various combinations of six core services: (1) information exchange, (2) digital catalogs that help to automate the procurement process, (3) auctions that attract large numbers of suppliers to compete for contracts, (4) logistics services to facilitate the physical movement of goods, (5) collaborative planning so different members of a supply chain can view each others' inventory levels and production schedules, and (6) value-added services such as design collaboration, financing or off line brokering
Christiaanse and Markus (Christiaanse and Markus 2003)	Electronic Marketplace	Intermediaries that employ IT capabilities and business rules to facilitate inter-organizational relationships in an industry sector

Industry Report		
Blodget and McCabe (Blodget and McCabe 2000) (Merrill Lynch)	Market-makers	There are four types of market-maker: catalog, auction, exchange and community market makers.
Phillip and Meeker (Phillips and Meeker 2000) (Morgan Stanley Dean Witter)	Exchanges	Internet trading exchanges are aggregation points that bring buyers and sellers together to create markets for exchanging goods and services.
Ariba (Ariba October 19, 2000) (Ariba)	B2B Marketplaces	Online markets, or B2B (business to business) marketplaces, are public Internet sites that allow large numbers of buyers and sellers to “meet” and trade
Laseter et al (Laseter, Long et al. 2001) (Booz Allen Hamilton)	e-Marketplace/exchange	We define an e-Marketplace as a forum that leverages the Internet to facilitate commerce among businesses
Kenjale et al (Kenjale and Phatak 2001) (Syntel)	B2B Exchanges	B2B exchanges are online marketplaces for businesses to buy and sell goods and services from other businesses.
Anonymous (Anonymous 2001) (OGC)	Electronic Marketplaces	Electronic marketplaces can facilitate a number of different market mechanisms, such as electronic catalogues, auction, reverse auction, and exchange

Appendix B**Examples of Different Types of EMs**

Industry	Pure Market-oriented	Hybrid	Pure Collaboration-oriented
Aerospace & Defense	Inventory Locator Service www.ilsmart.com	Exostar www.exostar.com	X
Agriculture	CattleSale.com www.cattlesale.com	Data Transmission Network www.dtn.com	X
Automotive	AutoPartsBazaar.com www.AutoPartsBazaar.com	Covisint www.covisint.com	IConnect www.iconnect-corp.com
Chemicals	CambridgeSoft www.cambridgesoft.com	Omnexus www.omnexus.com	Elemica www.elemica.com
Computers	Dovebid www.dovebid.com	X	X
Construction	Buildscape.com www.buildscape.com	BuildOnline www.buildonline.com	Citadon www.citadon.com
Electronics	Virtual Chip Exchange www.virtualchip.com	Avnet www.avnet.com	X
Energy	Intercontinental Exchange www.intcx.com	Pantellos Group www.pantellos.com	X
Excess Inventory	FreeMarkets Asset Exchange www.freemarkets.com	X	X
Food and beverage	FoodTrader.com www.foodtrader.com	efoodmanager AG www.efoodmanager.com	EFSNetwork www.efsnetwork.com
Healthcare	X	X	Neoforma www.neoforma.com
Hospitality & Travel	Sabre www.sabre-holdings.com	GetThere www.getthere.com	X
Industrial Equipment	Ironmax www.ironmax.com	X	X
Logistics & Transportation	Freightquote.com www.freightquote.com	Shiplogix.com www.shiplogix.com	GT Nexus www.gtnexus.com
Metal	Steel Spider	X	X

	www.steelspider.com		
MRO	Acequote.com www.acequote.com	X	X
Paper & Forest Products	Paper2Print.com www.paper2print.com	ForestExpress www.forestexpress.com	X
Promotional items	X	Promotional products association international http://www.ppa.org/	X
Real estate	CoStar Group www.costargroup.com	X	X
Retailing	RetailExchange.com ²⁶ www.retailexchange.com	World wide retail exchange www.wwre.org	JCommerceRetail.com www.JCommerceRetail.com
Telecommunication	Arbinet-Theexchange www.theexchange.com	X	X
Financial trading (Including insurance)	Catex www.catex.com	X	X

²⁶ An EM handling excess inventory in the retail industry

Appendix C

Inter-coder Agreement for Text Segmentation

		Coder B					Total
		1	2	3	4	5	
Coder A	1	169	1	4	0	2	176
	2	2	188	9	6	1	206
	3	2	2	255	3	2	264
	4	0	1	1	120	3	125
	5	9	21	39	12	86	167
Total		182	213	308	141	94	938

Symmetric Measures

	Value	Approx. Sig.
Measure of Agreement Kappa	.837	.000
N of Valid Cases	938	

- Total number of units coded: 938 (excluding part II comments. They are coded into the construct interviewees are asked about)
- Total number of interview documents: 34
- Average units per documents: 28

Formula for Cohen’s Kappa Coefficient:

$$\text{Cohen's Kappa} = (PA_o - PA_E) / (1 - PA_E)$$

PA_o: Proportion of agreement observed
 (PA_o = number of agreements/ total number of measures)

PA_E: Proportion of agreement expected by chance
 (PA_E = (1/n²)(Σpm_i)) Where n: number of units coded in common by coders;
 pm_i: each product of marginals)

Appendix D

Intercoder Agreement for Power Measures

II) Intercoder Agreement for Potential/Explicit Power

		Coder 1			Total
		.00	1.00	2.00	
Coder	.00	8	0	0	8
2	1.00	0	5	1	6
	2.00	1	1	13	15
Total		9	6	14	29

(0: No Power, 1: Potential Power, 2: Explicit Power)

Symmetric Measures

		Value	Approx. Sig.
Measure of Agreement	Kappa	.834	.000
N of Valid Cases		29	

II) Intercoder Agreement for Influence/Influenced by

		Coder 1			Total
		.00	3.00	4.00	
Coder	.00	8	0	0	8
2	3.00	1	6	2	9
	4.00	1	0	11	12
Total		10	6	13	29

(0: No Power, 3: Influence Others, 4: Influenced by Others)

Symmetric Measures

		Value	Approx. Sig.
Measure of Agreement	Kappa	.789	.000
N of Valid Cases		29	

Appendix E

Code Definitions and Coding Instructions

Codes	Brief Definitions and Coding Instructions
Effectiveness and Efficiency	
INFORMATION BENEFITS	Information benefits are the better information that a participant can get compared with the information a company gets without EMs. Normally information benefits include information transparency, more information available, sharing more information with trading partners, real time aspects of the information, and higher quality of the information.
IMPROVED TRANSACTION PROCESSES	Improved transaction processes refers to the benefits of streamlining contract execution, including order placement, order acknowledgement, delivery, and payment. Reduced errors, saving staff time, improved productivity, and reduced product turnover time are often seen as the benefits of improved transaction processes. Although reduced cost is also a benefit of improved transaction process, please don't code it in this category. Due to its significance, another category, "Cost saving", was created for it.
IMPROVED NEGOTIATION PROCESS	Improved negotiation process refers to the benefit brought by streamlining and standardizing negotiation process, which could be reduced errors, time saving and improved decision making.
EM IT COMPARATIVE ADVANTAGE	The comparative advantage of EMs relative to other systems such as EDI and propriety systems. It normally includes benefits such as the greater compatibility and flexibility of the EM system, the ability to share infrastructure with other participants, and the easy to use capability of the system.
IMPROVED INVENTORY MANAGEMENT	Inventory can be better managed due to the use of EMs. This could be increased in-stock probability, reduced inventory level, and the ability to quickly liquidate inventories.
IMPROVED FORECAST	Demand forecast is improved due to the use of EMs. Normally it is because of collaboration between trading partners to share order and demand forecasts.
RISK REDUCTION	The risk of transactions is reduced. The reduced risk can be due to the control of EM operators to reduce risk of impersonal transactions, or due to the collaboration between trading partners.
EASY SEARCH	All search-related benefits should be coded in this code. For buyers, the search-related benefit is the ability to reach more suppliers. For sellers, the search-related benefit is the ability to reach more buyers, or to attract more buyers' attention to their products.
COST SAVING	Costs of any kind should be coded in this category. Normally it includes reduced selling/purchasing cost, reduced traveling cost, reduced catalogue mailing cost, and reduced fax and phone cost.
INCREASED COMPETITION	Competition between buyers and suppliers is increased due to the use of EMs. Please code in this category if participants explicitly express they felt competitive pressure through the EM.

RATIONALIZATION OF PURCHASING	If buyers take the opportunity to change their purchasing practices, please code in this category. This could be consolidating purchases to fewer suppliers when moving online, or changing the relationship strategies for purchasing some products.
CLOSER RELATIONSHIPS	Buyer and suppliers are more closer to each other due to the frequent communications that are brought by online collaboration, or by the experience of working together to set up the system.
Satisfaction	
SUPPLIER DISSATISFACTION	Suppliers are not happy about EM competition and benefit cannibalization. We think increased competition and reduced selling prices both can cause supplier dissatisfaction. However, please do not code them into this category because they have their own categories. Only code it when interviewees explicitly express their (or others') dissatisfaction.
Moderating Factors	
LOSS OF EXTRA SERVICES	The use of an EM causes suppliers to reduce the service level provided to buyers.
INTEGRATION PROBLEM	The benefit of using an EM is discounted by lack of integration. This could be lack of internal integration across different operations, or lack of integration with the EM system.
POOR FUNCTIONALITIES	Poor functionalities of EMs limit the benefits of using it, such as poor search capability, outdated product catalogue, slow setup process and poor interface. Generally poor functionalities are things that should be taken care of by EM operators.
LOSS OF FACE-TO-FACE INTERACTIONS	Loss of face-to-face interaction is a problem with all electronic systems, including EMs, since they are media that can not convey human facial expressions or help to build personal relationships, etc.

Appendix F

Inter-coder Agreement for EM Impact on Buyer-Supplier Relationships

Codes	Kappa Coefficient (First time coding)	Kappa Coefficient (Second time coding)
Effectiveness and efficiency		
INFORMATION BENEFITS	0.761	1.000
IMPROVED TRANSACTION PROCESS	0.278	0.752
IMPROVED NEGOTIATION PROCESS	0.841	1.000
EM IT COMPARATIVE ADVANTAGE	0.242	1.000
IMPROVED INVENTORY MANAGEMENT	0.119	1.000
IMPROVED FORECAST	0.785	0.785
RISK REDUCTION	0.872	0.872
EASY SEARCH	0.419	1.000
COST SAVING	0.541	1.000
INCREASED COMPETITION	0.596	0.715
RATIONALIZATION OF PURCHASING	0.785	1.000
CLOSER RELATIONSHIPS	0.617	0.766
Satisfaction		
DISSATISFACTION	0.648	0.837
REDUCED SELLING COST ²⁷	-0.414	
Moderating factors		
LOSS OF EXTRA SERVICES	0.653	1.000
INTEGRATION PROBLEM	0.785	1.000
POOR FUNCTIONALITIES	0.872	1.000
LOSE-OF-FACE TO FACE INTERACTIONS	0.523	0.841

²⁷ In the second coding, this code was merged to "COST SAVING"

Appendix G

Main Reasons for First Time Coding Disagreements

1. **IMPROVED TRANSACTION PROCESS:** One coder thought this code only included streamlined processes that appeared in collaboration-oriented functionalities such as transaction facilitation. The other coder suggested it should also include streamlined processes that appear in forward auctions too, since these one off purchases also involved delivery processes that could be streamlined. The second coder's opinion was adopted.
2. **EM IT COMPARATIVE ADVANTAGE:** One coder thought "easy to use" and "the ability to use PDA to place orders" were not the IT comparative advantage of EMs, but was later convinced that they were since EDI and many propriety technology don't support PDA order placement and are not as user friendly as EMs.
3. **IMPROVED INVENTORY MANAGEMENT:** One coder thought this only involved inventory benefits from CPFR application. But the other coder suggested that forward auctions also helped improve inventory management, which allowed quick sale of the inventory products. The second coder's suggestion was adopted.
4. **EASY SEARCH:** We had a disagreement on whether we should code into this category when sellers put their catalogues on EMs to attract an audience. We decided we should, since putting catalogues in one central place facilitates buyer search for suppliers.
5. **COST SAVING:** Disagreement was mainly caused by whether or not we should code the cost savings resulted from improved transaction process in this category. We finally decided that we should code it in the "cost saving" category, but not the "improved transaction process" category.
6. **INCREASED COMPETITION:** Sometimes coders inferred meanings from sentences to code this category. As a result, reduced selling cost and supplier unhappiness were also coded in this category, since they all caused or were caused by increased competition. We then decide to code into this category only if interviewees explicitly said they felt there was an increase in competition.
7. **REDUCED SELLING COST:** Disagreement was caused mainly because there was a lot of overlap between this code and the "cost saving" code. After consulting another researcher who was familiar with the research, we merged these two codes.
8. **CLOSER RELATIONSHIPS:** Disagreement was on the closer relationships caused by more frequent communication. One coder thought they should be coded in "information benefits", but after examining the context of the sentence, we decided to code such situations in this code because these more frequent communications could be both online and offline.
9. **DISSATISFACTION:** Causes of disagreement were the same as those of increased competition, since we inferred meanings indirectly from passages. We then decided to code into this category only if interviewees explicitly said they felt they or their trading partners were not happy about using EM applications.

10. **LOSS OF EXTRA SERVICES:** Both codes had the same understanding of this code, but the problem was caused by carelessness.
11. **LOSS OF PERSONAL RELATIONSHIPS:** The problem was caused by the misinterpretation of several passages, which were treated originally by one coder as irrelevant, but after discussion we arrived at an agreement that they were relevant and should be coded into this category.

Appendix H Questionnaire

Buyer-Supplier Relationships and the Adoption of Business-to-Business

Electronic Marketplaces²⁸

(Confidential)

Norman P. Archer, Ph.D.
McMaster eBusiness Research Center
905-525-9140 Ext. 23944
Fax 905-528-0556
Email: archer@mcmaster.ca

Shan Wang, M.A.
McMaster eBusiness Research Center
905-525-9140 Ext. 26183
Email: wangs7@mcmaster.ca

Michael G. DeGroote School of Business
McMaster University
1280 Main Street West
Hamilton, ON L8S 4M4

Company Name _____
Respondent _____
Phone _____
Email _____
Fax _____
Date _____

Final Report Requested by Respondent []

Mailing address _____

²⁸ This questionnaire has been revised due to confidentiality. This is the buyer version of the questionnaire. The supplier version is very similar to the buyer version, except for some minor wording changes.

Introduction

Thank you very much for participating in our study of electronic marketplaces. A business-to-business Electronic Marketplace (EM) is an electronic platform that supports multiple business buyers and sellers in conducting transactions with each other. An EM is sometimes considered to be more compatible with competitive short-term relationships. However, due to the importance of long-term business relationships in today's business world, organizations involved in long-term relationships with other businesses may also want to reap the benefit of EMs. Our research explores the interaction between buyer-supplier relationships (including both long- and short-term relationships) and the adoption of EMs. We expect that this research will be able to offer useful guidelines for businesses interested in choosing and working with an EM.

Your answers to this questionnaire will be maintained in strictest confidence and neither you nor your company's identity will be revealed in any way through any research results arising from this study. We would also like your permission to tape record the telephone interview. These tape conversations are only for creating transcriptions of our conversations and will be destroyed after the transcriptions have been completed.

Part I

The first part consists of some questions related to your organization's use of ***²⁹ and your online purchasing strategies. Our questions will relate mostly to your use of this electronic marketplace to interact with your suppliers.

I. General Information

1. Your position in the organization: _____
2. Number of employees in your organization: _____
3. Do you sell or buy through ***? Please answer the following questions according to your role with this EM. If you play both roles, please choose the role you are more familiar with.

²⁹ *** represent the name of the EM.

____ Buyer

(This is a buyer version. If you are a seller, please use the seller version)

4. Approximate your transaction volume, by value, conducted through ***:
- _____

II. Adoption:

5. Why did you adopt the use of ***?
6. If you do not use *** that much, are there reasons why you do not use *** more frequently?
7. Was your company influenced by or has your company influenced your suppliers when deciding to adopt ***?

Yes _____ No _____

*(Hints: These influences can be financial and technical support, invitations, discussions, information sharing about the adoption of ***, and even potential threats about not doing business if you do not choose to participate with ***)*

If yes, can you provide us with a specific example of such influences, without actually identifying the suppliers involved?

- Please describe what you and your suppliers did during this interaction
- What were the results of this interaction?
- What portion of your business is conducted with this particular supplier?
- How critical was this interaction to your *** adoption decision?

III. Strategic choice of functionalities and the impact of the use of these functionalities

8. What applications (catalog, auctions, etc) do you use with ***?

I) _____
II) _____
III) _____
IV) _____

Based on the applications you have identified above, we will work through, one by one, all the services and applications that you use with ***, and the impact of the use of these services and applications on your organization, and its suppliers.

9. For application I:

- 9.1 Please describe how you use application (I).
- 9.2 What products/services are involved in this application?
- 9.3 By using the application (I), are you dealing with suppliers with long-term relationships, or short-term relationships?
- 9.4 Why do you choose to be involved with this kind of relationships for purchasing these products/services? (**In case that they are involved in**

two kinds of relationships with suppliers, what are your strategic reasons for choosing to work online with these different relationships?)

- 9.5 How important are these suppliers in your company's overall supplier base?
- 9.6 Are there any positive or negative changes of your relationship with your suppliers as a result of the use of this application?
- 9.7 What are your perceived benefits of using this application?
- 9.8 What are your perceived bad side effects of using this application?

10. For application II, III, IV....:

Repeat questions asked about application (I)

11. If you are involved in both long-term and short-term relationships when sourcing products through ***, do the characteristics of products or services that your company trades with your suppliers tend to differ between/among different types of relationships? Yes _____ No _____

If yes, please describe how they are different.

12. Additional Comments

Part II³⁰

1. Please indicate your agreement with the following statements regarding your adoption decision and the use of *, on a scale of 1 = strongly disagree to 3 = neutral to 5 =strongly agree with the statement. Please circle or underline the number that reflects your opinion in each case.**

	Strongly disagree	Neutral	Strongly agree
1.1 We adopted *** mainly in order to do business with existing suppliers.	<u>1</u>	<u>2</u>	<u>3</u> <u>4</u> <u>5</u>
1.2 We adopted *** because major industry players in our industry or our major suppliers joined ***, although they did not issue an explicit invitation.	<u>1</u>	<u>2</u>	<u>3</u> <u>4</u> <u>5</u>
1.3 We were influenced in our adoption of *** by our major suppliers.	<u>1</u>	<u>2</u>	<u>3</u> <u>4</u> <u>5</u>
1.4 Our company has influenced our suppliers in the adoption of ***.	<u>1</u>	<u>2</u>	<u>3</u> <u>4</u> <u>5</u>
1.5 The cost of adopting *** has been very high.	<u>1</u>	<u>2</u>	<u>3</u> <u>4</u> <u>5</u>
1.6 Our company has limited resources committed to adopting and using ***.	<u>1</u>	<u>2</u>	<u>3</u> <u>4</u> <u>5</u>
1.7 Adopting and using *** functionalities required major process changes.	<u>1</u>	<u>2</u>	<u>3</u> <u>4</u> <u>5</u>

Please think of a supplier that you are dealing with through *. Please give priority to product suppliers, instead of service suppliers.** Let’s call this supplier A. You need not tell us the name of this supplier.

All the following questions are asked about your relationship with supplier A, and your interactions with this supplier A either online or offline. Do you have this trading partner A in mind?

Please indicate the length of your company’s online relationship with supplier A:

³⁰ We did not ask EM operators this part of the information since most of questions of part II were dealing with the relationships with a specific trading partner, and EM operators had less knowledge about that. But we included in their semi-structured questionnaire several questions that EM operators were supposed to be knowledgeable.

Long-term relationship _____ Short-term relationship _____
 Is there any contract involved? _____

2. What is the functionality your company uses in interacting with supplier A through ***?	_____ _____ _____
3. What are the types of products/services your company purchases through *** from supplier A?	1. _____ 2. _____
All The following questions are related to supplier A, functionality identified in 2 and the type of products/services identified in 3.	
4.1b The average number of orders that you place for purchasing the products/services identified above with supplier A.	_____ (Per day/month/year)
4.2b For this type of products/services , how far in advance can you predict what product/service your company will need?	Within _____ (week/month/year)
4.3b For this type of products/services , how far in advance can you predict the quantity of the product/service your company will need?	Within _____ (week/month/year)
4.4b Your estimated units of change from order to order for this particular type of products/services your company needs.	_____ percentage change
4.5b The average transaction value per order placed with this supplier A.	_____ dollar/order
5. Please indicate your agreement with the following statements with supplier A, on a scale of 1 = strongly disagree to 3 = neutral to 5 =strongly agree with the statement. Please circle or underline the number that reflects your opinion in each case.	
5.1 Degree of product/service standardization in goods we search for and/or trade through *** is high	Strongly disagree Neutral Strongly agree 1 2 3 4 5 <u>1</u> 2 3 4 5
5.2 On average this type of products is easy to describe.	1 2 3 4 5 1 2 3 4 5

<p>5.3. Prices for this type of products change from order to order.</p> <p>5.4 The suppliers of this type of products in the industry change frequently.</p> <p>5.5. If this relationship with supplier A were to end, my company or this supplier would lose investment in costly specific information systems that were dedicated to our relationship.</p> <p>5.6 If this relationship with supplier A were to end, my company or this supplier would be wasting a lot of knowledge that was tailored to our relationship.</p> <p>5.7 If this relationship were to end, either my organization or this supplier would lose a lot of investment made in our present relationships. <i>(These investments can be dedicated plants, warehouses, and purchasing special equipment, training workers, hiring special expertise.)</i></p> <p>5.8 The level of trust between my company and supplier A is high.</p> <p>5.9 My company and supplier A share a lot of information beyond basic price and product feature information <i>(i.e., proprietary information related to products, cost structure, production schedules, customer information, inventory information, or demand forecasts, etc).</i></p> <p>5.10b My company values quality higher than price when sourcing these products.</p> <p>5.11b Supplier A is innovative in dealing with my company in such areas as product or production innovation.</p> <p>5.12b Supplier A is responsive to our business requirements, and can modify or go beyond the terms of contract in fulfilling our needs.</p>	<p><u>1</u> <u>2</u> <u>3</u> <u>4</u> <u>5</u></p> <p><u>1</u> <u>2</u> <u>3</u> <u>4</u> <u>5</u></p> <p><u>1</u> <u>2</u> <u>3</u> <u>4</u> <u>5</u></p> <p><u>1</u> <u>2</u> <u>3</u> <u>4</u> <u>5</u></p> <p><u>1</u> <u>2</u> <u>3</u> <u>4</u> <u>5</u></p> <p><u>1</u> <u>2</u> <u>3</u> <u>4</u> <u>5</u></p> <p><u>1</u> <u>2</u> <u>3</u> <u>4</u> <u>5</u></p> <p><u>1</u> <u>2</u> <u>3</u> <u>4</u> <u>5</u></p> <p><u>1</u> <u>2</u> <u>3</u> <u>4</u> <u>5</u></p>
<p>6. The following statement concerns the impact of use of functionality identified in question 2 on your purchases. These impacts are not necessarily restricted to this particular supplier. By using this functionality:</p>	<p>Strongly disagree Neutral Strongly agree</p>

6.1 We can better fulfill our collaborative goals related to the procurement of these products.	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>
6.2 This functionality let us share more information with suppliers.	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>
6.3 The quality of shared information is higher	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>
6.4 Our suppliers are more responsive and innovative when dealing with us.	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>
6.5 We now search for more suppliers and suitable products easily by using this functionality.	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>
6.6 Our procurement price is lower.	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>
6.7 There is an increased competition among suppliers.	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>
6.8 We have more information for negotiation due to the use of this functionality.	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>
6.9 When sourcing these products, we are more satisfied with our online business partner relationships.	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>
6.10 Our online relationships are more productive than offline relationships.	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>

7275 05