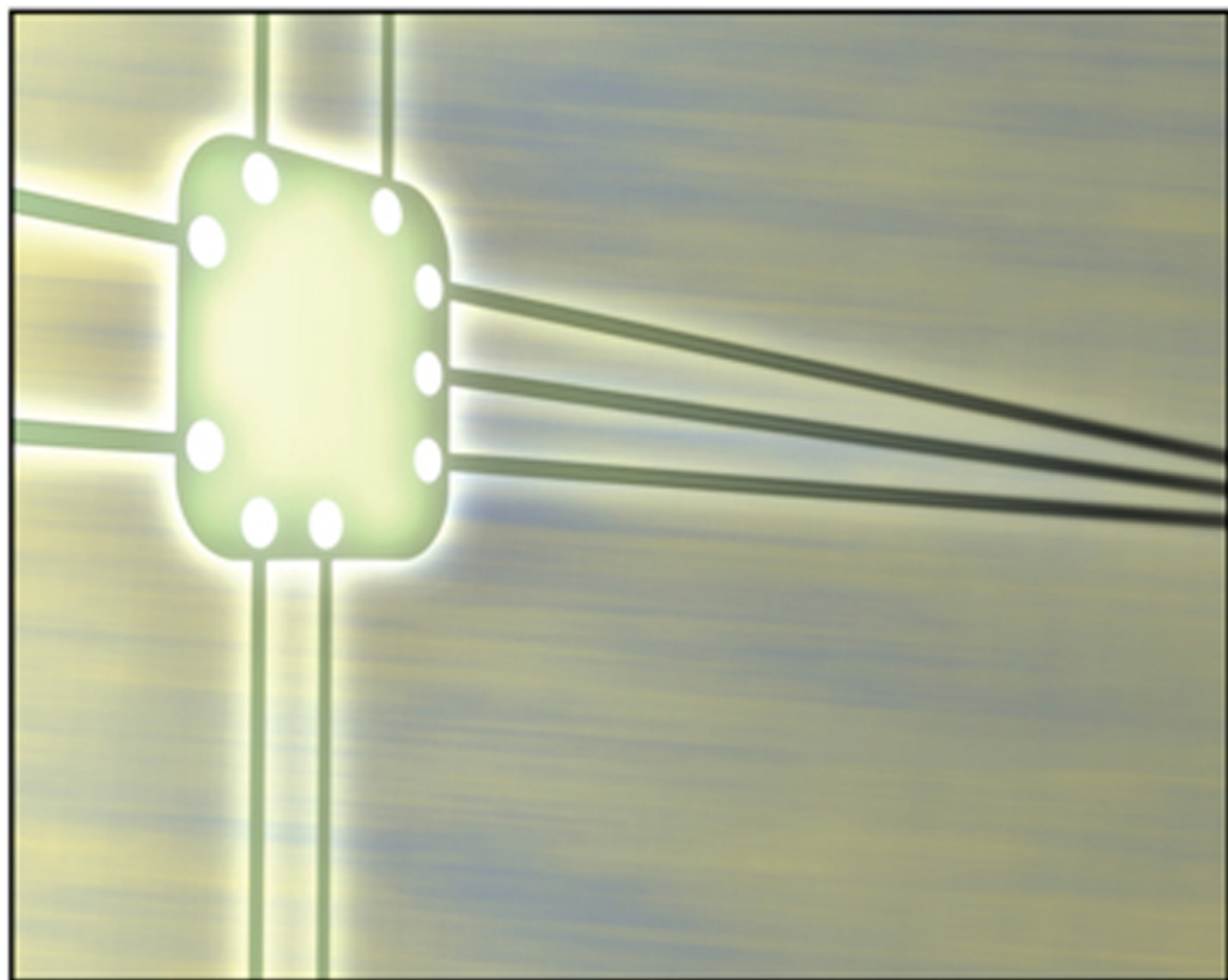


Emergent Strategies for E-Business Processes, Services, and Implications

Advancing Corporate Frameworks



Emergent Strategies for E-Business Processes, Services, and Implications: Advancing Corporate Frameworks

In Lee
Western Illinois University, USA



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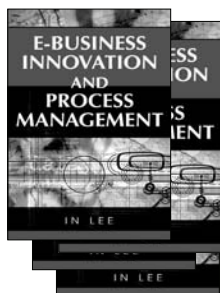
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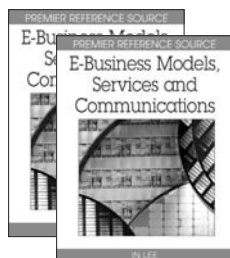
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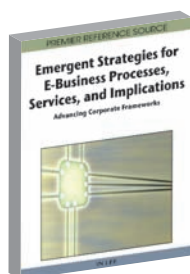
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With the rapid advancement in information technologies, e-business is rapidly growing in significance and is having a direct impact upon business applications and technologies. E-Business Models, Services and Communications provides researchers and practitioners with valuable information on recent advances and developments in emerging e-business models and technologies. This book covers a variety of topics such as e-business models, telecommunication network utilization, online consumer behavior, electronic communication adoption and service provider strategies, and privacy policies and implementation issues.



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Recently, e-business applications have evolved beyond business transactions and services to include customer relationship management (CRM), mobile computing, Web mining, e-healthcare, social networking, and Web 2.0. As e-business continues to create new business models and technologies, researchers, higher education faculty, and practitioners are in great need of appropriate reference resources to enhance their understanding of all aspects of e-business technologies and management.

E-business is broadly defined as a business process that includes not just the buying and selling of goods and services, but also servicing customers, collaborating with business partners, and conducting electronic transactions within an organization via telecommunications networks. E-business technologies and applications continue to evolve in many different directions and are now key strategic assets in business organizations. New e-business applications that have significant implications for the corporate strategies are being developed constantly. Current e-business research comes from diversified disciplines ranging from marketing, psychology, information systems, accounting, economics to computer science. The Advances in E-Business Research (AEBR) Book Series plans to serve as balanced interdisciplinary references for researchers and practitioners in this area.



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Proponents of Customer Relationship Management (CRM) suggest that a firm can develop a value creation relationship, such that an increase in customer value, leads to an increase in firm value (Mithas et al., 2005). The value for the customers comes from the provision of goods and services that match their needs. However, the research to date on the effectiveness of using e-CRM systems to both foster and monitor this value creation process is somewhat mixed. This chapter proposes to cross-functionally integrate organizational assets with customers' interests via technology. The resulting framework can assist managers in improving services, through the use of e-CRM, to understand what is important to the customer.

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<i>Jean Perrien, Université du Québec à Montréal, Canada</i>	

This chapter examines how e-CRM has affected both organizational and individual behavior in a leading Canadian bank. The innovative and customer-driven culture of this bank pushed it toward early adoption of e-CRM technology. The findings emphasize the role played by many strategic and organizational

dimensions in the success of e-CRM implementation. In fact, to make e-CRM efforts pay off, new business processes are required to achieve more effective and closer interactions with customers. The shift toward customer orientation needs to be supported by a shift in organizational objectives and processes. The results indicate that employees' individual behavior successfully changed from a transactional to a relational perspective, and that training and coaching ensured a successful integration of e-CRM technology. Nevertheless, the employee reward and evaluation system, which should have been changed to leverage CRM impact, has surprisingly been forgotten. This deficiency is addressed by proposing a new framework for enhancing e-CRM effectiveness.

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Tim Coltman, University of Wollongong, Australia

Sara Dolnicar, University of Wollongong, Australia

Most sectors of industry, commerce, and government have reported variation in the performance payoff from electronic customer relationship management (e-CRM). In this paper we build on a surprisingly sparse literature regarding the importance of managerial discretion, to show that the heterogeneity of beliefs held by managers about e-CRM execution matter when explaining e-CRM success. Drawing on a data sample comprising 50 interviews and 293 survey responses we utilise segmentation techniques to identify significant differences in managerial beliefs and then associate these belief segments with e-CRM performance. Results indicate that three distinct types of managers can be identified based on the heterogeneity of their e-CRM beliefs: (1) mindfully optimistic, (2) mindfully realistic, and (3) mindfully pessimistic. Further, our results imply that there are far less homogeneity at the individual firm level than is normally assumed in the literature, and that heterogeneity in managerial beliefs is systematically associated with organisational performance. Finally, these results serve to remind practitioners that e-CRM performance is dependent upon the right balance between managerial optimism and realism.

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Richard Feinberg, Purdue University, USA

Ko de Ruyter, University of Maastricht, The Netherlands

Multi-channel retailers that utilize an e-CRM approach stand to benefit in multiple arenas by providing targeted customer service as well as gaining operational and competitive advantages. To that end, it is inherent that multi-channel retailers better understand how satisfaction—a necessary condition for building customer loyalty—influences consumers' decisions to shop in one retail channel or another. The purpose of this study was to examine the influence of shopping experience on customers' future purchase intentions, both for the retailer and for the channel. Using a controlled experimental design, U.S. and European subjects responded to a series of questions regarding the likelihood making a future purchase following either a positive or negative shopping encounter. Results suggest that shopping intentions vary based on the shopping channel as well as cultural differences.

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Do Mobile CRM Services Appeal to Loyalty Program Customers?	59
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Veronica Liljander, Swedish School of Economics and Business Administration, Finland

Pia Polsa, Swedish School of Economics and Business Administration, Finland

Kim Forsberg, Intrum Justitia Finland, Finland

Not until very recently has mobile phone technology become sophisticated enough to allow more complex customized programs, which enable companies to offer new services to customers as part of customer relationship management (CRM) programs. In order to enhance customer relationships and to be adopted by customers, new mobile services need to be perceived as valuable additions to existing services. The purpose of this study was to investigate the appeal of new mobile CRM services to airline customers. An empirical study was conducted among loyalty program customers (frequent flyers) of an airline that was considering using MIDlet applications in order to add new mobile services to enhance customer relationships. The results show that customers do not yet seem to be ready to fully embrace new mobile applications. Although the services appeared to slightly improve customers' image of the airline, the services did not seem to enhance their loyalty towards it. However, customers who already used sophisticated mobile services, such as the Mobile Internet, had a significantly more positive attitude towards the proposed services. Thus the success of mobile CRM seems closely linked with customers' readiness to use existing mobile services. Before engaging in costly new investments, companies need to take this factor into serious consideration.

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Developing a Global CRM Strategy	77
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Michael Shumanov, Monash University, Australia

Michael Ewing, Monash University, Australia

While the managerial rationale for adopting customer relationship management (CRM) has been fairly well articulated in the literature, research on strategy development is scant. Moreover, reports of "CRM failures" in the popular business press have done little to inspire confidence. To date, what little research has been conducted in the area of CRM strategy development has been confined to a single country (often the U.S.). Global CRM strategy development issues have yet to be specifically addressed, particularly which elements of CRM strategy should be centralised/decentralised. The present study examines the complexities of global CRM strategy using the case of a leading financial services company. Interviews are conducted in 20 countries. Global Head Office and external IT consultant perspectives are also considered. Our findings confirm that a hybrid approach has wide practical appeal and that subsidiary orientation towards centralisation/decentralisation is moderated by firm/market size and sophistication.

Section II

E-Business Models and Strategies

Chapter VII

- Strategic Positioning and Resource-Based Thinking: Cutting Through the Haze of Punditry to Understand Factors Behind Sustainable, Successful Internet Businesses 92
John Gallaughar, Boston College, USA

This article synthesizes and leverages two strategic frameworks when analyzing the true nature of strategy and the Internet: (1) the concept of strategic positioning, and (2) the resource-based view of the firm. When considered together, these approaches create a powerful tool for understanding the factors determining the winners and losers among Internet businesses. Several examples of the applied framework are demonstrated. These frameworks also help challenge broken thought around many of the postbubble assertions regarding strategy and the Internet. This analysis is based on a series of case studies, with information drawn both from secondary sources as well as over 60 field visits with senior managers at technology firms in Seattle, Silicon Valley, and Tokyo conducted from 2005-2006.

Chapter VIII

- A Tale of E-Business Models: From the Music to the Television Industry 104
Savvas Papagiannidis, Newcastle University Business School, UK
Joanna Berry, Newcastle University Business School, UK
Theodoulos Theodoulou, Newcastle University Business School, UK

This chapter covers the concept of e-business models and how they relate to the music video and television environments. After identifying the value creation chain of music and video broadcasting to provide a context for the chapter, it assesses independent producers and aggregators of content, important new factors in the value chain of entertainment, as well as the various mechanisms through which content is reproduced. Following a comparison of the music and video/television business models, a case study is presented which exemplifies the reconfigured value chain presented herein. The background, development, and outputs of Current TV are presented in order to highlight the ultimate issue clarified in this chapter—that the changing nature of music, video, and television broadcasting markets combined with faster broadband connection—will continue to underpin radical changes in both music and television industries.

Chapter IX

- Strategic Maneuvering in Healthcare Technology Markets: The Case of Emdeon Corporation..... 122
Kirill M. Yurov, University of Illinois at Chicago, USA
Yuliya V. Yurova, University of Illinois at Chicago, USA
Richard E. Potter, University of Illinois at Chicago, USA

Healthcare technology markets have been recently identified as potential investment targets. Having survived a major environmental shock, the dot.com bust, firms in the healthcare technology industry are presently experiencing an impressive revenue growth. In this study, we investigate the strategies of Emdeon Corporation, a healthcare technology firm whose e-business model provides clues for achieving

a sustained revenue growth and profitability. We trace the current sustainability of Emdeon's e-business model to a related diversification strategy that the firm's upper management has pursued via mergers and acquisitions (M&As). We also address the motivation behind current restructuring of Emdeon's e-business model. We argue that maturation of diversified e-business models leads to the transformation of individual segments into distinct entities focusing on specific technology markets.

Chapter X

Complementary Role of Website in Business Model Development..... 136

Olli Kuivalainen, Lappeenranta University of Technology, Finland

Hanna-Kaisa Ellonen, Lappeenranta University of Technology, Finland

Liisa-Maija Sainio, Lappeenranta University of Technology, Finland

The aim of this chapter is to provide a holistic exploration of the development of the business model of a magazine Web site, and of the factors behind its success. The discussion is based on an explorative case study of a successful Finnish magazine publisher and its Web site. We use triangulated data (interviews, observation, statistical data, customer feedback, and newspaper articles) to describe and analyze the development of the Web site and the subsequent changes in the e-business model of the magazine from the Web site foundation in 1998 to the situation in fall 2004. Our case illustrates that a magazine's Web site is linked to all of its functions (editorial, circulation, and advertising), and to the business-model elements that are vital to its success. We suggest that the discussion forums in question (one type of virtual community) benefited from the positive feedback that resulted in positive network effects, and led to the adoption of the service. Moreover, community activities have enhanced customer loyalty and added a more lifelike dimension to the magazine concept. As such, the Web site now complements rather than substitutes the print magazine. Interestingly, although it does not independently fulfill the requirements of a successful business model (cf. e.g., Magretta, 2002), it enhances the customer experience and adds new dimensions to the magazine's business model.

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A Reverse Auction-Based E-Business Model for B2C Service Markets..... 155

Tobias Kollmann, University of Duisburg-Essen, Germany

Matthias Häsel, University of Duisburg-Essen, Germany

LetsWorkIt.de is a German B2C platform for different kinds of service and handcraft orders. Based on the concept of reverse auctions, demanders compose descriptions of the required services to place orders on the platform. The supplier bidding lowest at the end of the auction obtains the right to carry out the order. Drawing upon and widely confirming existing theories on e-marketplaces, this chapter examines the underlying e-business model and the competitive strategy of LetsWorkIt. The case provides evidence that the reverse auction-based intermediation of handcraft and service orders is suitable to form the basis of an e-marketplace and points out that for such ventures, a combination of public relations, performance marketing, and cooperation, represents an ideal strategy to increase the number of demanders and suppliers. Moreover, the case suggests that, depending on the business model, it may be feasible to concentrate marketing activities on one of these two customer groups, since LetsWorkIt has managed to achieve a significant number of successful, high-quality auctions by primarily aligning its competitive strategy with the demand side.

Section III

E-Business Management

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<i>Denis Caro, University of Ottawa, Canada</i>	

The 21st century continues to witness the transformation of organizational systems globally through the deployment of Information and Communication Technologies (ICT). The emerging future is witnessing the convergence of artificial intelligence, biotechnology, nomadic information systems, and nanotechnology. This promises to further transform the nature of inter-organizational systems between the corporate and public sectors. The evolution of e-health systems is a case in point. In the light of the Wuli-Shili-Renli (WSR) approach, this key informant study explores the strategic perceptions of corporate ICT and health care executives in Canada and Sweden. Public governance values play critical roles in evolving and sustaining symbiotic e-health networks in Canada and Sweden. The chapter exposes the unique transgenic dimensions of evolving e-health systems. The findings and implications of the study underscore the need for further international e-business research on the socio-cultural domains in which inter-organizational systems evolve.

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<i>Karl Knapp, University of Indianapolis, USA</i>	
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Offshore information technology (IT) outsourcing has been becoming mainstream alternative to in-house operations. While offshore development is a relatively new trend in IT, the concept of outsourcing manufacturing and service operations has been going on for more than 50 years. Many Asian countries are driving their economic success through taking offshore projects from developed countries. These countries have advantages of low-cost and available labor force. Various studies conducted over the last 10 years have shown that outsourcing allows firms to reduce high overhead costs, improve productivity, contribute flexibility, and thus improve overall performance of the firm. However, offshore IT outsourcing brings new challenges and risks. The skeptics believe that outsourcing may weaken the local business competitiveness of the region, investors' confidence in investing in local businesses, and may create a spiral effect on economic indicators such as: unemployment, enrollment in schools, living styles, housing, and construction, and so forth`. This study investigates the socio-economic impacts of offshore IT outsourcing in the United States using a system dynamics model.

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<i>Indrit Troshani, The University of Adelaide, Australia</i>	
<i>Sally Rao Hill, The University of Adelaide, Australia</i>	

The eXtensible Business Reporting Language (XBRL) is an emerging XML-based standard which has the potential to significantly improve the efficiency and effectiveness of intra- and inter-organisational information supply chains in e-business. In this chapter, we present the case for using convergent interviews as an appropriate and efficient method for modelling factors impacting the adoption of emerging and under-researched innovations, such as XBRL. Using this method, we identify environmental, organisational, and innovation-related factors as they apply to XBRL adoption and diffusion. Contentious factors, such as the role of government organisations, XBRL education and training, and the readiness of XBRL as an innovation, and its supporting software solutions are also examined in detail. Taken together, these discussions constitute an important step towards theory development for emergent e-business innovations. Practical adoptions strategies and their implications are also discussed.

Chapter XV

An Introduction to the Management and Protection of Intellectual Property Rights 223

Bill Vassiliadis, Hellenic Open University, Greece

Vassilis Fotopoulos, Hellenic Open University, Greece

Copyright protection is becoming an important issue for organizations that create, use, and distribute digital content through e-commerce channels. As online corruption increases, new technical and business requirements are posed for protecting Intellectual Property Rights, such as watermarking, use of metadata, self-protection, and self-authentication. This chapter gives a review of the most important of these methods and analyses of their potential use in Digital Rights Management systems. We focus especially on watermarking, and argue that it has a true potential in e-business because it is possible to embed and detect multiple watermarks to a single digital artifact without decreasing its quality. In conjunction with parallel linking of content to metadata there is true potential for real life copyright-protection systems. Furthermore we attack the problem of DRM systems' interoperability with Distributed License Catalogues (DLCs). The DLC concept, borrowed from Web engineering, makes available ('advertises') content or services concerning DRM functionalities, enabling multiparty DRM eco-systems.

Chapter XVI

Intelligent Contracting: An E-Supply Chain Management Perspective 249

Tagelsir Mohamed Gasmelseid, King Faisal University, Saudi Arabia

The unprecedented advancements witnessed in the field of information and communication technology over the last couple of years are significantly affecting the nature and magnitude of B2B interactions, as well as their operational effectiveness and efficiency. However, interaction and contracting among global enterprises continued to be challenged by the difference of laws, authentication requirements, and endorsement constrains. With the rapidly increasing proliferation of mobile devices, wireless communication systems, and advanced computer networking protocols, the deployment of electronic contracting platforms and applications has provided many opportunities to enterprises; dictated new axioms for doing business; and gave rise to new paradigms. Together with the increasing institutional transformations, technological advancements motivated businesses to engage in an interactive process of contract formulation and negotiation.

Section IV

Online Consumer Behavior

Chapter XVII

The Applicability of Network Effect Theory to Low-Cost Adoption Decisions: An Investigation of Peer-to-Peer File Sharing Technologies 277

Jaeki Song, Texas Tech University, USA

Eric A. Walden, Texas Tech University and Carnegie Mellon University, USA

In this work, we examined the boundary of the applicability of network effects theory. We theorized that when adoption is cheap, the cognitive demands of estimating network effects outweigh the benefit of making optimal adoption decisions. Thus, even in contexts where network effects do exist, we predict that adopters will use simple heuristics to make adoption decisions, if adoption is cheap. We propose that adopters simply do what they observe others doing. Using the context of peer-to-peer file sharing, we conducted three studies comparing network effects against simply following the behavior of others, and found in all three cases that there was no marginal effect of network size on willingness to adopt. However, when subjects were told classmates' adoption choices, there was a strong marginal effect on willingness to adopt. Put simply, if people are offered the option of downloading a free peer-to-peer software, then changing the network size from 1,000 to 1,000,000 has no effect on their willingness to adopt, but having two classmates express a choice not to download the software, had a large negative impact on a subject's willingness to download. Thus, our subjects, when faced with the option of a free download, did not behave in accordance with network effects theory, suggesting that there is a boundary on the applicability of the theory to internet adoption behavior.

Chapter XVIII

An Empirical Analysis of Cellular Phone Users' Convenience Perception and Its Impact on Shopping Intention in Mobile Commerce..... 294

Wen-Jang Jih, Middle Tennessee State University, USA

Two mutually reinforcing forces currently are at work to propel an upward spiraling in the business arena. As wireless communication technology continues to advance in providing broadband connection to both static and mobile users, innovative user-centric Web-enabled services also are routinely being experimented to provide an unprecedented level of convenience for online shopping. Although the concept of convenience has been discussed extensively in retailing and consumer behavior literature, there still is a dearth of research that empirically validates the construct in the context of m-commerce. This chapter presents a study that was conducted to examine the effect of convenience on customers' intention of shopping via their mobile communication devices. Three research hypotheses were formulated to test the claims derived from the literature. Hypothesis 1 states that the customer perception of convenience is significantly related to m-commerce customers' demographical characteristics. Hypothesis 2 states that m-commerce customers' convenience perceptions are significantly correlated with product/service features. Hypothesis 3 states that m-commerce customers' shopping intention is significantly affected by their convenience perception. Primary data collected from college students in Taiwan were analyzed

to examine the relationship between perceived convenience and shopping intention. The result shows a significant relationship between the two variables, and a positive effect of convenience perception on shopping intention. The findings have practical implications for m-commerce strategists by providing more understanding of the m-commerce success factors from a consumer behavior point of view.

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The Effects of System Features, Perceived Risk and Benefit, and Customer Characteristics on Online Bill Paying.....	311
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Fang He, Southern Illinois University at Carbondale, USA

Peter P. Mykytyn, Southern Illinois University at Carbondale, USA

Along with the exponential increase in online business transactions, the online payment system has gained in popularity because vendors and creditors realize its growing importance as a foundation to improve their information infrastructure and to achieve “paperless” operating efficiency. However, due to per se different characteristics among customers and Web-systems, both sides’ perspectives and technology factors could cause a significant level of variation in customers’ acceptance of online payment methods. Our research involving 148 subjects who participated in a field survey, examined the impact of a series of possible decision factors, including perceived risk, perceived benefits, vendor’s system features, and customers’ characteristics, on the intention to use an online payment system by customers. The results suggest that vendors/creditors should: one, pay particular attention to improving the security and the ease-of-use of their transaction network; and two, focus on adding necessary option features, such as recurring automatic deductions, so that they can speed up the transformation process and encourage customers to switch to using online payment methods.

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Preface

In the early 1990s, e-business heralded what is being called the Internet-driven "new economy." It revolutionized the process of buying, selling, and exchanging products and services, and spawned a host of business and technology innovations. As globalization and e-business pose new opportunities and challenges, firms face increased pressures from stakeholders to create e-business values. Firms are constantly experimenting with new business models to provide the most value-added, innovative, convenient services for their customers. They also attempt to find which e-business applications will contribute effectively to their sustainability and growth. In the early 2000s, the development of wireless technologies and mobile computing extended the reach of e-business to mobile business environments. Virtual communities became prominent business model structured around user interests and needs. Recently, the impact of Web 2.0 on the Web users and the society is noteworthy. Many new technologies are emerging under the Web 2.0 umbrella including really simple syndication (RSS), Wikis, Weblogs, Web personalization, photo sharing (Flickr, Zoomr), social networking applications, AJAX and API programming, streaming media, podcasting and MP3 files, and social bookmarking. According to O'Reilly and Battelle, Web 2.0 is the architecture of participation where users can contribute to Web site content, creating network effects. This architecture is based on social software with which users generate content, and on the programming interfaces that allow developers to add to a Web service or access data.

As e-business technologies advance, an in-depth understanding of e-business models, applications, strategies, and consumer behavior, proves to be more valuable than ever before for the successful e-business development and management. In light of the current lack of comprehensive studies in e-business planning and management, an overarching framework development is in urgent need to assist e-business managers in assessing enabling technologies and the success factors when developing e-business plans.

"Emergent Strategies for E-Business Processes, Services, and Implications: Advancing Corporate Frameworks (Advances in E-Business Research, Vol. 3)" provides researchers, professionals, and educators with the newest research on e-business trends, strategies, applications, and practices. Forty-two renowned researchers from nine countries have conferred their expertise to this publication. The book consists of 19 chapters and is divided into four segments: Section I discusses various electronic consumer relationship management frameworks and applications; Section II addresses e-business models and strategies; Section III explores various e-business management practices and issues; and Section IV investigates online consumer behavior.

Section I: *E-Customer Relationship Management*, consists of six chapters. Chapter I, *"Managing the Customer Relationship: A Framework for E-CRM Analysis,"* by Keith F. Ward, St. Edward's University (U.S.); Erik Rolland, University of California Riverside (U.S.); and Raymond A. Patterson, The University of Alberta (Canada), examines how—by using an analytical framework—a healthcare provider can develop competitive advantage through implementing e-CRM systems that create perceived customer

value for its patients. This framework allows the firm to systematically look at points where the customer interacts with specific organizational assets.

Chapter II, “*A New Conceptual Framework for Greater Success with Integration of E-CRM*,” by Soumaya Ben Letaifa and Jean Perrien, Université du Québec à Montréal (Canada), examines how e-CRM has affected both organizational and individual behavior in a leading Canadian bank. The findings emphasize the role played by many strategic and organizational dimensions in the success of e-CRM implementation. Nevertheless, the employee reward and evaluation system, which should have been changed to leverage CRM impact, has surprisingly been forgotten. This deficiency is addressed by proposing a new framework for enhancing e-CRM effectiveness.

Chapter III, “*Managerial Discretion and E-CRM Performance*,” by Tim Coltman and Sara Dolnicar, University of Wollongong (Australia), builds on a surprisingly sparse literature regarding the importance of managerial discretion, to show that the heterogeneity of beliefs held by managers about e-CRM execution matter when explaining e-CRM success. Drawing on a data sample comprising 50 interviews and 293 survey responses, this article utilizes segmentation techniques to identify significant differences in managerial beliefs and then associates these belief segments with e-CRM performance. Results indicate that three distinct types of managers can be identified based on the heterogeneity of their e-CRM beliefs: (1) mindfully optimistic, (2) mindfully realistic, and (3) mindfully pessimistic.

Chapter IV, “*Multi-Channel Retailing and Customer Satisfaction: Implications for E-CRM*,” by Patricia T. Warrington, Texas Christian University (U.S.); Elizabeth Gangstad and Richard Feinberg, Purdue University (U.S.); and Ko de Ruyter, University of Maastricht (The Netherlands), examines the influence of shopping experience on customers’ future purchase intentions, both for the retailer and for the channel. Using a controlled experimental design, U.S. and European subjects responded to a series of questions regarding the likelihood of making a future purchase following either a positive or negative shopping encounter. Results suggest that shopping intentions vary based on the shopping channel as well as cultural differences.

Chapter V, “*Do Mobile CRM Services Appeal to Loyalty Program Customers*,” by Veronica Liljander and Pia Polsa, Swedish School of Economics and Business Administration, (Finland); Kim Forsberg, Intrum Justitia Finland (Finland), investigates the appeal of new mobile CRM services to airline customers. An empirical study was conducted among loyalty program customers (frequent flyers) of an airline that was considering using MIDlet applications in order to add new mobile services to enhance customer relationships. The results suggest that the success of mobile CRM seems closely linked with customers’ readiness to use existing mobile services. The study recommends that before engaging in costly new investments, companies take this factor into serious consideration.

Chapter VI, “*Developing a Global CRM Strategy*” by Michael Shumanov and Michael Ewing, Monash University (Australia), examines the complexities of global CRM strategy using the case of a leading financial services company. Interviews are conducted in 20 countries. Global Head Office and external information technology (IT) consultant perspectives are also considered. The findings confirm that a hybrid approach has wide practical appeal and that subsidiary orientation towards centralisation/decentralisation is moderated by firm/market size and sophistication.

Section II: *E-Business Models and Strategies* consist of five chapters. Chapter VII, “*Strategic Positioning and Resource-Based Thinking: Cutting Through the Haze of Punditry to Understand Factors Behind Sustainable, Successful Internet Business*” by John Gallaughier, Boston College (U.S.), synthesizes and leverages two strategic frameworks when analyzing the true nature of strategy and the Internet: (1) the concept of strategic positioning and (2) the resource-based view of the firm. When considered together, these approaches create a powerful tool for understanding the factors determining the winners and losers among Internet businesses. Several examples of the applied framework are demonstrated.

Chapter VIII, “*A Tale of E-Business Models: From the Music to the Television Industry*” by Savvas Papagiannidis, Joanna Berry, and Theodoulos Theodoulou, Newcastle upon Tyne (UK), presents the concept of e-business models and how they relate to the music video and television environments. After identifying the value creation chain of music and video broadcasting to provide a context for the chapter, this article assesses independent producers and aggregators of content, important new factors in the value chain of entertainment, as well as the various mechanisms through which content is reproduced. Following a comparison of the music and video/television business models, a case study is presented which exemplifies the reconfigured value chain presented herein. The background, development, and outputs of Current TV are presented in order, to highlight the ultimate issue clarified in this chapter.

Chapter IX, “*Strategic Maneuvering in Healthcare Technology Markets: The Case of Emdeon Corporation*” by Kirill M. Yurov, Yuliya V. Yurova, and Richard E. Potter, University of Illinois at Chicago (U.S.), investigates the strategies of Emdeon Corporation, a healthcare technology firm whose e-business model provides clues for achieving a sustained revenue growth and profitability. This study traces the current sustainability of Emdeon’s e-business model to a related diversification strategy that the firm’s upper management has pursued via mergers and acquisitions.

Chapter X, “*Complementary Role of Website in Business Model Development*” by Olli Kuivalainen, Hanna-Kaisa Ellonen, and Liisa-Maija Sainio, Lappeenranta University of Technology (Finland), examines the role of a magazine Web site in the publisher’s business model, and depicts the strategic changes in that role. The aim is to provide a holistic exploration of the motives behind the development of the model, and of the subsequent success factors of the Web site. The discussion is based on an explorative case study of a successful Finnish magazine Web site. The results show that the site now complements, rather than substitutes, the print magazine as it enhances the customer experience and adds new dimensions to the magazine’s business model.

Chapter XI, “*A Reverse Auction-Based E-Business Model for B2C Service Markets*” by Tobias Kollmann & Matthias Häsel, University of Duisburg-Essen (Germany), examines the e-business model and competitive strategy of a German B2C reverse auction platform for service and handcraft orders. The case widely confirms existing theories on e-marketplaces and suggests, moreover, that it may be feasible to primarily align competitive strategy with the demand side, in order to achieve a significant number of successful, high-quality auctions.

Section III: *E-Business Management* consists of five chapters. Chapter XII, “*Evolving E-Health Systems: Symbiotic Constructs between Corporate and E-Health Care Worlds in International Space*” by Denis Caro, University of Ottawa (Canada), explores the strategic perceptions of corporate ICT and health care executives in Canada and Sweden. Extending Zhu’s WSR-Li framework into the Realpolitik of e-health systems internationally, this chapter exposes the unique transgenic dimensions of evolving e-health systems. The findings and implications of the study underscore the need for further international e-business research on the socio-cultural domains in which inter-organizational systems evolve.

Chapter XIII “*Socio-Economic Impacts of Offshore Outsourcing of Information Technology*” by Karl Knapp, University of Indianapolis (U.S.); Sushil K. Sharma, Ball State University (U.S.); and Kevin King, Clarian Health (U.S.), investigates the socio-economic impacts of offshore IT outsourcing in the United States using a system dynamics model. Offshore IT outsourcing has been becoming mainstream alternative to in-house operations. The skeptics believe that outsourcing may weaken the local business competitiveness of the region, investors’ confidence in investing in local businesses, and may create a spiral effect on economic indicators such as: unemployment, enrollment in schools, living styles, housing and construction, and so forth. The results of this study show that there are significant negative socio-economic impacts to the individuals and local economies as a result of offshore IS outsourcing.

Chapter XIV, “*Towards Theory Development for Emergent E-Business Innovations: Using Convergent Interviewing to Explore the Adoption of XBRL in Australia*” by Indrit Troshani and Sally Rao Hill, The University of Adelaide (Australia), contributes to theory development by presenting an argument for using convergent interviews as an appropriate and efficient method for modeling factors that impact on the adoption of emerging and under-researched innovations, such as XBRL. Using this method, this study identifies environmental, organizational, and innovation-related factors as they apply to XBRL adoption and diffusion. Contentious factors, such as the role of government organizations, XBRL education and training, and the readiness of XBRL as an innovation along with its supporting software solutions are also examined in detail.

Chapter XV, “*An Introduction to the Management and Protection of Intellectual Property Rights*” by Bill Vassiliadis and Vassilis Fotopoulos, Hellenic Open University (Greece), gives a review of the most important Intellectual Property Right protection methods. It also analyzes their potential use in Digital Rights Management systems. There is a special focus on the watermarking technique, and more particularly, the potential of using multiple watermarks with parallel linking of content to metadata. Furthermore, the problem of DRM systems’ interoperability is considered, and a solution in the form of metadata repositories enabling multi-party DRM eco-systems is proposed.

Chapter XVI, “*Intelligent Contracting: An E-supply Chain Management Perspective*” by Tagelsir Mohamed Gasmelseid, King Faisal University (Kingdom of Saudi Arabia), discusses the context of electronic contracting and proposes a multiagent framework to address the process of electronic contracts formulation within the context of supply chain management processes. Recognizing the variety of e-business models and the growing importance of improving relationships (downstream and upstream), the multiagent framework aims at improving the capacity of e-business models and strategies and competitive advantages of enterprises. The framework incorporates a new domain-based mechanism to supplement the current phases of status analysis and objectives setting of a typical electronic contract.

Section IV: *Online Consumer Behavior* consists of three chapters. Chapter XVII, “*The Applicability of Network Effect Theory to Low-Cost Adoption Decisions: An Investigation of Peer-To-Peer File Sharing Technologies*” by Jaeki Song and Eric A. Walden, Texas Tech University (U.S.), examines the boundary of the applicability of network effects theory. This study theorizes that when adoption is cheap, the cognitive demands of estimating network effects outweigh the benefit of making optimal adoption decisions. Thus, even in contexts where network effects do exist, the study predicts that adopters will use simple heuristics to make adoption decisions, if adoption is cheap. The results of experiments suggest that there is a boundary on the applicability of the network effects theory to internet adoption behavior.

Chapter XVIII, “*An Empirical Analysis of Cellular Phone Users’ Convenience Perception and Its Impact on Shopping Intention in Mobile Commerce*” by Wen-Jang Jih, Middle Tennessee State University (U.S.), presents a study that was conducted to examine the effect of convenience on customers’ intention of shopping via their mobile communication devices. Three research hypotheses were formulated to test the claims derived from the literature. Primary data collected from college students in Taiwan were analyzed to examine the relationship between perceived convenience and shopping intention. The result shows a significant relationship between the two variables, and a positive effect of convenience perception on shopping intention. The findings have practical implications for mobile commerce strategists by providing more understanding of the m-commerce success factors from a consumer behavior point of view.

Chapter XIX, “*The Effects of System Features, Perceived Risk and Benefit, and Customer Characteristics on Online Bill Paying*” by Fang He and Peter P. Mykytyn, Southern Illinois University at Carbondale (U.S.), presents the effect of a series of possible decision factors, including vendor’s system

features, perceived risk and benefits, and customers' characteristics, on the intention to use an online payment system by customers. Compared with traditional payment methods such as pay-by-check, pay-by-phone or wire transfer, online payment is considered more time- and cost-efficient, convenient, and flexible for customers and businesses. However, customers can differ and Web-based systems can vary in terms of services and features offered, perhaps leading to a significant level of variation in the intention to use online payment systems.

E-business has become an essential component for any organization interested in achieving competitive advantage. The growth of e-business is phenomenal in terms of sheer sales volume and the number of corporate and individual adopters. Many new ideas and applications are constantly emerging and provide potential opportunities and challenges for further research and implementation. A successful adoption of any e-business business models and applications requires contextualizing e-business and designing a solution derived from multi-layered perspectives of concepts, methodologies, tools, and applications. "Emergent Strategies for E-Business Processes, Services, and Implications: Advancing Corporate Frameworks (Advances in E-Business Research, Vol. 3)" is a unique collection of the latest research associated with the emerging e-business technologies and applications. This book attempts to stimulate the advancement of various e-business frameworks and applications, and to provide future research direction. As leading experts in the e-business area, the contributors did an excellent job of providing our readers with timely, critical, and thought-provoking knowledge. We expect this book to shed new insights for researchers, educators, and practitioners to better understand the important issues and future trends of e-business research and technologies. I would like to express my gratitude to the authors and reviewers for their invaluable contribution and collaboration. Finally, I sincerely thank Deborah Yahnke, assistant development editor, and other members of the IGI Global for their help with this book project.

In Lee, PhD
Editor-in-Chief

Section I

E–Customer Relationship Management

Chapter I

Managing the Customer Relationship: A Framework for E-CRM Analysis

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Abstr Act

Proponents of Customer Relationship Management (CRM) suggest that a firm can develop a value creation relationship, such that an increase in customer value, leads to an increase in firm value (Mithas et al., 2005). The value for the customers comes from the provision of goods and services that match their needs. However, the research to date on using e-CRM systems to both foster and monitor this value creation process is somewhat mixed. This chapter proposes to cross-functionally integrate organizational assets with customers' interests via technology. The resulting framework can assist managers in improving services, through the use of e-CRM, to understand what is important to the customer.

INtr ODUct ION

In the first half of the twentieth century, the owner of a neighborhood general store was able

to anticipate the demands of his customers. His product offerings would be based on intimate knowledge of his customers, their families, lifestyles, and preferences. These insights were

gathered through a series of personal interactions with his customer-base. The value of the relationship was clear to both the store owner and the customer in terms of appropriate inventory levels and availability of products.

However, changes in the retail marketplace (e.g. the growth of mass market retailing) and changes in the shopping experience itself (e.g. purchasing goods over the Internet) have fostered customer anonymity and paved the way for a growing disconnect between firms and their customers. Evidence of this disconnect can be found in a recent survey of 362 “leading companies,” which showed that while 80% of the firms believed they were delivering superior service to the customer, the reality is that only 8% of their customers concurred (Allen, et al., 2005). To correct this situation, a growing number of firms are adopting ‘customer relationship management’ tools to forge a stronger link to their customers.

cr M LIt Er At Ur E r EVIEW

Customer relationship management (CRM) has its roots in relationship marketing which supports the proposition that a firm can boost its profitability by establishing long term relationships with its customers (Boulding, et al., 2005). Proponents of CRM suggest that a firm can develop a value creation relationship such that an increase in customer value leads to an increase in firm value (Mithas et al., 2005). The value for the customers comes from the provision of goods and services that match their needs. The firm derives its value in the form of cost savings since it is less expensive to retain existing customers than to expend time and energy on constantly acquiring new customers. For example, Gupta et al. (2004) found that a 1% improvement in customer retention can increase firm value by 5%.

Despite the potential for this value creation proposition, widespread adoption of CRM languished until it was bolstered by new information

technology systems and widespread use of the Internet (Greenberg, 2002) – thus being renamed e-CRM. Elements of e-CRM include email, chat rooms, interactive websites, and e-forums (Lee-Kelley et al., 2003). Today, e-CRM is considered a strategic imperative for firms looking to improve customer retention and an engine for “improved shareholder value” (Payne and Frow, 2005).

An examination of the research evaluating the effectiveness of e-CRM would show the results are quite mixed. The commercial market research studies suggest a lack of performance. In a Forrester Research survey of 260 business and technology executives, Band (2008) noted that a ‘significant’ number reported poor results on 11 different capabilities (e.g. customer service, customer data management, etc.) provided by e-CRM. Earlier, a Gartner Group study (Hagermeyer and Nelson, 2003) found 70% of the firms adopting e-CRM saw a decline or no improvement. This 70% figure matched the CRM project failure rates found by Tafti (2002) in an academic study.

However, there have been CRM studies with positive results. In a (2005) Journal of Marketing edition dedicated solely to CRM, Boulding et al. (2005) noted that eight different authors reported that CRM processes can improve firm performance. One of the eight authors, Ryals (2005), cited a case study where a business unit increased its profits by almost 300% by using specific CRM tools. Mithas et al. (2005) found that, for a cross-section of U.S. firms, the use of CRM applications is positively associated with improved customer satisfaction.

What is the reason for the mixed results? Reinartz et al. (2004) noted the overall lack of studies that examine CRM across a range of firms and that extant studies may have had mediating variables (e.g. industry, level of economic development) that were not examined. Others failed to consider differences in types of CRM adopted, level of implementation, or firm strategy (Reinartz et al., 2004). Payne and Frow (2005) noted these variances and identified 12 different

possible definitions for CRM. The authors then proposed classifying CRM research into three broad categories – with the first group looking at a specific CRM activity from a technical point of view, a second group that addresses the wide spectrum of CRM technologies, and then a third group that focuses on CRM from the customer's point of view. This final group they labeled as 'customer-centric' and suggested that all research should use this type of strategic framing when discussing CRM (Payne and Frow, 2005). Reaching some agreement on the defining characteristics of CRM allows the development of frameworks for analyzing and applying its concepts.

CRM Frameworks

Dyson et al. (2007) argue that frameworks are useful tools in developing strategic decisions. Given the strategic importance of customer retention, the decisions made in regards to developing and utilizing customer relationship management tools should be categorized as being strategic in nature. However, an internal study by the British Telecommunications Group (BT, 2001) found that "75 per cent of companies did not have a definition of CRM and 61 per cent did not have a framework for CRM strategy" (Payne and Frow, 2006, p. 140). The two authors go on to conclude that it is unlikely that firms can be effective in implementing CRM given management's lack of complete understanding of the nature of CRM and inability to develop a frame for planning (Payne and Frow, 2006).

This leads us to believe that CRM development methods should be guided by frameworks or methods that incorporate the CRM into the firm's strategic processes. While several frameworks have been developed, (e.g. Richard et al., 2007; Chalmers, 2006), research focus has primarily been on the technology as it impacts customer relationships. Others suggest the use of gap analysis – a framework that can be used to determine the steps necessary to improve IT processes and other

strategic functions. While gap analysis is useful when the desired outcome is known, in CRM implementations – when goals are often unclear – gap analysis would not be appropriate.

Payne and Frow (2005) proposed a strategic framework for customer relationship management which stressed the cross-functional integration of processes, people, operations, and marketing capabilities through information, technology, and applications. Both gap analysis and Payne and Frow's (2005) strategic framework are tools for implementing strategy once a desired target or goal is known. However, what is necessary is a process to identify or reveal strategic opportunities.

In the light of the above, this chapter proposes a framework that aids managers in improving services by understanding what is important to the customer. In line with the premise of Payne and Frow (2005), this framework promotes a cross-functional integration of organizational assets (processes, people, operations) with customers' interests via technology. The utility of this framework can best be illustrated by examining a service industry with multiple touchpoints over a longer customer interaction period such as the healthcare industry.

HEALTHCARE AND CRM

In the service economy, a direct relationship exists between the customer and the provider of the service. Sales revenue is the final proxy indicator of customer satisfaction, and if dissatisfied, customers can vote with their feet. This is true for the healthcare industry today since customers are changing their health plans every 24 months, and – in some cases – even dropping out of the healthcare insurance system altogether (U.S. Census Bureau, 2004). Complicating the relationship in healthcare is the fact that there is no price transparency. Neither customers, nor in many cases the healthcare providers, are able to determine a specific price for service – before the

service is rendered. From the customer's point of view, there is no direct relationship between the price and the service and, therefore, measuring the value of their transactions - the quality of service against price - is difficult at best.

In *Crossing the Healthcare Chasm: a New Health System for the 21st Century*, the Institute of Medicine reported;

“(H)ealthcare has safety and quality problems because it relies upon outmoded systems of work. Poor designs set the workforce up to fail, regardless of how hard they try. If we want safer high quality care, we will have to redesign systems of care including the use of information technology to support clinical and administrative processes. (Institute of Medicine, 2001)”

The report argues effectively that the current inefficiencies of the healthcare service industry need to be rectified. These inefficiencies contribute both to lowered healthcare organization performance as well as higher costs to the consumers. The report further suggests that the healthcare services industry could benefit by customizing its service offerings to fit the patient's needs and values (Institute of Medicine, 2001).

The cost of healthcare rose sharply during the 1980s and 1990s – as much as five times the rate of inflation. According to the Kaiser Family Foundation, the cost of employer-sponsored health plans – which covered 60% of all Americans – increased by 13.9% in 2003, 12.9% in 2002, and 10.9% in 2001 (Kaiser, 2003).

Rising healthcare costs clearly contribute to an increasing number of Americans having dropped out of the healthcare coverage system. According to data from the US Census Bureau, as of 2004, 44 million Americans had no healthcare insurance at all. This suggests that customers no longer perceive healthcare insurance to have value commensurate with the rising costs, or simply cannot afford it. Today's \$359 per month average is too high a cost for most families (Kaiser 2003). A

recent Mercer Study (2003) found that employee contributions especially for family coverage rose sharply in 2003. In response, in smaller companies, only 48% of employees currently elect family coverage, down from 51% in 2002, and 60% in 1999 (Kaiser, 2003). As expenses rise, employees opt out.

In addition to failing to control rising costs, healthcare providers appear to be out of touch with their consumers. Due to regulation and privacy concerns, the healthcare field moved at a pace much slower than online advertisers in organizing its efforts around available customer information. In fact, Zablah et al. (2004) argued that all parties to the healthcare equation need to utilize information technology more effectively, and manage their relationships in a meaningful manner.

If the healthcare provider does establish a customer relationship, the organization can offer customer service and support on the web in a confidential manner. Reports traditionally provided in-person (e.g. routine tests, blood work analysis, etc.) could be made available through e-CRM. Outside lab reports of X-rays and MRIs can be transmitted to the healthcare provider for face-to-face discussion with the patient and then could be made available electronically to the patient. FAQs suggesting relevant studies could be displayed for additional understanding of the results from these tests. This would allow patients time to reflect and develop reasonable questions about the reports either in lieu of personal interaction (which often is redundant) or as a supplement to personal meetings.

Communication through e-CRM – enhanced by personal contact when needed – would build trust, increase satisfaction, and provide the primary care physician with the potential to improve both quantity and the quality of patient-handling. Once trust is established, service providers will see that coordinated joint-efforts lead to outcomes that exceed what the firm could have achieved if

it acted solely in its own best interests (Anderson and Naurus, 1990).

There is little doubt that the system is in trouble. Customers' reactions to perceived over-priced services and a suspected decrease in quality are contributing to the decline of the current system. e-CRM offers the potential to substantially change the healthcare system's focus towards its consumers by building and improving long term customer relationships. In turn, this could potentially lead to higher customer satisfaction and lower costs while possibly leading to greater loyalty and implicit cooperation (Lee-Kelley et al., 2003). Therefore, healthcare managers should seek to increase the role of e-CRM in the healthcare service equation.

Fostering Positive customer Interaction through E-crm

The service delivery process for healthcare can be divided into three phases. The initial phase of e-CRM requires encouraging customer contact through marketing and referrals. The purpose is to improve what the firm knows about the customer at inception of the relationship. Information technology can be used to develop insights into the customer's condition, which allows the healthcare professional to work more efficiently through quicker diagnoses. Labor efficiency can be an important component of a successful healthcare business strategy (Axxelson and Easton, 1991).

The second phase involves the actual service delivery by the healthcare organization. At this point, encouraging communication between the healthcare provider and the patient is the key to customer-perceived quality (Ward et al, 2005). The healthcare service relationship includes interaction with any member of the organization's staff, and the organization needs quality feedback from the patient in order to produce a satisfactory result.

In the third phase, post delivery of the primary service, the organization needs information re-

garding bill payment, additional service scheduling, and customer feedback. Errors in billing can turn a positively perceived interaction into a negative one. Failure to continually encourage a patient to follow recommended after-care procedures may also cause an initially positive customer interaction to deteriorate. In sum, e-CRM programs can be designed to encourage social relationship exchanges during the length of the relationship (Dwyer et al., 1999).

Each of the phases above can be improved through combining the Internet with CRM activities to create the e-CRM processes. When incorporated appropriately into the organizational daily processes, e-CRM can:

1. Reduce the cost of communicating with customers
2. Provide web-based opportunities for self-service activities, thereby reducing administrative overhead
3. Integrate delivery of services, production, and derive value chain cost savings
4. Boost sales through Internet marketing
5. Improve customers' interaction with the firm, leading to service improvements

The use of web-based services between providers and customers permits companies to be much more efficient in delivering services. e-CRM allows a company not only to keep in contact with its customers, but to extend its relationships with customers (Tsikrikis et al., 2004). In fact, it is difficult to find a service provider without a website presence, but the level of customer interaction is still low. Anecdotal evidence certainly suggests that there is a lack of interactive exchanges between customers and service providers, and thus the current e-CRM services are not being used to their full potential. The reasons are manifold, but central to the question is the managers' understanding of what the customer cares about, and what kinds of interaction are indeed possible given a set of organization resources.

A Framework for Discovery of E-crm Opportunities

The first step in defining the e-CRM opportunity is to determine the general and specific reporting information necessary to service the clients. Although professionals may be the best judge of their peers, the patient's view is relevant in determining the quality of services delivered in healthcare. This has been amply illustrated in prior literature (e.g. Donabedian, 1986).

In the outpatient healthcare setting, four dimensions explain the majority of customer-perceived quality (Ward et al., 2005):

1. Interaction & Communication - Giving customers the experience of constant, courteous & caring treatment;
2. Access - Giving customers timely and affordable access to medical care;
3. Tangibles - Providing the customer with physical facilities, equipment, personnel and credentials which they expect from a healthcare provider; and
4. Outcome - Positively impacting customer health as a function of the care given

Table 1 below shows the quality dimensions found in Ward et al (2005) as applied to outpatient healthcare providers. These dimensions were developed by examining other healthcare customer quality studies as well as empirical analyses of large healthcare datasets. Other healthcare service models do exist. The chief among these is the SERVQUAL model which was adapted from the marketing field to evaluate healthcare service quality. However, researchers have had varying degrees of success in adapting it to the healthcare setting (Clemes et al., 2001). While noting that each industry and service provider may develop

Table 1. Quality factors and dimensions in outpatient healthcare

Customer-Perceived Quality Dimension	Statistical Factor	Share of Variance Explained	Share of Variance by Dimension
Interaction & Communication	Provider	35.4%	44.8%
Interaction & Communication	Staff	9.4%	
Access	Scheduling	10.4%	20.6%
Access	Waiting Times	10.1%	
Tangibles	Facility	9.1%	9.1%
Outcome	Referrals	9.9%	9.9%
Total Variance Explained		84.3%	

their own models and/or adopt unique dimensions for perceived quality, the healthcare industry lacks a dominant model for analyzing customer service. Therefore this example uses dimensions from a successful healthcare industry study with which the authors are quite familiar.

Utilizing the above dimensions and taking advantage of e-CRM, the authors propose a new CRM Strategic Differentiation Model for Competitive Advantage (SDMCA). The intent of this model is to develop a robust understanding of information regarding existing and potential interaction points between the customer and provider, capturing the entirety of the patient's healthcare experience. Healthcare providers may use SDMCA as a method to align organizational assets, the Internet, and customer evaluations of

quality in order to develop competitive advantage through improved perceived quality.

Organizational theorists divide the resources of an organization into logical categories of assets including: Providers/Staff, Processes and Procedures, and Facilities. Upon this set of organizational assets are placed the four major quality dimensions discussed above. Figure 1 juxtaposes the quality dimensions (i.e. how the customer perceives service quality) against the organizational assets, (i.e., what resources will the firm engage to deliver their services). The framework depicted in Figure 1 enables a manager to understand and link perceived quality to the available organizational assets. The process involves creating an organizational specific framework along two axes: the first is the various dimensions

Figure 1. Outpatient healthcare CRM strategic differentiation model

Organizational Assets	Quality Dimensions							
	Interaction & Communication		Access		Tangibles		Outcome	
	Interaction Point	e-CRM Opportunity	Interaction Point	e-CRM Opportunity	Interaction Point	e-CRM Opportunity	Interaction Point	e-CRM Opportunity
Personnel	1. Physician interaction	1. Clinical content and intelligent assessment of in-person and e-mail consults						
	2. Staff interaction	2. Tracking customer follow-up contact	1. Availability of provider of choice	1. Integrate physician schedules into on-line appointment scheduling	1. Proper board certification for provider	1. Post qualifications on web site	1. Referral acceptability and timeliness	1. On-line referral scheduling with key referral network linked to web-based scheduling system
Operational Processes & Procedures	1. Billing system	1. On-line account access	1. Appointment scheduling	1. On-line self service appointment scheduling 2. E-mail or phone appointment adjustments just prior to arrival if the appointments are running late				
	2. Appointment reminder process	2. e-mail reminders	2. Waiting times		1. Process status of key performance indicators is available 24/7	1. Web interface for customer and employee access to key performance indicators	1. Effectiveness of referral process	1. Web blogs for customers to communicate with each other regarding referral effectiveness
Facilities & Operational Assets				1. Maps and parking information on the web site				
	1. Automated frequently asked question (FAQ) system	Customer log-in and usage monitoring with automated follow-up	1. Available parking 2. Wheelchair access	2. Up-to-date accessibility information.	1. Convenient and clean facilities	1. Inspection reports are posted on-line for customer inspection	1. Remote diagnostics	1. High speed internet transfer of digitized diagnostics such as X-rays, CT scans, and MRI's.

of quality derived from the customer's point of view (often gathered using survey instruments). The second is the set of organizational assets that produce services for the customer. The intersection points in Figure 1 are collections of one or more opportunities for CRM systems to observe the service product in ways that are meaningful to the customer's perception of quality.

By examining this cross-functional coordination between the customer and the provider, management can determine where in the system service needs to be changed or improved in order to maintain or create a genuine relationship with the customer. The cost savings of retaining customers can in fact offset the whole e-CRM investment (Bygstad, 2003).

Use of the Framework in E-crm

The value of the SDMCA framework can be demonstrated by working through examples based on Figure 1, starting with the top, leftmost cell.

Interaction and communications

Critical data can be exchanged between the physician's office and the customer on the first contact by email. Instead of calling for an appointment, the customer can make a request and state the level of urgency and nature of their ailment (possibly with the aid of an intelligent automated agent or a well-designed display menu). Often, referrals are made by other physicians and this process could be automated from one office to the other without the need for patient intervention. The physician and the physician's staff can both scan and review the patient's request. Those needing urgent treatment can be quickly identified, whereas those seeking routine appointments can be queued to the appropriate staff member at the first opportunity. Often an established relationship exists between the patient and physician,

and when the patient contacts the physician for an appointment the need and urgency is clearly known by the physician.

A second part of this interaction-space involves the staff interaction. Accessing customer information through the data bank and other collateral sources, this information can be merged into the patient's request for a consultation. The staff can develop a reasonable basis to judge relative urgency. This can act as a double check, where cases needing urgent care can be flagged, and nursing calls can be dispatched if needed. e-CRM and the staff thus become part of a method to expedite availability of the physicians, rather than roadblock to physician access (as seen from the patient's point of view).

The next interaction-space is Personnel in the Access quality dimension. Again, part of the human process involves the staff or the physician's determination as to the speed in which services must be delivered. By taking advantage of data from multiple sources, the staff can proximately schedule an appointment for care. Much depends on the availability of the physician and the type of patient symptoms experienced.

Turning to the Tangibles section of SDMCA, management may use a website to post information - for the customer's benefit - about the physical examination, the indicated results, and protocols for treatment. All of this is hosted in a secure environment, where only the patient has access to the information. This can be a great step forward by healthcare providers as they reach out to patients. The Internet makes information readily accessible to physician and patient alike. We know that patients will often go for 'second opinions' after a visit with a physician and providing the health information a-priori can help both in diagnosis and treatment.

Diagnostic reasoning systems can also be engaged to aid in diagnosis and treatments. In this way, the information is greatly broadened, and at the same time controlled. If the patient responds by communicating conditions which

match an alternate diagnosis, again a clerical staff employee can flag this and bring it to the attention of the responsible healthcare provider immediately.

The Outcome and Interaction and Communication interaction-space fulfills the expectation of the next step in terms of the physician, nurse, and staff responsibility such as referral to a specialist. The customer has been provided with more information, may be examined by the physician more immediately, and the customer can continue to explore alternate conclusions or other research. As for the provider, staff time spent arranging appointments for patients can be replaced by a more efficient, and documented appointment process. The provider also has superior ways to keep in touch with the patient, without consuming hours of expensive professional time.

Operational Procedures

First, we explore the revenue collection function of the provider-patient relationship. On-line account access gives both parties the ability to determine cost immediately, and the speed of collections. If the patient has unpaid bills, this will be known equally - by both parties. It will not come as an unexpected (and often embarrassing) surprise.

e-CRM can also be effectively utilized for appointment reminders, as well as situation specific protocols for continuing referrals or examination. Operationally, the appointment process with the desired provider can become self-service. The patient will see and know first-hand the scheduling problems of the desired provider. The customer can regain some control and schedule appointments, by balancing their understanding of the provider's availability against their perceived urgency.

If there is need for referral after consultation, this information can be provided by the physician's staff, and they can insert information about other consultants available in the patient's website electronic file. If the process is not to the customer's

satisfaction, the patient can communicate the need for additional human service. In quality health-care, this should trigger a prompt response.

The website can also be used to provide the patient with additional information and references to additional sites if other questions arise. Having access to additional information is likely to create relative patient satisfaction with the outcome.

Facilities and Operational Assets

Another way in which e-CRM becomes a part of the service, and integrates the provider-customer relationship, is to post frequently asked questions (FAQs). Customer satisfaction should rise as knowledge rises. In addition to healthcare information, provider-specific information can be disseminated such as directions to the facility and the quality and availability of parking or wheelchair access near the facility.

The SDCMA model touches the important interaction points between patient and healthcare provider. It creates operational efficiencies for the providers, and it explodes the availability of information, and promotes the ease of access for relevant treatment.

LIMITATIONS OF THE FRAMEWORK

From the practitioner's perspective, the useful insight into strategic healthcare e-CRM development is the understanding of how customers will perceive their interactions with the organizational assets as they receive service. The useful insight for e-CRM practitioners and developers is that neither the customer nor the organization can be examined apart from one another.

The usefulness of the proposed framework depends on the creativity of the manager. Alignment of this framework with organizational strategic goals is critical for success. The establishment of an overall strategic plan, as well as an information systems strategic plan prior to the use of

this framework is essential. Strategic direction and boundaries on the e-CRM ideas generated by the framework are critical. While the use of this framework may facilitate better strategic planning, it is designed to complement proper information systems strategic planning and CRM development methods that are critical to successful deployment of e-CRM and CRM strategies.

While this framework may create awareness of the potential value of an e-CRM process, it does not assist in developing the process nor in analyzing the cost of developing that process. The organization must consider the cost of measuring and analyzing data as well as the cost in developing e-CRM processes. In addition, the organization must have the skills and abilities to take advantage of the opportunities provided by the framework. Mithas et al. (2005) concluded that "...CRM applications merely enable firms to collect customer knowledge. Only when firms act on this knowledge by modifying service delivery or by introducing new services will they truly benefit from their CRM applications." Further, Chalmers (2006) stated that "Value must be placed on what is really important for customers, and not the things the company thinks are important."

CONCLUSIONS: THE REAL VALUE OF E-CRM IN HEALTHCARE

The paper presents a tool to enable improved strategic analysis for the purpose of developing better e-CRM systems. It shows the critical points of quality, from the customer's perspective, for healthcare services, via the SDMCA interaction-space framework. However, what is the purpose for this additional effort?

The answer lies in customer perceived quality, which may lead to a higher rate of customer retention. Studies show a dramatic increase in profits from small increases in customer retention rates (Reicheld, 1996). As little as a 5% increase in retention had impacts as high as 95% on the

net present value delivered by retaining customers (Reicheld, 1996). Other studies have shown that repeat customers generate over twice as much gross income as new customers (Winer, 2001)

Not only does effective use of e-CRM generate increased profits, the exchange of information demonstrates to the customer a desire to maintain a valued relationship (Moorman et al., 1992). Research suggests that relationship commitment is at the core of all successful working relationships, and is an essential ingredient in successful long term relationships (Anderson and Narus, 1990). A partner committed to the relationship will cooperate with another member because of a desire to make the relationship work (Morgan and Hunt 1994).

Analyzing the opportunities for e-CRM using the SDMCA framework may give a healthcare provider the ability to communicate effectively and efficiently. This communication – again without a specific price – can create value for the customer; and the firm can increase profits. It is a building block for trust and relationship commitment. There is no course of action more beneficial to the customer than to follow on with the diagnosis, and e-CRM – when viewed as an integral part of the service being offered – is the key asset.

Many of today's new technological tools could be utilized to these ends: the web, kiosks, call centers, etc. The paradox of utilizing e-CRM in healthcare to better inform the service provider's patients is that while it may decrease direct interaction with the staff of the organization, it may create increased patient loyalty as they perceive the value of higher quality access to relevant information regarding their condition and its treatment. It would in fact create more personal involvement from the patient, a higher degree of control over decision making after the analysis is given, and increased reliability in providing healthcare.

e-CRM needs to be integrated into the healthcare service product. Nothing would build trust

and improve customer satisfaction as dramatically as the exchange of information through e-CRM. Firms which adopt these approaches will attract and retain new customers due to the exchange of information. The most important point is to identify and address the customer needs. This must be done throughout the entire relationship. Not only can a firm's e-CRM yield information about a new patient, but search engine companies have already harvested a goldmine of information about their customer's lifestyles, which could easily be incorporated into e-CRM systems in the healthcare sector.

Measuring quality in healthcare tells the story of successful business practices. No other source of data collection can be more helpful for future competitive efforts and the firm's survival. Therefore, it is imperative that managers ask the right questions to generate meaningful information about the customer's healthcare experience based on the dimensions with which they perceive the service. Nothing can propel a nation across the healthcare service 'chasm' faster than strategically aligned e-CRM, and e-CRM is the material which will construct the solid bridges of future success.

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Managing the Customer Relationship

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Chapter II

A New Conceptual Framework for Greater Success with Integration of E-CRM

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Abstract

This chapter examines how e-CRM has affected both organizational and individual behavior in a leading Canadian bank. The innovative and customer-driven culture of this bank pushed it toward early adoption of e-CRM technology. The findings emphasize the role played by many strategic and organizational dimensions in the success of e-CRM implementation. In fact, to make e-CRM efforts pay off, new business processes are required to achieve more effective and closer interactions with customers. The shift toward customer orientation needs to be supported by a shift in organizational objectives and processes. The results indicate that employees' individual behavior successfully changed from a transactional to a relational perspective, and that training and coaching ensured a successful integration of e-CRM technology. Nevertheless, the employee reward and evaluation system, which should have been changed to leverage CRM impact, has surprisingly been forgotten. This deficiency is addressed by proposing a new framework for enhancing e-CRM effectiveness.

THE SHIFT TO CRM

Since the 1980s, researchers have been talking more and more about an era of focusing on

customer retention (Sheth, 2002). **Relational marketing**, in fact, was born of the premise that keeping a customer is more profitable than attracting a new one (Coyles & Gokey, 2005; Perrien,

Filiatrault, & Ricard, 1993) and emerged following the abandonment, by some, of the logic of customer acquisition for a new logic of **customer retention** (Sheth, 2002). This logic also brought certain concepts to the fore, including customer management, better known as “Customer Relationship Management” or e-CRM (Mitussis & O’Malley, 2004; Sheth, 2002).

Although, in the current effervescent context with regard to electronic commerce, CRM is seen as a major issue among firms, few studies have explored its concrete implications for specific industries (Liu, 2007). Ten years after the concept of a relational approach began to be studied, Perrien, Filiatrault, and Ricard (1993) noted, more specifically for the banking sector, problems and constraints linked to implementation of such an approach. Among these were the need for a customer-oriented culture and better knowledge of customers, a change in the evaluation process for personnel in contact with customers, and decreased rotation of personnel. More than 20 years later, after much research on the subject, the development of a number of e-CRM tools, and many changes in firms following reengineering, the questions being asked are, What picture can be painted and diagnosis be made of implementation of a relational approach? Have financial institutions made the necessary changes to effectively implement e-CRM?

The objective of this chapter is to examine organizational strategies implemented by banks to make a successful migration to a relational approach. The research, conducted at a well-known Canadian bank, addresses the following points:

1. To understand the early experiences of pioneering banks with operationalizing e-CRM
2. To identify the current weaknesses or deficits in the implementation of e-CRM
3. To offer recommendations and a new conceptual framework for greater success with integration of e-CRM

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The need to focus on the customer has entailed much investment in information technologies, and so the first large firms to install IT systems have benefited from an enormous competitive advantage. While mass communications and advertising have lost effectiveness, customized, targeted, specific communications are emerging as the means of attracting and retaining customers (Ben Letaifa & Perrien, 2007). The implementation of a market-oriented strategy requires knowledge, relationship management, and technical skills. Focus on the customer, marketing segmentation, targeting, and positioning, supported by information technologies, form an essential asset in meeting the new marketing challenges, whence the trend toward implementing CRM over the last decade. Indeed, firms’ information systems, especially those in banks, have been growing constantly for a decade and include ERP (enterprise resource planning), CRM, and SCM (supply chain management) (Chen & Li, 2006).

For banks, there have been several specific reasons for making this investment. First, the banks hoped to optimize their costs: ERP was the integrated software package that met this need by acting, in effect, on expenditures. Because cost reduction was not open-ended, firms then sought to act on the second parameter of the equation by attempting to influence revenue generation; CRM met this need by improving management of sales, marketing, and customer service.

To implement such a customer-oriented strategy, the banks acquired various technologies that helped them to gather, cross-tabulate, and analyze customer databases (Franke, 1988; Liu, 2007). CRM improves service and encourages **customer retention** through the bank’s different access points, including e-mail, the call centre, the branches, and the contact personnel, to provide better support for subsequent, increasingly multi-channel interactions with customers. In fact, another reason for the increasing popular-

ity of CRM is the proliferation of marketing and communications channels that target **customer retention** (Mitussis & O'Malley 2004; Sheth, 2002; Zikmund, McLeod, & Gilbert, 2002).

However, bank personnel often resist use of these databases. Studies show that there is a problem with the use of this information (Customer Relationship Management Association of Canada, 2002; Dyché, 2001; Ricard & Perrien, 1994; Rigby, Reichheld, & Schefter, 2002). Thus, training is the most important requirement if CRM is to be efficiently implemented and deployed (Liu, 2007). In this paper, we attempt to verify the level of use of IT tools and the impact of e-CRM on organizational and individual behavior.

CRM, increasingly called **e-CRM** because of the growing importance of electronic mobility, is a business strategy derived from **relational marketing**, which uses information technologies to provide the firm with a reliable, complete, and clear vision of its customer base so that processes and customer interactions can be used to maintain and develop mutual relationship benefits (Mitussis & O'Malley, 2004). A number of researchers have explored how firms could exploit the potential of a CRM strategy to attain a competitive edge by offering more value to customers (Campbell, 2003). However, implementation of technology alone does not guarantee that such results will be achieved (Campbell, 2003). A number of studies have shown that failures have resulted from organizational problems (53%) or the lack of ability to access the most relevant information (40%) (Ernst & Young, 2001). A **CRM** project is, first and foremost, a business strategy that will guide the desired change in culture (Liu, 2007).

Some researchers reduce the scope of CRM to a simple tool or technological solution, while others speak of the human and strategic prospects of the new relational paradigm. There are apparently as many definitions of the CRM concept as individuals working in this sector (Paas & Kuijlen, 2001). The terminology is very much in style in contemporary marketing, but its implica-

tions remain poorly interpreted (Paas & Kuijlen, 2001) or little explored (Liu, 2007). However, it is possible to observe two important aspects of CRM: technological and strategic.

Reduced to a purely technological definition, CRM enables a company to provide itself with the means to be in permanent contact with its clients, whatever interface is used. In this sense, CRM is a strategic tool for implementation of relational marketing. However, most authors today no longer use this definition and instead talk of a CRM strategy alongside a CRM technology, for before considering a CRM technology, a company must create an customer-acquisition and -retention strategy (Rigby et al., 2002), which leads us to the second perspective.

The second, strategic aspect defines CRM as being the establishment, development, maintenance, and optimization of mutually beneficial relationships between clients and companies (Buttle, 2001), as a customer-oriented business philosophy or strategy (Forsyth, 2001), or as a new business approach or philosophy that permits the maintenance and development of successful relational exchanges (Reinartz & Kumar, 2003). While relational marketing is based on interaction within relational networks, CRM is the entirety of values and strategies of relational marketing, with a particular emphasis on customer relations, in the form of a practical application (Gummesson, 2002).

The most detailed definition has been given by Christopher, Payne, & Ballantyne (2002):

CRM is a strategic approach to improving shareholder value through the development of appropriate relationships with key customers and customer segments. CRM unites the potential of IT and relationship marketing strategies to deliver profitable, long term relationships. Importantly, CRM provides enhanced opportunities to use data and information both to understand customers and implement relationship marketing strategies better. This requires a cross-functional integration

of people, operations and marketing capabilities enabled through information technology and applications.

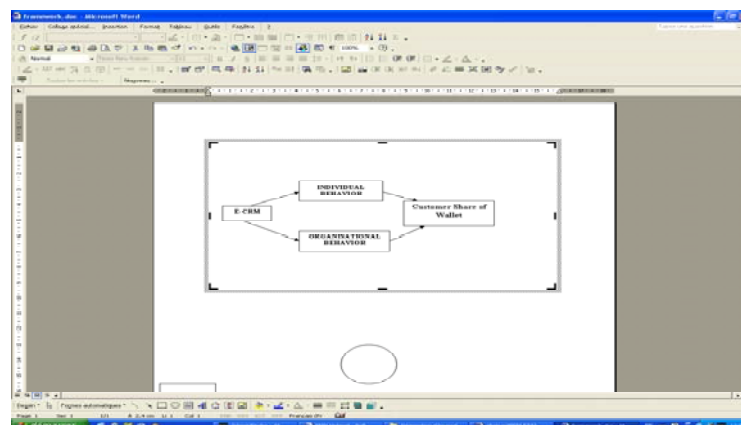
Because of the ever-growing role of the Internet and of various IT tools, the term **e-CRM** is used more and more frequently (Gummesson, 2004). Within e-CRM, data warehousing and data mining offer new opportunities for collecting and integrating information that will enable innovative marketing strategies to be devised (Eggert & Fassot, 2001; Gummesson, 2004). The proposed conceptual framework emphasizes that e-CRM has an impact both on the organization and on the individual. Indeed, implementation of e-CRM, whose ultimate goal is to increase **customer share of wallet**, necessitates two types of changes: an organizational change in bank operations and an individual change of behavior among personnel who interact with customers. **Organizational behavior** results from the mechanisms put in place by the company in order to foster practices that are standardized, coherent, and consistent with the advocated vision and values. The **individual behaviors** and personal attitudes of the employees

who carry out the actions must theoretically be aligned with the **organizational behavior** and vice versa. Finally, **organizational** and **individual behaviors**, fed by **e-CRM**, should increase **customer share of wallet**.

In spite of the growing popularity of the concept of **share of wallet** and its use by both academics and practitioners, the term has been neither defined nor measured (Zeithaml, 2000). The first definition in the literature is that by Evans, Keiningham, and Perkins-Munn (2003): "The percentage of the volume of total business conducted with the firm by a client organization within a 12-month period." Several new definitions are beginning to emerge, such as that of Cooil, Keiningham, Aksoy, and Hsu (2007), who propose, "**Share of wallet** is the percentage of money a customer allocates in a category that is assigned to a specific firm." Du, Kamakura, and Mela (2007) posit that "the firm's **share of wallet** of a customer as the share of total requirements across all the product categories the focal firm offers."

All of these definitions, however, lack precision. We have proposed a more complete definition of share of wallet that takes account of the

Figure 1. Organizational and individual impacts of e-CRM on increasing customer share of wallet



time factor, the continuity of the concept over time, and the types of factors influencing this continuity. Here is our proposed definition (Ben Letaifa & Perrien 2006: 141): “**Share of wallet** is the proportion of assets or business invested by a customer with a given supplier (in percentage of total business or assets invested by the customer in a given industry), over a determined time. This proportion may change over time due to personal and/or situational factors.” Situational factors are factors on which the customer may not act, but which contribute to the growth of share of wallet due to “partial” loyalty (Binks & Ennew 1996). They include opportunity costs, the lack of perceived difference among banks, local choice constraints, habit, and inertia. Customers with partial loyalty may, over the long term, reduce their **share of wallet** or even withdraw it if the situational factors change. In Great Britain, for example, in spite of a high level of dissatisfaction and a problem with service quality, SMEs show a high retention rate. This is explained by partial loyalty due to inertia, high opportunity costs, and the perception that there are few differences between banks (Binks & Ennew 1996). Personal factors, on the other hand, explain growth in **share of wallet** due to total customer loyalty on both the attitudinal and behavioral levels. In this case, there is a motivated choice ensuing from a satisfactory experience, an emotional relationship, or a preference due to the image of an institution (branding and psychogenic need for belonging and respect).

METHODOLOGY

A qualitative approach is required, allowing researchers to deal with complexity, context, and persona and the multitude of factors, relationships, and fuzzy phenomena involved (Gummesson, 2006). According to Yin (1994), the case study is the appropriate method for researching com-

plex phenomena that must be examined in their environment. This study seeks to understand how implementation of e-CRM by a pioneering Canadian bank affected organizational behavior and the individual behavior of financial advisors. The case study allows complexity to be addressed, while accepting that the subject under study may be complicated and ambiguous. In addition, the case study offers an opportunity to place variables and categories of variables in context, thus guaranteeing greater realism and relevance than does a traditional quantitative approach (Gummesson, 2006).

When qualitative methods are used, the border between academic research and management consulting becomes blurred, offering more opportunities for knowledge discovery, since the researcher plays the role of consultant in these intensive studies on the organization and organizational behavior (Gummesson, 1991). The criterion of flexibility also determines, in large part, the choice of approach. In the qualitative approach, the research question may be modified midway through so that the results will have greater internal validity (Stake, 1995).

To ensure greater validity of the data on the internal reality of the bank studied, triangulation of data was performed at two levels: triangulation of the type of data sources (primary or secondary), and a triangulation within a single series of data sources (diversification of sources of a similar nature). Triangulation puts the research tool to the test by ensuring that the results obtained are not a reflection of the methodology (Bouchard, 1976). In effect, the research was conducted according to two perspectives: the bank’s discourse through internal communications, and the personnel’s perspective – that is, its vision of the relational strategy implemented and its effectiveness.

For this bank, 10 interviews were conducted in different branches located in separate geographic locations. This was done deliberately so that the maximum information from each branch and

new information specific to this particular environment could be elicited, in order to maximize the marginal contribution of each branch investigated. It was interesting to compare different data on different neighborhoods with heterogeneous clienteles (profile, age, ethnic or religious group, portfolio diversity). The interviews were stopped when there was a sense of saturation and repetition of information. It was then no longer relevant to continue with the in-depth interviews since the maximum amount of information had been gathered. These data were compared with various secondary data (opinions of professors and experts, external statistics, and specialized and scientific articles).

The content analysis was performed with Decision Explorer software, which codified the results and facilitated viewing, analysis, and interpretation of the variables. Decision Explorer software was also used to better illustrate the relations between the different organizational, individual, and customer characteristics and to trace their impacts.

r EsULTs AND Disc Uss ION

Through the interviews conducted with financial advisors from various branches, it is possible to confirm the successful implementation of **e-CRM** at the level of operationalization of the process of gaining customer knowledge and using information. The CRM projects implemented were successful. The different CRM modules (analysis, marketing, sales, and call centre) allowed for the development of better databases, more complex segmentation of the market, more precise portfolio analysis, instant campaign management, updating and customization of Web sites, and integration of call centers. The successful implementation of the technological tools then enabled the organizational objectives of e-CRM to be attained in terms of integration of new, customer-oriented ways of doing things. All of the in-depth interviews confirmed

that the knowledge and customer-importance dimensions had been incorporated into financial advisors' values and daily routines.

Indeed, the branches chosen had successfully integrated the customer vision both internally and at the level of the financial advisors' working philosophy. However, weaknesses were observed in terms of operationalization of the CRM strategy in the evaluation and reward system, which was not aligned with the established relational objectives. Below, we give details on these observations.

t he Financial Advisors' Perspective

The IT interfaces seem very user-friendly. For instance, the advisors said that they were satisfied with the CRM tools that provided them with complete analytic dashboards on customer profiles and histories. The technology therefore provides concrete daily support for better knowledge and customer service.

The interviews conducted showed that the advisor/customer relationship is based on advice and that the advisors had incorporated the **relational approach** into their communication and working processes. The interviews also revealed an environment of respect that some called "affection" for the customer and of a culture around this affection. For instance, in response to the question "What qualities are required to be a financial advisor?" the following criteria were mentioned unanimously: "affection for the customer, a sense of listening, desire to advise, patience." Other criteria also emerged, such as "objectivity, curiosity, energy," but not as spontaneously or unanimously.

Table 1 summarizes some of the ideas that emerged during the interviews and shows how advisors understand their role and the relational approach; how advisors concretely serve their customers; the underlying daily organizational processes; the individual characteristics required, in their opinion; and their experience with and knowledge of the customer.

The table points to the following conclusions:

- The financial advisors enjoy serving their customers and feel proud to work in their bank.
- Knowledge of the customer's values will guide the choice of products or services depending on the customer profile (according to risk aversion: likes risk or prefers security)
- The financial advisors feel like true advisors and advise according to the profile of each customer and not the profitability of the products.
- According to the financial advisors, there is no problem of advisor/customer trust. The customer always comes to view the advisor as if he or she were a doctor: the advisor needs to know everything to give the best advice.
- The financial advisor always updates the customer's file according to the data supplied by the customer, even if the advisor doubts their veracity.
- There is a reciprocal emotional connection between financial advisor and customer (the necessary trigger for trust) and this connection, though it is not immediate, ends up resulting in a number of experiences that demonstrate to customers that their financial advisor is giving them better advice than they would get at other banks.
- Financial advisors have technological tools that keep track of call lists, meetings, and follow-up, as well as interfaces that include comments, notes, customer profile, life objectives, and so on.

These statements show that there is no problem with follow-up or updating of information. A contract of mutual trust is established between the customer and the advisor, and the commitment to the relationship is reciprocal. Such a high-quality

relationship flows from two processes: either an immediate trigger or connection or experiences that build trust over time. In both cases, customers develop a sense of trust that enables them to divulge all of the financial and personal information needed for proper monitoring on the customer databases.

the Perspective of secondary Data

In consulting various internal corporate documents on priorities, objectives, vision, and bank values, we observed that the customer is at the core of the corporate strategy.

Each of the dimensions in terms of priorities, objectives, and values is then disaggregated and concretized in customer-oriented actions. We observed that the relational discourse reflects an approach that is operationalized internally and a working philosophy that is now part of the institutionalized organizational learning.

The results of external sources are shown in table 2, which cross-references the data gathered from the different information sources used (primary and secondary). Specialized journals, articles, and expert opinions converge to evaluate the vision of the customer, the value of innovation and customer orientation, and the success of CRM at the bank studied, thus supporting the results of the interviews and the discourse of the internal documents consulted.

Thus, the challenges facing this institution do not reside in the process of follow-up and updating of information on customers, but in development of the resources necessary to exploit the potential of the information gathered. The high-value-added services for the bank and for the customer are financial planning and financial advice centered on the turning points of life, through a varied range of financial products and services, including deposit accounts, investments and group investment funds, credit and debit cards, individual loans, and mortgage loans.

Table 1. Summary: excerpts of key points of interviews

Category	
Advisors' approach to advising	<p>"The first thing I say to a customer is that we are going to build a relationship together and that I am here to advise you."</p> <p>"The relationship is case by case, it is between two people, not a bank and a customer."</p> <p>"After the first interview, the customer and I decide on the frequency of contact: this depends on his preferences and his portfolio ... if term deposits, and if he isn't interested, two contacts per year is enough."</p> <p>"This is what I'm advising you, and here's why."</p> <p>"Always help the customer achieve his objective according to his values, never talk in terms of products or services."</p>
Individual characteristics	<p>"You have to like the customer, be patient, know how to listen, advise, be objective."</p> <p>"A good advisor listens, advises like a doctor, finds what is best for the customer, and not necessarily for the bank."</p> <p>"The qualities required are listening, affection for the customer, organization, initiative, patience, energy."</p>
Organizational characteristics	<p>"The bank has taught us to be sure of ourselves and have trust in our rates."</p> <p>"We have interfaces that let us view psychological [with regard to risk], financial, personal characteristics ... our comments ..."</p> <p>"Our relational guide teaches us to ask questions, change the conversation, return indirectly to key points, how to pick up on ambiguities in answers without seeming to be insistent, how to ask certain sensitive questions in other ways, how to elicit certain responses ..."</p> <p>"The sales platforms let me integrate lots of complex data."</p> <p>"We have lots of latitude and responsibility."</p> <p>"The performance objectives are high."</p> <p>"The fixed pay base should be increased rather than being evaluated on a variable base, since we serve the customer before we serve the bank's interests."</p> <p>"Lots of coaching, compulsory courses..."</p> <p>"Lots of team meetings."</p> <p>"Weekly polls of the customers by our manager to check customer satisfaction..."</p>
Experiences	<p>"I always advise customers to pay their mortgages and I help them find a way to pay them, even I am penalized in my pay, since less \$\$\$..."</p> <p>"I always explain why I need information: knowing them better will enable me to offer services according to the specificities of the portfolio that they already have somewhere else; and knowing the other investments enables me to understand the deadlines and not give the same deadlines; helping them to better renew their contracts at better rates according to their future perspectives: mortgage payments, credit, education, etc."</p>
Knowledge of the customer	<p>"The customer likes continuity in the relationship, the proactiveness of the advisor, respect for confidentiality ..."</p> <p>"The customer must feel that he clicks with the advisor."</p> <p>"The customer is retained thanks to the advice that we give him and not due to the rates."</p> <p>"The fact that our position is a career position reassures customers, since they will always do business with the same person, and we know them better."</p> <p>The customer who is skeptical at first ends up through experience understanding that we are true advisors."</p> <p>"Customers like it when we send them personal cards for birthdays, weddings, etc."</p>

Table 2. Synthetic comparative analysis of the relational approach of the financial institution according to various secondary and primary sources

	Secondary sources			Primary sources	
	Specialized journals	Scientific articles	Comments by professors and experts	Internal documents	Internal interviews
Number	8	6	3	10	10
Vision	Customer vision	Customer vision	Visionary bank	Has earned its customer preference	The customer first
Values	Innovation Customer Service	Customer service	Customer Excellence	Excellence of service to customers and colleagues Collaboration toward success Personal responsibility for high returns. Diversity aiming at growth and innovation Trust inspired by integrity in all actions	Customer Efficiency Trust Commitment
CRM successes	Involvement of top management made CRM successful Creation of customer loyalty	Customizes its products and services Reduces its operating costs Creates customer loyalty	Relational approach well implemented in business processes	Success Growth of market share Creation of customer loyalty	Success Trust and commitment of customers High retention rate

The advisors interviewed complained that they were overwhelmed by administrative and clerical duties, which encroach on the time allotted to functions with a higher value added and do not require particular skills. For instance, tasks ranging from sending greeting cards (birthday, birth, wedding, etc.) to tending to mortgage and loan dossiers (an average of 2 hours to fill forms) are

done to the detriment of more complex operations such as financial review of customers' portfolios, for example, each of which requires five hours of work; the minimum requirement is set at five portfolio reviews per week.

A number of constraints at the structural level and in organization-management policies impede the achievement of the anticipated returns. Inter-

nal management procedures seem to have caused more than 90% of cases of relationship breakdown between a bank and its customer (Perrien, Paradis, & Banting, 1995). A number of researchers have

therefore proposed a redefinition of profit centers, evaluation criteria, training, and policies for management of bankers (Campbell, 2003; Perrien & Ricard, 1994). For example, banks must study

Table 3. Summary of diagnosis of gap between desired situation and real situation according to two perspectives: bank and financial advisor

		Ideal situation/goal	Real situation
Bank	Number of customer contacts/year/ advisor	4 contacts Each customer leaves with a RDV or a note for a next appointment at a specific date	Between 2 and 4 contacts Each customer leaves with a RDV or a note for a next appointment at a specific date
	No. of contacts per week (tel. and meetings)	25 contacts Close follow-up of each contact	20 to 23 contacts Close follow-up of each contact
	No. of customers per advisor	Minimum of 300 customers	400 customers on average
Advisor	Remuneration and rewards	<ul style="list-style-type: none"> • Higher base salary • Evaluation of “customer service and advice” performance • Transferability of commissions following transfer from customer to advisors on the road or representatives • Allocation of a salary scale reflecting skill level 	<ul style="list-style-type: none"> • Base salary (\$45,00–50,000) • Variable compensation depending on growth on the books • Bonus calculated on corporate and individual performance (customer polls, growth, and 12 financial plans) • Objective of \$10 million/year independent of number of customers; below \$40 million, no variable remuneration • Commission on transfers of accounts internally • Same salary scale as account managers (32)
	Administrative duties	<ul style="list-style-type: none"> • Fewer administrative tasks • Access to administrative assistants for credits, mortgages, and correspondence 	<ul style="list-style-type: none"> • Administration of loan and mortgage forms • Sending of greeting cards to customers • One assistant per six advisors

the optimal number of customers per portfolio per advisor and make sure that the rotation rate (changes of job, and thus of customers, within the firm) of advisors is not too high, so that advisors can develop a long-term relationship that is part of a logic of continuity with their customers (Perrien et al., 1993). Making a **relational approach** successful requires that more time be devoted to the customer, focusing on the customer's needs, and it is thus appropriate to give the personnel the means to perform to this end.

LIMITATIONS AND DIRECTIONS FOR RESEARCH

The research may have limitations based on the choice of certain key branches in a single banking institution. However, since the objective of the study was to evaluate the results of implementation of a relational approach, it was necessary to choose branches in a pioneering and visionary bank.

In fact, these results are not transferable to other banking institutions. First, internal environments of banks may differ (in terms of strategies, organizations, and characteristics of internal resources); second, the other banks are far from having finalized their migration to the relational approach. For instance, an ambitious study conducted by Liu (2007) with the objective of making a portrait of CRM best practices in the banking sector tried to compare five pioneering CRM projects in five banks in Europe and North America, but the results did not allow either the internal realities nor the critical issues on which the banks were working to be grasped. The analysis of the complexity of internal environments requires that case studies and a qualitative methodology be used, involving the gathering of primary data in order to observe and understand processes in their respective contexts.

CONCLUSION

Individual customer-oriented behaviors increase customer satisfaction and lead to development of long-term relationships between the organization and its customers (Chang & Lin, 2008). These relational behaviors are explained by an organizational commitment and an emotional commitment. The bank employees questioned had a high level of commitment even though the remuneration and reward system does not allow for appreciation of the quality of individual behaviors.

However, organizational and emotional commitments are reinforced by the perceived level of organizational support. This POS (perceived organizational support) is defined as the personal feeling that the organization values individuals' contribution and sees to their well-being (Chang and Lin, 2008). Due to this discrepancy, there is therefore a real risk that, over time, employees will express frustration and some lessening of motivation due to the fact that there is no model for evaluating and measuring individual relational performances. In these cases, **e-CRM** is deployed in the business procedures but not in the process for evaluating resources.

To assess the capacity to integrate **e-CRM** into internal processes, one must first identify the components of the skill of knowing the customer, a key variable in the **relational approach**. This flows from four elements (Campbell, 2003): the customer-information process; the IT marketing interface; the involvement of senior management; and **the system of evaluation and rewards**.

The customer-information process refers to a group of activities and behaviors that generate knowledge of the customer corresponding to current and potential needs for products and services (Li & Calantone, 1998). The marketing-IT interface corresponds to the processes by which senior management makes known its support for the generation and integration of cus-

customer **knowledge** within the firm. **The system of employee evaluation and rewards** concretizes the processes by which the employee's behavior is aligned with the firm's objectives in terms of generation of **customer knowledge** and integration of that knowledge into the firm's marketing strategies (Campbell, 2003).

As described in the literature review, **customer knowledge** requires an understanding of different profiles and of the benefits valued by the customer. In the banking sector, firms agreed that the knowledge management capability provided by CRM is important and has value in sustaining and maintaining **customer retention** (Richard, Thirkell, & Huff, 2007). It is therefore possible to propose that the firm's performance with regard to knowledge is conditioned by the role that its contact personnel will play (Crosby, Evans, & Cowles, 1990) and therefore by the motivation system that supports these employees and encourages them to take a **relational approach**.

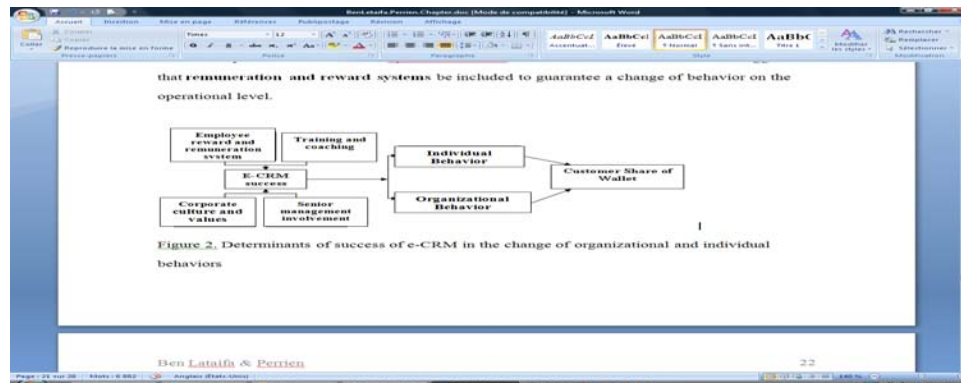
Customer knowledge has two main components: construction of this knowledge, which depends on the means of collecting information (the nature of which may be quantitative or qualitative) and transmission of data (Walser-Luchesi, 2003).

Banks would therefore have to make sure to institute internal processes necessary to knowledge of, listening to, and marketing services to customers. The bank must first institute a customer culture, build a climate of trust, and ensure the existence of mechanisms favoring better **knowledge of the customer** (Ricard & Perrien, 1999). This transformation of the corporate vision around new values will necessitate the abandonment of a logic centered on each transaction rather than on each customer. Beyond satisfying the customer who is the basis for the relationship, this means aiming to build a true win-win partnership.

Other important elements are involvement of senior management (Campbell, 2003; Forsyth, 2001; Kohli & Jaworski, 1990) and, especially, an internal reorganization of ways of doing business throughout all departments and all functions around a new common vision (Griffin & Hauser, 1991; Song & Dyer, 1995). Value cannot be generated by the purchasing of applications such as "CRM" if the firm has not already set up a customer-oriented vision and business processes (Peppers & Rogers, 2001).

The results of the empirical study have demonstrated that even when all these conditions are

Figure 2. Determinants of success of e-CRM in the change of organizational and individual behaviors



met, but the **remuneration and reward system** does not reflect the new logic of customer-oriented culture, the individual behaviors of the contact personnel may not follow corporate directives. In order to make up for this deficit, a new framework is proposed to integrate the different aspects of the successful operationalization of **e-CRM**. This new framework suggests that **remuneration and reward systems** be included to guarantee a change of behavior on the operational level.

IMPLICATIONS FOR MANAGEMENT

This chapter provides an overview of all opportunities that are presented to managers in terms of identifying factors helping to align individual behaviors with organizational behaviors to increase **share of wallet**. What emerges is that the alignment of internal processes with the CRM approach is critical. The **evaluation and reward system** does not seem to be taken into consideration in the implementation of the **relational approach**. This remains the most deficient aspect of implementation of the **relational approach**, even 10 or 20 years after it began to be studied. It would therefore be of great interest to review the measures instituted to motivate bank personnel and to encourage them to perform in a relational perspective.

Even when employees seem to have a customer-oriented attitude and say that they are very proud and very motivated to assume the role of objective, honest advisor, it would be to banks' advantage to institute mechanisms for stimulating and valuing these proactive attitudes. Indeed, employees' emotional commitment is the determining factor in an individual customer-oriented attitude (Chang & Lin, 2008). The emotional commitment, defined as an emotional identification with and commitment to the organization (Chang & Lin, 2008), is likely to bring out **individual behaviors** that conform to the organizational relational objectives.

This new avenue has great currency and relevance since the banks are still in a phase of testing of and adjustment to new internal processes that will enable them to convey their relational approach. The literature on CRM is still in its infancy (Romano & Fjermestad, 2003) and CRM has been studied mainly for its functional, operational, technological, and strategic aspects and not within a given industry (Liu, 2007). The analysis of CRM in the banking industry sheds light on the danger of focusing too closely on operationalization of CRM tools in daily activities while forgetting to develop a CRM strategy with the institution's employees. There is need for a balance between **e-CRM** and h-CRM, where "h" stands for "human" (Gummesson, 2004).

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Chapter III

Managerial Discretion and E-CRM Performance

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Abstract

Most sectors of industry, commerce, and government have reported variation in the performance payoff from electronic customer relationship management (e-CRM). In this paper we build on a surprisingly sparse literature regarding the importance of managerial discretion, to show that the heterogeneity of beliefs held by managers about e-CRM execution matter when explaining e-CRM success. Drawing on a data sample comprising 50 interviews and 293 survey responses we utilise segmentation techniques to identify significant differences in managerial beliefs and then associate these belief segments with e-CRM performance. Results indicate that three distinct types of managers can be identified based on the heterogeneity of their e-CRM beliefs: (1) mindfully optimistic, (2) mindfully realistic, and (3) mindfully pessimistic. Further, our results imply that there are far less homogeneity at the individual firm level than is normally assumed in the literature, and that heterogeneity in managerial beliefs is systematically associated with organisational performance. Finally, these results serve to remind practitioners that e-CRM performance is dependent upon the right balance between managerial optimism and realism.

Introduction

Variation in the degree of business success has been attributed to the importance of the customer

and the competitive advantages associated with a market orientation (Rust et al. 2000). One view of market orientation defines it as the ability to systematically gather and analyse customer and

competitor information, to share this market knowledge, and then to use this knowledge to guide strategy recognition, understanding, creation, selection, implementation and modification (Hunt & Morgan 1995). It should also come as no surprise that many marketers have turned to information technology—in particular customer relationship management (CRM)—as a way to support customer-oriented thinking, customer analysis and understanding (Javalgi et al. 2006; Ray et al. 2005).

According to research analyst, the Gardner Group, corporate investment in CRM technology will continue to grow at a compound annual rate of 11.7 percent during the 2006-2011 period (Lauchlan 2007). Reports of a positive link between CRM uptake and improved firm performance have been less encouraging. For example the Gartner Group, a research and advisory firm, claim that close to 50 percent of all CRM projects fail to meet expectations (*The Australian*, 8th July, 2003). Additionally, an InfoWorld survey of chief technology officers (InfoWorld 2001) found that close to 30 percent of chief technology officers said that CRM was one of the most “over hyped” technologies they had seen. A follow up survey of IT executives found that 43 percent of large companies that have deployed CRM still believe that it deserves the bad press (InfoWorld 2003).

In contrast to the above industry survey reports, the recent academic literature appears to confirm that CRM programs enhance firm performance. For instance, in a special section in the *Journal of Marketing* eight of the ten papers published—conducted in a wide variety of industry settings—came to this conclusion (Boulding et al. 2005). As a whole however, CRM is a neglected area of research where “further efforts to address its mobilization and alignment are not only warranted but desperately needed” (Zablah et al. 2003, p. 116).

One of the problems with the way CRM and performance has been measured is that the term often means different things to different people,

creating confusion and uncertainty. For example, in a series of interviews with executives, Payne and Frow (2005) found that to some, CRM meant direct mail, a loyalty scheme, help desk and call centre. Whereas, others envisioned a data warehouse, data mining, e-commerce solution or databases for sales force automation. To alleviate this problem we focus specifically on electronic customer relationship management (eCRM) programs as defined in a SAS Institute white paper (2000): “the creation of knowledge from process automation and the collection, synthesis and delivery of data derived from the Internet and information technology (IT) based interactions between the company and its customers/channel partners.” This definition captures two important aspects of eCRM: (1) IT infrastructure, and (2) e-intelligence capability. Modern IT such as relational databases, data warehousing, data mining and Internet delivery are a feature of eCRM programs that customise and enhance personal relationships with customer and suppliers. However, alone IT is an insufficient source of competitive advantage (Carr 2003). Rather, competitive advantages arise from the interpretation of data or what we refer to as “e-intelligence” in this study.¹

For many managers, eCRM creates an environment that is unfamiliar. Whenever decision makers face unfamiliar territory there is greater opportunity for managerial discretion to be seen as relevant and practically important to the final payoff. Hambrick and Finkelstein (1987) were the first to introduce and elaborate on the concept of managerial discretion as a way to reconcile polar views about how much influence executives and senior managers have on organizational outcomes. Defined as the “latitude of action” their proposition was that senior decision makers vary widely in how much discretion they have. Managerial discretion is not only theoretically important in its own right, but, is also potentially important to the complex decision making that accompanies eCRM investment programs. Yet, it is by no means clear that modern managers always engage in a

deliberate and considered way when addressing issues of whether, when and how to invest in IT programs (Swanson & Ramiller 1997; Swanson & Wang 2005).

In this paper we begin to explore this issue by investigating the effect of individual determinants of managerial discretion on organisational performance in the context of eCRM. In doing so, we extend present work in two directions: (1) we propose a new dimension of individual determinants of managerial discretion which have so far not been used, namely managerial beliefs. In this particular study, it is investigated whether managerial beliefs towards eCRM are associated with organisational performance; (2) we introduce heterogeneity into the discussion of individual determinants of managerial discretion. While accounting for heterogeneity among individuals is a common procedure in consumer behaviour studies, heterogeneity among managers with respect to individual determinants of managerial discretion has so far been neglected. We hypothesize that managers with different patterns of beliefs regarding eCRM can be identified and that segment membership is associated with eCRM performance.

The paper is structured as follows: first, we direct our attention towards the determinants of managerial discretion and the link to mindful (and mindless) behaviour. Next, we describe the empirical setting, along with a discussion of the sample and the clustering method used. Lastly, we discuss our results and offer suggestions to managers seeking to invest in eCRM programs.

c ONc EPt UAL FOUNDAt IONs

Managerial discretion is a challenging field of research. As Hambrick and Finkelstein (1987) argue, discretion is determined by three sets of factors: (1) characteristics of an organization's environment, in particular its industry; (2) the degree to which the organization itself is amenable

to execution and action; and (3) the degree to which the individual executive is able to envision a new course of action. Moreover, each of these categories holds multiple determinants of discretion, which do not necessarily co-vary (Hambrick & Abrahamson 1995). So, if a researcher wishes to empirically measure managerial discretion as it applies to eCRM programs, it is not clear how much weight should be given to environmental/industry factors posed by Hambrick and Finkelstein (1987), or organizational factors (Hannan & Freeman 1977) or individual forces (Swanson & Ramiller 1997).

Environmental Determinants of Managerial Discretion

Environments afford managerial discretion in different ways with some supporting greater variety and change than others. In some environments managers have a wide array of potential courses of action to experiment with programs such as eCRM. In other environments, few options exist. Managers are literally constrained by external forces, or there is relatively little ambiguity in the business, so only a narrow range of options is plausible among the executive (Thompson 1967).

Hambrick and Finkelstein (1987) specified seven industry level factors that determine managerial discretion: (1) product differentiability; (2) market growth; (3) industry structure; (4) demand instability; (5) quasi-legal constraints; (6) powerful outside forces; and (7) capital intensity. In a follow up empirical investigation, Finkelstein and Hambrick (1990) used qualitative assessments to show that the top management team were strongly associated with strategic persistence and conformity to industry norms in a low discretion industry (natural gas distribution) than was the case in a high discretion industry (computers).

However, this type of qualitative approach to assessing industry discretion is very limiting because it requires one to examine industries that

are unambiguous in their degrees of discretion. In reality, this is rarely the case and industry discretion is not best thought of as a unitary construct (Hambrick & Abrahamson 1995).

Organizational Determinants of Managerial Discretion

Neo-institutional theory directs us to the “rules of the game” by which players, both individuals and organizations, interact in exchange ties, be they social or economic (Carson et al. 1999). From this perspective, “neo institutionalism” recognizes the importance of embedded organizational complexity (i.e., rules of the game) and argues that hypothetically ideal strategic orientations can be fundamentally flawed. Indeed, much has been written about the inertial tendencies of organisations and about how inertia precludes choice (Hannan & Freeman 1977; Tushman & Romanelli 1985). The major forces that are thought to create inertia, and in turn, reduce executive discretions include: (1) size; (2) age; (3) culture; (4) capital intensity; (5) resource availability; and (6) internal political conditions (Hambrick and Finkelstein 1987). This line of thinking is well developed by Carson et al (1999) who theorise that first best strategic orientations, are often fundamentally flawed and therefore, are not feasible alternatives.

It is generally argued, at least among population ecology and institutional scholars, that environment and organisation characteristics generally inhibit an organisation’s ability to consider change and therefore limit the extent of managerial discretion. However, managerial discretion is not just influenced by environmental and organizational factors, but by the executive himself or herself. Research has shown that managers are remarkably adaptive even under constrained conditions and frequently find play a way to play a key role in the performance of the firm (Peteraf and Reed 2007).

Individual Determinants of Managerial Discretion

By virtue of their personal characteristics, executives and senior managers differ in the degree to which they generate and consider different investment programs (Hambrick and Finkelstein 1987). The relevant characteristics previously examined include: (1) aspiration levels; (2) level of commitment; (3) tolerance of ambiguity; (4) cognitive complexity; (6) political acumen; and (7) location of power base. This work has largely been driven by a vision of decision making that is drawn from the logic of appropriateness based on organizational rules and practices (March 1991).

An interesting twist to the research on individual discretion is the reality that because most managers are highly optimistic most of the time, there is a tendency to take unnecessary risks. Although this over optimism can be traced to many sources, one of the most powerful is the tendency by individuals to exaggerate their own talents—to believe that they are above average in their ability to implement change programs (Lavallo 2004; Powell et al. 2006). Furthermore, bandwaging behaviour of the “me too” variety where individuals seek to replicate moves by competitors has also been shown to motivate prior investment in innovation (Abrahamson 1991).

One of the most consistent findings emerging from organizational decision research is that people have very little time for problem solving and when they do undertake these activities they tend to display considerable irrationality (Brunsson 1985). They make inferential errors, create myths to account for uncertainty, and are resistant to feedback (March, 1994). In other words, scant reasoning may characterize IT related investments such as eCRM programs—with subsequent implications for firm performance. We see evidence of this in the work by Swanson and Ramiller (2005) where they suggest that

“mindless” behaviour tends to characterise IT investment decisions.

Mindful and Mindless behaviour

Mindful and mindless behaviour is a way of working that is grounded in the minds of participating individuals (managers) through a process of heedful interrelating (Weick & Roberts 1993). In the case of eCRM investment decisions, heedful interrelating arises as managers interpret and act upon a model of a changing environment and organizational situation: how they gather information; how they perceive the world around them; and whether they are able to change their perspective to reflect the situation at hand (Langer 1989).

At an individual level, mindfulness focuses on the ability to continuously create and use new categories in perception and interpretation of the world (Langer 1997, p4.). It requires the decision maker to be involved in noticing more and catching unexpected events early in their development. In contrast, mindless behaviour involves routine use of pre-existing categorisation schemes. Mindlessness is not noticing, being on automatic pilot, applying recipes, imposing old categories to classify what is seen, acting with rigidity, and mislabelling unfamiliar new contexts as old familiar contexts (Seiling & Hinrichs 2005). In other words, managers that display mindless behaviour may go through the motions of problem analysis, but they are really not listening to what is going on and display a lack of awareness of self and one's environment (Langer 1990; Weick, 2001).

Mindfulness and mindlessness draws from the “sensemaking” concept that has been shown to be critical in dynamic and turbulent environments (Weick 1993; Weick 1995). Sensemaking is a process of social construction (Burger & Luckmann 1967) in which individuals attempt to interpret order and make retrospective sense of what is occurring. It allows people to deal with uncertainty and ambiguity by creating rational

accounts of the world to support decision making and subsequent action (Maitlis 2005). Both uncertainty and ambiguity are likely to characterise eCRM programs that draw on potentially unreliable components. These components comprise IT infrastructure—databases, software and networks—and a diversity of stakeholders—executives and managers, frontline sales and business analysts, and IT professionals. Hence, the way in which individual executives and senior managers view eCRM using the concept of mindfulness and mindlessness can potentially provide an important measure of how organisations determine whether, when and how to invest in an eCRM program and the final success the company will enjoy from these programs.

DATA

A stratified random sample of 2000 senior managers was purchased from a commercially available database. The sample included five industry groups: financial and business services (39 percent), government (20 percent), retail (11 percent), manufacturing (23 percent) and primary industries (7percent). This sample structure was chosen for two reasons: (1) to avoid a systematic bias of results by environmental and organizational determinants of managerial discretion, and (2) to improve the relevance and generalisability of our results. The questionnaire—developed on the basis of insight gained from 50 interviews conducted as part of the exploratory research phase of the study—was addressed to senior managers, with care taken to ensure respondent competency. The number of responses totalled 293 (giving an 18 percent response rate).

The mean and median sizes of the organisations included in this sample amounted to 2,480 and 650 employees respectively. Tests of the distribution of returned questionnaires relative to the sample indicated that no industry or size bias existed in the responses received.

To ensure the validity of our measures, we examined key informant bias, non-response bias, common method bias, dimensionality, and convergent and discriminant validity: senior managers were targeted from three functional areas (IT, marketing, and strategy), reducing the impact of *key informant bias*. Twenty-five percent of respondents indicated that they were not interested in completing the questionnaire, 10 percent said the survey was not applicable to their firm, and a further 20 percent cited a range of reasons why they did not complete the form (the questionnaire is too long, we receive too many of these questionnaires with little apparent benefit, and so on). Based on responses obtained from a short web-based form sent to all non-respondents, the risk of *non-response bias* was not considered to be high. To test for *common method bias*, we applied Harman's *ex post* one-factor test across the entire survey (Podsakoff & Organ 1986). Thirty-eight distinct factors were needed to explain 80 percent of the variance in the measures used, with the largest factor accounting for only 11 percent of the variance. Hence, there was no "general factor" in the data that would represent a common method bias.

The questionnaire contained general questions about the organisation and the position of the respondent within this organisation. In order to be able to investigate whether a systematic association between managerial beliefs regarding eCRM and overall e-business success can be determined, a set of eight questions was included that measures managerial belief about eCRM. For example, eCRM— if implemented— would: receive support by managers in other departments, face major technological constraints, or provide joint profit opportunity for the firm and customers.

In common with work in the information systems literature we adopt a broad conceptualization of performance that captures financial and productivity measures (Kohli & Devaraj

2003). The financial performance measures include: improvement in market share, annual growth in revenue and increased total sales. The operational items reflect operational productivity across various strategic dimensions such as: the ability of e-business to offer new customer insights, to work faster and to produce highly integrated customer data.

METHODOLOGY

Heterogeneity of managerial beliefs (individual determinants of managerial discretion) was investigated by identifying groups of managers who share similar beliefs about eCRM. This was achieved by partitioning the responses of all 293 managers who have completed their questionnaires. Only five questions were included for the purpose of this study. Two main reasons led to the pre-selection of five items. First, the number of variables that can be used in clustering depends on the number of respondents: if a large number of items are used (the dimensionality of the data set is high), a sufficient sample size has to be available in order to be able to identify data patterns. Following the recommendation by Forman (1984) who states that a sample of at least 2^k is needed to segment the respondents on the basis of k binary variables; preferably $5 \cdot 2^k$ should be available. This limits the number of variables that can safely be used in our study to seven for the less and five for the stricter recommendations. Second, some of the eight variables had very low agreement levels. Following the recommendations by Frochot and Morrison (2000) a frequency criterion to variable selection was used: the three items with agreement levels of 17 percent or less were eliminated as they were not capturing a high amount of heterogeneity in beliefs.

The following five items consequently formed the segmentation base for the heterogeneity analysis:

1. "The customers and trading partners should recognize the opportunity for joint profit as a result of my business unit's e-intelligence strategy"
2. "It is only a matter of time before full scale individual customization based on electronic data is a reality"
3. "My organisation has a high level of confidence concerning our ability to successfully implement a fully integrated e-intelligence strategy"
4. "The major constraint in implementing a future e-intelligence strategy will be organisational not technological."
5. "e-intelligence systems are a way forward for bricks & mortar operations to gain a strategic advantage against e-business start-ups."

The aim of the partitioning task is to identify a set of "belief segments" among the participating managers. Within each belief segment managers are as similar as possible to each other and as different as possible from managers assigned to other belief groups. The partitioning algorithm chosen for this task was a topology-representing network (Martinetz & Schulten 1994). This procedure was chosen because topology-representing networks outperformed alternative partitioning algorithms, including the most popular k-means clustering algorithm, in an extensive comparison by (Buchta et al. 1997) in which the performance of seven partitioning algorithms was evaluated using 11 artificially generated data sets with known structure. The topology-representing network algorithm, which is similar to the popular k-means algorithm but allows for neighbouring centroids to update after each iterative step, has proven to be most successful in identifying the correct data structure of the artificial data sets in the Buchta et al. (1997) Monte Carlo simulation study.

Topology-representing networks are self-organising neural networks that group the data points into a predefined number of clusters while simultaneously arranging those clusters to topo-

logically represent the similarities between the resulting attitudinal segments. This is achieved via an iterative process that includes the following steps: (1) the number of segments to be revealed (Frank et al. 1972; Myers & Tauber 1977) or constructed (Mazanec 1997; Wedel & Kamakura 1998) is defined beforehand, (2) starting vectors are picked at random, where the number of starting vectors is equal to the number of segments and dimensionality equals the number of managerial belief statements used as segmentation basis, (3) one case—this is the pattern of agreements and disagreements of each manager with respect to all five statements—is presented to the network, (4) one of the randomly selected starting vectors is determined to be closest to the presented manager's belief pattern based on distance computation. This closest starting vector is declared the "winner" and allowed to adapt its vector values towards the values of the assigned case to a predefined extent ("learning rate"). (5) In addition to this winner, one or more neighbours of the winner are allowed to adapt their vector values to a lower extent. This process ensures that the network not only learns to best represent the managers in the data by segments, but also that neighbourhood relations between the belief segments are mirrored in the final solution. Step (5) is the only difference between the popular k-means algorithm and the topology-representing network algorithm.

This iterative and adaptive procedure is repeated numerous times for the entire data set with a decreasing learning rate. This means that rough sorting and adaptation of the random starting points takes place in the initial stages of the learning process, while the final iterations are essentially used to fine-tune the segmentation solution. After this learning phase—in which the network learns to best possibly represent the empirical data—a so-called recall run is performed in which all cases are presented to the network one more time without undertaking any more value adaptations. In this stage each manager is assigned to the group which represents his or

her view best (this centroid group has the smallest distance to the belief vector of the manager).

Clearly, the decision as to how many starting vectors to choose defines the number of belief segments that will result from the analysis. The selection of the best number of starting vectors is therefore very crucial (Thorndike 1953) and to date no optimal solution for this problem has been developed. We use the criterion of stability to choose the number of starting points; in doing so we avoid the problem that any single computation of a clustering algorithm can potentially lead to a random solution. This procedure was proposed and successfully used by Dolnicar, Grabler & Mazanec (1999) in the context of the segmentation of tourists based on their destination images. Given that data partitioning is an iterative process with a random starting solution, each computation can potentially lead to a different solution. The more similar, or stable, segmentation solutions are over multiple runs of computations, the more reliable the solution. We choose the number of clusters that leads to the most reliable solution in the following way: topology representing network solutions with segment numbers ranging from 2 to 10 were computed. For each segment number, 50 repeated computations of the topology representing networks were computed (450 computations in total) and the stability of the resulting segmentation solutions was assessed. The three-segment solution emerged as the most stable. The results from the three-segment topology representing network partitioning are discussed in detail below.

It should be mentioned that partitioning or clustering data is a data analytic procedure that is of exploratory, not confirmatory nature. Given that (1) our research problem is to investigate heterogeneity among managers and assess whether any such heterogeneity is associated in a systematic and significant way with corporate eCRM performance, and (2) no theory exists to enable the formulation of a priori hypotheses for the belief segments and the nature of belief segments be-

ing associated with performance, confirmatory methods were not suitable for our study. However, stability tests were conducted to assure that the solution presented is not a random solution that occurred in one run of the algorithm only.

Furthermore, the resulting belief segments were validated using a series of other questions that were available from the survey, such as organisational resources and assets, environmental pressures and organisational performance etc. The underlying idea of this external validation is that belief segments should reflect organisational conditions. If this is not the case, one could argue that the beliefs managers hold with respect to eCRM are irrelevant as they are neither associated with organisational assets, environmental pressures and constraints, and not with organisational success. Five criteria were used to assess the external validity of the belief segments: environmental pressures, organisational assets, the level of eCRM implementation, operational implementation constraints and firm financial performance. Given the ordinal nature of these measures, we used Chi square tests based on cross tabulations. The resulting p-values were Bonferroni corrected to account for multiple testing on one data set and avoid overestimation of significant findings due to possible interaction effects not captured by the independent testing procedure.

r Es ULts

The results of partitioning managers according to their eCRM-related beliefs, which are used as indicators of the individual determinant of managerial discretion, leads to three segments of managers which differ significantly in their agreement with statements relating to eCRM in their organisation. The segment profiles depicted in Figures 1, 2 and 3 are used to describe the groups of managers that demonstrate the highest levels of homogeneity. Each figure shows the agreement percentage of managers within the segment as columns and the

percentage of agreement in the entire sample as horizontal black bars. Segments are interpreted by comparing the segment profile with the profile of the total sample. Belief segments were interpreted in two stages. The first interpretation is provided in this section and focuses on a description of segments based solely on their responses to the segmentation variables only. This first stage could be referred to as a purely empirical interpretation of segments. In the Discussion section the empirical segment profiles are interpreted in more detail, using the concept of mindfulness as well as the dimension of optimism versus pessimism as the interpretation basis.

Empirically, Segment 1 (which is depicted in Figure 1 and contains 32 percent of all respondents) is characterised by an optimistic attitude towards eCRM in terms of joint opportunities and strategic advantages over e-business start ups. Every single manager in this segment agrees that “The customers and trading partners should recognize the opportunity for joint profit as a result of my business unit’s e-intelligence strategy”. On the other hand, not a single member of this group believes that his/her organisation has a high level of confidence concerning our ability to successfully implement a fully integrated e-intelligence strategy. This view is supported by the fact that

three quarters of all managers of this segment attribute the lack of confidence to organisational constraints. As will be described below in detail, this belief segment is consequently referred to as the “mindfully optimistic” group: they have strong views about both the advantages of eCRM and the constraints of implementing it in their organisation, while at the same time seeing great potential in adopting eCRM measures.

Segment 2 (depicted in Figure 2 and containing 32 percent of all respondents) differs from the “mindfully optimistic” segment in their assessment of their confidence to be able to successfully implement eCRM in their organisation: every single respondent classified as a member of Segment 2 agrees with this statement. This is mirrored by a lower than average agreement level with the statement that organisational constraints will stand in the way of successful implementation. Interestingly, however, this segment has a lower percentage of members who believe that customers and trading partners should recognize the joint profit opportunity of eCRM; they are slightly less optimistic regarding the strategic potential for eCRM. Most importantly the respondents in this segment believe that their organization has extensive experience dealing with eCRM related change and have in place capabilities and strategies to successfully implement complex

Figure 1. Managerial belief segment 1: Mindful optimists

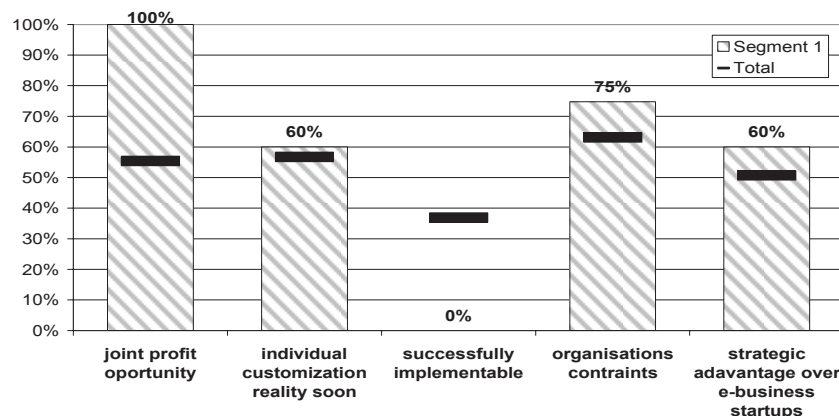


Figure 2. Managerial belief segment 2: Mindful realists

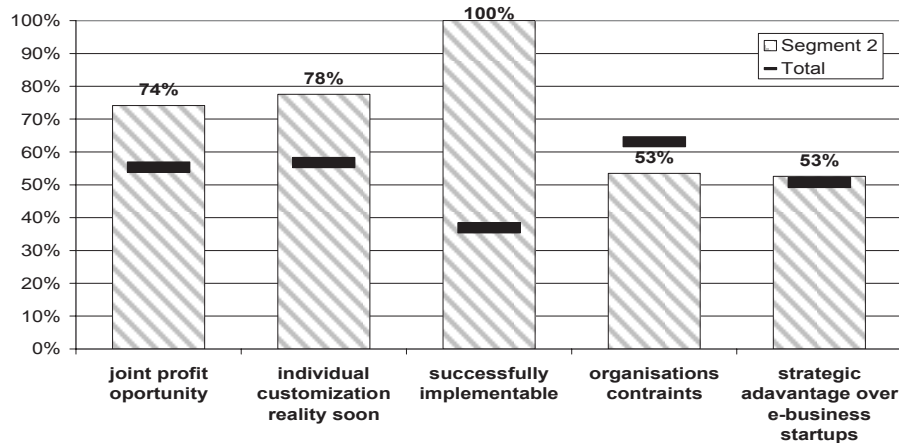
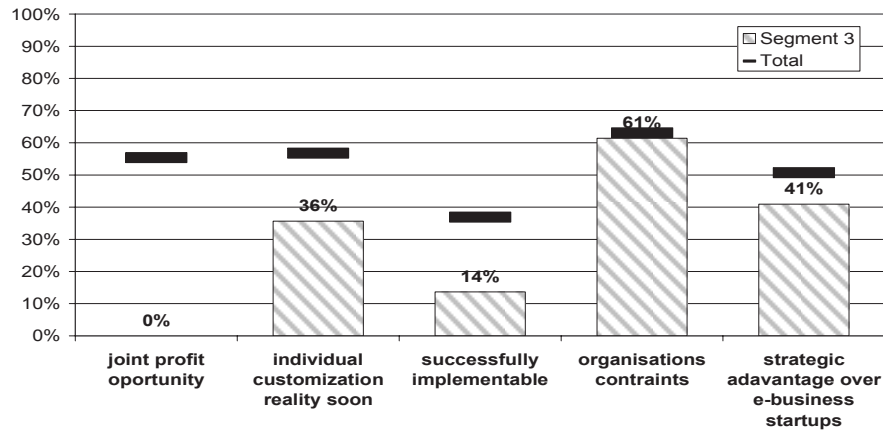


Figure 3. Managerial belief segment 3: Mindful pessimists



IT applications. This segment is referred to as “mindfully realistic”: managers in this group express an informed view which is characterized by a cautious evaluation of the opportunities and a high level of confidence in the implementation capability.

Finally, managers assigned to Segment 3—and depicted in Figure 3—contain the largest proportion of managers: 36 percent of the sample. These managers do not see any great benefit in eCRM. There is a distinct lack of support regarding the potential for strategic and performance improve-

ment. Further, there is a general lack of support for individual customization. This more modest view of eCRM is unlikely to provide sufficient incentive to lead to the changes in organisation, process, training and reward systems that eCRM demands. Indeed, there is little confidence that the organization can successfully implement eCRM even though the organizational constraints are not insurmountable. This segment is referred to as being “mindfully pessimistic”: managers in this group do not see much value in eCRM and—in addition to that—do not think they could suc-

Table 1. Background variable analysis

	Per cent by segment			
	1	2	3	p-value
<i>Environmental Pressures (agree/strongly agree):</i>				
Internet is improving competitive standing of the firm	30	52	24	<.01
eCRM has the ability to create new value for our major customers	51	73	37	<.01
Relationships with major customers would have suffered with eCRM	41	51	25	<.01
<i>Organizational Assets (agree/strongly agree):</i>				
Importance of customer relationship know how to firm	90	87	73	<.05
Staff understand the nature of interactive media such as eCRM	18	43	21	<.01
Real time updates of customer transactional data are a reality in our firm	22	45	27	<.02
<i>Level of e-CRM Implementation</i>				
Have successfully integrated eCRM into core systems	15	28	15	<.01
<i>Operational Implementation Constraints (agree/strongly agree):</i>				
Difficult pay only cursory attention to e-CRM because they are more concerned with areas generating immediate cash flow and profitability	70	34	56	<.01
When deciding among strategic alternatives, political influence & parochial interest play a crucial role	47	29	41	n.s.
Gaining consensus is a major hurdle in deciding on new business strategies	54	33	48	<.01
<i>Firm financial performance (agree/strongly agree):</i>				
Increased market share	4	16	6	<.03
Increased total sales (revenue turnover)	3	22	9	<.01
Annual growth in revenue	8	25	15	<.05
<i>Operational performance (agree/strongly agree):</i>				
Able to offer new insights into customer needs	35	60	31	<.01
Faster response to customer needs (agree/strongly agree)	66	79	52	<.01
Integrated customer data	30	48	27	<.02

successfully implement it in their organisation and would face organisational constraints in trying to do so.

Given this heterogeneity in managerial beliefs it is reasonable to assume that an association with organisation-level indicators could be detected. In order to assess whether this is indeed the case the segments selected were evaluated against variables other than the individual discretion variables used to generate the solutions above. While the segmentation analysis focused on the individual determinants of managerial discretion, the additional variables used for the external validation of segments (see Table 1) capture the environmental and organizational dimensions of managerial discretion (Hambrick and Finkelstein 1987). Table 1 contains the percentage of managers within each of the belief segments who

either agree or strongly agree with the organisation—level statements in the first column of the table. As can be seen, organisations in Segment 2 face significantly higher environmental pressures and possess higher levels of organisational assets. Further, they have significantly higher experience in successfully implementing eCRM programs (28 percent of organisations as opposed to 15 percent in the case of both Segment 1 and segment 2 organisations). Perhaps not surprisingly, they also demonstrate significantly better results in terms of financial and operational performance.

These results confirm the importance of environmental and organisational measures in the determination of managerial discretion for managers in Segment 1, and to a lesser degree, managers in Segment 2. The results also confirm the importance of implementation constraints to

Segment 1 and appear to suggest that managers in Segment 1 should have strong reservations about their ability to successfully execute eCRM. Interestingly, they also highlight the financial and operational performance differences, with Segment 2 leading the way on both measures.

Discussion

Although an examination of the popular press indicates that managerial discretion is critical to organizational success and a general reading of the qualitative academic management literature would support this belief, almost all of our main-line empirical theories ignore executive beliefs and intentions except in the most superficial of ways (Finkelstein & Hambrick 1996). Furthermore, qualitative descriptions of the way executives and senior managers behave in organizations continues to show that they spend very little time on decision making or making choices—when they do undertake these activities they tend to display considerable irrationality (Brunnsen 1985).

As the data in this study suggests, considerable variance exists across the three elements of managerial discretion (i.e., environmental, organizational and individual) that have been conceptualised in our section titled “Conceptual Foundations”. Further, the individual dimension of managerial discretion is systematically and significantly associated with environmental and organizational determinants, indicating the concept of mindfulness plays a major role in managerial discretion and, consequently, corporate performance.

The attitudinal responses and background measures in Segment 1 imply that eCRM will be strategically important and is expected to deliver performance improvement. However, it is also widely acknowledged that it will be very difficult to integrate eCRM into core systems. These difficulties arise because of pressures for short term results that drive parochial interests

and a lack of consensus across stakeholders in the organization. These results indicate that managers are “mindful” of the benefits and constraints. However, the poor performance by companies in this sector across financial and operational measures suggests a degree of over optimism. We label the managers in this segment as *mindfully optimistic* to reflect an awareness of what is going on around them that is moderated by an inability to flawlessly execute. This view of marketing strategy is consistent with recent work by Nohria *et al* (2003) on the role of strategy versus implementation. According to Nohria it matters less which strategy is picked by a firm as long as implementation is achievable.

In common with managers in Segment 1 there is no shortage of belief about what is going on around them and the subsequent benefits of eCRM. This situation is characteristic of mindful behaviour and is beneficial because eCRM change requires companies to generate enthusiasm and create the motivation for change. The trick is to balance optimism with an ability to generate realistic assessments of whether this type of change is feasible. Companies in Segment 2 are the best performers (see Table 1 scores for both financial and operational performance) and the results in Figure 2 suggest that managers have a realistic appreciation for the likely benefits. We label the managers in this segment as *mindfully realistic* where managerial discretion is driven by actions and beliefs.

Lastly, in Segment 3, industry and organizational pressures act to limit managerial discretion and subsequent performance. The operational reality for decision makers in this segment is that their customers are likely to be at different states or levels of relationship development and consequently the opportunity for strategic benefit is low. The managers in this segment recognise that there is less of a market landscape into which they can attempt to “fit” an eCRM program. Although, operational constraints are not insurmountable the managers in this segment

remain pessimistic about the value of eCRM given the expenses involved and the expected difficulty involved in integrating existing business processes. This fact was pointedly laid out by a financial manager from a firm in this segment: "I would say we're in a maturity curve where we've gone from the crawling stage and now we're just stumbling around. I don't think anyone's really got it down pat." We label the managers in this segment as *mindfully pessimistic*.

It should be noted at this point that no segment emerged that could be labelled as "mindless". While this particular sample of managers did not reveal a mindless segment, it is likely that other samples – particularly such that include lower level managers – would lead to a belief segment that would indicate mindlessness as characterised by Seiling & Hinrichs (2005). Such managers are more unlikely to have a clear view on the potential of eCRM activities and/or not be in the position to judge the organisation's capability to implement such technology.

Managerial Implications

As businesses depend increasingly on information systems such as eCRM, it becomes important that managers come to grips with the complexity that accompanies imperfect technology (Sipior and Ward 1998), uncontrollable user behaviours (Orlikowski 1996) and dynamic environments (Mendelson and Pillai 1998). The conundrum for managers is that eCRM programs offer most benefit when integrated throughout the enterprise. Yet, in achieving new levels of eCRM integration managers must rely on unreliable components (human and technological) for reliable delivery of customer relationships and financial performance. This difficulty is rarely acknowledged and an important managerial implication from managerial discretion and mindfulness theory is that eCRM performance arises not from abstract strategies or plans, but rather from an ongoing focus on operational execution (Weick and Sutcliffe 2001).

In many organizations the extent to which they possess the capabilities to implement sophisticated marketing and operational change programs varies considerably. In some cases, their IT infrastructure, legacy customer databases, and the software to manipulate customer data is simply not designed to support widely accessible customer data. In other cases, the diversity of stakeholders involved in a CRM program (e.g., frontline sales, business analysts, IT professionals and functional managers) creates accountability issues that can frustrate the organisational transformation necessary to support an eCRM strategy. This study has shown that the essence of good eCRM management appears to have more to do with the ability to act. To this point, it appears that managerial discretion is an important managerial skill that has been under emphasized in the literature.

study Limitations

As any study, our research has limitations that qualify our findings and present opportunities for future research. Firstly, the cross-sectional design employed does not enable us to explore the role of managerial discretion over time. Although it is often argued that cross-sectional designs are justified in exploratory studies that seek to identify emerging theoretical perspectives, this does not escape the inability of this type of design to fully capture the complexity in eCRM which inherently assumes contact over a certain period of time before eCRM success translates into improved key performance indicators of organizations. Therefore, the results of this study should be viewed as preliminary evidence regarding the varying criteria of eCRM. This reinforces the now customary call for the use of longitudinal studies to corroborate cross-sectional findings.

The data collection approach deserves mention. First, performance was measured using subjective assessments relative to other businesses in the same industry. Potential reporting biases can exist when personal judgments are

used to evaluate competitive positioning in an industry. Although research has shown that self-reported performance data are generally reliable (e.g., Dess and Robinson 1984) and represent a valid way to operationalise financial performance (Dess & Robinson 1984; Fryxell & Wang 1994), caution needs to be exercised in interpreting our results. Ideally, we would wish to validate and complement such measures with objective data on financial performance, together with various operational metrics that would better explain any excess rents. The ability to measure financial and operational dimensions more fully to eliminate potential biases would undoubtedly provide a richer depiction of e-business performance. Unfortunately such data is hard to obtain, partly because of the difficulty of extracting the data relevant to the business unit being studied from more aggregate corporate accounts, but also for reasons of commercial confidentiality.

CONCLUSION

Managerial discretion is a concept of great potential significance, both as a theoretical construct and as a practitioner tool to improve organisational phenomena such as eCRM. However, discretion is a multifaceted, highly abstract concept that, by its very nature, cannot be directly observed (Hambrick & Abrahamson 1995). What this means is that in environments such as eCRM where the linkages between actions and outcomes are often uncertain, the research design must be more explicit in an attempt to evaluate the role of managerial discretion and take into account heterogeneity in all dimensions of managerial discretion: individual, environmental and organizational. As noted by one manager in a large retail chain interviewed for the study, opinion matters and whose opinion is being voiced is not irrelevant!

Probably the biggest impediment so far has been serious doubts by the Managing Director in particular and other senior managers about the value of e-business. Some of them think this is really a flash in the pan, they spend a lot of money then find out it's just a passing phase and then why did we bother to spend all that money and waste all that time with it.

Our results show that managers hold very different views about the impact of eCRM programs on firm performance. It is easy therefore, to see that the payoff from seeing the world in the right way can be substantial. Marketing researchers have access to a suite of measurement techniques (e.g., discrete choice modelling) that can be used to model stated preferences and begin to better understand the role of managerial optimism, beliefs and judgment. This may shed new light on a source of valuable information as to why certain firms succeed while others fail.

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ENDNOT E

- ¹ In this study, *e-intelligence* is defined as the adding of intelligence to electronic data. It represents the creation of knowledge from the information flowing into the firm from its web-based and traditional systems. It allows companies to customize and enhance personalized relationships with customers and suppliers and improve the effectiveness and profitability of business processes and operations.

Chapter IV

Multi-Channel Retailing and Customer Satisfaction: Implications for E-CRM

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Abstr Act

Multi-channel retailers that utilize an e-CRM approach stand to benefit in multiple arenas by providing targeted customer service as well as gaining operational and competitive advantages. To that end, it is inherent that multi-channel retailers better understand how satisfaction—a necessary condition for building customer loyalty—influences consumers' decisions to shop in one retail channel or another. The purpose of this study was to examine the influence of shopping experience on customers' future purchase intentions, both for the retailer and for the channel. Using a controlled experimental design, U.S. and European subjects responded to a series of questions regarding the likelihood making a future purchase following either a positive or negative shopping encounter. Results suggest that shopping intentions vary based on the shopping channel as well as cultural differences.

INTR ODUCT ION

Retailers are being advised that the future of retail will belong to those who execute seamless multi-channel access (Chu & Pike, 2002; Close, 2002; Johnson, 2004; Pastore, 2000; Thompson, 2003). The reason is quite simple—retailers must be where shoppers want them, when they want them...anytime, anywhere, and in multiple formats (Feinberg, Trotter, & Anton, 2000). If customers want to shop from a store, retailers must have a physical location; if customers want to shop over the telephone, retailers must be available by phone; if customers want to shop over the Internet, retailers must be accessible online. And, in the future, if customers want to shop via a wireless device, retailers must be available by wireless. Multi-channel access is considered one of the top 10 trends for all businesses in the next decade (Ernst & Young, 2003; Feinberg & Trotter, 2003; Levy & Weitz, 2003). Indeed, surveys show that consumers not only want multi-channel access, they expect it (Burke, 2000; Johnson, 2004).

Electronic customer relationship management (e-CRM) has the potential to enable retailers to better meet the needs of their customers across retail formats and, at the same time, maximize the strategic benefits of a multi-channel strategy. By effectively using modern information technology, retailers are able to offer shoppers the advantages of a one-to-one relationship, yet reap the profit savings that accrue from mass-market operating efficiencies (Chen & Chen, 2004). Customer retention lies at the heart of e-CRM. As such, e-CRM is increasingly viewed as vital to building and maintaining customer loyalty.

The research on e-CRM has been very conceptual in nature outlining research agendas and possible strategic models of the nature and scope of e-CRM (e.g., Parasuraman & Zinkham, 2002; Varadarajan & Yadav, 2002). The most recent review of the e-CRM literature suggests that we really know three things about e-CRM (Zeithaml, Parasuraman, & Malhotra, 2002).

1. E-CRM is multidimensional and each study examines a “favorite” attribute it finds to be important. But, as yet, we do not know if ease of use, privacy, site design, or any of a variety of attributes is determinant of some e-CRM outcome.
2. Consumers really care about e-CRM after negative online shopping or service experiences. Consumers seem less concerned with e-CRM issues following routine Web interactions.
3. While there is anecdotal evidence to suggest e-satisfaction to be important for purchase, repurchase, and loyalty, the evidence is simply not empirical and/or strong.

In reading Zeithaml et al.’s (2002) review of the e-CRM literature, it appears that e-CRM is seen as an independent issue from other points (channels) of satisfaction. The conceptual point of this study is that e-CRM is part of a broader issue of customer satisfaction. What happens in the “e” channel, what happens in the store channel, and what happens in any other channel has an effect within the channel it occurs and in the retailer’s other channels.

Satisfaction is a key determinant of retail customer loyalty (Cronin, Brady, & Hult, 2000). To date, the extant research is relatively silent regarding the effect of shopping satisfaction (or dissatisfaction) on consumers’ channel choices. The goal of this study was to assess the effect of a satisfactory/dissatisfactory shopping experience on customers’ future shopping intentions for the retailer, the shopping channel, and alternative shopping channels. What is the likelihood of purchase from a retailer in the same or different channel following a positive or negative shopping experience? There is some evidence to suggest that multi-channel shoppers are actually not very loyal to any particular retailer (Reda, 2002). As such, this study employs an experimental design to determine what effect experience (satisfying, dissatisfying) in a particular channel (store, catalog,

or Internet) will have on a customer's decision to shop with the same retailer in the same channel, a different retailer in the same channel, and the same retailer in a different channel.

customer satisfaction and Multi-channel retailing

Multi-channel access allows retailers to reach a greater market and to leverage their skills and assets to increase sales and profits. It allows a single organization to overcome the limitations of any single channel. The goal of retailing is to attract consumers, keep consumers, and increase "wallet share," and a multi-channel presence increases the probability of all three (Chu & Pike, 2002).

One can construct an argument for the importance of multi-channel retailing for retail success by noticing that most of retail sales on the Internet are done by multi-channel retailers (Johnson, 2004). Research on multi-channel retailing has focused on the factors that drive channel choice (e.g., Burke, 2000; Chu & Pike, 2002; Inman, Shankar, & Ferraro, 2004; Wu, Mahajan, & Balasubramanian, 2003) and the nature of the multi-channel shopping experience generally (Burke, 2000). As reported by Chu and Pike (2002), the National Retail Federation's Shop.org found that 78% of online shoppers also made a purchase at the retailer's physical store and 45% bought merchandise from the retailer's catalog. The same study reported that 23% of catalog shoppers also shopped at the retailer's Internet site (e.g., an Eddie Bauer catalog shopper also purchased at eddiebauer.com). Only 6% of store shoppers purchased from the retailer's online site. However, slightly more than half of catalog shoppers and 75% of store shoppers search for pre-purchase information online.

Unfortunately, research has neglected the complex relationship between shopping experiences and future shopping behavior in a multi-channel environment. The complexity of the relationship

between store-based, catalog, and online shopping extends beyond the mere description of what people are doing inter- and intra-channel. It encompasses the relationship between encounters in one channel and subsequent decisions to shop in the same or another channel. Is a good experience in one channel equivalent to a good experience in another channel as it relates to future channel choice? Indeed a recent study showed very clearly that there are tradeoffs that consumers make between channels and these tradeoffs are not equal; a positive/negative experience differs in value depending on the channel and the resulting choices differ as well (Keen, Wetzels, de Ruyter, & Feinberg, 2004).

Substantial research supports the premise that satisfaction/dissatisfaction of customer experience in a store has a direct impact on the probability of revisit to the store (e.g., Feinberg, 2001; Fornell, Johnson, Anderson, Cha, & Bryant, 1996; Loveman, 1998; Rust & Zahorik, 1993; Rust, Zeithaml, & Lemon, 2000). Satisfaction is generally viewed as the foundation for any marketing relationship (e.g., Morgan & Hunt, 1994; Selnes, 1998). Research on e-retailing has been founded on the same premise with the same general finding: customer satisfaction is related to return visits to a Web site (Balasubramanian, Konana, & Menon, 2003; Freed, 2003; Reibstein, 2002; Zeithaml et al., 2002). The belief in customer satisfaction as the "prime directive" of the retail-consumer relationships is further supported by the extensive range of popular books on the subject (e.g., Blanchard & Bowles, 1993; Sewell & Brown, 2002). If customer satisfaction is important for decisions in one channel alone, there is likely to be some relationship between the satisfaction in one channel and future channel decisions. Multi-channel retailers will benefit from understanding the nuances of these effects and be better able to successfully implement and fine tune e-CRM strategies.

Hypothesis Development

Even if a one-to-one relationship between experience and choice is subject to some variation, it is clear that there should be a relationship. Positive retail encounters influence the likelihood that consumers will revisit and possibly buy again from a retailer on future shopping trips (Cronin et al., 2000). Thus, satisfied shoppers are likely to shop again from a given retailer in the same channel (i.e., store, catalog, or Internet). In other words, a positive experience with Retailer A in a particular channel (e.g., store) will have an impact on a subsequent decision to patronize Retailer A in that same channel.

H1: There is a direct positive relationship between a satisfying shopping experience with a retailer in a given channel and a consumer's willingness to patronize the retailer in the *same* channel in the future.

A favorable shopping experience with a retailer in a particular channel is likely to increase the possibility of shopping with the retailer across all channels. Brand recognition and the value associated with the retailer in one channel is transferred to the retailer in all channels in the same manner that positive beliefs about a core brand favorably influence consumers' evaluations of the brand's extensions (e.g., Randall, Ulrich, & Reibstein, 1998). This effect occurs as a result of a categorization process whereby feelings and beliefs are transferred by association to other stimuli that are similar. For example, a consumer's positive experience with a multi-channel retailer in the store channel leads to the belief that the consumer will have a positive shopping experience at the retailer's Web site or from the retailer's catalog. Negative experiences should lead to lower probability in the same way; that is, a negative shopping experience at the retailer's store lowers the probability of shopping at the retailer's Internet site or from their catalog.

H2: There is a direct positive relationship between a satisfying shopping experience with a retailer in a given channel and a consumer's willingness to patronize the retailer in a *different* channel in the future.

Finally, it is likely that consumers show a preference for shopping in a particular channel. Whereas some consumers prefer store-based shopping, non-store retail, particularly the Internet, is increasing in popularity. Despite a lack of empirical evidence, it is logical to assume a satisfying shopping experience in a given channel will influence preference for that channel in the future. Thus, it is expected that a positive shopping experience online is likely to build a consumer's confidence in shopping online, which, in turn, enhances the likelihood of shopping online in the future. Similarly, a positive catalog shopping experience is likely to reinforce a consumer's decision to shop and purchase from catalogs in the future. Alternatively, a negative shopping experience in a given channel is likely to have an unfavorable impact on the probability of shopping in the channel in the future.

H3: There is a direct positive relationship between a satisfying shopping experience in a given channel and a consumer's willingness to shop in the *same* channel in the future.

METHODOLOGY

A 3 (shopping channel) by 2 (shopping experience) factorial design was employed to test the hypotheses. An experimental design was chosen as a first attempt at looking at this issue because of the high degree of control and ability to achieve cause and effect understanding of this issue. To add to the conceptual validity, the study was replicated with a European sample. As a result, the experimental design was a 2 (U.S., Dutch) x 3 x 2.

stimulus Material

A scenario approach was employed to manipulate shopping channel and shopping experience. A shopper was described as having either a satisfactory or dissatisfactory shopping experience in one of three different shopping channel contexts (store, Internet, or catalog). Subjects in each sample (U.S., Dutch) were randomly assigned to read one of the six scenarios (see Appendix A for the scenarios).

A pretest with a U.S. sample was conducted to confirm that the positive retail shopping experience generated greater positive effect than the negative shopping experience. The stimulus material used for the study in Holland was identical to that of the U.S. study since all student subjects in Holland take their classes in English. Pretests indicated that the manipulations were effective in the Dutch sample and that there were no sources of misunderstanding.

Dependent Measures

A series of six questions were developed to assess future shopping intentions. Subjects were asked to indicate the likelihood the shopper described in the scenario would make a future purchase from the same retailer in the same channel, from the same retailer in a different channel, from a different retailer in the same channel, or from a different retailer in a different channel. Responses were recorded using 5-point scales ranging from not likely at all (1) to extremely likely (5) (see Appendix A for item descriptions).

Procedure

A convenience sample of undergraduate students was drawn from two universities; 148 of the 353 subjects were enrolled at a major Midwestern university in the U.S. The remaining 205 subjects attended a well-known university in Holland. Subjects were instructed to read the short narra-

tive appropriate for their experimental condition. Subjects then completed a manipulation check question followed by the set of six dependent measures for assessing future shopping intentions.

RESULTS

Preliminary Analysis

A check for the shopping experience manipulation yielded a significant main effect ($p < .05$) with the negative experience leading to a less satisfactory response than the positive experience. There were no interactions. Thus, the manipulation of shopping experience was successful.

Hypothesis testing

ANOVA was used to determine whether shoppers would be willing to return to the same retailer in the same channel following a satisfactory shopping experience. The analysis revealed a main effect for shopping with the retailer again in the same channel. As hypothesized, when subjects were asked the likelihood of repurchase from the same retailer in the same channel, a negative shopping experience led to a lower probability of repurchase ($M = 1.60$) than a positive shopping experience ($M = 4.30$). Thus, H1 was supported.

The analysis also showed that the probability of purchasing again in the same channel from the same retailer is not equal for all channels ($F(2, 341) = 6.67, p < .05$). Subjects in the store treatment group were significantly more likely to repeat purchase from the same retailer in the same channel than those in either the catalog or Internet treatment groups. This was primarily due to the variation between the channel treatment groups in the U.S. sample. In other words, a significant interaction was found between country (i.e., U.S., Dutch) and shopping channel ($F(1, 341) = 4.2, p < .05$). Subjects in the U.S. store treatment group were significantly more

Table 1. ANOVA findings

	^F G	^F C	^F E	^F G*C	^F C*E	^F G*E	^F G*E*C	R ²	Over- all ^F
Same Retailer Same Channel	3.24	6.67*	1022.07*	4.21*	.34	.31	.92	.76	98.62*
Same Retailer Different Chan- nel	15.82*	5.69*	294.15*	5.34*	3.43*	1.50	2.30	.51	32.61*
Different Re- tailer Same Channel	3.36	23.59*	19.57*	2.53	33.30*	1.58	.33	.30	13.56*

Note: G = U.S./Dutch, C = Channel (Internet/Store/Catalog), E = Shopping Experience (Satisfactory/Dissatisfactory) * $p < .05$

likely to return to the same retailer/same channel (M=3.33) than store subjects in the Dutch sample (M=2.95). Essentially, there was no significant difference in the likelihood of purchasing again from the same retailer/same channel among the three channel treatment groups in the European sample (Table 2). In contrast, in the U.S. sample, the likelihood of purchasing again from the same retailer/same channel was significantly greater for the store treatment group than for the catalog and the Internet treatment groups ($p > .05$).

H2 predicted that a satisfying shopping experience with a particular retailer would increase the likelihood of shopping again with the retailer in other channels. ANOVA indicated that shopping channel interacted with shopping experience ($F(1,341) = 3.43$, $p < .05$). More specifically, the likelihood of purchasing from a retailer in a different channel was significant for all three channel treatment groups; however, shopping experience affected channel treatment groups differently. Subjects in the store treatment group (M=3.49) were less willing than Internet (M= 3.63) or

Table 2. Means: U.S. and Dutch subjects by channel

Same Retailer Same Channel		
Channel	U.S.	Dutch
Internet	2.76	2.95
Store	3.33	2.95
Catalog	2.92	2.67
Same Retailer Different Channel		
Channel	U.S.	Dutch
Internet	3.08	3.06
Store	3.10	2.43
Catalog	3.18	2.89
Different Retailer Same Channel		
Channel	U.S.	Dutch
Internet	2.90	3.05
Store	3.25	3.70
Catalog	2.72	2.65

catalog subjects ($M=3.85$) to consider shopping from the retailer in a different channel following a satisfactory experience. Similarly, subjects in the store treatment group were the least likely to consider a future purchase from the retailer in a different channel following a negative shopping experience (Table 3). These findings lend support for H2.

Additionally, a significant interaction was found between shopping channel and country ($F(1,341)=5.34$, $p<.05$). Subjects in the U.S. store treatment group were significantly more likely ($M=3.10$) than store subjects in the Dutch sample

($M=2.43$) to make a future purchase from the retailer in a different channel (Table 2). Whereas, very little difference occurred between shopping channel treatment groups in the U.S. sample, the likelihood of shopping again from the same retailer in a different channel varied significantly across treatment groups in the Dutch sample with means of 2.43, 2.89, and 3.06 for store, catalog, and Internet, respectively.

According to H3, the greater the shopping satisfaction, the more likely shoppers will be to return and shop again from the same channel. The findings from H1 provide some support for this hypothesis as consumers were indeed willing to revisit the retailer in the same channel following a satisfactory shopping encounter. To test H3, the subjects were asked the likelihood of shopping in the same channel from a *different* retailer. The data analysis revealed a significant main effect for shopping experience ($F(1, 341)=19.57$, $p<.05$), a significant main effect for shopping channel ($F(2, 341)= 23.59$, $p<.05$), and a significant shopping channel by shopping experience interaction ($F(2,341)=33.3$, $p<.05$). When asked the likelihood of making a future purchase from a different Internet retailer, subjects in the satisfied Internet treatment group were more likely ($M=3.15$) than subjects in the dissatisfied treatment group ($M=2.80$) to do so. Conversely, subjects in the satisfied store treatment group were less likely ($M=2.73$) than subjects in the dissatisfied store treatment group (4.22) to make a future purchase from a different store retailer. There was not a significant difference among the two shopping experience treatments for the catalog subjects. The implications of this finding will be discussed in the following section. The findings provide only partial support for H3.

Discussion and Implications

The primary objective of this study was to examine the effect of retail channel (i.e., store, catalog, and Internet) and shopping experience on future

Table 3. Means: Positive/negative shopping experience by channel

Same Retailer Same Channel		
Channel	Experience	
	Positive	Negative
Internet	4.20	1.51
Store	4.41	1.87
Catalog	4.14	1.45
Same Retailer Different Channel		
Channel	Experience	
	Positive	Negative
Internet	3.63	2.52
Store	3.49	2.05
Catalog	3.85	2.22
Different Retailer Same Channel		
Channel	Experience	
	Positive	Negative
Internet	3.15	2.80
Store	2.73	4.22
Catalog	2.62	2.74

shopping intentions. To provide further support for the findings, samples were drawn from both the U.S. and the Netherlands.

As predicted, the findings for H1 show that a satisfying shopping experience will increase the likelihood of returning to shop with the retailer again in the same channel. While this finding is not surprising, the analysis suggests that there is significantly greater variation in this effect across retail channels among U.S. shoppers than among Dutch shoppers. Thus, cultural differences may affect how consumers respond to satisfying (or dissatisfying) experiences in different retail channels.

The findings for H2 suggest that satisfactory shopping experiences will encourage customers to patronize a retailer in more than a single channel. On the other hand, negative shopping experiences will decrease the likelihood customers will shop with the retailer in alternative channels. Whereas, subjects' responses across channels were similar for positive experiences, future purchase intentions for negative shopping experiences varied. This finding supports the notion that channels are not neutral vessels of experience but differ in important ways. In this study, Internet shoppers were significantly more likely to patronize another channel (with the same retailer) than were store shoppers or catalog shoppers following a dissatisfactory experience. Intuitively, this seems reasonable as Internet shoppers are usually store shoppers as well, but store shoppers are not always Internet shoppers. In other words, when a consumer's Internet shopping encounter is less than satisfactory, the person is likely to attribute some of the negative experience to the channel. For a store shopper, the negative encounter will weaken the likelihood the person will consider shopping with the retailer online or through a catalog. Thus, channel characteristics play a role in how a negative encounter influences a shopper's future shopping intentions.

Finally, the findings from H3 further demonstrate the impact that retail channels may

have on influencing consumers' future shopping intentions. The response to shopping experience was similar for subjects in the catalog treatment groups. Based on this result, dissatisfied catalog shoppers were equally as likely as satisfied catalog shoppers to consider making a future purchase from a catalog retailer in the future. The effect of a negative catalog shopping encounter seems to have very little effect on the decision to shop in the future from catalog retailers. A negative shopping encounter significantly increased the likelihood that a store shopper would purchase from a competing store retailer. Interestingly, the effect was reversed for the Internet shoppers. A negative shopping encounter significantly decreased the likelihood that an Internet shopper would purchase from a competing Internet retailer. In other words, satisfied Internet shoppers were more likely than dissatisfied Internet shoppers to express a willingness to purchase from a competing Internet retailer. Thus, satisfied Internet shoppers will return to the channel again but not the retailer. In essence, all Internet retailers benefit from positive Internet experiences. On the other hand, dissatisfied Internet shoppers will not only choose another retailer, but they will also choose another channel. This could mean that repeat purchase behavior, and even customer loyalty, is more difficult to sustain in the Internet channel as compared to other retail channels. Further research is needed to more thoroughly investigate these interpretations.

cON c LUsION

If retailers are offering shoppers multiple channel options now, it is expected that pressure will increase for all retailers to do so in the future. The findings of this study suggest that above all else channel satisfaction/dissatisfaction is a significant issue—but not in an equal way. For some channels, satisfaction/dissatisfaction has a greater or lesser impact. In addition, channels are

not all equal. Independent of satisfaction and dissatisfaction the likelihood of switching channels and switching retailers differs across the three channels studied.

Here are the major lessons learned from this study:

1. A positive experience is the prime directive for any retailer hoping to keep a consumer loyal to any particular channel.
2. A positive experience in the Internet channel may actually increase the likelihood of trying the Internet channel of another retailer. This may have significant implications for e-retailing. Clearly the goal of e-retailing is to move store and catalog customers to “e.” Yet in doing so a retailer may dig their own grave by also making it likely the consumer will try another Internet retailer also. If their experience at that site is more positive than the original retail site the unintended side effect of moving a consumer to “your” site is destroyed.
3. The European/American differences are important. The differences by sample group suggest that there are differing retail experiences across cultures, and these differences affect consumer behavior. The lack of consistency in the findings here suggests that cross-cultural studies need to be very careful in explaining and generalizing their findings. European studies need to be sensitive to the fact that their results might differ from U.S. results and vice versa. Internet/store/catalog shopping in the U.S. differs from Europe, and these differences may result in consumer behavior that differs for the same stimulus environment.

There are a number of multi-channel opportunities for retailers. Retailers can leverage strong brand value by adding channels. For example, Internet-only retailers can establish brand equity

by opening physical stores or merging with an existing store-based retailer (e.g., Sears’s acquisition of Lands’ End). Multi-channel retailing leverages advertising and marketing expenses as well as distribution and supplier networks. Benefits of a multi-channel strategy to store-based retailers include access to expanded demographic and psychographic segments, opportunity to drive cross-channel traffic, and the ability to use existing stores for distribution and return of merchandise purchased off-line. And, as this study shows, multi-channel retailing leverages customer satisfaction. Customer satisfaction in one channel transfers to other channels. Successful multi-channel retailing is contingent on understanding the variation in consumer responses that positive/negative shopping experiences produce in different channels and different cultures. Channel-specific e-CRM strategies that take into account these variations should contribute positively to improved customer service and operational efficiencies.

Multi-channel retailing will clearly be a growth industry for retailing (Wagner, 2002) if for no other reason than multi-channel consumers spend more (Jupiter Communications, 2000; Stringer, 2004). Promotions and incentives will need to be multi-channel. Customer service as well as operational systems and processes will need to be integrated and customized for each channel. The customer’s interaction with a retailer’s brand should be seamless across all channels. More research is clearly needed to better understand how the customer’s experience in one channel affects the behavioral responses toward other channels.

As an experimental study using scenario-based research, emphatic statements like “x or y increase or decrease purchase” (or probabilities of purchase) are tenuous at best. The study involves a sample of consumers who tell us what they think is likely to happen: imagined positive/negative experiences and real positive/negative experiences may affect “real” purchase behavior and intentions in different ways. Yet, the clear cause and effect

relationships uncovered may illuminate what does happen, and so there is value in encouraging experimental work in this particular area.

This research shows that the assumption that e-CRM is equivalent to CRM in non-Internet channels is not complete. Too many studies appear to be focused on the examination of the antecedents and composition of e-CRM and not its consequences both within and across retail channels. In effect, e-CRM has the potential to create positive benefits for the multi-channel retailer in the form of positive effect (i.e., customer satisfaction) across all the retailer's channels as well as positive effect for the channel in general.

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APPENDIX A

store scenario/ satisfying shopping Experience

Betsy is very interested in purchasing a camera, and she estimates that the cost will be in the \$200 to \$500 range. After doing research she has determined that one brand and model is perfect for what she needs and it is in her price range. She decides to make the purchase at a store. After making the purchase, she is happy with her shopping experience. Betsy thinks she has made a great purchase for the money. Betsy is now interested in purchasing a DVD player. After research, she knows what brand she wants and what it will cost.

store scenario/Dissatisfying shopping Experience

Betsy is very interested in purchasing a camera, and she estimates that the cost will be in the \$200 to \$500 range. After doing research she has determined that one brand and model is perfect for what she needs and it is in her price range. She decides to make the purchase at a store. After making the purchase she is unhappy with her shopping experience. Betsy thinks she has wasted her money. Betsy is now interested in purchasing a DVD player. After research, she knows what brand she wants and what it will cost.

Four additional scenarios were created: Internet, satisfying shopping experience; Internet, dissatisfying shopping experience; catalog, satisfying shopping experience; catalog, dissatisfying shopping experience.

Dependent Measures:

How likely is it that Betsy will buy from:	Not at all likely	Unlikely	Neither likely nor unlikely	Likely	Extremely likely
1. The same store ^a	1	2	3	4	5
2. A different store	1	2	3	4	5
3. A catalog from that same retailer ^b	1	2	3	4	5
4. The Internet Web site of the same retailer ^b	1	2	3	4	5

a. The dependent measures were adapted to match each scenario (e.g., item 1 for the Internet scenario read: The same Internet site.

b. Items 3 and 4 were summated and a mean was generated to represent the likelihood of shopping in a different channel.

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Chapter V

Do Mobile CRM Services Appeal to Loyalty Program Customers?

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Abstr Act

Not until very recently has mobile phone technology become sophisticated enough to allow more complex customized programs, which enable companies to offer new services to customers as part of customer relationship management (CRM) programs. In order to enhance customer relationships and to be adopted by customers, new mobile services need to be perceived as valuable additions to existing services. The purpose of this study was to investigate the appeal of new mobile CRM services to airline customers. An empirical study was conducted among loyalty program customers (frequent flyers) of an airline that was considering using MIDlet applications in order to add new mobile services to enhance customer relationships. The results show that customers do not yet seem to be ready to fully embrace new mobile applications. Although the services appeared to slightly improve customers' image of the airline, the services did not seem to enhance their loyalty towards it. However, customers who already used sophisticated mobile services, such as the Mobile Internet, had a significantly more positive attitude towards the proposed services. Thus the success of mobile CRM seems closely linked with customers' readiness to use existing mobile services. Before engaging in costly new investments, companies need to take this factor into serious consideration.

INTR ODUCTION

During the last two decades the marketing community has witnessed a transfer from transaction-based marketing strategies to an emphasis on creating interactive relationships between the company and its customers (cf. Grönroos, 2000). With the overall aim of increasing customer retention and managing customer relationships for profit, CRM has become an essential part of many companies' marketing strategies. One of the newest tools to improve individual services to customers is mobile technology. Because of the rapid development in mobile technologies, it has recently become a noteworthy tool in CRM strategies, and therefore marketing strategies will need to be developed to suit this new channel (Akhgar, Siddiqi, Foster, Siddiqi, & Akhgar, 2002; Balasubramanian, Peterson, & Jarvenpaa, 2002; Helenius & Liljander, 2005). However, so far little is known about how companies intend to incorporate mobile technologies into CRM and about the effects it will have on customer retention (Crosby & Johnson, 2001; Okazaki, 2005). The mobile channel will be of particular interest to companies that already have a loyal customer base that has trusted the company with personal information. This is the case in customer loyalty programs, which have been shown to positively affect customer retention and customer share development (Verhoef, 2003). Loyalty programs already use online services for loyalty program details, such as customer services for members and information on accumulated benefits (Lam & Chan, 2003).

One new software solution for customized relationship programs is known as Mobile Information Device Profile (MIDP). Programs subscribing to this standard are called MIDlets and are coded in Java, which by the end of 2007 will be included in most mobile devices in Western Europe (Riivari, 2005). The easy-to-use universal nature of MIDlet applications offers both corporate programmers and individual end users a convenient way to create

their own mobile programs to serve company- and user-specific needs.

Given the scarcity of empirical research on mobile CRM and the availability of new applications, the purpose of our study is to investigate how mobile CRM services, developed for a MIDlet application, are perceived by the loyalty program customers of an airline. More specifically, we study the appeal of the proposed mobile services to customers, their intention to adopt the services, and whether the services would improve customers' perceived image of the airline and enhance customer loyalty. The goal of CRM is to build a competitive advantage that distinguishes the brand from competitors and creates stronger customer loyalty (Crosby & Johnson, 2001). Since few studies have combined CRM and mobile services research (notable exceptions being Lin & Wang, 2006; Mort & Drennan, 2005), the current study contributes to the extant mobile service literature by offering a CRM perspective on mobile commerce and by investigating customers' attitudes towards mobile CRM.

The paper is structured as follows. First, the concept of mobile CRM and its benefits to customers are discussed. Second, the empirical study is introduced and the results are presented in the form of descriptive statistics. The paper ends with a discussion of the results, limitations, suggestions for future research directions, and managerial implications.

MOBILE CRM

Relationship marketing and CRM are frequently used interchangeably, but equally often CRM refers to a company's technology solutions for managing relationships, such as direct mail, loyalty cards, and e-commerce (Payne & Frow, 2005; Verhoef, 2003). A common conceptualization of CRM is still lacking: it has been described as a process, strategy, philosophy, capability, and technology (Zablah, Bellenger, & Johnston,

2004). Thus CRM can be viewed in a broad or a narrow sense, as a holistic approach to managing relationships, or the implementation of a specific technology solution project (Payne & Frow, 2005). CRM is clearly more than a technology, but in practice it is often associated with the use of databases and technological applications (Payne & Frow, 2005; Shah & Murtaza, 2005). A distinction is often made between operational, analytical, and collaborative CRM applications (Crosby & Johnson, 2001). Operational e-CRM includes customer service applications (Fjermestad & Romano, 2003), which is the focus of the present study. Thus our study employs a narrow CRM approach, by investigating the potential positive consequences for a company of implementing mobile CRM.

We define mobile CRM as *customer relationship management of any kind including interactive communication between an organization and a customer using a mobile device* (cf. Helenius & Liljander, 2005; Lam & Chan, 2003; Mort & Drennan, 2005). The special characteristics of mobile CRM in contrast to CRM in general are its temporal and spatial autonomy. Mobile devices include a large number of wireless mobile communication tools, such as regular cell phones, smart phones, pagers, PDA's, and notebooks, the most common device being some sort of cell phone with more or less sophisticated data transmission capabilities. One of the technological solutions enhancing mobile CRM that is applicable to cell phone devices is MIDlets—the technological solution investigated in our study.

MIDlet Applications as a Gateway to Mobile CRM

The rapid technical progress has led to new ways of processing data and of serving the mobile consumer. Our chosen example is MIDlet applications (Adjari, 2001), which bring the mathematical and information processing functions of a small computer into a mobile phone. Through their mobile

phones customers can manage information and launch applications in the same way as when using the fixed Internet. Applications are invisible to customers, who only evaluate the services as they are offered through the application. To use a company's services through a MIDlet application, customers need to download it to a mobile device. Applications can be provided for free by a company as part of its CRM program, or they can be offered to customers as a value-added component at a price.

The success of a mobile CRM strategy depends on how well the application is designed, the design of the interface and services, as well as customers' evaluation of the service content in relation to any additional costs of using it. Although in the past consumers have felt cautious about using mobile services (Anckar & D'Incau, 2002), in the future mobile applications are expected to have an important impact on customer acquisition and retention, by offering additional services and benefits to customers (Kannan, Chang, & Whinston, 2001; Riivari, 2005; Varshney & Vetter, 2001). We will next discuss the benefits of mobile CRM using MIDlet applications in the context of frequent flyer customers.

Benefits of the Mobile channel to customers

The perceived relative advantage of a new technology such as added benefits in comparison to other service modes is essential for customer adoption (cf. Walker, Craig-Lees, Hecker, & Francis, 2002). Several benefits have been mentioned in relation to mobile technologies. Often cited as the main characteristic and added value to customers of mobile services is the possibility of accessing services whenever and wherever required (Heinonen, 2004, 2006; Sugai, 2005; Turban, King, Lee, Warkentin, & Chung, 2002). Mobile value arises in particular from spontaneous and immediate service needs (Anckar & D'Incau, 2002; Pura, 2005). In CRM the mobile channel can be

used to actively communicate with customers wherever they are, offering them access to the same services as through the fixed Internet or through personal contact.

Another advantage often mentioned is that companies can provide location-specific information and service to customers (Jukic, Sharma, Jukic, & Parameswaran, 2002; Turban et al, 2002; Wang & Cheung, 2004), for example, informing customers of the nearest physical touch point for the company's services.

The quality and usefulness of mobile services have received less attention than time and place benefits but are important for customer satisfaction and loyalty (cf. Chae, Kim, Kim, & Ryu, 2002; Nordman & Liljander, 2004). There are few studies on the relationship between e-CRM features and customer service evaluations (Feinberg & Kadam, 2002). However, research has shown that mobile services are evaluated on similar dimensions as e-services, while taking into account the limitations of the technology (Chae et al., 2002; Lin & Wang, 2006; Nordman & Liljander, 2004). Our study includes customer evaluations of mobile service content and usability; comfort and security; and mobile feedback services.

Service content and usability (SCU) can be viewed as intangible benefits (Money, Tromp, & Wegner, 1988) or as mobile life quality enhancers (Mort & Drennan, 2005). They are of particular importance for customer satisfaction with utility services (Chae et al., 2002), such as airline travel and frequent flier services. Mobile CRM could offer completely new services to customers, such as entertainment services or enhancements of existing offerings by adding a new wireless dimension to them. One example would be improving the usability of the main product, for example, by offering updated flight information to air travelers. Until the launch of new application technologies such as MIDlets, such opportunities and intangible benefits for enhancing customer relationships have not been widely available. Our study examines SCU by investigating customer perceptions of the

content and usability of services such as access to flight schedule and route information, special offers, booking, payment, and check-in over a mobile phone.

Regrettably, digital fraud is becoming increasingly widespread, and customers' feelings of insecurity or discomfort may outweigh the benefits they expect to gain by embracing new applications (Kaapu, 2005; Kindberg, Sellen & Geelhoed, 2004; Walker et al., 2002). Therefore, we also investigate customer perceptions of the *comfort and security* of mobile service usage.

Customer mobile *feedback* (m-feedback) is a key component of an e-CRM strategy (Cho, Im, Hiltz, & Fjermestad, 2002). It is important that companies have effective channels for customer feedback and procedures to resolve complaints, recover customers, and reduce switching (Fornell & Wernerfelt, 1987; Johnston & Mehra, 2002). Technological interfaces are important channels for customer complaints and quick service recoveries (Bitner, Brown, & Meuter, 2000). Such services are an important feature of customer relationship programs (Winer, 2001), and mobile CRM could provide one feedback channel. M-feedback can be used for suggesting ideas for service improvements, as well as for giving compliments or voicing complaints. The mobile channel could offer quick resolutions to problems, taking full advantage of mobility.

Benefits to the Firm

Offering mobile CRM applications to customers should have positive consequences for the firm. One such consequence is increased customer loyalty (Fjermestad & Romano, 2003). Another important consequence is the positive effects that it may have on the image of a brand and the company (Helenius & Liljander 2005; Lam & Chan, 2003; Nysveen, Pedersen, Thorbjørnsen, & Berthon, 2005). A CRM strategy must lead to a more distinct brand and to higher customer loyalty (Crosby & Johnson, 2001). Contacts with

customers through different channels can add to or detract from their feelings of loyalty towards the company (Shankar, Smith, & Rangaswamy, 2002). Therefore, the brand assets (cf. Aaker, 1996; Aaker & Joachimsthaler, 2000) *image and loyalty* were assessed in our study.

MEt HOD

To investigate the appeal of a new CRM technology solution to customers, that is, mobile services offered through a MIDlet application, a mail survey was constructed. Members of a Nordic airline's frequent flyer loyalty program were sampled for the study. The airline is one of the world's oldest operating airlines, with a turnover of 1,698 million euros in 2004. Among airlines, it has been at the forefront of electronic service development, and frequent flyers are offered self-services on the Internet (e.g., check-in), at the airport (e.g., electronic gates), and when on the move (e.g., an SMS(Short Message Service)-based mobile check-in service). The airline's frequent flyers are always among the first to be offered new technology services. Previously published data on these customers show that their technology readiness is comparatively high (Liljander, Gillberg, Gummerus, & van Riel, 2006). Thus they form an attractive segment for mobile CRM. To maintain its technology advantage, the airline is planning to offer new mobile services to its loyalty program customers. The services are designed with MIDlet applications. Our study was conducted to investigate the appeal of the proposed services to loyal customers.

Questionnaire Design

Background data were gathered on gender, age, loyalty program level (here called: bronze, silver, gold, platinum), and customers' current use of the airline's electronic services. To check for the suitability of their mobile devices for MIDlet

applications, and their readiness to use such services, customers were asked how often they use mobile phone e-mail, Internet browsing, and WAP(wireless application protocol) services, and whether their mobile phone supports Java applications. A "do not know" alternative was offered for the last question, since many consumers are unaware of all available features in their mobile phone.

SCU was measured by asking the respondents to imagine that the airline offered a mobile phone-based application that made it possible to look up schedules, check frequent flyer information, book flights, and perform check-in at the airport through their mobile phone. The following scale and items were used (7-point Likert scales, strongly disagree-strongly agree):

"I would have significant use for":

- mobile phone-based flight schedule and route information (SCU1)
- frequent flyer-information and special offers (SCU2)
- flight booking and payment (SCU3)
- check-in services (SCU4)

An alternative to the formulation of this question would have been to use a perceived usefulness scale from the technology acceptance model (TAM) as a basis for our study (cf., Davis, 1989; Featherman & Pavlou, 2003; Venkatesh & Davis, 2000; Venkatesh, Morris, Davis, & Davis, 2003). However, our formulation of the SCU statements was chosen because it corresponded best with the local language. SCU taps into similar issues as the perceived usefulness component of TAM, in that it asks customers to evaluate if the services would be of use to them. Another reason for not using TAM for our research was that, since the services do not yet exist, customers would have been unable to evaluate their ease of use, which is an important TAM component.

Four statements relating to *comfortable and secure use* of mobile services were included

(7-point Likert scales). It should be noted that “comfortable use” in the local language includes connotations of “free of effort,” which has been considered important for technology acceptance (Davis, 1989, p. 320).

- I would feel comfortable booking my flight through a mobile phone service (Comfort1)
- I would feel secure booking my flight through a mobile phone service (Secure1)
- I would feel comfortable paying for a flight through a mobile phone service (Comfort2)
- I would feel secure paying for a flight through a mobile phone service (Secure2)

Mobile feedback was evaluated on the following items (7-point Likert scales):

- I would feel comfortable giving feedback through a mobile phone service (MFB1)
- I believe that the airline would handle mobile feedback in the same way as conventional feedback (MFB2)
- Mobile feedback would make it easier for me to contact the airline (MFB3)
- Mobile feedback could help the airline better solve my problems (MFB4)
- I would use the mobile feedback service regularly (MFB5)
- I would give mobile feedback in instances I otherwise would not (MFB6)

As timeliness is one of the key features of mobile feedback, customers were also asked:

- How quickly they believed that they would send mobile feedback (MFBSend)
- How quickly they expected to receive an answer (MFBReceive)

The response alternatives to MFBSend were: a) Immediately after a negative incident, b) Some

time later when I sit down, c) Within the same time span as I would give regular feedback, and d) I do not think I would give mobile feedback at all.

Improved benefits to the firm, in the form of increased brand assets, were measured with the following statements:

- Mobile services would make the airline more desirable as an airline carrier (Image1)
- Mobile services would improve my picture of the airline as an airline carrier (Image2)
- Mobile services would distinguish the airline from other airlines (Image3)
- Mobile services are associated with a modern and technologically up-to-date company (Image4)
- Mobile services could be a key factor that keeps me from changing to another airline (Loyalty)

In addition, customers’ willingness to pay for new services was asked for regarding mobile feedback (WillPayFeedback) and flight booking (WillPayFlight). They were also reminded of the fact that the price of phoning the call centre was 1.64 euros per call. The alternatives given for both questions were: a) nothing, b) the price of an SMS message, c) 2€, d) 5€, e) 10€ or more.

Customers’ intentions to use the services (Adopt), were captured with one question: If this application were available, I believe I would: a) Begin using it instantly, b) Wait until I hear from other people who have used it, c) Wait until it becomes the standard way of using the air carrier’s services, d) Probably never use it. Since the service did not yet exist, only adoption intentions could be measured. This is a common problem in many technology adoption studies (e.g., Anckar & D’Incau, 2002; Featherman & Pavlou, 2003; Plouffe, Vandenbosch, & Hulland, 2001). However, since we have collected information on customers’ adoption of other mobile services, we had data on their actual mobile ser-

vice adoption. These data were used to explore differences between more experienced and less experienced mobile service customers. Research on technology adoption covers descriptions of adopter characteristics (e.g., Okazaki, 2006) but to a lesser extent differences between perceptions of technological applications in different adopter groups. For example, Anckar and D’Incau (2002) found significant differences in intentions to use mobile services between adopters and non-adopters of the Internet. Thus, we expected the experienced mobile service customers to evaluate the proposed services more positively than the less experienced customers.

sample

Stratified sampling was used to include customers from all frequent flyer levels, representing a variety of customer loyalty to the company. Since there are fewer customers on the higher levels, a normal probability sampling procedure would have yielded a disproportionately high number of bronze members, many of whom fly infrequently and thus would not be the prime beneficiaries of the proposed services.

The survey was posted in an official airline-branded envelope, together with an introductory letter and a prepaid return envelope, to 262 frequent flyers, including 70 Bronze, 70 Silver, 70 Gold members, and all the Platinum members (52). The total response rate was 42%, yielding 104 completed questionnaires. In addition to the completed responses, nine were returned uncompleted. One questionnaire was discarded as incomplete, two were returned blank because the respondents were not proficient in the local language, and six envelopes were returned because of change of address.

The response rates for frequent flyer levels were: Bronze (32.9%), Silver (40%), Gold (45.7%), and Platinum (40.4%). There may be several reasons for a higher response rate among the more frequent flyers among loyalty card members. One

reason could be that people who travel often are more likely to have sophisticated phones, with which they can access e-mail while being away from work. Another plausible reason is that customers who have reached a higher level within the loyalty program feel a greater attachment to the airline and thus are more inclined to respond to the survey.

Answers to the background questions revealed that 78.8% of all respondents were male, which is representative of the total sample that received the survey. Male customers are overrepresented on all loyalty program levels, except the Bronze level. The age distribution among survey participants was 18-25 years (1.9%), 26-35 (13.5%), 36-50 (46.2%), 51-65 (37.5%), and 66+ (1%). These figures correspond with previous studies of the firm’s frequent flyers and suggest that the age distribution is representative of the airline’s loyalty program clientele.

Results

customer readiness to use Mobile services

When new services and technologies emerge, customer adoption is often slower than expected by companies (Gilbert & Han, 2005). For example, customer adoption of self-service check-in automats at airports has been slow, as has been the adoption of electronic check-in (Liljander et al., 2006). However, the customers who responded to the present survey appear to be at the forefront of mobile service adoption. More than half of the respondents (53.8%) used the mobile Internet daily, weekly, or monthly, whereas only 26% had never used it, or had only tried it (20.2%). There was no relationship between the loyalty program level and the use of mobile Internet services (Chi-Square=5.049, $p=0.168$). In addition, Chi-square tests showed that there was no relationship between gender and mobile

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Internet adoption ($p=0.258$), but that there was a relationship between adoption and age ($p=0.025$). Not surprisingly, but contrary to insignificant findings in other mobile service contexts (Mort & Drennan, 2005), older customers (51-65, 66+) had adopted sophisticated mobile services to a lesser extent than younger customers.

Customers are not necessarily aware of what applications they use to access services, and thus they may possess Java-supporting phones with-

out being aware of this. Among the respondents only 43.3% were confident that their phone supports Java, 22.1% said that it did not, and 33.7% did not know. Thus a fairly large percentage of loyalty program customers have the necessary equipment to access and receive new services, but the majority showed the need to either update their phones or receive help in recognizing and using inherent mobile features. The results are presented in Table 1.

Table 1. Mobile Internet use and awareness of JAVA support

Percentages							
<u>Use of mobile internet</u>	Bronze	Silver	Gold	Plati- num	Total		
	N=23	N=28	N=32	N=21	N=104		
Daily	17.4	28.6	46.9	47.6	35.6		
Weekly	17.4	10.7	6.3	4.8	9.6		
Monthly	4.3	10.7	15.6	0	8.7		
Have tried a couple of times	17.4	25.0	18.8	19.0	20.2		
Have never used	43.5	25.0	12.5	28.6	26.0		
	Gender			Age			
<u>Use of mobile internet</u>	M	F	18- 25	26-35	36-50	51-65	66+
	N=82	N=22	N=2	N=14	N=48	N=39	N=1
Daily	37.8	27.3	0	42.9	43.8	25.6	0
Weekly	8.5	13.6	0	0	16.7	5.1	0
Monthly	9.8	4.5	0	28.6	4.2	7.7	0
Have tried a couple of times	22.0	13.6	50.0	14.3	25.0	15.4	0
Have never used	22.0	40.9	50.0	14.3	10.4	46.2	100.0
<u>Awareness of JAVA support in respondents' personal mobile phone</u>						Total	
Mobile phone has JAVA support						43.3	
Mobile phone has no JAVA support						22.1	
Do not know						33.7	

Next, the attractiveness of the proposed services, as well as their impact on image and loyalty will be presented. The respondent data were divided into two groups, those who used the mobile Internet daily, weekly, or monthly (mobile Internet adopters) and those who never used it, or who had only tried it (mobile Internet non-adopters). As previously mentioned, the first group was expected to evaluate the services more highly than the second group.

Mobile service Evaluation

Table 2 presents the mean result for customer evaluations of SCU; comfort and security; m-feedback; and improvement of brand assets. The results for the total sample show a neutral attitude towards the proposed mobile services, with means close to the middle value of the scale (4). T-tests were performed to investigate differences in means between adopters and non-adopters of the mobile Internet. Since mobile Internet adopters were expected to exhibit higher scores than non-adopters, one-tailed *t* tests are reported. As expected, customers who already use more sophisticated mobile services found the offered services significantly more attractive in terms of SCU, comfort, and security.

Of particular interest from a CRM perspective is the finding that frequent flyers evaluated frequent flyer information (SCU2) as the least interesting service. This result requires further investigation within the company to reveal the reasons for it. One reason may be that customers cannot imagine what kind of information could be communicated on the small screen, and what the benefits would be. Pairwise *t* tests revealed that the mean for customers' perceived use of check-in mobile services (SCU4) was significantly higher ($p < 0.01$, two-tailed) than the means of other proposed services. One explanation is that check-in via various technological devices is becoming increasingly familiar to airline customers. Thus, familiarity with performing these services by us-

ing other technologies may have a positive effect on consumer interest in performing them also with their mobile phone. In addition, paired-samples *t* tests showed that customers felt significantly ($p < 0.01$, two-tailed) more comfortable and secure booking (Comfort1 and Secure1) than paying for flights (Comfort2 and Secure2) with their mobile phone. This was the case in all customer groups (complete sample, adopters and non-adopters).

M-feedback would be a novel service, offering customers the possibility of immediate feedback to the company through a device that they always carry with them. Even though customers believed that mobile feedback would be handled in the same way as other feedback (MFB2 $\bar{M} = 5.40$), they expressed only a lukewarm interest in the service. Means of MFB1 and MFB3-6 ranged from 3.46 to 4.35 for non-adopters, and from 3.98 to 4.88 for adopters. Only the difference in the means of MFB1 and MFB5 was significant between adopters and non-adopters, showing that adopters would be more comfortable using the mobile phone for feedback (MFB1) and that they would use it more regularly (MFB5). However, the low means overall (adopters $\bar{M} = 4.14$, non-adopters $\bar{M} = 3.46$) for MFB5 suggests that most clients would hesitate in making mobile feedback their primary communication channel with the company.

Regarding m-CRM benefits to the firm in the form of improved brand assets, there were no significant differences between adopters and non-adopters (Table 2). According to the mean values, offering mobile services might improve the image only slightly. In particular Image4 (adopters $\bar{M} = 5.45$ and non-adopters $\bar{M} = 4.96$) showed that the airline with mobile services would be perceived as a modern and technologically up-to-date company. However, customers' responses to loyalty ($\bar{M} = 3.34$ and $\bar{M} = 2.44$) demonstrated that mobile services would probably not be a key factor in keeping customers from switching airlines. This mean score is the lowest in comparison with all other statements. Thus, the conclusion

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Table 2. Item means for mobile Internet adopters, non-adopters, and the total sample

Components (7-point scales)	Mobile Internet Adopters N=48	Mobile Internet Non- Adopters N=56	<i>t</i> test p-value ¹	Total N=104	SD
<u>Service content and usability</u>					
Mobile phone-based flight schedule and route information SCU(1)	4.80	3.81	0.004	4.35	1.945
Frequent flyer-information and special offers SCU(2)	4.18	3.23	0.002	3.74	1.712
Flight booking and payment SCU(3)	4.68	3.77	0.008	4.26	1.926
Check-in services SCU(4)	5.84	4.71	0.000	5.32	1.541
<u>Comfort and security</u>					
I would feel comfortable booking my flight through a mobile phone service Comfort(1)	4.85	3.73	0.001	4.33	1.839
I would feel secure booking my flight through a mobile phone service Secure(1)	5.24	4.17	0.000	4.74	1.754
I would feel comfortable paying for a flight through a mobile phone service Comfort (2)	4.25	3.29	0.006	3.81	1.986
I would feel secure paying for a flight through a mobile phone service Secure(2)	4.40	3.64	0.014	4.05	1.793
<u>Mobile feedback (MFB)</u>					
I would feel comfortable giving feedback through a mobile phone service MFB(1)	4.71	3.98	0.026	4.37	1.927
I believe that the airline would handle mobile feedback in the same way as conventional feedback MFB(2)	5.41	5.40	0.430	5.40	1.523
Mobile feedback would make it easier for me to contact the airline MFB(3)	4.88	4.35	0.072	4.63	1.790
Mobile feedback could help the airline better solve my problems MFB(4)	3.98	3.75	0.258	3.88	1.810
I would use the mobile feedback service regularly MFB(5)	4.14	3.46	0.024	3.83	1.765
I would give mobile feedback in instances I otherwise would not MFB(6)	4.67	4.35	0.203	4.52	1.887
<u>Brand assets</u>					
Mobile services would make the airline more desirable as an airline carrier Image(1)	4.52	3.92	0.033	4.24	1.726
Mobile services would improve my picture of the airline as an airline carrier Image(2)	4.80	4.23	0.041	4.54	1.683
Mobile services would distinguish the airline from other airlines Image(3)	4.86	4.35	0.061	4.63	1.656
Mobile services are associated with a modern and technologically up-to-date company Image(4)	5.45	4.96	0.060	5.22	1.595
Mobile services could be a key factor that keeps me from changing to another airline Loyalty	3.34	2.44	0.005	2.92	1.810

¹ *t* tests between adopters and non-adopters, one-tailed significance reported

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must be that customers do not expect the mobile services to be a bonding factor in their relationship with the company. They might be perceived as nice additions to existing services, but not as a relationship strengthening factor.

Speed of Mobile Feedback, Willingness to Pay and Intentions to Use

One of the key features of mobile feedback is its potential speed both in sending and in receiving feedback (MFBSend and MFBReceive). Only 49%

said that they would send feedback immediately when they had experienced a problem, while the rest would do it later; 42.2% expected to get an answer immediately, or within 2 hours, while the rest expected to get it in one day or later. The results are presented in Table 3. Since quick handling of mobile feedback would require extra resources and thus added costs, customers were asked if they would be willing to pay for the mobile feedback service. Not surprisingly, the majority of customers were prepared to pay either nothing (31.4%), or the price of an SMS (54.9). Only a small

Table 3. Quickness of m-feedback, willingness to pay and intention to use the services

Percentages			
<u>MFBSend</u>	Total	<u>MFBReceive</u>	Total
Immediately	49.0	Immediately	21.6
Sometime later	16.7	Within couple of hours	20.6
Same time frame as conventional feedback	22.5	The same day	24.5
Not at all	11.8	In due time	33.3
<u>WillPay Feedback</u>	Total		
2 € or more	13.7		
The price of SMS	54.9		
Nothing	31.4		
<u>WillPay Flight</u>	Total		
2 € or more	9.7		
The price of SMS	51.5		
Nothing	38.8		
<u>StartUse</u>	Total		
Immediately	35.0		
Wait until more people have adopted the services	48.6		
Probably never	16.5		

percentage of customers (13.7%) were prepared to pay 2€ or more for the service. Similar results were obtained for customers' willingness to pay for flight booking services (WillPayFlight). Only 9.7% were prepared to pay 2€ or more for the services, while the others were prepared to pay nothing (38.8%) or the price of an SMS (51.5%). This result is in line with earlier findings on customer willingness to pay for mobile services (Jarvenpaa, Lang, Takeda, & Tuunanen, 2003)

Customers were also asked how soon they believed that they would start using these services if they were offered (StartUse, Table 3). The answers revealed that 35% would begin to use them immediately, while 48.6% would wait until more people had adopted the service, and 16.5% said that they would probably never use them.

Discussion

A key finding of the study is that customers do not yet seem to be ready to fully embrace mobile services as part of an airline's relationship marketing program. Their attitudes towards the proposed services can be described as "wait and see" and "let others use it first." This is a typical consumer response to many innovations, and it does not in itself mean that they would not adopt any of the services, if they were available. Resistance to innovations is an instinctive response in many consumers, which is due to functional and psychological barriers (Ram & Sheth, 1989). So far, consumers have not embraced mobile commerce to the extent that was predicted at the beginning of this century (Ankar & D'Incau, 2002; Nordman & Liljander, 2004). However, consumers have expressed a higher interest in utility than in entertainment services (Ankar & D'Incau, 2002), which seems promising also for m-CRM programs. Our study showed that customers were most interested in utility mobile services that they were likely to have used pre-

viously on other technological interfaces (e.g., check-in services).

When dividing the data into two groups, adopters and non-adopters of mobile Internet, we found that the adopters had a more positive attitude than non-adopters towards many of the services. This supports the results of Ankar and D'Incau (2002), where adopters of the fixed Internet expressed a higher interest in mobile services compared to non-adopters. The mobile Internet adopters in our study were younger than non-adopters, indicating that there is a new generation of customers who are more positively tuned into this new channel. However, since all customers expressed a low interest in receiving frequent flyer information through their mobile phone, its use in CRM will have to be carefully considered. The study also revealed that customers are not prepared to pay additional costs for being able to use the mobile channel, whenever and wherever required. Customers expect the same feeless services through the mobile channel as they have become used to on the wired Internet. They are also not prepared to pay for quicker service, but probably see this as a normal service improvement in a competitive environment. For example, immediate feedback attracted customers to some extent but not enough to be paid for. However, although the new service would require additional investments from the companies, they should welcome customers' complaints as part of a defensive marketing strategy (Fornell & Wernerfelt, 1987).

Further, customers did not feel that the new services would have a strong positive effect on the company's brand assets in terms of improved image and retention. One reason might be that customers view mobile services as a hygiene factor and not as a motivation factor. Thus in the same way as customers expect all companies to have an online presence, they expect them to offer mobile services. Customers might not use them regularly, but they expect them to be available when needed. Moreover, business customers

probably know by experience that successful services are easily copied by competitors and that readily available applications do not offer unique and stable competitive advantages to a company. Further, customers may be afraid of their phones being cluttered with unwanted messages and may prefer companies to communicate with them in a less obtrusive way.

Since CRM aims to increase customer retention, the findings of the survey indicate that at present the suggested m-services to frequent flyers would not achieve this aim. The new means of getting flight information or buying flight tickets do not seem to be sufficiently attractive to enhance customer loyalty.

LIMITATIONS AND FUTURE RESEARCH DIRECTIONS

The study has several limitations, which have to be taken into account when interpreting the results. In addition to the obvious limitations of studying a small sample of a single company, and the bias that comes from self-selection among those who received the survey, other limitations need to be mentioned. An important limitation is that customers had to imagine the proposed services and could not experience them first hand. It is possible that they would have had a more positive attitude if they had been able to try the service on a high quality mobile device. Multiple items in the questionnaire on customers' current mobile service use and on their loyalty to different service channels would have provided valuable information that would have helped in explaining the results. The study was conducted in close cooperation with the company, which put severe limitations on the constructs that were used for the study. Thus, future studies should include more of the well-established concepts in the consumer adoption literature. For example, future studies should include more information on customer

innovation characteristics and behavior, which would make it possible to categorize customers into more specific adopter segments. Despite the limitations of TAM in studying customer interface usage of technology (Nysveen, Pedersen, & Thorbjørnsen, 2005) to explain the adoption of mobile CRM, measures from the consumer innovativeness and/or technology acceptance literature could also be used.

Our study should be seen as exploratory, in providing some initial findings on customer perceptions of mobile CRM services. More studies are obviously needed, in other companies, on other services, and on complete customer relationship programs. Since consumer innovativeness research has concentrated on tangible products (for a review, see Roehrich, 2004), it would be fruitful to apply this line of research on services and technologically novel products, and in particular on a combination of m- and e-services. Further, it would be of interest to study customers' reasons for their choice of channel to contact a company and to receive communications from it. Research on bank services has shown that customers use different channels for different purposes (Patrício, Fisk, & Falcão e Cunha, 2003), but there is also evidence that the new generation of customers make little difference between channels (Lindstrom, 2003). Finally, our study could be extended to examine specific use contexts that may influence the usability of mobile services (Kim, Kim, & Lee, 2005).

Managerial Implications

MIDlet technologies offer companies the opportunity to develop new, specialized services; bringing benefits, and thereby added value, to customer relationships. In the hype and speed of technological development, it is easy for companies to be fascinated by technological developments that may seem to improve both current services and brand image, but which attract little interest when

they are first introduced on the market. Customers' habits change slowly. Although mobile banking has enjoyed a remarkable success throughout Europe, it is in many ways a unique context (Riivari, 2005). In other contexts, such as travel services (Wang & Cheung, 2004), neither the market, nor the devices seem to be ready for the complexity of mobile travel services. Therefore, companies that consider developing wireless services as part of their CRM strategy should first thoroughly investigate its potential in relation to costs. Our study showed that most customers expect companies to offer new CRM mobile services free of charge, as part of customer relationship maintenance costs. Companies need to carefully consider what charges can be claimed for services that are intended to add value to customer relationships. Further, companies need to educate customers in the use and benefits of mobile services and provide incentives to encourage trial.

In addition, when developing mobile services, it is important that the logic of using the service strongly resembles that which the customers have grown used to through other channels, or through other service providers. This is a huge challenge, since different channels differ considerably in how the service is presented to customers, and different applications result in different service logics and scripts. To give an example from airlines, customers already have had to learn different logics for checking in on the Internet and through an automat at the airport. In addition, the Internet check-in services and automats of different airlines have different interfaces and work in different ways. Thus, it is understandable if customers are unwilling to learn yet a third way to check in through their mobile phone. These types of problems have to be minimized through service development that gives the customers' perspective first priority.

From a relationship marketing perspective, it is important that customers are provided with a

choice of how to interact with the company. Relationships are not enhanced by forcing customers to interact with certain channels. Therefore, we adopt a different standpoint from Winer (2001, p. 89), who suggests that "[the] essence of the information technology revolution and, in particular, the World Wide Web is the opportunity afforded companies to choose how they interact with their customers." Instead, we suggest that the new channels afford *customers* an opportunity to choose how to interact with the company, and that strong customer relationships can be built only through voluntary use of new technologies. When designing strategies, all channels need to be considered from a customer relationship perspective, designing the services of each channel so that it maximizes its benefits to customers.

Concluding Remarks

Our study on mobile CRM contributes to the literature on mobile services by being one of the first empirical investigations of customer attitudes towards loyalty program services provided through a mobile device. Although the study showed that loyalty program customers have little interest in mobile CRM services, it can be concluded that mobile CRM to some extent enhances the brand image of a company, which over time may have a positive effect also on customer retention. In addition, offering mobile services will demonstrate that the company is at the forefront of service technology development. This will attract early adopters with a strong interest in new technologies, whose expertise can be used, for example, by involving them in the service development process. Thus it is clear that the mobile channel should be included in companies' future CRM strategies, but also that more research is needed on the benefits of mobile CRM to both customers and companies.

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Chapter VI

Developing a Global CRM Strategy

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Abstract

While the managerial rationale for adopting customer relationship management (CRM) has been fairly well articulated in the literature, research on strategy development is scant. Moreover, reports of “CRM failures” in the popular business press have done little to inspire confidence. To date, what little research has been conducted in the area of CRM strategy development has been confined to a single country (often the U.S.). Global CRM strategy development issues have yet to be specifically addressed, particularly which elements of CRM strategy should be centralised/decentralised. The present study examines the complexities of global CRM strategy using the case of a leading financial services company. Interviews are conducted in 20 countries. Global Head Office and external IT consultant perspectives are also considered. Our findings confirm that a hybrid approach has wide practical appeal and that subsidiary orientation towards centralisation/decentralisation is moderated by firm/market size and sophistication.

Introduction

Recent advances in information technology (IT) have enhanced the possibilities for collecting customer data and generating information to

support marketing decision making. CRM has been heralded by some as being the key to delivering superior business performance by focusing organisational efforts towards becoming more customer-centric and responsive (Davenport, Har-

ris, & Kohli, 2001; Puschman & Rainer, 2001). However, others have cautioned that increasing information may actually *increase* the complexity of the decision-making process thereby adversely affecting decision-making performance (Van Bruggen, Smidts, & Wierenga, 2001).

Much of the extant academic literature on CRM has focused on identifying antecedents and consequences (e.g., Bull, 2003; Day & Van den Bulte 2002; Kotorov, 2003; Ryals & Knox, 2001). CRM has been variously conceptualised as (1) a process (e.g., Day & Van den Bulte, 2002; Galbreath & Rogers, 1999; Srivastava, Shervani, & Fahey, 1998); (2) a strategy (e.g., Croteau & Li, 2003; Verhoef & Donkers, 2001); (3) a philosophy (e.g., Fairhurst, 2001; Reichheld, 1996); (4) a capability (e.g., Peppers, Rogers, & Dorf, 1999) and (5) a technology (e.g., Shoemaker, 2001). Although there is clearly more to CRM than technology (Day & Van den Bulte, 2002; Reinartz, Krafft, & Hoyer, 2004), it is important to recognise that technology does play a central role in supporting the seamless integration of multiple customer touch points. IT also enables organisations to collect, store, develop, and disseminate knowledge throughout the organisation (Bose 2002; Crosby & Johnson, 2001). Customer knowledge is critical for successful customer relationship management (Crosby & Johnson, 2000; Davenport et al., 2001; Hirschowitz, 2001).

CRM Defined

The importance of technology in enabling CRM is exemplified by the attempts at defining the concept. CRM has been defined as the alignment of business strategies and processes to create customer loyalty and ultimately corporate profitability enabled by technology (Rigby, Reichheld, & Schefter, 2002). In a similar vein, Ryals (2002) defines it as the lifetime management of customer relationships using IT. E-CRM is defined as the application of customer relationship management processes utilising IT and relies

on technology such as relational databases, data warehouses, data mining, computer telephony integration, Internet, and multi-channel communication platforms in order to get closer to customers (Chen & Chen, 2004; Fjermestad & Romano, 2003). In many respects e-CRM is a tautology in that without “e,” or technology, there would be no CRM. We therefore standardise on the term CRM throughout the paper.

As a business philosophy, CRM is inextricably linked to the marketing concept (Kotler, 1967) and market orientation, which stresses that firms must organise around, and be responsive to, the needs of customers (Kohli & Jaworski, 1990; Narver & Slater, 1990). From a capability perspective, CRM needs to be able to gather intelligence about current and prospective customers (Campbell, 2003; Crosby & Johnson, 2000; Davenport et al., 2001; Zablah, Bellenger, & Johnston, 2004) and apply that intelligence to shape its subsequent customer interactions. Furthermore, CRM processes need to acknowledge that relationships develop over time, have distinct phases, and are dynamic (Dwyer, Schurr, & Oh, 1987). Adopting this view highlights that CRM processes are best thought of as longitudinal phenomena. The interesting feature for firms is that they should interact and manage relationships with customers differently at each stage (Srivastava et al., 1998). Essentially, CRM involves the systematic and proactive management of relationships from initiation to termination across all channels (Reinartz et al., 2004). Another aspect of the relationship continuum is that not all relationships provide equivalent value to the firm. CRM requires firms to allocate resources to customer segments based on the value of the customer segment to the firm (Zablah et al., 2004; Zeithaml, Rust, & Lemon, 2001).

CRM Strategy

A high degree of CRM process implementation is characterised as where firms are able to adjust their customer interactions based on the life-

cycle stages of their customers and their capacity to influence or shape the stages (i.e., extending relationships, Reinartz et al., 2004). Standardising CRM processes enables consistent execution to customers across all delivery channels. Successful CRM also requires organisational alignment (employee reward systems, organisational structure, training procedures) and investments in CRM technology. Interestingly, the level of technological sophistication of CRM technology makes no contribution to economic performance and supports the view that CRM is more than just software (Reinartz et al., 2004).

CRM can be conceptualised at three levels: (1) company wide, (2) functional, and (3) customer facing (Buttle, 2004). This study adopts the company-wide definition of CRM which views CRM as a core customer-centric business strategy focused on acquiring and retaining profitable customers (Buttle, 2004). This requires a customer-centric business culture, formal reward and recognition systems that promote employee behaviours that enhance customer satisfaction and the sharing of customer information and its conversion into useful knowledge.

Unfortunately, CRM's potential has, in many instances, failed to be realised. Successful implementation requires the adoption of a customer-centric business strategy and a redesign of functional activities, workflows, and processes (Galami, 2000; Nelson & Berg, 2000). Some organisations have begun focusing their business strategy around their customers and capturing, sharing, and applying customer knowledge to deliver superior service and customisation (Mitchell, 1998).

However, despite the rhetoric, empirical research on CRM strategy development is scarce. In particular, work on the vexing standardisation/localisation issue is lacking. In this increasingly globalised economy, it is surprising that researchers have overlooked cross-national differences and global CRM strategy issues. To address these gaps, the present study will

seek to explore in depth the issues surrounding standardisation versus localisation of CRM strategy development. A case study of a leading financial services company is used to explore these issues. The paper reviews the localisation/centralisation literature, describes the study to be undertaken, and based on the findings draws a number of conclusions regarding global CRM strategy development and highlights areas worthy of future research.

GLObAL cr M str At EGY

In an increasingly competitive and complex market environment, multi-national enterprises (MNE's) are under constant pressure to re-assess the degree of autonomy they grant to their local subsidiaries. While headquarters are likely to have more expertise on strategic matters, local subsidiaries are likely to have more information on operational issues and be more responsive to dynamics impacting their specific market. Within a specific MNE context, centralisation refers to where decision making is vested largely with the global parent company (Cray, 1984). By contrast, decentralised organisations are defined as those where each subsidiary has a high degree of autonomy in making decisions on processes and products relevant to the needs of the local market (Edwards, Ahmad, & Moss, 2002).

There is some empirical evidence to suggest that although subsidiaries of global parent organisations may be given some autonomy in making operating decisions, strategic decision making is invariably controlled by the parent organisation (Bowman, Farley, & Schmittlein, 2000), which can be manifested through IT (Roche, 1996). Moreover, IT provides an efficient and effective decision support system to transfer information from the local subsidiary into the parent company's reporting models, increasing the capacity of head-quarter management to engage in local company decision making (Clemmons & Simon, 2001;

McDonald, 1996). Using a case study approach, Ciborra and Failla (2000) found that IBM failed in its vision for global CRM because of their fixation for standardisation and centralisation and the use of IT to enforce behaviours. Furthermore, they concluded that this variation in CRM adoption at the country level and unique regulatory requirements made the concept of “global CRM” tenuous at best, although they acknowledge that CRM is a “powerful weapon for centralisation” (Ciborra & Failla, 2000, p. 122).

This desire for greater parent company control is a function of perceived risk. That is, the greater the perceived level of risk, the greater the desire for active decision making (Garnier, 1982). The types of decisions likely to require parent company decision making include capital expenditure; acquisitions and divestments; and funding. A criticism of centralised decision making is that it is expensive and that local subsidiaries are unable to react quickly to changes in local market dynamics (Harris, 1992). There is some empirical evidence to suggest that organisations with decentralised decision making performed better than those organisations characterised as having centralised decision making with respect to marketing (Ozsomer & Prussia, 2000). Moreover, highly centralised organisations make less contribution to their host country in terms of investment, knowledge transfer, and management expertise than their decentralised counterparts (Fina & Rugman, 1996).

We have adopted a typology developed by Barlett and Ghoshal (1989) to classify the predisposition of organisations for a globalised/localised orientation. They describe organisations as: global, international, multi-national, and transnational. A global organisation is characterised as driven by the need for global efficiency, while having structures that are more centralised in their strategic and operational decisions. An international organisation is characterised as transferring and adapting the parent company’s knowledge or ex-

pertise to foreign subsidiaries. The parent retains influence and control, but to a lesser extent than a classic global structure. A multi-national organisation manages its subsidiaries as though they were components of a portfolio of multi-national entities with headquarters exercising low control and low coordination. Finally, a transnational organisation seeks a balance between global integration and local responsiveness. This type of organisation has structures considered to be both centralised and decentralised simultaneously. Transnational firms have higher degrees of coordination with low control dispersed throughout the organisation. Using this typology, our focal firm can be characterised as a global organisation. That is, they employ structures that are more centralised in their strategic and operational decisions, and their products are homogenous throughout the world. Given a centralised structure, most of the decisions are made at headquarter level and imposed on subsidiaries.

Agency theory

We use agency theory (Ross, 1973) as the theoretical foundation for describing the relationship between headquarters and country subsidiaries. Agency theory refers to the basic agency structure of a principal and agent who are engaged in cooperative behaviour, but having differing goals and attitudes to risk (Ross, 1973). In our research, the principal is headquarters and the agent is the subsidiary organisation. Goal differences, risk tolerance differences, and information asymmetry can create problems in agency relations (Eisenhardt, 1985). The first general problem is differences in the goals of principal and agents. Agents may act in their own self-interest at the expense of the principal. Secondly, principals and agents may have different tolerances towards risk. In the context of CRM strategy development, the principal is likely to have a lower risk tolerance than the agent. The third problem, asymmetric

information arises when one party has more information than the other, or when one party prefers to keep some information private.

There are two types of agent behaviour that could be detrimental to the principal. The first, adverse selection might refer to a subsidiary's misrepresentation of its ability to undertake/implement CRM. The second moral hazard refers to the fact that the agent may not act as diligently as anticipated in carrying out the will of the principal. However, agency theory proposes that better information management systems can reduce the agency problem and provide the principal with greater control and is consistent with our earlier discussion on global CRM strategy development. Control may take the form of behaviour-based or outcome-based strategies. Both rely on the principal's ability to evaluate the performance of the agent, either on a behaviour-by-behaviour basis or at the end of the project based on its outcome (Eisenhardt, 1985).

From the principal's perspective, adopting an outcome-based control strategy is likely to be difficult given that the principal would need to wait until the long-term outcomes became known. Consequently, a behaviour-based control strategy may be preferred by the principal in CRM strategy development. The degree of knowledge that the principal (headquarters) has about the agent (wholly owned subsidiary) in terms of market characteristics, customer profile, and processes, enables headquarters to more effectively monitor and control a subsidiary's behaviour (Kirsch, 1996). This is likely to mitigate the risk of subsidiaries acting in their own self-interest at the expense of the entire organisation. Agency theory (Ross, 1973) is therefore useful in addressing our research questions: what aspects of CRM strategy should be centralised/localised? and what are some of the complexities of cross-national CRM strategy development? Another fundamental concept is the level of involvement between the principal and agent in implementation. For instance, if the agent

is able to customise the CRM implementation to reflect their country's requirements, then the principal has less ability to control the behaviour of local country CRM managers compared to where the local subsidiary is required to implement a standardised CRM solution. However, the control dichotomy needs to be balanced to avoid implementation failure particularly where headquarters does not have an in-depth understanding of local market conditions. Furthermore, where a standardised implementation is imposed, it is important to consider the level of knowledge and dynamic learning mechanisms that will need to be created in the local subsidiary to address system failures.

We also examined the channel coordination literature (i.e., Frazier, 1999; Frazier & Rody, 1991; Hunt & Nevin, 1974), which describes the relationship between buyer and seller involving a distribution channel. However, given that this research seeks to examine the relationship between headquarters and its subsidiaries, agency theory offers a more robust theoretical foundation with respect to CRM strategy development. The channel coordination literature relates more to relationships characterised as involving a distribution channel, rather than describing the parent-subsidiary relationship.

METHOD

Data collection

Understanding both substantive and methodological context permits the reader to put the research into context and thus derive deeper meaning from the findings (Johns, 2001). Data were derived using the case study method and utilising a multi-sample longitudinal research design (Yin, 1994). Case studies enable the development of deep insights into respondent beliefs and assist in theory development (Beverland, 2001). Bonoma (1985),

Table 1. First round sample characteristics

Subsidiary	Person Interviewed	Function
1.	Senior Consultant CRM Project	Strategic
2.	Customer Relations Manager	Strategic
3.	Marketing Manager	Operational
4.	Leader CRM	Strategic
5.	Customer Service Manager	Strategic
6.	CRM Manager	Operational
7.	Marketing Manager	Operational
8.	CRM Director	Strategic
9.	CRM Manager	Operational
10.	CRM Manager	Strategic
11.	Senior Consultant - XYZ Consulting	Strategic

Table 2. Second round sample characteristics

Subsidiary	Person Interviewed	Function
1.	Marketing Manager	Operational
2.	CRM Manager	Operational
3.	Customer Relations Manager	Strategic
4.	CRM Manager	Operational
5.	Marketing Manager	Operational
6.	Leader CRM	Strategic
7.	CRM & Corporate Sales Manager	Operational
Subsidiary	Person Interviewed	Function
8.	Manager CRM & Internet Marketing	Operational
9.	Marketing Manager	Operational
10.	Marketing Manager	Operational
11.	Marketing Manager	Operational
12.	CRM Director	Strategic
13.	CRM Programs Manager	Operational
14.	CRM Manager	Operational
15.	Manager Prospecting & New Media	Operational

Hirschman (1986), and Deshpande (1983) have all advocated for greater application of qualitative research methods in marketing. In order to avoid cueing subjects into a desired response, respondents were asked fairly general questions on the topic in order to elicit themes (Strauss & Corbin, 1992). Specifically, two “grand tour” questions (McCracken, 1988) were asked. The first related to issues surrounding local subsidiary decision-making empowerment in relation to CRM strategy. The second, on what CRM processes and systems should be centralisation versus decentralisation. Each participant was also sent a copy of the final transcript for comment. Any comments were noted and the results adjusted accordingly (Johnston, Leach, & Liu, 1999). The research questions were then e-mailed to sample 1 respondents with a statement thanking them for participating in the initial depth interviews and reiterating the purpose of the research. This was broadly described as seeking to gain an understanding of global CRM strategy development complexities with the aim of sharing the eventual findings across the whole group. In order to cross validate the results using a different group of respondents, we e-mailed the same two research questions to a second sample of respondents coupled with a statement describing the research. The objective was to assess the robustness of the initial sample findings with a separate sample of respondents (Deshpande, Farley, & Webster, 1993).

Two rounds of interviews were conducted with managers having a functional responsibility for CRM in their respective national subsidiary. Whether CRM respondents were responsible for CRM strategy or implementation was dependent on the level of the respondent within the organisation. Invariably, more senior respondents were responsible for strategy formulation. We had a mix of both strategic and operational CRM respondents (see Tables 1 and 2). The first sample consisted of CRM representatives from the following subsidiaries: Australia, Belgium, Germany,

Italy, Netherlands, Spain, Switzerland, United Kingdom, and United States. To improve construct validity, interviews were also conducted with the internal strategy department at headquarters and with external consultants assisting in CRM strategy formulation. This provided a strategic level view of the vision for CRM from a Group/HQ perspective (Deshpande, 1983; Johnston et al., 1999). Details of first round respondents are presented in Table 1.

The first round of interviews was conducted by one of the authors over the telephone (Holbrook, Green, & Krosnick, 2003) and recorded/transcribed in order to assist in thematic analysis. The transcribed data was then edited and any additional data was integrated to develop a case summary. Details of second-round respondents are presented in Table 2. Australia, Germany, Netherlands, Spain, and Switzerland were represented in both samples, although in this case an alternative respondent, having responsibility for CRM, was interviewed.

FINDINGS

In reporting our results, we quote actual statements made by respondents in order to improve the validity of the findings for the reader (Eisenhardt, 1989; Yin, 1994).

Perceived complexities of Global CRM strategy Development

The general consensus of both samples suggested that they are limited in their ability to make strategic decisions. “[Subsidiaries] get a very strong framework from headquarters.” Most respondents also anticipate that strategic decision-making is unlikely to become more devolved. Some respondents noted a distinction between strategic decision-making in terms of IT and operations: “I must say that the CRM project on the IT side is

very much directed by the project group at head office. On the other hand, nobody asks us if CRM processes are in place and actively managed” and “CRM initiatives particularly system related are being governed on a global or regional basis [and the subsidiary] probably does not have an overriding influence on it.” An exception to this is country X, where the different stage of CRM development in that market has meant that “[head office] kind of gave us the ability to operate outside of their purview.”

Respondents in both samples noted cultural differences and maturity of markets as contributing to the complexity of global CRM strategy development. For instance, *“local cultural differences make it difficult to offer standardised CRM tools.”* Another respondent noted *“no one central system can accommodate all of the differences that exist.”* And another: *“what works great in one country may not work at all in another country.”* Another perceived complexity was the capacity to meet all the different subsidiary requirements. *“The number of countries and the differences in market size and maturity creates another layer of complexity.”* And *“you have to deal with a lot of market specifics—market-specific business processes and market-specific system adaptations.”* Process concerns were also articulated, *“...existing local IT systems and related business processes cause issues when trying to overlay a global IT system.”* Interestingly, hardly any respondents considered software-related issues as potential barriers to CRM strategy development, which may reflect their view that CRM is more than just software. However, one respondent noted, *“fractured information flows between head office and local subsidiaries results in misinformation regarding CRM developments.”* And another respondent (in the second sample) raised the issue of cross functionality: *“CRM can’t be implemented easily because it is cross functional.”* Some respondents also noted that *“country-specific legislation also needs to be considered.”*

standardised Across Markets or tailored to Local Market requirements?

On the question of whether CRM processes and systems should be centralised, or decentralised, a “hybrid” approach has practical merit. That is, embracing a centralised CRM IT system which can then be configured by subsidiaries to meet local market requirements. The perceived benefits of this approach are that it is cost and resource efficient. Nearly all agreed that there were considerable advantages to centralisation. For example, *“If you just let every country do what they wanted, it would be chaos. Everybody would come up with unique solutions, there would be double investments and duplication of effort, there would no cooperation and I think the organization would suffer.”* And *“centralise as much as possible and localise as little as possible.”* A small market perspective was that *“we feel that some sort of centralisation in one country can very much benefit smaller countries due to budget constraints impeding their ability to develop their own systems.”* The general consensus was that decentralisation would be inefficient in terms of resource utilisation, costs, and duplication of effort. On the other hand, they did recognise that complete centralisation would lead to a situation of inflexibility. *“If you do everything on a central basis, one size fits all, then you are going to end up with inertia of the organization—think global act local.”* There was some dissension on whether centralisation was more cost efficient than localisation. *“From a high level perspective [centralisation] might be cheaper, but down the road, one country will have a couple of hundred requirements, another country will also have another couple of hundred and the question is whether it is going to be worth it. The money that you and everyone is going to spend for changes will be [the] same as having a local solution.”* The answer seems to be somewhere in the middle. *“In my opinion, I think it makes*

sense to develop them centrally and to adapt to local requirements. Each market is different and has different cultures, has different issues and so to develop things centrally makes sense because of development costs. But each market has to adapt them locally.” And, “You may need to develop some tools that are able to have some consistency at its core, but which can then be configured to meet local needs, because its in the local market where you have got to survive.” And “a centralised CRM tool is cost efficient and easy to update if you want to further develop the tool. If it is decentralised, then each country may spend a lot of financial resources doing that. The negative thing is that it doesn’t take into account the local needs of the market.”

Another perspective viewed lack of market-specific information as a potential barrier to centralisation. *“My perspective is that markets know more what they need than the central department. I think the processes are not that different from country to country, but the key integration points are different for each market and are not well understood by headquarters. I think that when you try and bring a group approach to a specific problem its not going to work.”* Another respondent noted the possibility for resistance, *“...what I can see, there is high resistance [to a centralised tool] from the markets because they want a lot of customisation which is not allowed and that causes a lot of problems.”* Similarly, *“I think that CRM processes should be decentralised because of the respective market idiosyncrasies and it is important to set common objectives and standards and pursue them. In my opinion, centralisation is much more expensive [compared to localisation] because of the customisation costs.”* One respondent noted that performance measurement also needs to be standardised in order to enable comparability. *“Success measurement KPIs need to be defined so that the performance of one market can be objectively compared against another market.”*

One respondent suggested a set of guiding principles or framework could be utilised to assist in providing some direction, but ultimately subsidiaries would be responsible for decision making given their more intimate understanding of the market. *“I think there needs to be a strategic framework which is applicable for all subsidiaries all over the world and you can act within this framework to bring in your own experience, bring in your market-specific issues.”* Another respondent noted that an alternative to the centralisation-decentralisation dichotomy is clustering markets based on similar characteristics and then applying a common approach. *“It might be a European solution for say all European countries, ‘an Americas solution’ for North and South America and so forth.”*

Global Strategy

Local subsidiaries are often not empowered to make strategic decisions with respect to CRM. This may be a function of the perceived risk (Garnier, 1982). This finding is consistent with Bowman et al. (2000) who found that strategic decision making was controlled by the parent company. There also appears to be some dissension on whether the organisation has achieved a global strategy for CRM. *“Is there one [a global strategy]? To my mind we have only managed to derive some more or less binding rules for the subsidiaries, which tell them the ‘do’s’, and ‘don’ts’ in treating their customers. A concise strategy focused on retention and acquisition to my mind does not yet exist.”* In summing up, one respondent noted that, *“CRM is really about the business first and the business processes. The system should be designed to support this, not the other way round.”* A number of large market respondents noted that there should be a global platform for knowledge management. *“We need to capture the key learnings from each market and*

leverage off these for the next country.” And “lets stay connected and learn from each other.”

Cross-National Differences

In comparing differences between countries a clear pattern begins to emerge: two countries are demonstrably more advanced in terms of CRM implementation than the other 18, who are largely still in a passive “data collection” phase, not yet using customer data in their marketing strategies to anywhere near its full potential. The two advanced countries, by contrast, are well ahead of the curve—using advanced customer analytics for segmentation purposes to proactively manage customer relationships. The other interesting dynamic within this context is the fact that Head Office has largely allowed the advanced country “to get on with it” and granted them a high degree of autonomy. Among the other 18, there is another fairly obvious partition, between more advanced and less advanced. We say obvious because the split is fairly predictable and is driven by country size, stage of economic/social development, and market size. Basically, mature versus developing economies.

There also appears to be a feeling that the group strategy favours large markets and the needs of smaller subsidiaries in emerging markets are subordinated. *“There needs to be more attention paid to the smaller [market] solution and strengthening central support.”* And *“from the point of view of small markets, you might think that decisions are sometimes based on the big market.”*

Discussion

Most respondents recognised the many advantages of standardisation. They could see the merit in having a universal strategic framework to guide the CRM process. They acknowledged that IT systems should be standardised to avoid resource

duplication and any possible re-inventing of the wheel. This was particularly evident in smaller and/or less developed markets. However, a number of problems with standardisation were also acknowledged. These included inability to factor into account cultural differences/idiosyncrasies, country-specific legislation, and complexities arising from the inherently cross-functional nature of CRM. Thus, somewhat predictably, calls for a hybrid approach can be deduced from the data. However, based on the strength of arguments and also drawing on the literature, we conclude that local adaptation needs to be well justified and should be viewed more as the exception rather than the norm.

Theory-building and Managerial Implications

This paper makes at least two significant contributions to the extant CRM literature. First, given the lack of empirical research in the area, it extends on earlier work on the complexities of global CRM strategy development (Ciborra & Failla, 2000; Massey, Montoya-Weiss, et al. 2001). Findings confirm that there is a lack of clarity regarding what the important antecedents are to global CRM success. The more mature markets in this study seem to have a better developed understanding of the importance of these dimensions and invest resources in enhancing their competencies in these areas. Second, we have shed some light on the perennial standardisation/adaptation question and have provided a preliminary framework of what elements may be amenable to centralisation and which to localisation. For global CRM managers and strategists, the findings suggest that a centralised approach has merit. Indeed, the majority of CRM functionality could well be centrally located, with the more customer-centric elements driven at the subsidiary level. The benefit of this approach is that it improves control and coordination while reducing transaction costs (Clemmons & Simon, 2001).

Limitations and Future research

A number of limitations of this research are noted. First, the non-random selection of respondents introduced an element of judgement into the sampling process. Furthermore, for the majority of subsidiaries, a single informant may not accurately represent the entire view of the organisation. However, it was felt that the manager identified as responsible for CRM activities was the most qualified to respond to in-depth interview questions. Another limitation of this study is that it only involves a single organisation in a single industry and therefore the results may not be generalisable to other organisations or industries. The researchers attempted to mitigate the limitations of the sample by utilising two respondent samples (Deshpande et al., 1993). A problem also arises in attempting to find a suitable second informant in small subsidiaries, and some initial respondents may object to having a cross-validation process. Finally, stringent university "Ethics in Research Involving Humans" guidelines prevented us from identifying verbatim quotes with individual respondents because that would compromise respondent anonymity.

A number of directions for future research have emerged from this exploratory study. First, a study examining global CRM strategy development across industries would be useful to test the generalisability of these findings. In addition, further research is required to examine the relative importance of those global CRM factors we have identified and test whether there are some other factors which contribute to global CRM complexity, which have been overlooked in the current study. Also further work is required to quantify the cost-benefit of localisation versus centralisation. It is not clear whether the inflexibility that a centralised CRM tool mandates compensates for the anticipated cost benefits. It may be that the costs of local market customisation erode these cost benefits. An interesting stream for

future research would be to attempt to develop a framework that provides organisations with some insights into the required sequencing of CRM activities consistent with stage of implementation in order to build a solid foundation for the development of further CRM capabilities. Finally, from a cross-cultural perspective, the applicability of a stage model to global CRM implementation is worth considering.

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Section II

E-Business Models and Strategies

Chapter VII

Strategic Positioning and Resource-Based Thinking: Cutting Through the Haze of Punditry to Understand Factors Behind Sustainable, Successful Internet Businesses

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Abstract

This article synthesizes and leverages two strategic frameworks when analyzing the true nature of strategy and the Internet: (1) the concept of strategic positioning, and (2) the resource-based view of the firm. When considered together, these approaches create a powerful tool for understanding the factors determining the winners and losers among Internet businesses. Several examples of the applied framework are demonstrated. These frameworks also help challenge broken thought around many of the postbubble assertions regarding strategy and the Internet. This analysis is based on a series of case studies, with information drawn both from secondary sources as well as over 60 field visits with senior managers at technology firms in Seattle, Silicon Valley, and Tokyo conducted from 2005-2006.

UNDERSTANDING COMPETITIVE ADVANTAGE

Strategic Positioning

To understand strategic positioning it is important to first recognize what it is not. Many firms claim

to have crafted a sustainable strategy, only to realize that their competitive position is vulnerable and will be eroded over time. Vulnerable business models are often the result of relying on operational effectiveness. Operational effectiveness involves “performing *similar* activities *better* than rivals perform them” (Porter, 1996). Being

operationally effective is critical for sustained business. Firms must strive for improved quality and design, lower costs, and increased efficiency. However, operational effectiveness alone is almost never sufficient enough to determine winners over the long term. This is particularly true of Internet-based businesses where technologies are highly replicable (Shapiro & Varian, 1998).

Technology-based competition leveraging operational effectiveness often pushes firms to improve quality and lower cost. However, given that the steps taken are readily replicable, firms engaged in this sort of hyper competition often see profits decrease rather than increase (D'Aveni, 1994; Wiggins & Ruefli, 2005). There are many examples illustrating the challenges relating to the intensity of competition among Internet firms. For example, Gallagher and Downing (2000) demonstrated that among leading Web portal firms, leadership in feature innovation played no role in achieving market dominance. Rivals engaged in a rapid response feature war in which the average first competitive response matching a pioneering technical innovation was only 1.5 months. Forrester and Gomez rankings of the user experience among online brokerage firms reveal a similar pattern over time, with firms that have ranked last in one quarter's reports subsequently moving up in less than a year to obtain top honors. Also consider the fate of many firms that are recipients of the Webby Awards. The Webbys, awarded by an international committee of 500, are considered by many to be the Oscars of user interface design. Yet despite being recognized for excellence, dozens of prior winners of the Webby Awards have gone bankrupt, had their stocks delisted, or dramatically scaled back operations (Wired, 2003). Design and feature innovation are vital and too many firms have failed in execution due to poorly conceived user experiences; however, design excellence alone is not enough to build a sustainable online winner.

So how do firms succeed? Proponents of strategic positioning suggest sustainable advantage

is achieved through differences. Strategic positioning refers to "performing *different* activities from rivals' or performing similar activities in *different ways*" (Porter, 1996). To return to the case of discount brokerages, while the various online discount brokerages have jockeyed for position in usability rankings, one firm, Schwab, has achieved consistent and sustainable competitive advantage, ranking #1 in market share leadership since first going online in the mid 1990s. Schwab's differences are not attributable to easily matched advantages such as lower fees or superior interface, but rather to difficult-to-acquire assets including the nation's largest branch network and the strong Schwab brand. A full 70% of new Schwab members open accounts through the branch network, while the vast majority of these new customers are immediately migrated to electronic trading channels for subsequent interactions (Myers, Pickersgill, & Van Metre, 2004).

Proponents of strategic positioning argue that organizational *differences* can help a firm avoid the self-inflicted wound of hyper competition by insulating a firm against competitive convergence enabled by the rapid diffusion of best practices (Porter, 2001). Firms are advised to choose strategies that confront competitors with tradeoffs that these rivals are unable or unwilling to efficiently undertake. Such trade-offs would result in competitors straddling markets, often resulting in rivals attempting to deploy business models with divergent capital structures, alternate margin and volume demands, and nonsynergistic assets (Porter, 1995). The classic nontech example of straddling is the response of major carriers to Southwest Airline's position. By eschewing hub and spoke systems, tiered service classes, meals, travel agents, and flying one fleet of aircraft, Southwest has built a value chain that is so efficient that competing carriers would need to cut roughly 20% of their cost structure to attain comparable margins. Many firms, including Continental with Continental Lite and British Airways with Go, have attempted to emulate Southwest's model,

but failed due to straddling. Most recently, Delta announced the folding of Song after losing a reported \$13 million in a single year on the effort (Serwer, 2004; Mullaney, 2005).

Tech and the Resource-Based View of the Firm

The strategic positioning perspective, however, is limited in that it does not clearly articulate the types of differences that a firm should pursue. The resource-based view (RBV) of competitive advantage (Barney, 1986, 1991; Wernerfelt, 1984) is particularly useful in helping to shape thinking regarding strategic positioning. In the resource-based view, firms are seen as having the potential to earn sustainable returns ahead of industry rivals if and only if they have superior resources that are protected by some form of isolating mechanism preventing their diffusion throughout the industry (Barney, 1991).

In an earlier analysis, Mata, Fuerst, and Barney (1995) examined four variables: capital requirements, proprietary technology, technical IT skills, and managerial skills, and identified that of these, only managerial IT skills could provide sustainable advantage. However this analysis ignores assets that are created or enabled by information technology (Smith, Vasudevan & Tanniru, 1996). While technology can be copied, oftentimes the resources *created* or *enabled* by technology cannot be. This goes beyond the process view espoused by Smith and Fingar (2003) and recognizes that technology is not only a component of most modern strategic processes, but further, strategic technology implementation can create assets that satisfy the four characteristic criteria of the resource-based framework. In this sense, it isn't the technology that is the advantage. It is what a firm does with the technology. The capability to conceptualize and deploy technology that can create or reinforce strategic assets is critical (Bassellier & Benbasat, 2004; Clemons & Row, 1991).

Considering this in the context of Internet firms, a set of key strategic resources emerges. Unlike the picture painted by Porter (2001) in which low barriers to entry erode competition and margins, eliminating profitability and sustained advantage, the opposite seems to be taking place. Strategic resources seems stronger online than in the physical world. There are winners—large consistent winners—among online firms. Perhaps what is most interesting is that in so many cases, it is startup firms, not established firms, which have acquired these resources. This dynamic seems to have taken place largely because these entrants have struck with models that create exploitable strategic resources. As *Businessweek* has stated, when compared to off-line threats and new entrants it seems that “the online winners today are the winners, period” (Hof, 2002).

Resources leveraged by the online winners rely on a subset of key resources not unlike those exploited by off-line giants, but given the special circumstances of the Internet channel, these resources are exploited in different ways and are not necessarily transferable from one channel to another. Assets include scale, network effects, data and switching costs, brand, and distribution channels. This is not an exhaustive asset list, however some subset combination of these assets is typically present in firms that have proven to be sustainably dominant in the Internet space. Figure 1 shows the development of the proposed model from objective through characteristics and asset identification. The following examples and theory critique demonstrate the application of the model in various contexts.

Netflix: Defeating Two Goliaths

To illustrate the above model's ability to identify the factors associated with the strategic success of Internet business models, consider the example of Netflix. The Los Gatos, California firm pioneered a DVD subscription service where users pay a flat fee to have DVDs delivered to their home

via postal mail. Customers hold DVDs as long as they want with no penalty. Plan fees determine how many DVDs a customer can have at a given time, with the most popular plan offering 3 DVDs at a time for \$17.99. Customers choose movies online through a Web browser. If a movie is not available, the customer's next available selection is shipped.

In 2004, many analysts were predicting the death of Netflix (Friesen, 2005). Both Blockbuster and Wal-Mart had entered the market for online DVD subscription services. With over 9,000 outlets and rental cards held by 43 million U.S. households, Blockbuster was by far the nation's leading video rental chain. Wal-Mart at the time was #1 on the Fortune 500 list. Both of these late entrants had large existing customer bases, well-known brands, massive scale, and were attempting to synergize online and off-line channels. Blockbuster, for example, offered coupons to its online subscribers, good for two free in-store rentals a month. Wal-Mart heavily promoted the service with in-store displays. Both services undercut Netflix prices with their initial

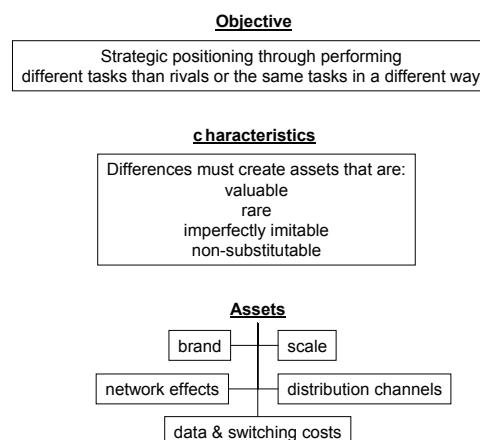
subscription plans. Increased competition forced Netflix to advertise more at a time when online ad rates were increasing. The outlook for the pioneer was not good.

Fast forward to the end of 2005 and it seems that David has trounced both Goliaths. Netflix profits were up seven fold. During the same period, Blockbuster had posted a loss of \$1.2 billion and Wal-Mart withdrew entirely from the subscription DVD market (McGregor, 2005). Subscribers at Netflix topped 5 million, while the firm's year-end customer churn of 4% was at an all time low. Rather than being crippled by competition, Netflix ended the year in its best shape ever.

How could this happen? Netflix possessed key resources for competitive advantage, scale, data, brand, and proprietary technology, which others were not able to match. And even though rivals possessed these resources off-line, none of these advantages significantly translated into the market for online DVD subscription.

In terms of infrastructure scale, by year-end 2005 Netflix had 37 distribution centers capable of reaching over 90% of the country with one day

Figure 1. Combined strategic positioning & RBV model: From objective to characteristics to assets



mail turnaround. The model becomes profitable when this warehouse scale is combined with customer scale. With five times the customer base of its next rival, Netflix sends out an estimated 1 million DVDs each day. This huge customer base allows the firm to offer a deeper movie selection than any new entrant. Indeed, Netflix is a poster child for the *long tail* phenomenon where firms offering a large selection find profitable markets for less popular items (Anderson, 2006). Warehouses can afford to stock 42 million DVDs encompassing 55,000 titles categorized in 250 genres. By one estimate, 35,000 unique titles are processed in a given day, vs. a maximum title catalog of 3,000 at most video stores (*The Economist*, 2005).

Managing this selection requires sophisticated tools for collaborative filtering. Netflix's proprietary, home grown ratings system, Cinematch, contains over 1 million lines of code and is considered best-in-class. Users are encouraged to rate content they have seen, and these data are used to make additional recommendations. The average subscriber has rated more than 200 movies. Netflix claims that a million new ratings are added to the system each day, and that the system contains well over half a billion ratings in total. The power of the database to move back catalog content has allowed the firm to partner with studios. The studios provide DVDs to Netflix at a reduced cost, while the firm shares a percentage of its subscription take with the studios based on titles shipped. Studios gain costless marketing of content that has already been produced. One analysis suggests Netflix makes 90-95% of its recommendations from the back catalog rather than new releases (Goldstein & Goldstein, 2006). The revenue sharing alliance with studios also raises an example of channel conflict. In 2001, the only film studio not participating in revenue sharing with Netflix was Paramount. At the time, Paramount parent Viacom also owned Blockbuster. Executives at Viacom, fearing support for a subsidiary's rival, refused to engage in revenue sharing. As retali-

ation, Netflix refused to recommend Paramount films in Cinematch. In 2001 a Paramount film, the Mel Gibson comedy *What Women Want*, was the #4 most popular rental in the United States, but on Netflix it did not even crack the top 100 (O'Brien, 2002).

The efficiency of the Netflix system and its processes improve over time with applied organizational learning. Earlier in the firm's history, Netflix had 115,000 customers and 100 support reps. But by year end 2005, the firm needed just 43 reps to service a customer base that had grown by a factor of 50. Netflix currently holds over 100 patents broadly covering multiple aspects of the firm's operations, and it has sued to protect the firm from copycat competitors. The continued excellence of the Netflix customer experience has reinforced the firm's brand strength. In 2005, market research firm Foresee ranked Netflix #1 in customer satisfaction among all Internet retailers (McGregor, 2005).

Netflix should be celebrated as a conventional wisdom defying example of how Internet startups with novel models can create resources so powerful, they can defeat category-leading firms that dominate adjacent channels. However, the business is not without grave vulnerabilities. The model works as long as there is no better alternative to long tail content distribution than the firm's dominant DVD-through-mail system. It is highly likely that new competition from video-on-demand services, as well as online rental and purchase opportunities such as Apple iTunes and Amazon Unbox, will present customers with a value proposition that exceeds the Netflix switching cost. While Netflix has announced plans for a video-on-demand business, the firm's CEO has stated that the new service will be underwhelming due to a lack of content from studios. The threat that studio partners may bypass Netflix in the next round of technical shock is significant and concerning.

ING Direct: same resources but Different strength?

While the resources in the model can be powerful advantages, it is important to analyze the strength of any apparent resources within an industry's context. As an example of this, consider the online banking market in the United States. The market share leader in this space is ING Direct, a division of Dutch financial giant ING. The division is highly profitable, due largely to its scalable and highly efficient operating model. The firm deliberately seeks self-service customers for products that have very little marginal cost per transaction. ING Direct only offers paperless checking accounts (all bill pay handled online – ING will mail a check to those that can't accept e-payments), and did not offer any checking until summer 2006. Customers who use labor-intensive phone service too frequently risk being *fired* from the firm (Esfahani, 2004). Each month, ING sheds roughly 3-4% of its unprofitable customers this way. All this leads to a radically high degree of efficiency. The firm holds roughly \$42 million in assets per employee, compared to an industry average of just \$5 million (Engen, 2005).

On the surface it would seem that ING Direct has at least three of the strategic resources that Netflix benefits from. As the market share leader, ING should enjoy both a brand and a scale advantage. And the cost to open an account and migrate any automatic payment systems is a switching cost working to keep existing customers with ING. However the existence of an asset alone is not enough to determine if a business can leverage it for sustainable advantage. One must also consider the asset's strength relative to the industry in which it operates. ING Direct's orange bouncing ball logo is well recognized among the firm's target demographic. However the quality of ING's customer base is questionable. Customers are attracted to ING Direct because of low rates, and these price sensitive customers are potentially

the industry's most disloyal. Scale plays a key role in asset efficiency, and a true scale advantage suggests that the largest firm should yield the best rates. However, a summer 2006 examination of the highest savings account rates at BankRate.com demonstrates that ING Direct often does not even rank in the top 20. Some banks with higher rates, like MetLife Bank, have strong brands in related financial services markets, but many of the firms that rank higher than ING are relatively unknown firms such as Emigrant Bank of New York, or the Transportation Alliance Bank of Ogden, Utah. While these firms do not advertise direct banking as extensively as ING Direct, the lack of advertising helps these firms keep costs low. In banking, smaller market, privately held firms can run quite lean. Because of this, large size (scale) doesn't necessarily equal the best efficiency, and it certainly does not guarantee the best rates. Because customers seek low rates, this segment is more likely to comparison shop based on rate (a price proxy) than customers in many other industries, suggesting limited brand strength despite high brand recognition. Finally, although switching costs exist, ING is an electronic bank, so migrating accounts is not difficult.

Do these weaknesses mean ING is doomed? No. But it does suggest that ING Direct does not possess resources with the strength to control the market to the extent that Netflix does. The lack of strong strategic resources implies competition based more on operational effectiveness than strategic positioning. While Netflix's strong assets helped the firm achieve a seven-fold increase in profitability in its most competitive year, when ING faced a particularly competitive second quarter in 2006, profits slowed to 3%, vs. a 30 % jump in the fourth quarter of 2006.

Timing, Yahoo, and Google

The role and influence of timing is particularly contentious among strategists who study Internet

firms. The case of Yahoo provides interesting examples on the role of timing. From a technical perspective, the Yahoo experience is an easy one to imitate. There are no substantive elements of the user interface that have intellectual property protection. Because of this, during its early rivalry many found the firm's service difficult to distinguish from rivals Excite, Lycos, and Infoseek/Go. Innovation was proven to be insignificant in determining the firm's dominance. The one factor empirically demonstrated to be related to Yahoo's market share was brand (Gallaughier & Downing, 2000). In an admittedly crowded market (firm founders have stated that the first two letters of the firm's name stand for "Yet Another"), Yahoo was first to successfully execute a national branding campaign. Through advertising and most notably PR, Yahoo grabbed media attention ahead of its rivals. An early distribution alliance with Netscape also helped the firm increase its exposure. As such, even in a crowded market, Yahoo was first to create and leverage strategic assets used to trounce its competition. Today Yahoo jockeys with Microsoft, a firm with software platforms and a browser as a distribution asset, for the largest reach in Internet traffic, and Yahoo ranks among the most profitable of U.S. media companies.

While timing played a role in Yahoo's ascendance, it also plays a critical role in its position with respect to its current and greatest challenge: Google. Yahoo was a public company for two years before Google was even founded. Beginning in 2000, Yahoo began paying Google for search, listing results through the subdomain google.yahoo.com. The tactic immediately doubled Google's visitors and helped reinforce Google as a search leader. By the time Yahoo elected not to renew its contract with Google, Google had already exceeded Yahoo in search traffic (Hansell, 2002). Yahoo's failure to see Google as a threat is particularly interesting because the firm continued to innovate with new features when compared to established portal rivals, yet had neglected

to improve search. Google's value proposition to users was simple: more accurate search (via the PageRank algorithm), a stripped down user interface containing less than 20 words, and no graphics beyond the firm's logo. Both of these approaches could be duplicated, yet rivals ignored them. During Yahoo's period of search innovation dormancy, Google was able to leverage its technical lead to create brand, grow market share, and thus generate scale. Google's size-based scale advantages today result from both its user and advertiser base, the largest in search advertising, and the size of the infrastructure needed to support its operations (the firm is estimated to use between 500,000 and 1 million servers to power its service). While both Yahoo and Google were started by Stanford doctoral students, the chances of a rival creating a comparable firm today are greatly diminished due to the capital requirements needed to support a competitor. Again, we see Google was not the first entrant, but it was the first to craft defensible assets in its space. And the firm's use of unmatched technology over time directly led to the creation of these assets.

broken thought and breakthrough Models

After examining the model of positioning leveraged through strategic resources we can reflect on some of the most popular writing on the strategic use of the Internet and see that much of the advice offered was wrong or broadly overstated. This broken thought is profoundly dangerous to managers seeking to understand the true nature of competitive advantage and how firms can construct strategies for success. Several examples of this failure are analyzed.

Myth: Moving Early is Unimportant

Michael Porter refers to the "myth of the first mover" in his widely cited piece, "Strategy and the Internet" (2001). Another *Harvard Business*

Review article, Nick Carr's "IT Doesn't Matter" offers the advice "follow, don't lead" in a bold call-out (2003). However, much of the evidence suggests this is at best an overly broad platitude and potentially terrible advice for the strategist. It took Barnes and Nobel 17 months to respond to Amazon.com's online effort, but by early 2006, Amazon has three times the profit and seven times the market cap of its late moving rival's online *and off-line* businesses. Wal-Mart, Federated, and many other established retailers have entered markets alongside Amazon, but none has approached the online size of the asset-creating first mover. Schwab launched Web trading in May of 1996, Fidelity in January of 1997. Prior to this, Schwab and Fidelity were closely ranked peers as the top two discount brokers, but by 2000 Schwab had captured 27.5% of the online trading market. Fidelity ranked fifth in trading volume with a share of just 9.3%. In online auctions, Yahoo and Amazon, each an established Internet brand with millions of users, could not break eBay's 80% domestic market share. Yahoo even offered its service commission free the first year, but to no avail. In payment systems, PayPal launched ahead of eBay's home grown service, Billpoint. PayPal's biggest market was in supporting transactions over eBay, but eBay recognized the startup had strategic assets that were simply too strong and eventually acquired PayPal for \$1.3 billion. All of these early movers were able to leverage their time lead to create strategic resources, and in every market, the late mover has had to spend more to gain significantly less market share with lower margins.

Myth: Switching Costs Have Limited Impact Online

More broken thinking exists around switching costs. Porter suggests "switching costs are likely to be lower, not higher, on the Internet", and predicts that services like PayPal will allow consumers to migrate from one vendor to another,

avoiding the cost of re-entering order information. In fact, switching costs and attendant data assets have proven to be vitally important. The case of Netflix demonstrated that even when well known rivals enter a market with a cheaper product, consumers were unlikely to switch. Netflix's share and customer base grew well ahead of rivals while customer churn fell. Wells Fargo has stated that firms that use online bill pay, a switching cost source due to time spent entering payee information and learning the interface, are 70% less likely to leave than customers who do not bank online. Part of the reason Yahoo was not able to migrate its user base from eBay to Yahoo Auctions was due to established eBay users' reluctance to give up their seller and buyer ratings and start anew—again, a switching cost. Even a firm like Google, where switching costs apparently are non-existent, has seen its usage rise. While it may be easy in theory for users to move from one service to the other, in practice, despite heavy innovation from rivals, users have not been presented with enough reason to make a switch. These businesses are not special exceptions; they are winners because the dynamics of their markets and models lead to powerful winner-take-most advantages.

Myth: The Benefits of Network Effects are Overstated

Porter has referred to Network Effects as a self-limiting mechanism, suggesting that it is difficult for a single firm to capture their benefits, and that network benefits reach a point of diminishing returns. Porter also argues that "creating a network effect requires a large investment that may offset future benefits". In fact, many firms that have leveraged network effects have done so with a minimum of investment. Firms that establish an early market share lead in markets where network effects are present often find that their consumers become advocates for the service, fueling increased demand with limited advertis-

ing. Second generation Internet businesses that have leveraged network effects to achieve half-billion plus valuations with no advertising include MySpace, Facebook, and Skype. While network effects are only significant in industries where exchange is critical (Gallaughier & Wang, 2002), in industries where these factors are at work, a winner-take-all dynamic ensues. EBay's delay in entering the Japanese market led it to withdraw in defeat, ceding a market in excess of \$2 billion to Yahoo because of a delay of only 5 months. Network effects, combined with switching costs, are a chief strategic asset at work in establishing the dominance of PayPal, Apple's iPod/iTunes products, Sony's Playstation 2, and major stock exchanges, among other services. Each of these businesses has a value exceeding \$1 billion.

Myth: Internet Brands are Weak

Porter suggests a lack of direct contact makes Internet brands more difficult to build than traditional businesses. He cites the high cost of advertising, product discounts, and incentives as part of the difficulty. But as stated previously, early movers have established extremely powerful online brands. In fact, one may argue that truly global brands have never been built faster and at a lower cost than those created by successful Internet firms. Not only is Google's brand strength held despite low switching costs and heavy competition, the firm spends 22 times less than MSN and 7 times less than rival on maintaining its brand advantage (Elgin, 2005). Google executives claim to have spent nothing on advertising through 2003 and continue to spend very little (Hansell, 2002). Amazon, eBay, Skype, Netflix, MySpace have all established themselves as virtually synonymous with their services, creating brands so strong that even rivals with established brands in other channels or markets must overspend to establish a place in the consumer psyche. And in fact consumer behavior demonstrates that there is very little room in the space of consumer

mindshare for a second, third, and certainly not forth tier player. Brands lower consumer search costs to find products, they proxy quality, and inspire trust. A failure to establish a strong asset is a recipe for online disaster, and a firm that can secure this asset has a daunting strength for rivals to attempt to match.

Myth: The Online Advertising Business is a Weak Revenue Generator

Early stage Internet investing was excessive, due in part to wild enthusiasm mixed with a lack of understanding regarding the power and necessity of acquiring strategic assets outlined above. However, the anomaly of the dot-com collapse caused many (including Porter) to overstate the case regarding the limitations of ad-centric business models. Porter stated, "Advertisers can be expected to continue to exercise their bargaining power to push down rates significantly, aided and abetted by new brokers of Internet advertising". In fact, once the dust settled from the dot-com collapse, online advertising among mainstream advertisers took off, rates rose, and inventory became scarce (Bonamici & Vogelstein, 2005). Consumer media time continues to accelerate online at the expense of other forms of media. Ford, GM, and Procter and Gamble are among the firms shifting millions online due largely to the measurable success of their early efforts. And by summer 2006, online advertising had turned Google into the world's largest media company by market cap, earning the firm three quarters of a billion dollars in quarterly profits. At that run rate, the firm's 2006 profits will be greater than Disney's 2005 earnings and nearly as much as Viacom's. Online advertising faces several challenges, including the scourge of click fraud, but the impact and success of the medium has been entirely the opposite of the widespread postbubble punditry.

Myth: Commoditized Technologies Assist Laggards

Nick Carr states that Moore's Law "guarantees that the longer you wait to make your IT purchase, the more you'll get for your money" (Carr, 2003). This is risky and simplistic advice. IT is more than just processor speed. While hardware may be commoditized, suggestions of the value of software commoditization ignore the danger of promoting generic processes or copyable technology in areas where tech can create or strengthen competitive assets. For example, Amazon initially purchased customer profiling and experience customization software from NetPerceptions, yet later decided rolling its own collaborative filtering system would give it an advantage. Apparently users surveyed in the University of Michigan's American Customer Satisfaction Index agree. In 2002, the firm was rated the top service business in any service industry, online or off, ever examined by the study. Netflix dropped Oracle's inventory management system when it realized superiority in delivery was critical to maintaining margin advantages over rivals. And Dell scraped an ERP implementation when it, too, felt that generic processes would be employed over strategic ones (Davenport, 1999). Commodity thinking about technology without regard to the process and resource creating strategic impact of this technology is flawed and potentially damaging.

Myth: The Internet's Low Entry Barriers Mean Firms are More Vulnerable than Off-line Counterparts

In 9 months, iWon.com was able to launch a service that on first blush appeared indistinguishable from Yahoo. But in hindsight it seems the firm had little impact on its larger rival's actions or competitive position. From Yahoo's perspective it was as if iWon never existed. Porter warns that the Internet significantly lowers entry barriers,

but as the points above make clear, late entrants have regularly tried and failed to copy the models of existing, strategically positioned firms. Market entry does not equal firm sustainability, and the ability to put up a Web site does not mean a firm will have the resources needed to sustain itself in the market. While low entry barriers can create problems in industries where leaders are unable to craft strategic assets that avoid price-based competition, most firms considered Internet leaders today are not threatened by the low entry barriers because they possess difficult to acquire strategic assets.

cON cLUsION

Firms will make mistakes and markets will evolve. Amazon's highly profitable media retail businesses may be under threat as the firm spends to expand in other categories and confronts established and resource rich firms in digital media. Technology may dismantle the advantages of the Netflix delivery network. MySpace and Facebook may be subject to faddish and changing tastes. Google's assets may be undercut if Microsoft successfully embeds search into Vista. And financial pressures as firms transfer from high growth to mature businesses may cause competitors to engage in costly battles to invade one another's space. By early 2006, Microsoft had \$40 billion in cash, Google had \$10 billion, Yahoo \$4 billion, eBay \$2 billion, and Amazon added more new hires in 2005 than any of these firms (Smith & Mangalindan, 2006). The outcomes of any future confrontations are unknown, but the sustainability of any eventual winners will be due to their ability to craft, exploit, and defend strategic resources.

Through cases and examples, this article has demonstrated that Porter's strategic positioning theory can be particularly valuable when combined with resource-based theory. While Porter's frameworks are of great value, practitioners and

theorists alike should regard the Internet-related platitudes, suggestions, and examples offered by many writers, including those by Porter and Carr, with skepticism. Strategy requires deep, reflective thinking about the differences across each industry. Technology matters greatly. It plays a key factor in creating valuable resources such as network effects, switching costs, and data assets. It also enables businesses that can leverage an operational lead to establish resources that can include brand and scale. The role of timing remains critical. Moving blindly into an industry with an unsuccessful model is a recipe for failure. It is acknowledged that technology must be sufficiently mature such that customers are prepared to accept a novel product or service (Suarez & Lanzolla, 2005). But comparing failed firms to late moving successes misses a key point: the failed businesses failed many times not because of their early timing but because of their imperfect model or flawed execution. While firms can choose to wait to learn from a rival's failure, if the incumbent is successful, then time leadership may be used to craft powerful resources that are difficult for hesitant rivals to overcome. Betting on rival failure is not a strategy – it is gambling. Strategic thinking about assets, and crafting tactical excellence to create these strategic resources, is a far more appropriate recommendation. It is hoped that the presented framework proves a useful tool in understanding as well as plotting successful businesses.

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Chapter VIII

A Tale of E-Business Models: From the Music to the Television Industry

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Abstr Act

This chapter covers the concept of e-business models and how they relate to the music video and television environments. After identifying the value creation chain of music and video broadcasting to provide a context for the chapter, it assesses independent producers and aggregators of content, important new factors in the value chain of entertainment, as well as the various mechanisms through which content is reproduced. Following a comparison of the music and video/television business models, a case study is presented which exemplifies the reconfigured value chain presented herein. The background, development, and outputs of Current TV are presented in order to highlight the ultimate issue clarified in this chapter—that the changing nature of music, video, and television broadcasting markets combined with faster broadband connection—will continue to underpin radical changes in both music and television industries.

INtr ODUct ION

Recent technological advances in video and television broadcasting over the Internet have

signalled a period of radical transformations for the market, resulting in innovative services like YouTube and new applications like Television over the Internet Protocol (IPTV). The initial evidence

of coupling audiovisual broadcasting with the Internet is already prompting a re-evaluation of frameworks and perceptions within the context of the network economy. In particular, changes in viewing preferences and habits have had a significant impact on what is broadcast and how this is done; effectively redefining what television is all about.

This chapter will focus on the value creation mechanisms and how new business models could underpin this ongoing transformation. We will use the experience gained since new business models were introduced in the music industry and discuss the similarities and differences when compared to the emerging models for video and television broadcasting using a number of examples and case studies.

E-bUsINEss MODELS

In this chapter we will adopt the definition by Afuah and Tucci (2003) who suggested that a business model is “the method by which a firm builds and uses its resources to offer its customers better value than its competitors and to make money doing so”. This definition encompasses two fundamental aspects, i.e. the transformation of resources into value and the extraction of profit from it. Following the dot com bubble, the element of profit extraction became more central for e-businesses, as a result of rationalising the selection of business models adopted for Internet-related ventures. What is often though difficult is how to identify where exactly the value is for the stakeholders, especially in complex markets, like the music and video/television broadcasting ones that we will be considering in this chapter. When it comes to presenting the case studies, we will also adopt their proposed taxonomy, which results in seven major business models, each having a number of variants: commission, advertising, mark-up, production, referral, subscription and fee-for-service.

If bandwidth is considered as a core element of the value generated by e-business models, one could argue that the video broadcasting business models and subsequently television business models could be seen as evolutionary models spawned from the music industry. If that was the case, though, then why have video broadcasting services like YouTube only recently become popular, when the vast majority of their content is comparable in size to MP3 files that have been around for many years? Before attempting to answer this question, it is worth putting the music and video markets in context, and following the directions set by the definition proposed by Afuah and Tucci, by discussing in more detail how resources are transformed into value and how this is extracted in order to benefit the stakeholders.

INtEr NEt AND Its IMPAct ON t HE MUslc INDUstr Y

The structure of the music industry at the end of the 20th century was totally dependent upon there being a strong copyright framework. The music industry was oligopolistic, with over 75% of market share owned by only four major labels. There were a handful of large independent labels and thousands of smaller independent labels. Copyright was crucial to all of them. It enabled them to recover the investment they made in songwriters and composers. Without copyright there would be no financial incentive for music publishers to invest in composers and musical works, and this could be to the detriment of artists, who depended upon publishers to manage the business of exploiting musical works and administering their royalty payments. Copyright was increasingly seen as a “pop commodity” (Frith, 1988); almost entirely defined in economic terms; a way of ensuring that revenue was derived from usage of a work and a means of establishing and enforcing legal ownership of a work. The privilege which came with this ownership was the exclusive right to make

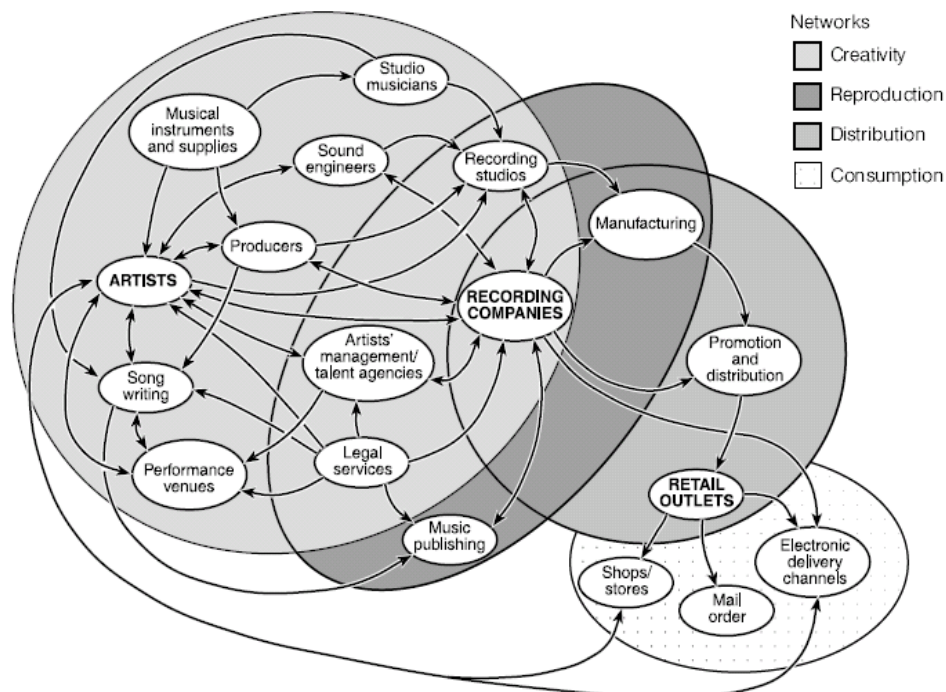
copies of the work, disseminate it, alter or adapt it. Copyright ensured that a flow of revenue was generated which went back to the rights holder.

This was challenged by peer to peer file sharing technologies, which enabled the free sharing and exchange of music files between anyone, anywhere, who downloaded an easy to use free program onto their computer. This coincided with rapid increases in storage capacities, equally rapid increases in broadband availability and connectivity, and the development of compression technologies that enabled high quality music to be distributed over the Internet. This assemblage of technologies created a far more open marketplace in which copyright was almost impossible to im-

pose. More importantly, from a small number of large, globally integrated companies producing the vast majority of available content the music industry suddenly opened up, creating new value creating opportunities.

Suddenly, consumers could get the music that they wanted freely, quickly and in a format that enabled them to copy each track over and over again. The artist and the consumer could create their own communications environments, through websites, blogs, social networking websites, instant messaging, wikis and email, in which they could contact each other directly. Artists were empowered not only to make, but also to reproduce, distribute, promote and sell their own music (in

Figure 1. Traditional music industry business models were based on a network of value-creating activities. Adopted from Leyshon (2001)



the process retaining far more of the profits than would be the case if they were signed to a record label) directly to the end user. The consumer, whilst also being able to reproduce, distribute and promote their own favourite music, could contribute to the act of creation as well. Traditional music industry business models were based on a network of value-creating activities; the artist created music, then traded their copyright to the record company in return for a cash advance. In return for this, the record company then owned (and therefore profited from) all uses of that music, and was expected to provide production support, manufacturing, reproduction marketing and promotion of the artists work, to a greater or lesser degree dependent upon the nature of the individual contract. This was a complex operation involving many different interested parties, as illustrated by Leyshon (2001) in Figure 1.

Artists created work and then signed over the copyright in this work – from short periods to perpetuity - to the record label, which in return paid an advance to the artist and supported them through the expensive process of recording, manufacturing, promoting and distributing their work to consumers. As the Internet reduced the cost of every element of this process, except for the initial creative aspect, it became possible for the artists to reach out directly to their audience, and for the audience to contact their favourite artists directly. This changed the nature of the traditionally linear and restrictive value chain, which had run from creation, manufacture, reproduction, distribution and finally to consumption. Although this linear value chain was still a necessary part of the creative process for some artists, and it provided a source of valuable content to a large proportion of music consumers, alternative processes of value creation were possible, which broadened the musical landscape in ways that could not have been foretold, and which could not be controlled.

WHAT Is t ELEVISION?

Television is the transmission of pictures and sounds via electric or electromagnetic signals and traditionally the word has been associated with the electrical appliance that can be found in most households these days. With the introduction of the Internet many existing broadcasters found a means to reach audiences outside the physical borders imposed on them by their infrastructure. Many new channels also appeared which broadcast solely over the Internet. Their appearance prompted us to define Internet-only TV channels as channels that broadcast continuous streams only over the Internet (Papagiannidis, Berry, & Li, 2006). The time element was added in order to distinguish them from video-on-demand approaches that bundled clips together, effectively creating a ‘channel’. Since then, interactive television services that offer video-on-demand features have appeared, blurring the boundaries between new and traditional definitions of television even further.

An answer to the question ‘what is television’ may simply be that the question actually does not matter anymore. Consumers have been increasingly looking for short-span entertainment (Skrebowski, 2004) – not just what they want, but when they want it and how – and ‘traditional’ television broadcasting may not be as appealing as it used to be. If this is the case, and the value creation opportunities that television used to offer are not as effective as they used to be then broadcasters and content producers would need to re-evaluate their strategies and shift their focus accordingly. Such a shift would probably need to be underpinned by enhanced customer and community interactions which could provide not only ample direct, feedback but also an opportunity for the viewers to participate actively in the creative process. Before proceeding to present the case of Current TV which a good example of the

aforementioned shift, we will first examine the video broadcasting value creation chain.

THE VALUE CREATION CHAIN OF VIDEO BROADCASTING

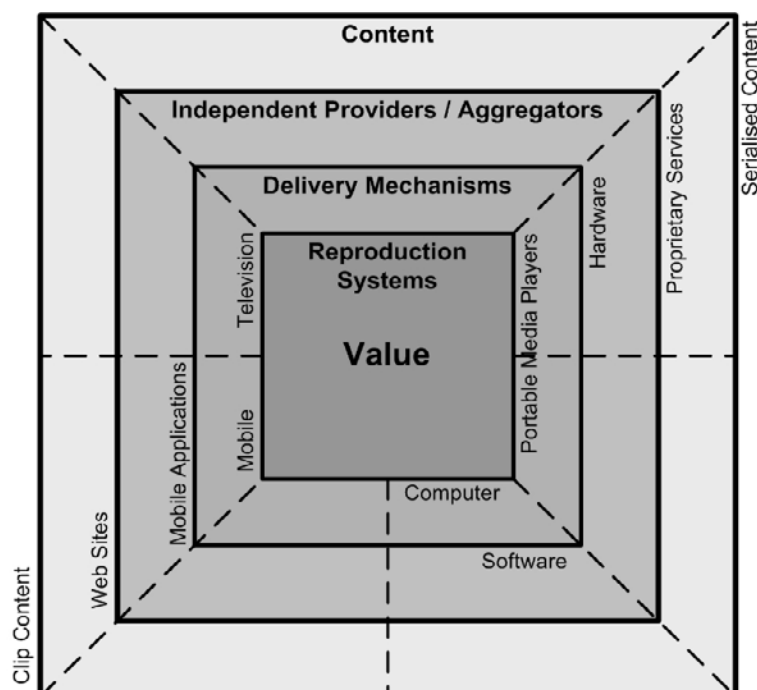
In this section we will use the framework illustrated in Figure 2 to present case studies on the value creation chain of video broadcasting over the Internet market. As illustrated in the figure there are four levels: the content creation stage, the independent or aggregated distribution mechanism, the hardware or software delivery mechanism and finally the reproduction system itself. An offering has to go through these stages in order to reach the audience and create value.

Each stage offers a number of options and each combination of options among these four levels could provide a different type of offering. For example, serialised content could be available over a web site, downloaded by the user and then reproduced on a portable media player. For each one of the levels we will also present a case from the music industry, demonstrating the similarities and differences.

content

Video content can either be one-off or part of a series of clips. This serial approach to video content could allow distributors who have a direct relationship with the audience to adopt subscription-based models revolving around a specific

Figure 2. The web of relationships in video broadcasting over the Internet. Adopted from *Wired* (Anonymous, 2006) with modifications.



creator or creation. Audio content like podcasts are ideal for subscription models and many are supported by advertising or sponsorships. However, episodic content is not typical of the music industry, and subscription models in the music industry were a relatively new phenomenon (Pogue, 2005). Where serialized video content may come from commercial producers who would upload either old content or even brand new episodes, the serial nature of subscription music is very different. In the context of music, the subscription simply provides a choice of what to listen to next, as opposed to facilitating viewing of the next instalment in a piece of episodic content. Consumers were able to 'rent' unlimited music from the provider of their choice, but this meant that if they stopped paying their subscription, they would lose access to everything they had previously enjoyed, not something that everybody desired (Garfinkel, 2002).

These models were mere reflections of existing thinking onto a new medium. Soon, the Internet's potential to completely transform traditional, linear and static industry models emerged, putting forward a new, more flexible value framework which blurred not only the stages of the value chain, but also the roles of the actors. The consumers were able to participate, becoming involved in activities traditionally in the domain of the industry, creating, distributing and promoting their own content that caters for a wide variety of tastes and interests. This had significant implications for the notion of value in the market, as value was now not necessarily associated with financial profit, but with intangible benefits such as an increase in self-esteem, kudos and peer recognition. This "co-creation of consumer experience" (Li, 2007) is reflected both in the music and the television industry. Star Trek New Voyages (www.newvoyages.com) is a good example of this, while the plethora of video blogs stands testimony to the spread of the phenomenon, as far as video broadcasting is concerned. These are often significantly more complicated to produce

than audio clips and may require substantially more resources. Content created by the 'audience' is usually distributed for free and in cases where revenues are generated this is usually through advertising or sponsoring.

Traditional broadcasters have also embraced the new broadcasting platforms to varying degrees. For example, in June 2006, the BBC broadcast the World Cup games live to UK Internet users for free (BBC, 2006a). Other broadcasters provide their entire programme online, albeit in low resolution due to bandwidth restrictions. More importantly, such television broadcasts may be limited, usually due to content licensing, within certain geographical boundaries, which forbids broadcasting them worldwide through the Internet.

Perhaps among those involved in content creation the independent producers and those catering for niche markets would benefit the most. Using the Internet they can distribute their creations for a fraction of the cost that a traditional supply chain would have demanded and at the same time reach a much bigger audience that could be big enough to render their efforts worthwhile (Berry & Papa-georgiou, 2006). Many examples of independent artists reaching out directly to their consumers exist in the music industry. A good example is that of David Bowie and others, who monetised their future success by releasing financial instruments known as bonds in which their fans could invest. The value of these bonds was predicated on the past success of their music, and consumers' investment in them provided sufficient income to ensure the artists' continued independence and future music output (AcidPlanet, 2004; Holland, 2006). The American band Clap Your Hands Say Yeah provide another example (Anonymous, 2006; Hasty, 2006; Leeds, 2005); their songwriter, Alec Ounsworth, said:

"I asked record labels, what exactly can you do for us that we're not doing for ourselves? And nobody had a reasonable answer. So it seemed

to me if we could handle it, we could handle it.”(Anonymous, 2006)

Whether their example is followed by Hollywood producers is probably questionable, as the risks inherent in multi-million dollar productions do not allow deviation from best practices easily. Still, there will be cases where smaller producers consider alternative distribution methods like the YouTube Director service that we present in the next section.

Independent Providers and Aggregators

Content creators are now able to sell directly through their web sites or via aggregators. Aggregators are services that gather information about content in one place, effectively creating a marketplace for digital content, which makes searching and subscribing easier. Aggregators benefit from the economies of scale, overcoming the barriers of setting up and maintaining separate points of sale for each creator, even if these barriers are much lower than traditional distribution barriers.

Legal Music aggregating services, introduced mainly as a response to illegal peer to peer downloading, managed eventually to gain momentum and many of them, such as iTunes, have become very popular. This was reflected by the introduction of download charts in September 2004, and their continued successful development since then, as over a million tracks were downloaded every week by mid 2006 (CMUnlimited, 2006).

When it comes to video over the Internet, one of the most popular aggregators is YouTube (www.youtube.com), which in autumn 2006 was bought out by Google – its popularity perhaps underlined by the \$1.6bn price tag. YouTube originally started as a personal video sharing service and has since then grown into a service that allows users to watch daily more than 70 million videos. This kind of success would not have been possible if

YouTube had not empowered users to set up and build communities around their content. The service allows users to upload, tag and share videos worldwide with family, friends or the public. It also allows them to browse millions of original videos uploaded by other members and submit their comments on each clip they watch. Users can subscribe to channels that group together clips either by the same user or are thematically related. They can also join a group that has a specific interest, e.g. comedy.

A natural evolution of creating communities with an interest in distributing and sharing digital content would have been to allow users to gain financially from their creations and YouTube has already moved in this direction. YouTube Director is a free service which allows musicians, amateur filmmakers, video-bloggers, and professional content producers to distribute content that lasts over 10 minutes. Google Video already offers such a service, albeit only in the United States. Similar music services have been around for some time. A good example is Garageband (www.garageband.com), a music label that facilitates the distribution of music for independent artists. Garageband was founded in 1999 and initially operated as a record label. Suffering the fate of many companies at the time of the dot-com boom/bust, it shut down in February 2002, re-launching the following month. The new version of Garageband purported to base all of its offerings on an innovative review process with thousands of listeners testing and rating new songs to a degree impossible before the advent of technologies which supported the development of online communities. This led to a natural process of selection performed directly by the listeners and as such it could be argued that it is more real and reliable. Nobody was able to upload a track of their own until they had rated and reviewed thirty other tracks in an anonymous process. Those acts which were most highly rated were made highly visible and were therefore more likely to be offered recording, publishing or licensing deals. However, Garageband did

not operate as a label itself, but as a promotional vehicle for the independent musicians who used the website. Its revenue model was supported through artists' payments for placing their music within the voting engine, at different costs for each level of activity supporting the artist. Advertising and paid downloads also supported the site's revenue model.

Delivery Mechanisms

Delivery mechanisms fall into three categories: mobile, software and hardware, although it is often difficult to say in which category a mechanism actually falls. A good example is the Slingbox, which allows place shifting of a video signal that may come from any source. The signal is then transmitted over the Internet and the user can view it using a personal computer, a PDA or a Smartphone. As Slingbox provides mobility using a combination of software and hardware, it actually fits in all three mechanisms. The user only has to pay for the equipment in order to watch all the channels that one usually has access to at home anywhere that an Internet connection is available.

When it comes to time shifting TiVo can take care of recording programmes. Users set up rules e.g. by specifying their favourite series or keywords and then based on them TiVo records any relevant broadcasts. TiVo knows the TV schedule by automatically connecting to the TiVo service, which is subscription-based, to download the information it needs. Users can then watch the recorded programs on the television or transfer them to their PC or mobile devices, or even burn them on DVDs.

An example of a software delivery mechanism is that of Apples iTunes (www.itunes.com) store. In addition to music videos, the iTunes Music Store in the United States features television shows from many of the biggest and most popular networks. These are available one day after they are broadcast on television for a small fee. Users

can watch them on their computer or transfer them to their iPods to watch them on the go. Other aggregators do not use their own software to deliver the music files, but rely on third-party software in order to do so.

Finally, when it comes to mobile delivery mechanisms, mobile phones are the first candidates to host video broadcasting. In fact, mobile phone users in Japan can watch digital TV on compatible mobile phones, through a service which may not be the world's first, but it has the potential to be the biggest by reaching more subscribers than in any other country (BBC, 2006b). Mobile phones have supported audio playback for some time and a number of them also support video playback. Not many, though, were initially destined to replace MP3-like players, mainly due to the limited storage space, although this has started to change with mobile phones now often featuring many gigabytes of storage space.

reproduction systems: the screens

As the name suggests, reproduction systems include devices that can display the content. These include television or computer screens, portable media players like iPods, mobile phones and others. In most cases these screens are part of the delivery mechanisms, but in the future one could envisage a scenario in which 'screens' stream content wirelessly from a pool of sources and simply act as terminals. Perhaps the most interesting attribute of a reproduction system is its mobility, which is related to its physical size, as it often determines what, when and how the viewers watch a programme. For example, a PDA screen may not provide the thrill and excitement of a full size television when watching a movie, but it can allow the viewer to carry it easily and watch the movie on the go. Perhaps a compromise could be achieved by using wearable display systems that would provide the benefits of large scale displays without limiting the user's mobility.

This is not an issue with music reproduction systems. A portable MP3 player can store thousands of tracks and reproduce them as a full-size HiFi system would have done only limited by the quality of the speakers. As earpieces can usually provide a good enough experience for users on the move, reproducing music is intrinsically much easier.

cOMPARISON OF MUSIC MODELS Vs. VIDEO AND TV MODELS

Although it can therefore be seen that video and music can, in general terms, map onto each other in the way that they are created, distributed, reproduced and delivered, the preceding sections illustrate fundamental differences in the detail which militate against a closer comparison of the two industries within this framework. If one looks at the audio and video industries as one industry, that of digital media, a possible explanation can be found as to why the audio one developed first, when the majority of available video clips are of comparable size. This may be due to the following reasons:

1. Consumers can relate to and easily appreciate the value of a stand-alone music track.
2. Consumers are more used to swapping music than video content.
3. The equipment required to swap music has historically been more readily available, portable and accessible.
4. P2P file sharing technologies were predated by consumers ripping their CDs to their computer to facilitate burning and sharing music in a more localised context. Because of this, they already had digital music libraries; so it was easier to put them online.
5. It also made sense for consumers to continue to grow their existing digital libraries as an alternative storage approach.

6. Consumers were more used to paying for video and getting their music for free.
7. Videos require that the user both listen and watch – music tracks could be listened to whilst the user was performing any number of other tasks. This may explain why viewers shifted their preference towards short duration content, that is often watched in order to ‘fill’ the gaps between two tasks, e.g. while waiting for the bus or during lunchtime.

The fifth point may also give an explanation for the rapid growth in user-contributed videos online which still drive the growth of the market. In order for services like YouTube to become successful a critical mass had to be reached, which meant time had to pass building up video libraries that attracted more users. The more users joined, the more attractive it became to publish content, creating a virtuous cycle.

However, there are more similarities than differences between the traditional music and television industries. To start with, both industries had business models based upon control and mass distribution of easily-digitised information. Control was retained by the major broadcasters or labels respectively through ownership of capital intensive industrial processes, and the doctrine of copyright; distribution was only hindered due to bandwidth limitations. Although distribution will be less of a problem as faster connections become available and less capital is required for digitally-mediated manufacturing and reproduction in particular, the issue of control becomes paramount, as consumers become more integrally involved in the creative processes of both music and video, and often both.

Historically both industries have been controlled by a small number of large, vertically integrated companies – in all cases, the major record labels were sub-divisions of large entertainment corporations which also had television interests. Both smaller television companies and

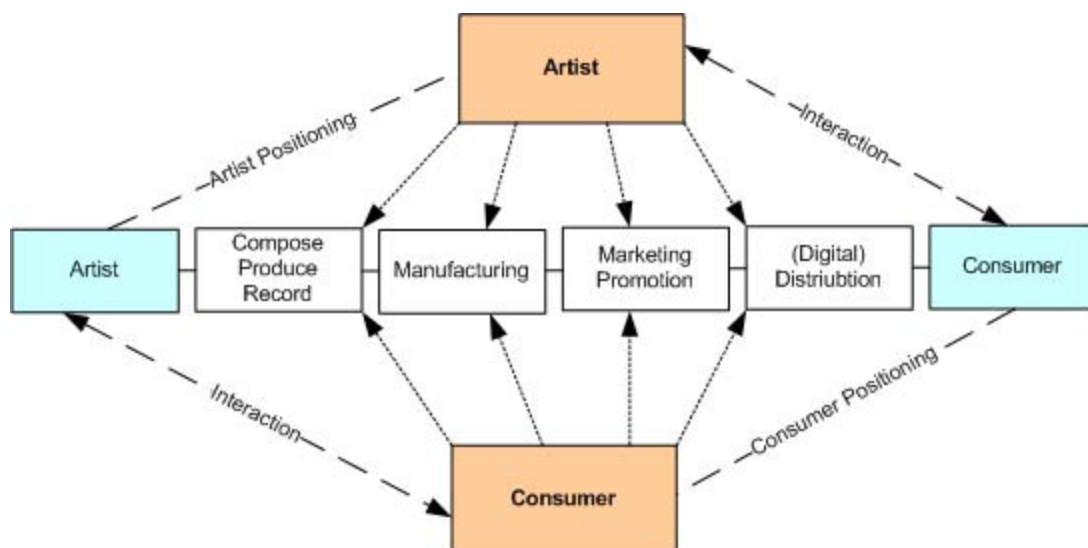
independent record labels tended to produce niche, specialist content, and were frequently owned in part or full by one of the larger companies in their industry. And the process of creating content and distributing it to the consumer was strictly controlled and frequently prohibitively expensive for an individual to undertake. Talent was contracted to each type of company with restrictive contracts, and ownership of the content produced; whilst contracts were in force they remained, in general, with the company.

The Internet challenged this. Distribution methods became more effective and efficient, entry barriers were lowered, artists and content creators were able to reach the audiences directly. The new business models advocate open platforms that are primarily based on sharing content in order to capitalise on their popularity indirectly, usually through advertising and occasionally subscription fees. These models had a fundamental difference from the traditional ones: they were built around a community instead of the content. This holds

true more for video than music as the community effectively decides what is relevant to them and filters everything else.

In fact, many of the successful services rely heavily on the community to rate and return feedback not only during the post-creation stage while searching for content, but increasingly during the creation stage too. As far as the music industry is concerned, this is a perfect example of the increasing interaction between the artists and the community of consumers. The traditional record label value chain continues to exist and underpins developing relationships: artists can still sign to a record label and in return for giving copyright in what they create away to the label in perpetuity they are provided with financial, promotional and artistic support. Consumers can still listen to, support and buy music from artists signed to major or independent labels. This business model is unlikely to alter dramatically; however, there are signs that some artists and consumers are moving away from their posi-

Figure 3. Artists and consumers repositioning themselves on the value chain



tions at either end of a linear value chain, and taking up a position above it. The artist is able to contribute to not only the creation, but also the reproduction, distribution and promotion of their work. The consumer is similarly empowered, and a previously impossible technologically-mediated direct relationship between these two stakeholders is becoming visible. This could be seen as a classic example of e-commerce disintermediation, perhaps, yet this chapter proposes that it reflects a far deeper and more fundamental shift of the positioning of and relationships between major stakeholders within and along the traditional value chain. These new relationships appear (in early light in Figure 3) to be far more flexible and yet at the same time more resilient than the fads and fashions which pervaded the music industry in the late 20th century.

This results in a far more varied, but also a far more fractured and differently-textured, content landscape. From a relatively homogenous selection of processed popular records, the consumer is now able to select from a wide range of music either found online whilst browsing, recommended by friends from all over the world, or even through direct contact from the artists themselves. Equally, the artist is able to reach out to a wider and more international audience, which was previously too expensive in time or money to access without the support of an internationally networked record label behind them. Importantly, the artist and consumer are able to interact directly, without requiring any intermediaries, to shape the music as it is in the process of production. The content that emerges because of these communications is likely to be more to the taste of the audience and therefore will lead to the greater success of the artist.

All of these potential changes to the traditionally linear music industry value chains are as yet only ripples at the edge of an ocean, the first effects to be noticed from the deep impact of the Internet on an oligopolistic and conservative industry. However, each of the linkages seen in

the new value framework discussed above can be examined through the lens of case studies, which are occurring with increasing frequency, showing how new models of business are springing up. The overriding feature of these new business models is the involvement of stakeholders at every level of the value creation. No longer can it be assumed that the consumer remains unimportant until the product is created – their immediate and early input to the creation process will ensure a more successful product. Equally, it is no longer possible to restrain artists behind a wall of copyright when they can simply walk around it and go directly to their fans through websites, blogs, instant messaging, email – any number of technologically mediated ways to bypass the traditional music industry position. It remains the case, until the source of these minor disturbances on a hitherto calm and controlled industry starts to show itself, that the traditional record label business model of copyright ownership and exploitation will remain in place. But a fundamental problem facing these labels is that of copyright, which although initially constitutive of the entire industry, is becoming less valuable as it is overtaken and ignored through technologically mediated processes such as peer-to-peer file sharing. Video broadcasting over the Internet has posed many similar challenges to those hoping to benefit by controlling copyright. Fans often have little respect for copyright when given the opportunity to download the latest episode of their favourite TV series, especially when this may not air in their country for months. Instead of trying to fight technology they could follow in the music industry's footsteps and embrace the capabilities that new technologies provide.

The emerging music value framework could be adopted to explain the changes in the online video marketplace. The repositioning of the creators and consumers is already happening and new relationships are formed every moment forming continuous feedback loops. Still, as with the music industry these are still ripples at the edge of an

ocean. The experience of the music industry, even though it is still undergoing its own transformation, offers invaluable insights for those interested in exploring these un-chartered waters.

Current TV: A Case of an Reconfigured Value Chain in the Television Industry

We have so far proposed that television business models could be seen as evolutionary models spawned from the music industry. Then, the new business models and the altered value chains of the music industry could be adapted to the television industry. As the framework proposed for the music value chain was a non-linear one, the television broadcasting one would also be non-linear, as illustrated in Figure 4. A notable difference between Figures 3 and 4 is that the latter not only considers the content creators, but also the TV broadcasters too. Both of them and the

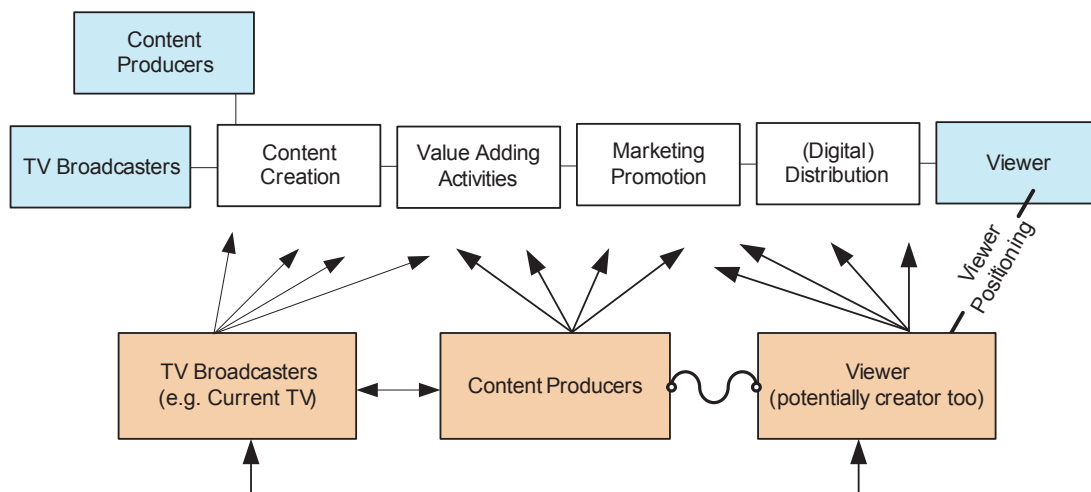
viewers, though, experience a similar repositioning along the value chain, enabling them to affect each link. In doing so, numerous opportunities for interactions among them emerge. A curly line between content producers and viewers is used in order to draw attention to the fact that viewers could be potentially active creators too, as we will see in the case study we will be presenting in the following section.

We will use this adapted framework in the context of a case study of a television broadcaster that has adopted an innovative business model and discuss how each link of the chain is affected in each case.

background

Current TV is a cable and satellite channel established in August 2005. Its founders are former United States Vice President Al Gore, who is the chairman, and Joel Hyatt, who is the chief executive officer. Although they mainly raised money

Figure 4. Producers/Television broadcasters and consumers, repositioning themselves on the value chain. Adapted from Papagiannidis and Berry (2007).



for the channel's start up costs from a Democratic base, Hyatt stated that politics are not going to influence the content presented to viewers (San Francisco Chronicle, 2005). Current targets an audience that ranges between eighteen to thirty four years old or, as one of its executives put it, "a media-grazing audience" (Young, 2007), that plays a central role in the station's business model. More specifically, for its broadcasting content Current primarily relies on short videos called 'pods' (Current TV, 2007a) that are submitted and uploaded by the viewers onto its network. In addition, the viewers have the opportunity to choose what is aired, by visiting its website and voting for the pods they like the most. In this way, Current goes well beyond the boundaries of the one-way communication model that traditional television offers, allowing viewers to influence what is broadcast, by actively participating in the creation and filtering of the content. Current enjoyed significant success with its innovative processes and activities, which added value to its content and one year after launching it managed to reach thirty million houses in the US, increasing its carriage by 70% (Current TV, 2006a). In addition, as of October 2006, it had broadened its market and launched in the UK and the Republic of Ireland (Current TV, 2006a). Current estimates its reach via cable and satellite TV networks at about 52 million homes around the world (Current TV, 2007a).

In the following sections we will examine Current's business model, by using the adapted television value chain framework shown in Figure 4.

c ontent c reation

The first step in the value chain involves the content creation and its acquisition by Current. Current utilises the Internet to efficiently acquire the content directly from the creators, many of whom are part of the audience itself. Content submitted by viewers is referred to as 'viewer

contributed content' or in Current's terminology 'VC²'. The topics for the pods could be selected by the creators themselves or picked from among the 'assignments' listed on the Current web site.

As only about a third of the content broadcast comes solely from the viewers (Current TV, 2007b), Current also needs other distinctive ways to create or acquire content. Following their innovative approach to obtaining content, Current approached news broadcasting in a similarly way, by partnering with Google. With Google being the most popular search engine, Current came up with the initiative to broadcast news covering topics relevant to the most popular searches on the web (Shim, 2005). The television program is called 'Google Current' and is broadcast every half hour, offering a unique approach to news broadcasting. An interesting point here is that Google's users indirectly decide what will be covered during the programme. Current also collaborated with Yahoo and launched the 'Yahoo Current Network' (Hansell, 2006) in an attempt to enhance its content and its network. At the Yahoo Current Network website, both professional and user-generated short clips are presented, split into different channels that are divided onto diverse specialised topics, such as travel, action sports, and cars.

Another Internet-based source of content that Current uses is that of viral video clips. The clips broadcast during the 'Current Virals' (Current TV, 2007c) television program are every day's most popular viral videos that get circulated on the web or appear on sites such as YouTube, Metacafe, MySpaceTV. Finally, in between the video-clips, short advertisements are shown. In line with Current's philosophy, viewers can create their own ad messages for well-known brands, called 'VCAM' (Current TV, 2007f), short for viewer contributed ad message. This is an inexpensive way for brands to tap into the creative flair of the audience, while potentially from the 'traditional' advertising stand point with the content broadcast being segmented into specific thematic areas ad-

vertisers can better target consumers and promote their products and services more successfully.

Internet services like YouTube have allowed users to upload and share their creations on the web. Current took this a step further and now content producers can appear on cable or satellite television too. This serves Current well, not only because it gets a significant percentage of its content in this way, but also because it can indirectly identify talent that has established a rapport with the audience. For example, a content producer called Joe Hanson became very famous with the pods he uploaded onto Current's network. Eventually, he got an offer to work for Current and host his own show called 'Joe Central' (Current TV, 2007e). Those producers who are successful in getting their content to appear on television programmes also get to benefit by a licence fee that Current pays depending on the content. Pod prices are negotiated on a per-piece basis. Current V-CAM submissions are paid at a flat rate of \$1000 per V-CAM (separate fees may be paid out if the sponsor decides to use the clip elsewhere), while promos are purchased for a flat rate of \$250 per promo (Current TV, 2007d).

The above clearly demonstrates the move of viewers from the end of the value chain, i.e. the consumption of the content stage, towards its left links, i.e. the creation and distribution stages, and their transformation to content producers in the process. They are not passive receivers of whatever content broadcasters throw at them, but can actively participate by submitting their own content.

Adding Value to content

The second link in the chain aims to add value to the content and the overall experience and Current in collaboration with the content producers and the viewers achieves this in a number of different ways.

First of all, Current's website offers online training and tips for content producers explaining

how to shoot, edit and upload their pods. Users with no prior producing experience can apply the tips provided, hopefully producing better quality pods. Even experienced users may find the 'Producers Resources' section useful. For example, one of the biggest challenges Current was facing from user-generated content was copyright issues, and, more specifically, the music used in the pods. Every time users uploaded a video clip, Current would have to find the songs or music used in that pod and then contact the company which owned the copyright in order to receive permission to use it. This could result in delays and increased production costs. Current's solution to this was to partner with APM Music, one of the biggest companies that offer music for films, television and radio productions (Mayberry, 2006). Producers interested in creating content for Current now have online access to the music library of APM for free. Therefore, they can easily, and more importantly legally, download and use music that best suits their pods. Current also offers samples and sound effects from Sony Media Software in a variety of popular music genres that could be used too when producing pods. Another important legal issue that Current offers support with is video releases of people and places that appear on pods. Creators can download and use release documents protecting themselves and Current against any legal claims.

When it comes to filtering, viewers can log on to the website and not only watch, but also vote for, thousands of 'promos' (very short video clips developed by users that refer to and promote Current) and pods, which are categorised by genre, with the ones receiving the most votes making it on air. By allowing its audience to vote, Current benefits by saving time and resources that would have otherwise been spent on searching for quality content to broadcast. Also, by categorising them, it can learn which genres are most watched and potentially divert more resources towards them. The consumers also benefit, as by voting, they are effectively in control of the content broadcast.

It is worth noting that although the content and information available on the US and UK/Ireland versions of Current's website are the same, there is a difference in that when a user from the US votes for a pod, it is rated only in the US website (Current TV, pers. comms). In this way, Current is able to localise its content, as pods which will eventually make it on air may be different in the USA from the ones broadcast in the UK and Ireland.

Moreover, in order for users to vote, they need to register and create an account, which effectively creates a community of creators and viewers. These accounts are not just a mechanism for uploading content or voting for pods, but represent a social entity within a very active community. This was reflected in the way voting worked, until Current changed their web site in autumn 2007. Users could vote by green-lighting pods, meaning that they were good enough to be put on air, or red-lighting them. Users that green-lighted uploaded pods and eventually made it on air were rewarded by achieving a higher voting rank, which meant that their green-lights counted more points towards a pod being aired. If users green-lighted a pod and it did not make it on air, then they lost points and they might even drop down the voting ranks. Consequently, users had a strong incentive to be very careful when they voted, as their votes could improve or damage their standing within the community and affect their ability to influence the filtering of the content.

Users can also write comments or give recommendations for the pods that content creators may find useful when producing future pods. So even though this does not add value directly to the pods for which the recommendations were made, the audience's 'wisdom' and their preferences can in the future help produce better targeted and higher quality pods. A good example of this can also be observed in how Current aimed to cover the 2007 New Year's Celebrations. Two members of Current's community suggested giving the network's viewers an unprecedented look at

New Year's from all corners of the globe (Current TV, 2007b). The concept spread through the Current message boards and many users decided to contribute to it. Current picked this up and decided on "New Year's Around the World" on New Year's Day, which included footage from all over the world. The community features that Current's web site offer also play an important role in helping viewers follow their favourite producers and their topics of interest using the 'My Current' section.

Finally, Current exploits the very nature of its business model by using its website as a delivery mechanism for all its content irrespective of whether it gets aired or not. This may not be innovative as a service, but it does differ significantly from the typical use of television broadcasters' web sites, which are mostly used as a means to promote their organisations and their programmes. Interestingly, the more users contribute by adding more content, the more valuable the web site becomes in its own right, as it can then attract even more visitors.

Marketing and Promoting content

Current provides content producers with an opportunity to see their work on television. Professional and amateur producers have the opportunity to reach national television and also make money out of it, with the only requirement being that their content is good enough to find support from the viewers who will vote for it. Although publishing video content online is now open to all, programmes that get broadcast on TV still carry kudos for both the content and the producer. This is a significant differentiating factor between Current and services like YouTube.

Content producers and the viewers themselves can also promote the content by embedding it in web sites they have access to, increasing the exposure it gets. In doing so, they also promote Current and indirectly the community around it and the rest of the content available.

In addition to Current's partnerships with Google and Yahoo!, Current has also partnered with Flavourpill, a company that distributes eleven different email-magazines about cultural happenings to more than 500,000 subscribers, in an attempt by both companies to promote and market their content. With the direct relationships that the Internet offers, Current is able to promote its content to all Flavourpill subscribers, and encourage them to develop and upload pods about cultural events onto a Flavourpill page available on Current's website. As Mark Mangan, Flavourpill's co-founder, claimed, this is "[a] brilliant merging of user-generated content with the television experience, Current is the perfect forum for our creative community to showcase their stories to millions" (Current TV, 2006b). The partnership allows Flavourpill to promote its content to a wider audience and broadens its distribution horizons, as with Flavorpill's weekly RADAR feed broadcast on Current the company is able to offer its events listings.

Digital Distribution

The final link of the proposed value chain framework is the distribution of content. This consists of all the mechanisms used by Current, the content producers and the audience in order to distribute the content among them and then consume it. Current offers three ways of watching its programme and clips. The first one is via cable and satellite TV. As stated above, this service is only available in the United States, UK and Ireland. Also, its web site acts as repository for all its content that is available for users to view as individual clips. In this way, Current manages to potentially decrease its distribution costs, increase its geographic reach and even achieve long tail economics (Anderson, 2006). In fact, Current is a good example of how long tail economics in television could work through a democratisation of the tools of production, the democratisation of distribution due to reduced costs and how

finally supply and demand can be connected in new ways. In addition, viewers can watch clips on the Current web site. Finally, users can embed clips in their own web sites (e.g. blogs) by adding a piece of code to load the clip, allowing viewers to consume individual clips relevant to that particular web site.

CONCLUSION

The video and television broadcasting markets are changing radically and the wider spread of faster broadband connection will only fuel these changes further. It could be argued that it is not a matter of whether it will happen; we have already presented a number of examples of this transformation. The real question is how quickly the market will move on to its next phase and equally importantly what the medium-term future will hold for it.

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Chapter IX

Strategic Maneuvering in Healthcare Technology Markets: The Case of Emdeon Corporation

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Abstr Act

Healthcare technology markets have been recently identified as potential investment targets. Having survived a major environmental shock, the dot.com bust, firms in the healthcare technology industry are presently experiencing an impressive revenue growth. In this study, we investigate the strategies of Emdeon Corporation, a healthcare technology firm whose e-business model provides clues for achieving a sustained revenue growth and profitability. We trace the current sustainability of Emdeon's e-business model to a related diversification strategy that the firm's upper management has pursued via mergers and acquisitions (M&As). We also address the motivation behind current restructuring of Emdeon's e-business model. We argue that maturation of diversified e-business models leads to the transformation of individual segments into distinct entities focusing on specific technology markets.

INtr ODUct ION

A growing specialization of e-business models has offered a variety of new services that create

business value for the healthcare industry (Parente, 2000; Payton, 2003; Singh, O'Donoghue & Soon, 2002). These diverse services can encompass online execution of medical transaction

processing, health information retrieval, and/or online enrollment to health plans, to name a few examples. Recent publications in the trade press have reflected a growing sense of optimism on the part of investors in e-business firms that serve niche technology markets. In particular, healthcare technology markets have been praised as potential investment targets (*New York Times*, 2006; *Wall Street Journal*, 2006). Investors presently focus on funding start-up companies that provide access to health-related information as well as offer Internet-based capabilities to compare quality and outcomes of healthcare services.

The gigantic size of U.S. healthcare industry presents many opportunities for technology firms that have a potential to improve value chains. According to the National Coalition on Health Care, the total healthcare spending in the United States reached \$1.9 trillion or about 16% of the gross domestic product in 2004. The fact that healthcare is a data-rich industry creates opportunities for technology firms to make health data exchanges more efficient and reliable. The other distinctive characteristic of healthcare is that it is strictly regulated. In this regard, the value proposition of technology firms is evident in their capability to decrease complexity of medical-transaction processing and reduce the number of data-related medical errors.

U.S. healthcare organizations first began to build proprietary information systems in the 1960s (Collen, 1991). At that time, hospital networks were most prolific adopters of information systems given that they possessed sufficient capital bases to do so. Only recently has it become cost-effective for physician practices to embrace medical software systems. Mass adoption of broadband Internet and decreasing costs of worldwide delivery of digital materials offer opportunities for technology firms to interconnect hospital information systems and connect to software systems of physician practices.

In addition to improved affordability of information systems and technological advancements,

healthcare institutions could potentially benefit from incentives offered by the regulatory agencies to digitize the exchange of health-related information. In the mid-2000s, the U.S. government intensified efforts to raise the adoption rate of electronic health record (EHR) systems. This technology enables caregivers to collect and circulate digitized patient data across the network of authorized healthcare providers (Goldschmidt, 2005; Ford, Menachemi & Phillips, 2006). The U.S. government plans to link individual EHR systems in a centralized network, allowing access to patient data on a national basis (Office of the National Coordinator for Health Information Technology, 2005). The planned centralization of EHR systems would be a massive undertaking on the part all the stakeholders of the U.S. healthcare industry. The increased quantity of digitized patient data would fuel further demand for medical-transaction processing services. Such a scenario indicates greater revenue-growth opportunities for the healthcare technology industry. Firms that are capable of building EHR systems, processing digitized data, and facilitating health-related decision-making would benefit from proliferation and centralization of EHR systems.

In the light of these important developments in the U.S. healthcare industry, we investigate the strategies of Emdeon Corporation, a healthcare technology firm whose e-business model provides clues for achieving a sustained growth of revenues and earnings in the emerging healthcare technology industry. Whereas e-business models built on a single source of revenue are dominant in this industry, Emdeon Corporation relies on a variety of revenue streams to sustain a leading market position. This case study explores the evolution of Emdeon's e-business model from a strategic management perspective. We trace the current sustainability and profitability of Emdeon's e-business model to a related diversification strategy that the firm's upper management has pursued through mergers and acquisitions (M&As). We also address the motivation behind the current

restructuring of Emdeon's e-business model. The time period for this investigation spans 1998 to 2005.

We will discuss the literature on healthcare e-business models in the second section. Research method and data sources will be addressed in the third and fourth sections, respectively. In the fifth section, we analyze the evolution of Emdeon's e-business model. This model went through a number of development phases, which were reflections of the changes in the firm's strategy. In the sixth section, we offer conclusions in the form of lessons learned from Emdeon's strategic maneuvering in the emerging healthcare technology markets. These lessons point to the factors that contributed to the firm's sustained profitability in the observed period.

Lit Er At Ur E ON HEALt Hc Ar E E-bUsINEss MODELS

There have been a number of academic and practitioner-oriented accounts that shed light on e-business model types that have emerged in healthcare technology industry. Given that e-business in healthcare is a recent phenomenon, this literature is at the early stage of development. The authors writing on this phenomenon largely investigate how healthcare technology firms add value to medical processes. The literature on trans-industry e-business models, on the other hand, has been plentiful. Timmers (1999, p. 2) advanced his definition of business models that is applicable for electronic environments: "A business model is defined as the organization of product, service and information flows, and the sources of revenues and benefits for suppliers and customers." Given that the focus of this article is on healthcare e-business models, we will focus on the current state of research on healthcare e-business models. In addition, we will selectively address research on general e-business models

that complements our discussion on healthcare e-business models.

Parente (2000) distinguished four categories of healthcare e-business models: e-commerce portals, e-commerce connectivity, business-to-business (B2B) e-commerce, and business-to-consumer (B2C) e-commerce. In the first category, the author recognized that healthcare portals primarily obtained their revenue through advertising fees. Parente (2000) also acknowledged that healthcare portals offered information retrieval capabilities to both providers and recipients of healthcare services. Portals originated their value proposition through provision of up-to-date and in-depth medical information. Payton (2003) analyzed the features of a number of healthcare Web portals to identify needed enhancements for information services targeting consumers of health plans.

The second category advanced by Parente (2000) in his taxonomy of healthcare e-business models was e-commerce connectivity. This model was primarily supported by revenues originating from transaction-processing activities. Provision of online accessibility to electronic medical records (EMR) and delivery of information on quality and outcomes of healthcare services were the other revenue sources for e-commerce connectivity model. The e-business model of Emdeon Corporation was cited as exemplary for the e-commerce connectivity category. Parente (2000) emphasized that Emdeon's primary value proposition was based on minimal investments in information infrastructure by users of transaction-processing systems. The author also noted that the major hurdle for Emdeon in terms of advancing this e-business model was a low rate of acceptance of new technologies by healthcare organizations. Parente (2000) explained Emdeon's strategy of aggressive acquisitions of healthcare technology firms as a reaction to this impediment. Abrams (2004) conducted a cross-sectional analysis of M&As in the healthcare technology

industry and concluded that e-commerce connectivity firms were behind a rise in spending on M&As in 2004. In particular, production of EMR solutions was an area poised for growth. Abrams (2004) noted that e-commerce connectivity firms benefited from an increasing interest, on the part of healthcare institutions, in adding Internet- and software-based components to their services.

Healthcare B2B and B2C e-commerce models function similarly to a general e-commerce model that facilitates efficient market exchanges of goods and services. Parente (2000) described a B2B e-commerce model that offered services unique to healthcare settings. Such B2B platform would facilitate procurement processes involving employers and health insurance companies. A firm deploying this e-business model would act as an agent for employers seeking competitive health plans for their employees. An agent firm would handle a variety of tasks, including assessment of alternative propositions and setting online accounts for individual employees. Singh et al. (2002) described benefits and shortcomings of B2B healthcare e-commerce models. In particular, they addressed cost savings that B2B models delivered to healthcare institutions which had procured medical supplies online. The authors also identified a number of key e-commerce firms specializing on sales of healthcare supplies. The value proposition of the healthcare B2C e-commerce model is based on facilitating online transactions between organizational sellers and individual customers. According to Parente (2000), this e-business model is represented in the healthcare industry by applications that support filling prescriptions online as well as remote management of health plans.

A number of research accounts that have focused on general e-business models have been influential in shaping our analysis of strategy development and implementation at Emdeon Corporation. In particular, taxonomies of Afuah and Tucci (2003) and Weill and Vitale (2001) have

complemented findings of the literature assessed above by stressing importance of economic factors for successful exploitation of e-business models. The taxonomy of e-business models devised by Afuah and Tucci depicted various economic dimensions of e-business models: profit site, revenues, and pricing. Our study relies on the “traditional” approach when evaluating business value creation by emphasizing revenue generation and profitability of the firm. When discussing revenue sources, Afuah and Tucci noted that e-business models could rely on commissions, subscription and advertising fees in addition to production, markup and referral revenue bases. These insights are helpful in distinguishing the revenue bases for the e-business model of Emdeon Corporation.

While the distinctive feature of the e-business model taxonomy by Afuah and Tucci (2003) was revenue bases, Weill and Vitale (2001) illuminated several other dimensions of the e-business model. They recognized such dimensions as strategic objective, value proposition, critical success factors, and core competencies in addition to sources of revenue. Weill and Vitale identified these dimensions for each of their eight e-business models, including content provider, intermediary, virtual community, and value net integrator. The dimensions of core competencies and value proposition have also been useful for our analysis of strategy development and implementation at Emdeon Corporation.

Finally, the taxonomy of e-business models developed by Timmers (1999) shed light on the influence of electronic business environments on enterprise value-chain activities. Having placed a major emphasis on Internet instigated value chain modifications, the author distinguished such categories of e-business models as e-procurement, value-chain service provider, virtual business community, collaboration platform, and value-chain integrator in addition to six other categories. While the taxonomies of Weill and

Vitale (2001) and Timmers offered a high-level view on various distinct e-business arrangements for value creation, we find it difficult to apply these taxonomies to the case of Emdeon Corporation. The taxonomy of Afuah and Tucci (2003) provided a clearer path for our discussion of strategy development and implementation at Emdeon due to the fact that we decided to focus on the dimensions of revenue generation and profitability when assessing the effectiveness of strategizing.

MEt HOD

This study primarily aims to explore competitive strategies in the emergent healthcare technology industry. We employ the case study approach to investigate the evolution of the e-business model of a healthcare technology firm. Benbasat, Goldstein, and Mead (1997) argued that the case study method could be used in information systems (IS) research for both exploration and explanation. Benbasat, Goldstein, and Mead (1997) noted that “a case approach is an appropriate way to research an area in which few previous studies have been carried out” (p. 370). The literature on e-business models in healthcare technology industry has not gained a critical mass yet. Healthcare technology markets have been undergoing a period of formation from the mid-1990s to the present day. Only recently, leaders have emerged in respective technology markets. We aim to trace the evolution of interactions between a leading firm in healthcare technology industry and pertinent client bases to identify lessons that we can learn from inception and implementation of a sustainable e-business model.

DAt A

The data used in this research was primarily compiled from U.S. Securities and Exchange Commission (SEC) 10-K quarterly and annual

reports provided by Hoover’s Online. In particular, we collected the data on revenues and earnings in 1998-2005 as well as in the first quarter of 2006 for the individual segments of Emdeon’s e-business model. SEC 10-K quarterly and annual reports from Hoover’s Online also provided the data on the M&As that Emdeon completed in the period of study. The second source of research data was Standard & Poor’s Market Insight database. We used analytical reports contained in this database to collect the data for the analysis of healthcare technology industry.

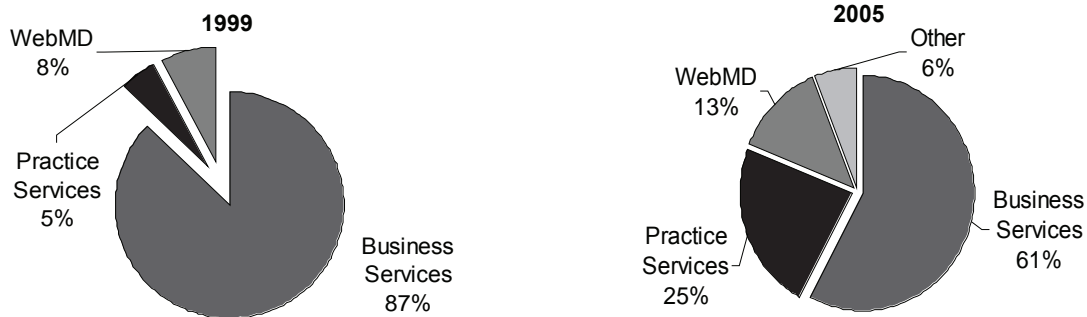
EVOLUt ION OF EMDEON’s E-bUsINEss MODEL

Emdeon Corporation has evolved from a company that relied on a single source of revenue with 648 employees and \$48.8 million of annual sales in 1998 to a leading multi-segment firm with 6,100 employees and \$1,277 million of annual sales in 2005 (SEC Reports, 1998, 2005). Currently, the firm controls a 17 % share of the market for healthcare technology services (GICS Sub-Industry Profile, 2006). We argue that the key factor to achieved sustainability and market success has been a related diversification strategy that Emdeon carried out via M&As. This strategy has enabled the firm to build a sophisticated e-business model that relies on several robust sources of revenue.

Entry to Healthcare t echnology Markets

Emdeon acquired electronic transaction-processing capabilities by purchasing ActaMed Corporation in 1998. In the next year, the firm made an IPO on the NASDAQ under the name of Healthcon. At that point, healthcare transaction processing services (Business Services according to Emdeon’s terminology) constituted Healthcon’s primary source of revenue, which accounted for 87% in 1999 (see Figure 1). The same year,

Figure 1. Emdeon's Annual Sales (Revenues) by Segments in 1999 and 2005



Note. From Securities and Exchange Commission 10-K annual and quarterly reports available from Hoover's Online database.

Healtheon merged with WebMD Corporation aiming to expand into healthcare portal services (WebMD segment according to Emdeon's terminology). The addition of Medical Manager Corporation formed the other core competency: software development services (Practice Services according to Emdeon's terminology) targeting healthcare providers. Therefore, by pursuing a related diversification strategy, Emdeon laid a foundation for its e-business model that largely remains intact to the present day. Through the key acquisitions made in 1998-2000, Emdeon achieved the economy of scope effectively building a diversified e-business model that relied on multiple sources of revenue.

When Emdeon entered the market for medical portal services following the merger of Healtheon and WebMD Corporation in 1999, the portal services market was still in the experimentation phase. Elfenbein and Lerner (2003) outlined the two milestones for the early phase of development of portal services. The inception of portal services is traced back to 1994 when the users of the World

Wide Web began to actively adopt the Internet browser. Portal services at that time attracted users through agglomeration of hyperlinks leading to the Web sites of interest, Web search capabilities, and proprietary content. In 1997, portal services entered a new phase of development, which denoted a boost in new content offerings such as online news and stock price information. Later, portal firms also expanded service offerings by adding such features as Internet-based auctions and electronic mail. According to Elfenbein and Lerner, Web portal firms primarily received revenue from two sources: fees for placing advertisements on portal Web pages and alliance agreements. In the portal services market, Emdeon chose to target a specific audience: providers and recipients of healthcare services.

In the 2000s, the Healtheon/WebMD portal has gained a noticeable position on the World Wide Web. A number of commentaries assessed the impact of this portal from a variety of perspectives. According to one commentary (Singh et al., 2002), the visibility level that Healtheon/WebMD portal

achieved made it a much-discussed destination for online medical services (e.g., transcription). Another commentary (Damsgaard, 2002) pointed to the general popularity of Healtheon/WebMD portal. The author viewed this portal as successful, noting that the survival rate in the portal services market was very low. The model of portal management that Damsgaard advanced pointed to the importance of building a strong customer base and proactively responding to changes in the external environment.

Emdeon Corporation entered the medical software market in 2000 when the firm acquired Medical Manager Corporation, whose most established unit was a practice management system. Emdeon pursued opportunities in an emerging technology niche that served physician practices. It is important to note that the market for software development services in healthcare at that point had reached maturation for large institutions. U.S. hospital networks began to deploy information systems as early as 1960s. Initially, hospitals invested their own resources in the development of such systems. For the most part, affiliated academic research centers provided the required computer resources and professional expertise (Collen, 1991). In the 1970s and 1980s, the number of software development firms serving

U.S. hospitals considerably increased (Michell & Singh, 1996). By the early 1990s, the market for hospital information systems reached maturity in terms of both cumulative sales amount and number of firms offering information systems solutions. According to Michell and Singh, 491 firms offered such solutions to financial and business office operations of U.S. hospitals in 1991. In addition, 218 firms brought IS solutions designed to manage patient records to the hospital software market in the same year.

The Medical Manager set of applications targeted a different niche by offering practice management software to physicians. Its integrated software solutions served major business aspects of a doctor's office and consisted of clinical, financial, and patient data management modules. Prior to the acquisition by Emdeon, Medical Manager had been installed at 25,000 businesses representing 80 medical specialties, according to the 1999 SEC 10-K annual report of Medical Manager Corporation. Acquired software development capabilities produced \$120 million, which accounted for 24% of Emdeon's total revenue in 2000 (see Table 1).

Emdeon gained an additional revenue stream from an unrelated segment: production and distribution of plastic materials. These materials

Table 1. Emdeon's annual sales by segments in 1998-2005 (millions of dollars)

	2005	2004	2003	2002	2001	2000	1999	1998
Business Services	759	687	506	467	384	269	46	34
Practice Services	304	296	303	275	260	120	3	
WebMD	168	134	111	84	75	102	4	
Other	79	77	72					

Note. From Securities and Exchange Commission 10-K annual and quarterly reports available from Hoover's Online database.

primarily target customers in the healthcare industry. This segment was inherited from Medical Manager Corporation acquired for its software development line of products. For the two years following the acquisition, Emdeon tried unsuccessfully to divest this unrelated segment. This fact presents evidence that the firm focused on a related diversification strategy upon the entry to healthcare technology markets.

strengthening a Diversified E-business Model

For the three e-business segments, Emdeon pursued two strategies to advance its market positioning: economy of scale and economy of scope. The former strategy dealt with customer base expansion while the latter focused on quickly adding new technologies and services. Emdeon Corporation skillfully mastered the art of expanding its customer base as well as scope of technologies and services via M&As. Table A1 summarizes the history of M&As completed by Emdeon for the software development segment in 2000-2005. In the period of 2001-2003, Emdeon acquired 38 small software development companies that provided technology services to physician practices for the total amount of \$24.9 million. This allowed Emdeon to reach the level of critical presence in the market of physician technology services.

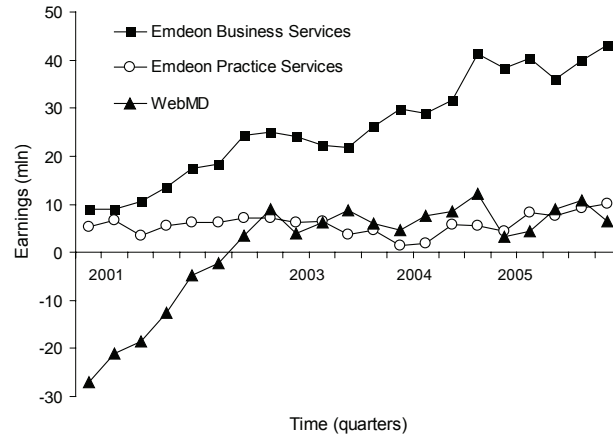
Table A2 illustrates the dynamics of acquisitions made by Emdeon for the segment of electronic medical-transaction processing services. The first series of additions were made in 1999-2000. Emdeon acquired firms that had closely related e-business models, including Envoy Corporation, Kinetra, LLC (a joint venture of EDS and Eli Lilly), and MEDE America Corporation. The next wave of acquisitions for this segment, performed in 2003-2004, signaled a change in strategy. Emdeon sought and acquired targets that would expand its scope of technologies and services. The firm added print-and-mail services

through the acquisition of Advanced Business Fulfillment, Inc. The addition of Medifax-EDI, Inc. provided a new capability for transaction processing services: real-time eligibility verification. In 2004, Emdeon acquired Dakota Imaging, Inc. and ViPS, Inc. to add capabilities in the areas of fraud detection and predictive modeling. At the same time, these acquisitions expanded the customer base of Emdeon. The addition of ViPS, Inc. resulted in entering a technology market serving healthcare government agencies and large insurance companies. The acquisition of Claims Processing Systems, Inc. brought in the clientele consisting of dental practices.

Emdeon faced a greater challenge for strengthening the portal services segment. This segment differed from the two other segments as it primarily relied on advertisement fees, and was a new e-business model at the time. Emdeon's portal services experienced losses for a number of years. The segment first became profitable in the third quarter of 2003 (see Figure 2). To this end, Emdeon made several acquisitions to provide enhancements to the portal's features as well as to diversify its customer base. Initially, portal services targeted online consumers of health information with such services as enrollment to health plans and health information retrieval. In 2001, Emdeon acquired Medscape, Inc. to penetrate a new customer base: providers of healthcare services. This development required addition of new portal features. Emdeon embarked on a series of acquisitions to offer additional Web site content: an online drug directory, online capabilities to compare costs and quality of healthcare providers, and online databases containing physician contact information and medical treatment guidelines. Table A3 displays the M&As that Emdeon pursued to carry out these changes.

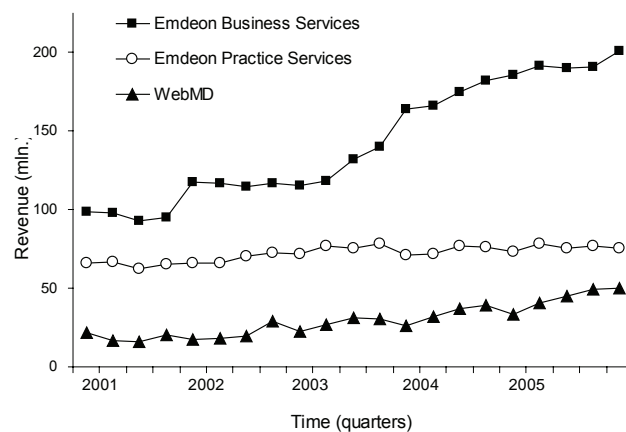
Figures 2 and 3 display a steady growth of revenues and earnings for each segment. The M&As that Emdeon executed in 1998-2005 resulted in achieving sustainability and profitability of its e-business model.

Figure 2. Emdeon's quarterly earnings before interest by segments in 2001-2006



Note. From Securities and Exchange Commission 10-K annual and quarterly reports available from Hoover's Online database. Quarterly sales and earnings data by business segments prior to year 2001 are not available because Emdeon Corporation started to distinguish sales and earnings by business segments for quarterly reporting only in year 2001.

Figure 3. Emdeon's quarterly revenues by segments in 2001-2006



Note. From Securities and Exchange Commission 10-K annual and quarterly reports available from Hoover's Online database. Quarterly sales and earnings data by business segments prior to year 2001 are not available because Emdeon Corporation started to distinguish sales and earnings by business segments for quarterly reporting only in year 2001.

Organizational restructuring

In the period of 2001-2005, Emdeon aggressively acquired companies that would fit the profiles of its three e-business segments: online medical-transaction processing, software development and portal services. Currently, the largest fraction of revenue for Emdeon comes from the transaction-processing segment. Development and sales of specialized software targeting healthcare providers make up the second largest source of revenue. The portal services segment generates the smallest amount of revenue. Changes in the breakdown of revenues by segment and distribution of revenues by segment over the observed period are displayed in Figure 1 and Figure 3 respectively.

Having built a sustainable e-business model, Emdeon embarked on a new strategy: organizational restructuring. In 2005, the firm spun off its portal services division under the name of WebMD Health Corporation. Realized profitability and a greater revenue growth rate in the recent years made this development possible. As evident in Figure 3, a revenue growth of the portal services segment enjoyed a healthy rate. The earnings of WebMD Web sites have been positive for a number of years as shown in Figure 2.

WebMD Health Corporation has been very active in pursuing M&As. The firm added Summex Corporation in July 2006 to supply information about wellness and health education programs, effectively expanding its array of services. In addition, WebMD made an announcement about its intention to purchase Medsite Inc., whose e-business model offered services in the areas of interactive medical education and physician recruitment. WebMD evidently continues the tradition of its parent, Emdeon, aiming to expand its market share and diversify its array of services through aggressive M&As.

CONCLUSION

The healthcare technology industry is dynamically evolving. Having survived a major environmental shock, the dot.com bust, some firms in this industry are experiencing an impressive revenue growth. The industry currently enjoys a 21.8% revenue growth based on the 12-month period compared with a 13.4% growth for the rest of the market¹. The firm in our study, Emdeon Corporation, emerged as a market leader in the healthcare technology industry by being able to adjust quickly to evolving market conditions. The key to the firm's success was its e-business model, which relied on multiple sources of revenue.

To enter healthcare technology markets, Emdeon Corporation pursued a related diversification strategy. In the span of three years, Emdeon made key acquisitions that formed distinct revenue segments of its e-business model: electronic medical-transaction processing, software development and portal services. The first lesson learned from Emdeon's experience is that a related diversification strategy creates a competitive advantage upon the entry to emerging niche technology markets.

Emdeon implemented a related diversification strategy by the means of M&As to achieve the economies of scope and scale quickly. Although Emdeon has entered a number of strategic alliances, the firm invests more aggressively in acquiring companies. The second lesson learned from Emdeon's experience is that firms in emerging niche technology markets can use M&As to sustain revenue growth and to increase market power.

Emdeon's upper management made a major strategy shift by spinning off one of the segments, portal services. Having secured a great deal of market power for this segment, Emdeon currently focuses on strengthening market positioning of the other segments. This change in Emdeon's

organizational structure points out that the firm's e-business model has reached a certain level of maturity. The lesson learned from Emdeon's restructuring strategy is that maturation of diversified e-business models in niche technology industries leads to the transformation of individual segments into distinct entities focusing on specific technology markets.

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ENDNOT E

- ¹ Public companies trading on the New York Stock Exchange, the American Stock Exchange, and the NASDAQ National Market. Data obtained from Hoovers Online via <http://www.hoovers.com>.

APPENDIX

Table A1. Emdeon's acquisitions made for its Practice Services Segment in 2000-2005

Company	Date	Price (in mln)	Profile
Medical Manager Corporation/ CareInsite Inc.	2000	2907	Medical Manager® practice management system.
10 small physician services companies	2001	8.2	Services for physician practices.
21 small physician services companies	2002	14	Services for physician practices.
7 small physician services companies	2003	2.3	Services for physician practices.
Conceptis Technologies, Inc.	2005	19.6	Medical education and promotion services aimed at physicians and other healthcare professionals with a strong online presence in the cardiology community.

Note. From Securities and Exchange Commission 10-K annual reports available from Hoover's Online database.

Table A2. Emdeon's mergers and acquisitions made for its Business Services Segment in 1998-2005

Company	Date	Price (in mln)	Profile
ActaMed Corporation	1998	n/a	Electronic data interchange via proprietary non-Internet network.
MEDEAmerica Corp.	1999	417	Automated transaction operations.
Kinetra LLC	2000	292	Electronic clinical transactions.
Envoy Corporation	2000	2,440	Electronic medical-transaction operations.
Advanced Business Fulfillment, Inc.	2003	113	Paid-claims communications services for third-party administrators and health insurers; print-and-mail capabilities.
Claims Processing Systems, Inc.	2003	5.6	Clearinghouse for dental practices.
Medifax-EDI, Inc.	2003	268	Real-time medical eligibility transaction services and other claims management solutions.
Dakota Imaging, Inc.	2004	39	Automated claims processing and business process outsourcing services; advanced data scrubbing.
ViPS, Inc.	2004	167	Information services to government and commercial healthcare payers, including provider performance measurement, fraud detection, disease management and predictive modeling.

Note. From Securities and Exchange Commission 10-K annual reports available from Hoover's Online database. All acquisitions were accounted for as purchases, except for ActaMed Corporation, which was accounted for as a pooling of interests.

Table A3. Emdeon's acquisitions made for its portal services segment in 1999-2005

Company	Date	Price (in mln)	Profile
WebMD, Inc.	1999	3,660	Portal services business and automated transaction operations.
Greenberg News Networks, Inc. (also known as Medcast)	1999	113	Medical news services.
OnHealth Network Company	2000	363	Portal services business.
MedicalLogic/ Medscape, Inc.	2001	9.8	Healthcare professional-focused Web site.
WellMed, Inc.	2002	19	Healthcare information technology applications development.
Optate, Inc.	2003	4.1	Online healthcare benefit decision support tools.
The Little Blue Book	2003	13	Online database and reference book containing physician practice information.
RxList, LLC	2004	5.2	Online drug directory for consumers and healthcare professionals.
MedicineNet, Inc.	2004	17	Health information Web site for consumers.
HealthShare Technology, Inc.	2005	30	Online tools to compare cost and quality of hospitals for use by consumers, providers and health plans.
eMedicine.com, Inc.	2006	26	Medical reference information and clinical knowledge base for healthcare professionals in 59 medical specialties; a consumer site with articles written by physicians for patients.
Summex Corporation	2006	10	Online and offline health and wellness information and lifestyle education.

Note. From Securities and Exchange Commission 10-K annual reports available from Hoover's Online database.

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Chapter X

Complementary Role of Website in Business Model Development

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Abstr Act

The aim of this chapter is to provide a holistic exploration of the development of the business model of a magazine Web site, and of the factors behind its success. The discussion is based on an explorative case study of a successful Finnish magazine publisher and its Web site. We use triangulated data (interviews, observation, statistical data, customer feedback, and newspaper articles) to describe and analyze the development of the Web site and the subsequent changes in the e-business model of the magazine from the Web site foundation in 1998 to the situation in fall 2004. Our case illustrates that a magazine's Web site is linked to all of its functions (editorial, circulation, and advertising), and to the business-model elements that are vital to its success. We suggest that the discussion forums in question (one type of virtual community) benefited from the positive feedback that resulted in positive network effects, and led to the adoption of the service. Moreover, community activities have enhanced customer loyalty and added a more lifelike dimension to the magazine concept. As such, the Web site now complements rather than substitutes the print magazine. Interestingly, although it does not independently fulfill the requirements of a successful business model (cf. e.g., Magretta, 2002), it enhances the customer experience and adds new dimensions to the magazine's business model.

INtr ODUct ION

The role and the effect of the Internet has been a hot topic within the media sector for some time. The Internet could be seen as one of the biggest challenges ever to the publishing industry as Internet-only publications incur virtually no paper, printing or distribution costs. Websites also compete with the two revenue streams that are essential to publishers, i.e. readers' and advertisers' time and money. Correspondingly, one of the dominant areas of research within the publishing sector has been the business model and its evolution in the age of digitalization (cf. e.g., Gallagher et al., 2001; Fetcherin & Knolmayer, 2004; Stahl et al., 2004; Vasisht & Gutierrez, 2004).

Consultants and practitioners have often used the term business model loosely to describe a unique aspect of a particular Internet business venture, resulting in considerable confusion in the end (Mahadevan, 2000). Similarly, it is evident that the link between the Internet and the business model is not always clear: the Internet as such is not automatically an enabler of new models, and its role may be just that of a medium, or a new distribution channel, for example. In fact, we believe that its role in most companies with functions outside of it cannot be separated from the business model as a whole. We agree with Porter (2001), who states that the Internet often complements the traditional activities of companies. Accordingly, it is not enough to examine just the "e-business model" without trying to comprehend the links to other activities.

This chapter thus examines the role of a magazine website in the publisher's business model, and depicts the strategic changes in that role. The aim is to provide a holistic exploration of the motives behind the development of the model, and of the subsequent success factors of the website. The discussion is based on an explorative case study of a successful Finnish magazine website. The case magazine, called BAP here (i.e. the Baby And

Pregnancy magazine), is a clear long-term market leader in its Internet services in Finland.

The next section of the chapter provides the conceptual background, and then the focus turns to business models within the magazine publishing industry. We then explain our research strategy, and introduce the case study: we describe and analyze the development of the website from its start in 1998 to the situation in fall 2004 using triangulated data (interviews, observation, statistical data, customer feedback, and newspaper articles). Finally, we suggest some implications for researchers and practitioners alike.

A r EVIEW OF t HE Lit Er At Ur E ON bUsINEss MODELS

For many companies the Internet has provided a platform for various business activities. It could be seen as a new market place, and in order to find out how to compete in such an arena many people have found the business model concept useful (Lumpkin & Dess, 2004). All the recent technological advances have brought about an extensive increase in choices and decisions that managers face in terms of business models, partly explaining the growing research interest in the field (Osterwalder 2004, 12). Business model concept has been widely discussed in both conceptual and qualitative papers, but also quantitative approaches evaluating the success factors of e-business models are emerging (see e.g. Albers and Clement, 2007).

The extant literature on business models is both extensive and manifold (cf. e.g., Slywotzky, 1996; Boulton et al., 2000; Dickinson, 2000; Hamel, 2000; Mahadevan, 2000; Rappa, 2000; Timmers, 2000; Rajala et al., 2001; Chesbrough & Rosenbloom, 2002). Correspondingly, definitions of the concept abound, each depending on the purpose and the theoretical background of the examiner. However, the basic idea appears to be

the same: it concerns what is produced and sold, how and to whom. How is the value of the product or service derived? What is the earnings logic behind the profit making? The business model is a representation of management thinking and practice that helps companies to see, understand and run their activities in a distinct and specific way (Chararbaghi et al., 2003).

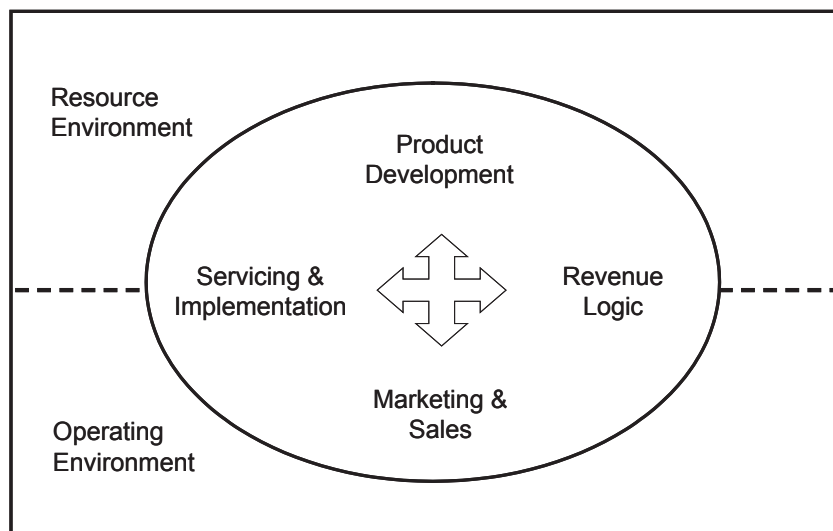
There seem to be two streams of definitions, reflecting fundamental theoretical differences in conceptualizations of business models and strategies. Firstly, there are definitions that follow Porterian value-chain thinking: we place in this category those in which streams (Mahadevan, 2000), flows (Timmers, 2000) or transactions (Amit & Zott, 2000) are used to describe the *functions* of the organization in a meaningful way. Rajala et al. (2001) follow the same logic with their elements of a conceptual business model: their definition encompasses the product-development approach, revenue logic, the marketing and sales approach, and the servicing and implementation approach. The second stream of definitions focuses on *resources* and reflects the resource-based view of the firm: they are asset

(Boulton et al., 2000) or resource based (Hamel, 2000). For the purposes of this chapter we have taken the definition put forward by Rajala et al. (2001) as a basis for inspection. Their model is presented in Figure 1 below.

The four elements in Rajala et al.'s model point out how a company develops its products, how it gets revenues, how it does its marketing and sales, and how it operates and serves customers. Accordingly we can make a distinction between various sources of revenue, i.e. *revenue logic*, and between various *functions* and/or *activities* of the company if our aim is to distinguish between utilized business models.

Rajala et al. (2001) also refer to a business model as a practical action plan for strategy execution. The potential benefits of this approach over the more traditional hierarchical strategy formation (cf. e.g., McDonald, 1992) lie in its wider, more holistic perspective on the company's operations: at its best, it is a cross-functional approach in terms of activities or resources, and incorporates a customer and cooperation orientation. It could be considered helpful in online environments, which continue to evolve dynamically.

Figure 1. Elements of the conceptual business model utilized in this study (Source: Rajala et al. 2001)



ONLINE bUsINEss MODELS IN t HE MAGAZINE PuBLisHING INDUstr Y

The focal actor in our study is a magazine publisher carrying out various strategic activities and utilizing certain business models. According to Daly et al. (1997), a magazine is a periodical publication containing articles, reportage, essays, fictional stories, and photographs, for instance. Consequently, there are many different types of magazines that could be classified as either consumer or trade (i.e. specialized business) publications. The content in these publications may be of active or passive interest. Those who advertise in so-called *active-interest magazines* (e.g., computer magazines) are mostly selling goods and services that are close to the editorial content and the self-selected interests of the readers. The advertising in *passive-interest magazines* (e.g., general interest magazines), on the other hand, is not an extension of the content.

Magazines obtain revenue by selling single copies and subscriptions, and by selling advertising space. Their commercial success rests on the “three-legged stool” of the editorial, advertising and circulation functions: the shortcomings of any “leg” affect the others and the stability of the entire venture. Thus, the three functions are intimately entwined: editorial decisions have an effect on how many copies are sold, which in turn has its effects on how many new subscribers the magazine can expect. Advertisers base their decisions on how many people buy the magazine. (Daly et al., 1997)

Daly et al. (1997) do not explicitly use the term business model in their book. However, they do refer to several constructs that could be considered elements of such a model, the most obvious given the nature of the industry being *revenue logic*: the two main sources of revenue are readers and advertisers, as they explain. The revenue logic of the print version of the magazine has been tried and tested in line with the history of publishing.

There are a few published studies focusing on online strategies for publishers that could provide guidance for business-model development in an online environment (e.g., Barsh et al., 2001; Grönlund & Toivonen, 2003; Kaiser, 2005). For example, Barsh et al. (2001) describe two possible strategies for magazine websites: a companion site and a destination site. Of these two, the companion site is the less ambitious option, the aim being to support and enhance the print magazine by “helping to build its brand and reach new audiences while adding an extra dimension for its existing one” (Barsh et al. 2001, p. 84). In contrast, a destination site is a web business, which ‘aims to become the top site in its category’ by providing unique content and applications, and correspondingly, maximizing value for users and extracting money from them (ibid). The latter concept could be seen as a product extension. However, despite these above-mentioned efforts, there is still a scarcity of comprehensive studies focusing on actual business-model development within the publishing industry (cf. Fetscherin & Knolmayer, 2004).

The main emphasis in business models in the age of digitalization has also been on revenues, i.e. how the magazine publisher could gain revenues from online operations (e.g., Gallagher et al., 2001; Stahl et al., 2004; Vasisht & Gutierrez, 2004). Around the turn of the millennium Gallagher et al. (2001) found evidence of four revenue models within the online activities of publishers: sales of online advertising, subscriptions for online content, the possibility to subscribe to the print publication, and content syndication to other online services. The idea of ‘syndication’, selling the content to other third-party distributors, was also found to be effective in a study conducted by Vasisht & Gutierrez (2004). In general, it seems that from the large variety of existing options, most publishers search for low-risk revenue generators; in addition to taking the syndication option, they use the web as a merchandising medium, for example (Posnock, 2001). It is also evident that

most online operations never make money in the early years of their existence (cf. e.g., Posnock, 2001). Although this may be changing, as according to a recent survey magazine publishers aim to create long-term revenue streams and profits with their websites, profitability is still a problem: internal funding, provided either centrally or by the relevant publication, tends to account for 50% of the revenue (FIPP, 2005).

Rajala et al.'s (2001) model includes the revenue-logic element, which enabled us to compare our focal firm to earlier research findings. Moreover, it also provides us with a wider perspective with its other dimensions, i.e. the functions perspective is included in the framework. The *function-* or activity-based elements were *product development* (which, in the case of the publisher, is most often undertaken by the editorial team and the whole magazine staff, including the online-team, and which needs creativity and innovations almost daily as new creative and innovative content has to be produced, cf. Küng, 2004), *marketing and sales* (conducted through the advertising and circulation functions of the publisher, cf. Daly et al., 1997), and *servicing and implementation* (in the role of customer-feedback services and physical distribution, for example). Physical distribution is mostly outsourced to postal-service providers in magazine publishing, however. These types of outsourcing decisions are linked with the level of integration in each of the functions and in the organization, which provides the resources for them. Another example is marketing and sales: a company may have a sales force of its own or it may use one provided by a partner (cf. Rajala et al., 2001).

All the elements or functions mentioned above may have their own objectives for online operations, which may differ from the general management's objectives. Furthermore, the different "legs" of the 'three-legged stool' of editorial, advertising and circulation (cf. Daly et al., 1997) may have different views of the importance of the online arm of the magazine. This may also

be linked to the personal rewards of the personnel: if a sales person selling advertisements to the printed magazine is not rewarded for sales to the online arm, she or he may not be willing to sell to the latter. However, this may change over time as learning occurs within the organization and the organization develops, often through 'crises' or critical incidents (cf. Greiner, 1998). Furthermore, new business models may arise, and the impact of existing models may change as delivery mechanisms and consumer behavior change (Gallaughier et al., 2001).

In sum, as the extant research suggests that there are many motives for maintaining an online presence in magazine publishing, such as to help to build up the brand and reach new audiences, to maximize customer value and subsequently to create more profits (e.g., Barsh et al., 2001; Kaiser, 2003), and as the strategic objectives of the online operations seem to change over time (cf. e.g., FIPP, 2003; FIPP, 2005), there is a need for studies that take a holistic view of the encompassing changes within magazine publishers' business models. The present study seeks to address this lacuna by providing an online success story from the industry. The key issues addressed include the motives behind the chosen business model and the subsequent success factors arising from its utilization and development.

Research Strategy

We chose to conduct a case study in order to identify the various aspects of a magazine's online strategy. According to Yin (2003), the objective of a case study is to understand a phenomenon in its natural context. Eriksson & Koistinen (2005) emphasize the importance of describing and understanding the context, as it makes the case understandable and partly explains it. Dyer & Wilkins (1991) see "good stories" as the ultimate result of case studies: they can lead us to see new theoretical relationships and question old ones.

Our study could be described as an *explorative single-case study* (Yin, 2003) with some *longitudinal* features (cf. e.g., Jensen & Rodgers, 2001). As is typical of an exploratory study, the case was purposefully chosen (see also Stake, 1985; Patton, 2002) and we did not have any prior propositions (Tellis, 1997).

A case study is considered an ideal research strategy when the intention is to capture a holistic participant view by using multiple sources of data (Tellis, 1997). We collected our data by conducting semi-structured interviews (for the interview themes, see Appendix 1) with five current and former members of the magazine's staff (see Table 1 below).

Three of the interviews were conducted face-to-face and tape-recorded with the interviewees' permission. They were then transcribed for analysis. Two of them were conducted via email. In addition, we have closely observed the development of the magazine's website since 1998; one of the authors has even worked in the publishing house and had a professional interest in the website in 1998-2001.

To give us deeper insight into the case the magazine staff also provided us with statistical data on web-visitor development, and with documents regarding their strategic planning and customer feedback. Other sources of data were newspaper articles covering the BAP web site, and circulation statistics provided by the Finnish Audit Bureau of Circulation.

In order to increase the validity of our study the authors contributed to the key findings indi-

vidually. The findings were double-checked and agreed upon jointly. Two interviewees were also asked to give feedback, and thus to build on the findings and validate them.

cAsE DEscr IPT ION

Our case magazine, a baby and pregnancy magazine we call BAP, has a print circulation of around 33,000. With this figure BAP is rated the number two magazine in its field in Finland. However, online there are 145,000 individual visitors per month, which makes it a clear market leader in terms of its online services. These services consist of a web page with content updated by the magazine personnel and a set of over 40 discussion forums for mothers-to-be, mothers of young children and other interested people. An average visitor spends more than 17 minutes at the site, the most used service being the discussion forum: it is estimated that there are approximately 18,000 messages posted each day, and more than 6.5 million messages are posted annually.

There were several reasons for choosing BAP as a research object. First, it was one of the first magazines to have an online presence in Finland, which makes the service well established and mature. Secondly, it also hosts one of the most active online communities in the country.

The BAP web page was launched in 1998. The first innovators (cf. Rogers, 1962) adopted the service rapidly and the pages gradually increased in popularity. The number of visitors took off

Table 1. Interviewees

Interviewee	Title	Experience with the case
1	Marketing director	> 5 years
2	Editor-in-chief in 2004	2-3 years
3	Editor-in-chief in 1998	> 5 years
4	Chief editor of the web site	> 5 years
5	Planning manager, advertising sales	> 5 years

in 2001; naturally the massive expansion in the availability and use of the Internet in Finland enlarged the number of potential users of the BAP online services as well (cf. e.g., Nurmela et al., 2000). Since then the site traffic has been increasing constantly, with some minor short-lived exceptions. At the time of the data collection in 2004 the growth was continuing, although it had slowed down slightly.

Interestingly, all the time when the website use was on the increase the printed circulation of BAP remained relatively stable. Bearing in mind the fact that the general trend in magazine publishing all over the world is that circulations are declining as more and more magazine titles are being launched, we think the BAP print magazine has done very well. Figure 2 shows both the circulation of the print version (black line) and the numbers of online visitors (dotted line).

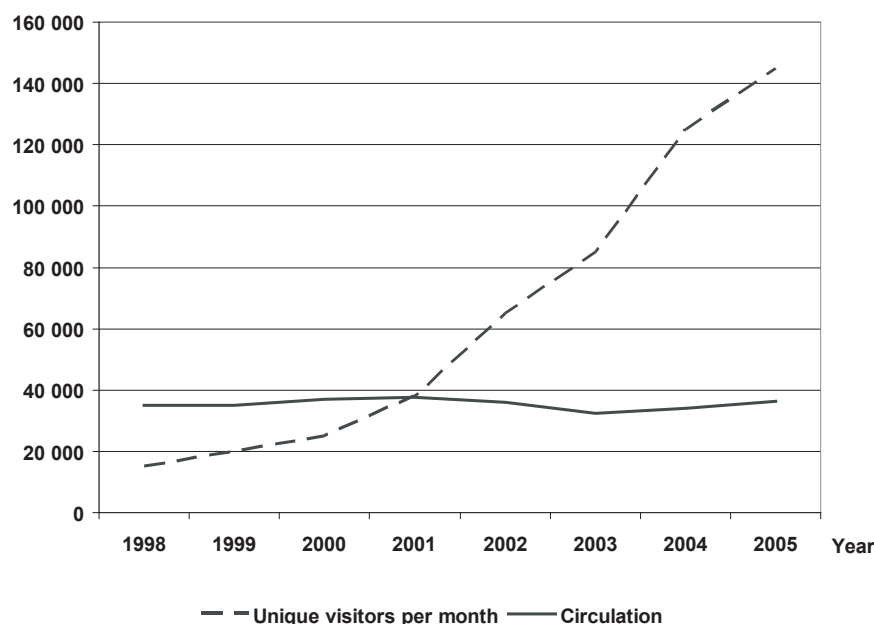
It is evident that BAP has done something “right” in terms of its online strategy: its web success has not cannibalized the print version^a, for example, and in 2004 approximately 2,800 new

members registered with the online service on an average day. In the following section we track down the changes in the BAP business model, and compare its actions with those of the competition. Following in the footsteps of Pettigrew (1990), we tried to distinguish the extreme situations, critical incidents and social dramas that led to changes in the business model or strategy, and subsequently to offer a reason for BAP’s success.

cAsE ANALYsIs

The research revealed a number of important findings regarding the development of the business-model dimensions within the case company. In general, the development of the BAP online activities occurred in an incremental manner, although it is worth noting that there were two points within the history of BAP at which the website traffic increased more rapidly, in 2001 and 2003. Taking our cue from these moments of time, we divided our case analyses into three

Figure 2. Developments in the use of the website and print circulation of BAP



episodes or epochs, each of which is more fully elaborated upon in turn. Interestingly, it seems that several significant incidents occurred within the company during those periods, and there were some changes in the business model.

1998-2000: Initial steps

The foundation of the BAP website in 1998 resulted from the editorial department's initiative. There were some Internet enthusiasts in the company and they sensed the coming boom in both the use of and services offered on the Internet. When the *strategic decision* to create the website was taken they came up with the idea of discussion forums as content for it: BAP was the first to introduce online discussion forums in the baby and pregnancy segment in Finland. There were two clear objectives for the online service. First, the creation of forums was seen as an easy way to build an innovative image for the magazine cheaply - consequently, the website had some *marketing objectives*. Secondly, it was thought that a magazine with a website with an interactive forum should be able to offer some extra value to its customers: it showed common sense to assume that forums could be useful for readers of the print version, and mothers and fathers could exchange their experiences regarding baby and pregnancy issues. Thus, according to our interpretation, the website was seen as a *minor product extension and as some kind of companion site for the print magazine*. However, the revenue generation from the online services as such was not even considered, and the status of the website was rather low.

Accordingly, it is obvious that the subsequent success of the forums was not anticipated at the time. No market research was conducted, nor were many resources given to the web team. For example, no customer service was planned for the online arm. In spite of this lack of resources during the period of its early development, the BAP web site reached a critical mass through word of

mouth. The visitors themselves had realized the value of the service, and in essence created the site and its content by utilizing the discussion forums. Table 2 presents the main elements of the online business model of BAP in three phases (i.e. 1999, 2001 and 2004), 1999 being shortly after the foundation of the website. At that time BAP did not even consider the possibility of incorporating other business-model elements or dimensions into its online operations.

There was no online competition within the baby and pregnancy magazine market segment in 1999. In 2001, when the use of the Internet had started to grow rapidly in Finland, some of the competitors within the segment started to develop their online operations and launched their websites accordingly. The content provided differed from BAP in many ways: most of the competing magazines filled their sites with posters from the print magazine, i.e. used the Internet in a passive way as a static form of advertising. The typical content included pictures showing the cover of the print version, tables of contents from different issues, and extracts from the editorial content. This approach differed from that taken by BAP: the Internet was used as an independent medium, the product being tailored to suit it and not to overlap with the printed content.

2001 to 2003: rapid Growth and a crisis

In the case of BAP, when the website traffic really took off its importance and value grew within the magazine publisher independently of the magazine. The website was found to be a good tool with which to enhance the magazine brand. Consequently, an editorial webmaster was recruited and the development of the site, which had been outsourced, was taken in-house. More emphasis was placed on *product development*, and the webmaster started to use customer feedback as a basis for improving the site.

The advertising and circulation functions of the publisher also started to realize the potential of the Internet during this period and they analyzed potential sources of revenue. The circulation department started distributing the URL address of the magazine in its marketing material, for example. They also introduced the online-subscription option, which was eventually taken up by a few subscribers. Furthermore, the first advertising sales to the online services were made. The first advertisements were buttons and banners, but these proved to be troublesome to master with the inflexible arrangements that were in force as sales were scattered both in-house and among the outsourced sales organization.

The changes and the above-mentioned developments led to the readjustment of the online business model of the company in 2001. In the middle of Table 2 we can see the key elements of the BAP business model around that time. It is clear that the role of the online service had strengthened within the strategy of the magazine, but the publisher still saw the Internet as a second-tier medium. The website did not generate much revenue and its basic function was seen to be to support the brand.

It is worth noting that an important milestone was reached around this time: the number of visitors to the website exceeded the number of print subscriptions (cf. Figure 2). As this positive trend continued the different functions of the magazine became conscious of some new opportunities in the online presence. For example, the advertising function realized the benefits of an increasingly segmented audience. Lively discussion forums could also provide information to the editorial staff on topics seen to be of importance, and thereby generate content for the print magazine; they would be good channels for marketing research. As far as the circulation function was concerned, the website visitors were considered a target: a large number of potential new subscribers to the print magazine were utilizing the service.

In general, it was realized that this huge number

of discussants in the forums could be a source of many advantages, and the magazine publisher did not know much about them. As a result, BAP decided to demand compulsory registration in 2003. Many users were taken aback by this decision and some of them established shadow sites instead of completing the registration. This development may have been related to the specific nature of the BAP website: although babies and pregnancies could be counted among the happiest and most emotional topics in Western cultures, the tone was not always positive, and discussion was not limited to parent-baby issues. Correspondingly, many users wanted to participate in this type of discussion anonymously.

However, at the time of the crisis the publisher took a step backwards. The rebellion made BAP change its registration system almost back to its former *modus operandi*, and it managed to win back its former visitors in a rather short period of time. Registration for some of the forums, including the most popular one, was made voluntary. Currently, most of them require registration before participation in the discussion, i.e. posting, but anyone can write anonymously on three of them: *sex*, *free topic* and “*online*”. The last-mentioned is BAP’s closest equivalent to a real-time chat room; it is a discussion forum that is updated every minute.

situation in 2004: New Growth

Since its short-lived crisis the site has been constantly updated and improved. Its popularity has brought positive publicity to the magazine, and the BAP discussion forums have also become a popular news topic in other media. Advertisers were attracted to the strong image of the online service and this led to an increase of advertisements both online and in print. A significant internal development of the service was related to the availability of financial resources: the online team was given more resources to develop the website and to communicate with the target

Complementary Role of Website in Business Model Development

Table 2. Main elements of the online business models of BAP in 1999, 2001 and 2004

Business model aspects of the website in 1999			
Product development	Revenue logic	Marketing and sales	Service and implementation
1. No editorial content: only online discussion forums -> new content	Not relevant for the website in 1999	1. Wanted to be first in the market -> marketing of the magazine	Not relevant for the website in 1999
Business model aspects of the website in 2001			
Product development	Revenue logic	Marketing and sales	Service and implementation
1. Customer feedback used as a basis for web site improvement	1. First advertising sales 2. Few online subscriptions	1. Web site seen as a means for supporting the brand 2. Online subscriptions started	1. Customer service
Business model aspects of the website in 2004			
Product development	Revenue logic	Marketing and sales	Service and implementation
1. Market research: Grasp of the audience, idea pool 2. Means for collecting material for the print magazine (e.g., surveys) 3. Continuous development of the print + web concept 4. Improving the versatility of online advertising 5. Improving the pricing knowledge of online advertising 6. Adds a new "life like" dimension to the magazine concept	1. Helps with defending the market position in terms of circulation and advertising sales 2. Extending the subscription length 3. Preventing the escape of the audience to competitor 4. Increase of advertising sales (sales of multichannel packets) 5. Web site another attractive advertising forum beside the magazine 6. Online subscriptions: lower costs and higher subscription prices than direct or telephone marketing campaigns	1. Communicates a modern image 2. Communicates the magazine's values 3. Supporting the brand 4. Positive publicity 5. Online registration basis for customer database and targeted marketing 6. Online subscriptions as a complementary channel 7. Supporting customer loyalty and commitment	1. Means for communicating with the target audience on a daily basis 2. Customer service

audience on a daily basis. Correspondingly, there were changes and further developments in the business model in 2004 (see Table 2).

The *product-development element* was developed further: the web content came to include samples of the editorial content within the print magazine, and vice versa, the web community was used more as a source of ideas and stories that were to appear in print. The advertising

function also came up with new ideas: it took the web sales back in-house, and developed new systems to allow a more versatile selection of online advertising forms.

The registration of users provided the circulation function with a tool for contacting potential subscribers, and allowed for the lengthening of the subscription period as many pregnant women utilized the web service. Furthermore, marketing

to potential customers online is cheaper than utilizing telephone sales. The website was also seen to support the circulation by enhancing reader commitment: virtual communities may build up customer loyalty and trust (cf. e.g., Srinivasan et al., 2002; Wang et al., 2006). These issues are linked with both the *revenue logic* and the *marketing and sales* elements within the business-model framework.

BAP is a clear market leader on the Internet in its own segment. The online service is well known, it generates lots of interest, and it has become bigger than the print version. Although all the direct competitors (i.e. magazines focused on babies and pregnancy) have created their own discussion forums (and have even tried to copy BAP), the BAP forums are well ahead of the competitors' equivalents in terms of popularity.

Furthermore, the BAP online business model seems to be more complete than the others. For example, it has managed to use the website as a marketing tool: its success has taken it to other media as news, its online advertising sales have helped the publisher to catch up with competitors in revenue terms, and its brand value has been enhanced.

In our opinion, the case magazine has also been able to make better use than its competitors of multi-channel tactics in its product development: readers are helping to generate material for the print version, and many of the articles include links to the content available on the Internet. To us it seems that the BAP website has far more to offer than direct online revenue streams. Most Finnish magazines targeted at women are still only using the web as an advertisement for the print edition, and interestingly enough, it seems that only its direct competitors have followed the BAP example.

Latest Developments

After our interview data collection the BAP website has naturally further developed and changed.

Current online offerings include, for example, blogs written by two fathers, a possibility for any BAP customer to publish their own blogs, archives of earlier published articles (only for the subscribers of the print magazine, digital paper format) and an online shop by a partner. In our view, BAP seems to follow the latest developments in online services and actively adopts new services on the website. BAP still has an extensive online audience, although the number of visitors does not reach the record statistics of 2005.^b However, BAP is the 8th most popular magazine website in general in Finland, and the number of weekly users exceed the print circulation on 37 500. We note that the print circulation development has followed a positive trend.

To sum up the development of BAP and reflecting it to a general development in publishing sector, for us it seems that online services may well support many functions and business-model elements that are important to a magazine's success. We will now discuss several key issues that have been behind the online popularity of BAP, and consequently vital to its overall success.

Discussion: What Lies behind the success story?

In our view, the key issue in the BAP website development since the early days has been the discussion forums. As mentioned above, they are the most utilized part of the online service and there are currently more than 40 of them. The magazine was the first in its segment to provide such forums, and the traffic on the site grew mostly through word-of-mouth. They have benefited from the positive feedback, which has led to positive network effects (e.g., Shapiro & Varian, 1999). Discussion forums could be seen as one type of virtual community, and the key notion here is customer loyalty created by online community activities.

Furthermore, the fact that there was no editorial content on the website at first, and that the

BAP online *product development* was driven by its customers, reflected a clear and courageous strategic decision. The publisher provided a platform, a discussion forum, and the users created the content and the value. This decision led to the evolution of the BAP online business model: the publisher did not want to copy the print version, and instead created an online product with different characteristics. This could be seen as a critical incident leading BAP to its online path.

In general, the development of the BAP business model has been led by the *product-development element* of the company (and the editorial leg of the magazine); the print magazine has been extended with this interactive arm of the brand. Accordingly, while the network effects and e-word-of-mouth partially explain the consumer adoption of the BAP website, the crucial determinant of its success may have been its internal adoption as a part of the magazine concept. The role of online operations within the business model grew over time. The first enthusiastic individuals within the company, such as the chief online editor, played a key role in the development of its online advertising sales by educating both sales people and customers. Innovations and their adoption are based on individuals (Tang, 1998); they only succeed if the innovation-to-organization problems can be solved (Dougherty & Hardy, 1996). The decision to limit the website to discussion forums during the early phase of its online operations was innovative: it was a trendsetter, and its first-mover advantage ‘brought in’ the critical mass in 1999.

There were no large risks during the early phases either. As the website content differed from the print version, there was no risk of cannibalization, and as the readers created the content, it was cost-effective as well. In this regard, another interesting development in the business model of the magazine was that the financial element (which is often considered a success criterion, cf. e.g., Magretta, 2002) did not play a large role at the start of the online operations. It seems that

one of the big issues in the creation of this first online strategy was the low cost. No revenues were expected in the first place, although BAP adopted a less-than-explicit “market research channel perspective” on virtual communities as early as in 1998 (cf. e.g., Catteral & Maclaran, 2002; Pitta & Fowler, 2005). The aim of the website was to “to get a grasp of the audience”, to create an “idea pool” and “to get a touch of real life”, and to provide material for the print magazine and guide its development - possibilities that gradually materialized: in 2001 it started to collect customer feedback, and in 2004 the use of the discussion forums in the further development of the magazine brand and content base became even more evident.

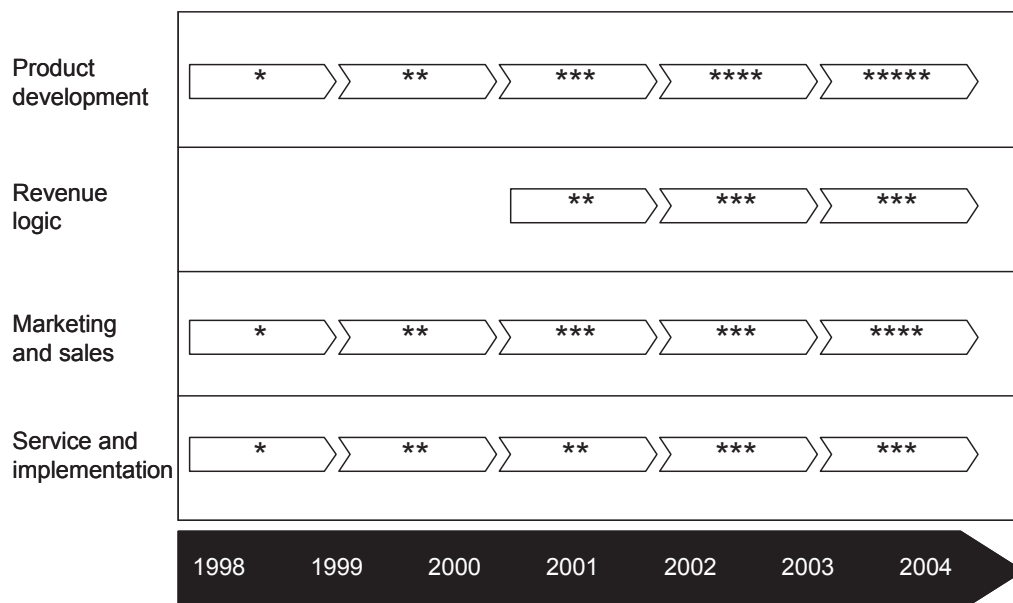
The website has always supported marketing and sales purposes, too. This is a business-model dimension that carries various benefits. Let us consider the image factors. First, the website gave BAP a technologically advanced image. Furthermore, the somewhat anarchistic and sometimes even wild nature of the community using the discussion forums also extended the brand of the magazine and gave it ‘street-credibility’. The content of the website was not a column written by an expert telling mothers and fathers how wonderful it was to be a parent or how to raise one’s children, it was more of a real-life experience.

In terms of revenue logic, as mentioned above, BAP introduced the option to subscribe to the print magazine online during its second epoch (around 2001). There are two main factors that make online subscriptions especially valuable to BAP. First, the costs are rather low, which makes them profitable, and in addition, fairly high prices are charged as the publisher does not want to annoy current subscribers using the online service with aggressive offerings on the website. Secondly, customers belonging to the online community may be more loyal to BAP as virtual communities can create trust and commitment. It is evident that this was one of the key reasons why the circulation function was interested in the online operations.

It seems to us that the development of the BAP business model has been fairly incremental, featuring a few critical incidents or decisions that have shaped its growth path. Figure 3 summarizes our analysis of the importance and evolution of the four elements of the business model between 1998 and 2004. As mentioned above, the *product development* element has shaped the nature of the progress of the online operations. *Marketing and sales* in the form of both circulation and advertising followed: the circulation function was mostly interested in defending its position, and in getting new print subscribers and long-term customers from the group of visitors on the site, while the advertising personnel considered the volume of site traffic important as it provided a sales argument for online ads. However, the idea of large-scale *revenue* generation from the actual website did not occur before 2001, and its role has increased only recently. The *servicing and implementation* dimension was given thought rather late as well.

To conclude, several key decisions made in the various stages of the BAP life-cycle, could be considered a basis for its success. First, the innovative and courageous decision taken in the early phase was critical. This was atypical for media industry: according to Davis (2004) many media companies tend to work from inside-out first, the focus being first in their existing products. However, BAP was a first-mover, and the website was established as an independent medium that was able to benefit from the strengths of the Internet, such as interactivity. Furthermore, the forums did not cannibalize the print medium. Secondly, the change in the business model in 2001 was decisive: the competitive situation had changed. Here, BAP did not copy what the others were doing, and instead strengthened the fundamental idea of the discussion forum. For example, more resources were given to the online team and the publisher, and BAP developed new ideas for utilizing the Internet even more effectively, e.g., in the form of data collection.

Figure 3. The development of the BAP business model. Code: the more asterisks, the more important the element in the current business model during that period.



Thirdly, in 2003-2004 the company started to react more rapidly to competitors' moves and customer feedback. At this stage the publisher considered all the elements found in the business model developed by Rajala et al. (2001), for example, more carefully, and established how they were connected to the three-legged stool (cf. Daly et al., 1997). This also led to the reanalysis of the business model of the publisher as a whole. With the help of the peer-to-peer discussion forums, BAP thus became a more down-to-earth medium; in our opinion this would not have been possible with only a print version. We believe that the online service is currently considered complementary to the print magazine, and the service carries many important functions that contribute to both the editorial content and the marketing of the magazine.

Implications for research and Practice

The objective of this case study was to explore the motives behind the chosen and developed business model, and behind the success factors of the magazine website. In our view, a successful website may well complement rather than substitute the print magazine, and add a more lifelike dimension to the magazine concept – and to the corresponding business model.

Furthermore, in both product development and sales & marketing function, our case study shows that there can be a clear link and true interaction between the online business model and the business model of the whole company. Use of the function-based business model concept of Rajala et al. (2001) in the case analysis helped us to reveal the links between the online business model and the total or overall business model of the magazine. Consequently, although resources as a basis for strategy formation (cf. e.g. Hamel, 2000) are gaining more and more attention, understanding the company operations in a limited timeframe may still be more straightforward with

a function-based approach. Thus, our case shows that functional business model tool may still be helpful for researchers and practitioners alike.

The main limitation of our study is that it was based on a single case. The chosen case may not be a typical example of magazine Web services, but we believe that its specific attributes enabled conclusions to be drawn that are useful to e-business researchers and practitioners. Another limitation was that the early-development phases of the case were described in retrospect.

Nevertheless, we believe that our analysis and discussion allow us to suggest some interesting implications. From the researchers' perspective, the notion of network effects and virtual communities is worth considering. Even though Porter (2001) was critical of the network effects of the Internet, our study indicates that a web page with an active virtual community may well witness positive-feedback economics and higher switching costs: advantages may accrue to the first movers (Shapiro & Varian, 1999; Johansson, 2002), resulting in a loyal customer base (cf. also Srinivasan et al., 2002; Wang et al., 2006). Customer loyalty, we believe, is the key concept online. The potential of online brand communities has also been acknowledged within the magazine publishing industry (FIPP, 2005), yet academic research is still scarce. This provides interesting avenues for future study.

There are further implications for practicing media managers. First, an Internet presence should be seen from a more multifaceted perspective, and should not merely focus on revenue streams. Our case illustrates that a website may support all the four dimensions (revenue logic, product development, marketing & sales, and servicing & implementation) of a magazine publisher's business model. On the basis of our results we suggest that success in implementing the Internet into the company's business model is more likely to occur when special on-line features are innovatively leveraged than when the Internet is forced to mimic what has been done off-line.

BAP successfully utilized this strategy from the beginning of its online operations. Our case also illustrates the importance of incrementally developing and strengthening online offerings in line with customer feedback and developments in the competitive environment. It has been shown that customer satisfaction is the key business driver in e-business ventures (Albers & Clement, 2007, 312). Therefore, gaining customer satisfaction and customer loyalty in the web is a powerful element of the online business model that supports the marketing and sales function of the print product as well as the overall business model.

Secondly, we suggest that active online services should be valued and exploited alongside the development of the print product. We agree with Galbi's (2001) suggestion that the print media should seek to build brands that are based on the active involvement of their readers and on actions they may take on the web. As in the BAP case, successful media-industry operators may gain advantages by possessing large and active discussion forums.

We believe that further longitudinal studies should be carried out in order to identify and evaluate the success factors of web pages and virtual communities. As suggested here, it would be useful in this case to study the development of the organization through critical incidents or 'crises' (Greiner, 1998; Kazanjian et al., 2000). For example, it would be of interest to know, do companies change their business models and general online behavior proactively or reactively.

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ENDNOTES

- ^a Several authors have addressed the so-called cannibalization question within the media industry (cf. e.g. Kaiser, 2003; 2005; Stahl, 2004; Simon, 2005), i.e. if the digital content and online presence lower the print circulation.
- ^b Unfortunately, the web site traffic measurement system was changed in 2005; currently they measure the number of unique visitors per week. Currently, the number of unique visitors per week is over 40 000 (at highest, the number of weekly visitors was over 50 000 in 2005)

APPENDIX 1

Interview themes

BAP website development:

- Could you describe your role in the development of the BAP website?
- Could you name other important persons who have had an important role in the website development?
- Could you describe the development of the BAP website since its beginning?
- What do you consider the most important phases of the development? Why?
- What do you consider the most important crises in the BAP development? Why?

The BAP website today:

- What are the main goals of the website?
- How do you see the relationship between the website and the print magazine?

Chapter XI

A Reverse Auction–Based E–Business Model for B2C Service Markets*

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Abstr Act

LetsWorkIt.de is a German B2C platform for different kinds of service and handcraft orders. Based on the concept of reverse auctions, demanders compose descriptions of the required services to place orders on the platform. The supplier bidding lowest at the end of the auction obtains the right to carry out the order. Drawing upon and widely confirming existing theories on e-marketplaces, this chapter examines the underlying e-business model and the competitive strategy of LetsWorkIt. The case provides evidence that the reverse auction-based intermediation of handcraft and service orders is suitable to form the basis of an e-marketplace and points out that for such ventures, a combination of public relations, performance marketing, and cooperation, represents an ideal strategy to increase the number of demanders and suppliers. Moreover, the case suggests that, depending on the business model, it may be feasible to concentrate marketing activities on one of these two customer groups, since LetsWorkIt has managed to achieve a significant number of successful, high-quality auctions by primarily aligning its competitive strategy with the demand side.

cOMPANY OVER VIEW AND HlSt Or Y

In early 2004, Alexander Bugge, Carsten Seel and Jörg Holtmann were wondering whether, in spite of the burst of the dot com bubble, an Internet-based business could become the center of their professional life. At that time, the idea of LetsWorkIt.de, a German business-to-consumer (B2C) auction platform for different kinds of service and handcraft orders, was born. Service auctions to be placed on the platform would include, for instance, gardening, wallpapering a flat, repairing a car, or printing advertising brochures. Although there was already a first-mover offering such auctions, the corresponding market was hardly existent and the publicity for placing service and handcraft orders on the web was still low. Bearing in mind the success of *eBay* and the fact that the target group of craftsmen was becoming increasingly affine to the World Wide Web, the three entrepreneurs began to develop their business idea and formulated their mission: “to become the leading electronic marketplace for service and handcraft orders and to provide our customers a high level of quality at a fair price.”

According to their respective competencies, Bugge, holding a degree in business administration, took over the areas of finance and marketing, whereas Seel, an experienced web developer with a degree in communication science, was responsible for the technical implementation issues and content management. Holtmann, also holding a degree in communication science, would focus on customer relations and PR work. However, having these highly complementary skills would not guarantee LetsWorkIt's activities from a liquidity point of view. On the one hand, there was a significant need for investing in technology and in establishing the company; whereby, on the other hand, the free-cash-flow could not be too negatively influenced. Consequently, the

founders decided to manage without salary in the beginning phase, and each of them subscribed a limited amount of capital. Moreover, they were supported by a business angel, an external expert on e-marketplaces who helped them from both a financial and a professional point of view.

In order to minimize development costs, Seel went for conducting the technical implementation of LetsWorkIt.de and the underlying database on his own, while his two colleagues carefully designed the electronic business processes to be implemented. For the server-side programming of the platform, Seel applied Microsoft's ASP technology. “Concerning hardware, we decided to fall back on a quality service provider ensuring that the platform would be available twenty-four-seven”, Seel remembers.

After less than half a year of exhaustive work, LetsWorkIt.de went online on July 1st, 2004. The main concept is as follows: demanders position orders in form of reverse auctions and compose descriptions of the required services. The duration of an auction can be between one day and six weeks. Suppliers then bid on these orders. The supplier bidding lowest at the end of the auction obtains the right to carry out the order – and is legally obliged to do so since there is a legally binding contract (i.e. a work or services contract) between demander and supplier. This contract is based on the description of the demander and the price of the supplier. Demanders include private persons, enterprises and tradesmen. Suppliers, however, are required to be enterprises or registered craftsmen and have to verify their accreditation.

“LetsWorkIt provides some obvious advantages for both demanders and suppliers”, Holtmann states. For the demander, these advantages include:

- saving money when placing handcraft and service orders,

- being sure to pay the lowest price,
- finding a service provider or craftsman very easily and quickly,
- avoidance of unpleasant negotiations, and
- reaching a wider range of service providers or craftsmen.

Advantages for the supplier include:

- acquiring orders in a simple and innovative way,
- increasing the workload of the own business, and
- saving advertising and distribution costs.

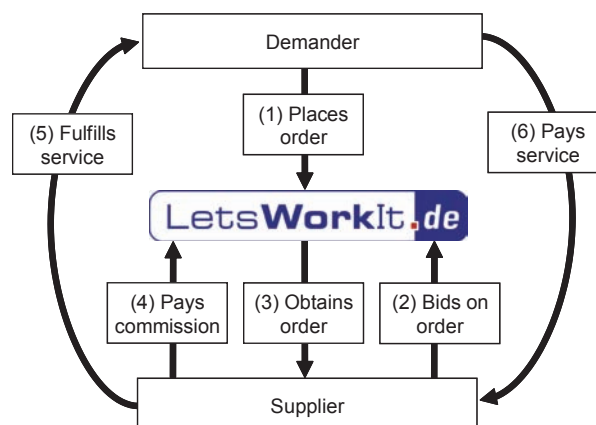
Acting as an intermediary between supply and demand that offers aggregation and matching functions, LetsWorkIt.de can be referred to as an electronic marketplace (Bakos, 1997; Kollmann, 2000; Dai & Kauffmann, 2002). “Our unique selling proposition is that placing orders on our platform is free of charge”, Bugge stated when he was asked about competitive strategy. Even after a successful auction procedure there are no costs

for the demander. Solely the service providers or craftsmen are charged with a intermediation fee after a successful auction. The amount of this fee for the intermediation of supply and demand depends on the contract value. Payment flows and activities between demander, supplier and LetsWorkIt.de are illustrated in Figure 1.

The founders were aware that the success of LetsWorkIt would not only depend on the successful realization of their business model, but also on the continued development and appropriate adjustment to market demands. Since the start of the operating business, the three founders therefore, as described in the remainder of this chapter, continued their activities focusing on three main areas:

- acquiring investors and cooperation partners (Bugge),
- improving and extending platform functionality (Seel), and
- investing high efforts in marketing and public relations (Holtmann).

Figure 1. Payment flows and activities between demander, supplier and LetsWorkIt.de



In the first quarter of 2005, both the number of registered participants and LetsWorkIt's revenues grew by approximately 350%. Having obviously proven the potential of the concept of service and handcraft auctions, LetWorkIt.de became a public limited company (GmbH) on May 1st, 2005. Three months later, the platform had about 12,000 registered demanders and 5,500 registered suppliers. On average, there were 1,800 new auctions per month. The auction success rate figured 60%.

The continuing success of LetsWorkIt is based on two interrelated factors—their innovative business model and their efforts in cooperation, marketing and public relations. Building on current literature, the two subsequent sections will consequently analyze the electronic business model and the competitive strategy of LetsWorkIt.

ELEctr ONIc bUsINEss MODEL

LetsWorkIt.de is a true company of the so-called Net Economy, i.e. a pure Internet-based business (Kollmann, 2006): With the heightened importance of the factor information, new possibilities resulted with respect to how enterprises create value (Amit & Zott, 2001; Lumpkin & Dess, 2004). An enterprise can create customer value not only through physical activities on the real level, but also through the creation of value on the electronic level (Weiber & Kollmann, 1998). These electronic value creation activities are, however, not comparable with the physical value creation activities presented by Porter (1985), rather they are characterized by the way in which information is used. In the case of LetsWorkIt.de, these activities include the collection, systemization, selection and distribution of information on orders and marketplace participants. An electronic value chain manifests itself through these specific activities of creating value that originates in and impacts only the Net Economy.

the Electronic creation of customer Value

The basis of a Net Economy venture's income must be formed by the added value for the customer. In the case of LetsWorkIt, customer value is not necessarily just the service or handcraft order. "In the first instance, value rests in our platform functionality related to an auction and the availability of information—regardless of temporal and spatial restrictions", Bugge explains. "This electronic product is made possible only through the use of information technologies", he further elaborates. Thus, the creation of customer value only occurs at the electronic level. This does not mean that LetsWorkIt does not require real resources such as personnel. LetsWorkIt also possesses a physical value chain, which plays, however, only a supporting role in order to successfully offer the electronic creation of value (Weiber and Kollmann, 1998). Such physical activities include the permanently staffed customer hotline—which, however, results in additional charge for the customers.

Building upon the underlying value chain in the Net Economy, it must also be determined what form of electronic value is created in the eyes of the customer for which he would be prepared to pay, i.e. what makes LetsWorkIt.de attractive from the customer's point of view. When implementing their idea, the most pertinent question for the three founders was: What kind of value is created for the demanders and the suppliers? As purchase decisions in the service sector are complex and varied, and the corresponding markets seem to be highly fragmented, platforms such as LetsWorkIt.de can add value by simplifying information search, respectively, reducing search costs (Giaglis, Klein, & O'Keefe, 2002; Bakos, 1997). According to a classification suggested by Kollmann (2006), the resulting customer value comprises these three aspects:

- *Overview value:* The aspect that LetsWorkIt.de provides an overview of a large amount of information that would otherwise involve the arduous gathering of information. By structuring service and handcraft orders in many different categories^a and presenting them in a common format, overview value is especially created for the suppliers looking for orders they can bid on. Also, demanders might browse the categories, orders, as well as detailed supplier profiles to get a first impression of the marketplace and its participants.
- *Selection value:* By submitting database queries, consumers can locate exactly the desired information/services more quickly and, thus, more efficiently. LetsWorkIt.de creates selection value by offering a search form that allows querying the database by keywords, order category, or zip code. Furthermore, after registering to the platform, suppliers have the possibility to apply for an e-mail-based “auction alarm” functionality that automatically informs them about new orders that are requested in their specific region.
- *Matching value:* This aspect deals with the ability, when using an online offer, to more efficiently and effectively match supply and demand (Bakos, 1998). LetsWorkIt.de collects service offerings and the demanders’ wishes, coordinates the participants and offers them a suitable trading partner. In the optimal case, both market partners (i.e. demanders and suppliers) will be matched with the best overall market allocation.

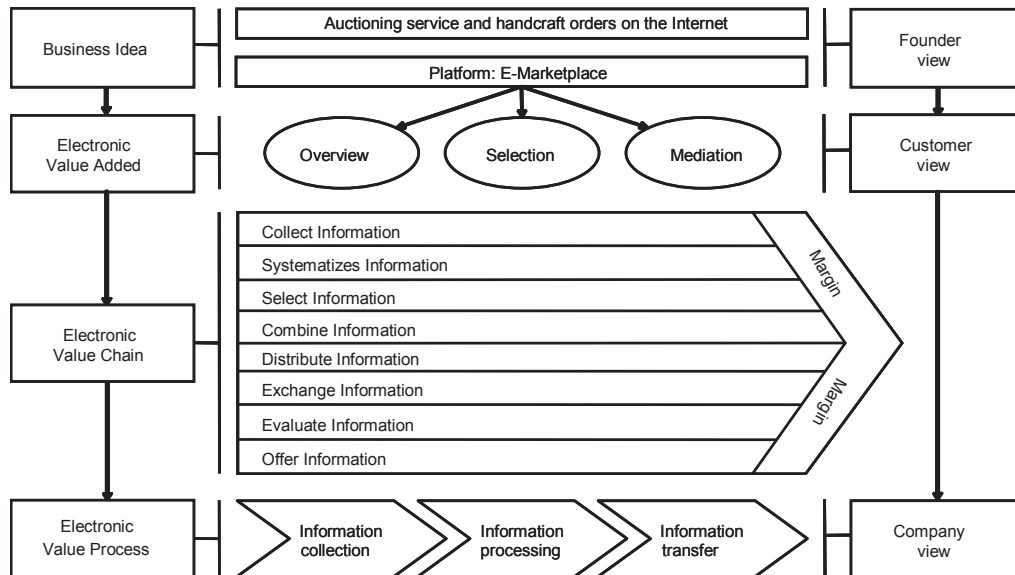
Considering these aspects, it becomes obvious that LetsWorkIt.de creates several different types of value and that both overview value as well as selection and matching values are created. In combination, these values result in an increased market transparency, an optimal price finding, greater efficiency through electronic order

completion, cutting down transaction costs and convenience.

Still, the question *how* these values are created remains. For the purpose of answering this question, the previously introduced electronic value chain can be applied. The electronic value chain separates an e-business into strategically relevant activities in order to better understand cost behavior and recognize present and potential sources of differentiation (Kollmann, 2006). Thus, the electronic value chain represents respectively those value activities which, for example, involve collecting, systemizing and distributing information. Through specific value activities, an electronic information product is created that presents value for which the LetsWorkIt customer is willing to pay. Therefore, the electronic value chain embodies the total value that is generated by the individual electronic value activities plus the profit margin.

The electronic creation of value on LetsWorkIt.de is depicted in Figure 2: The business idea is based upon reversely auctioning all kinds of service and handcraft orders on an e-marketplace (founder view). The electronic value creation is directly reflected in the resulting added value for the user (customer view) and refers centrally to the overview, selection and matching functions. An example: Both the supplier and the demander would be prepared to pay for the matching function, whereas only the supplier would be eventually willing to pay a fee for the selection function. In order to realize this creation of value, LetsWorkIt’s founders applied the value chain concept to identify particularly those value activities that form the core of value creation. Simplified, information on an order must be first collected; secondly, the location and the demander of the order must be determined and, in a third step, systematically stored in the database. Using this database, information is then offered to the potential suppliers who can formulate a query using appropriate search mechanisms. If a match is found through the query process, then the ac-

Figure 2. Electronic creation of value on LetsWorkIt.de (according to Kollmann, 2006)



companying information pertinent to the request is exchanged. If all of this occurs, the final product is a transaction. The electronic process of creating value is thus collecting information, processing and transferring it (company view).

Electronic Value creation Processes

As already noted, the business principle of LetsWorkIt.de applies reverse auctions for finding the lowest price for a given service or handcraft order. In opposite to forward auctions (as, for instance, known from eBay), the respective electronic value creation processes usually begin with the demander who places an order on the platform. While the price is decreasing, it is the suppliers who have to bid. So far, downward price auctions have mainly been applied in the business-to-business (B2B) area, in particular for

direct material purchasing (Emiliani, 2000). In this context, LetsWorkIt.de represents one of the first business models transferring the concept to B2C, with private consumers initiating the pricing process.

The respective electronic value creation involves both the core and service processes (Kollmann, 2006). Core processes such as placing an order (demander side) or bidding on an order (supplier side) hold a true function in the creation of value, whereas service processes support the business processes along the value chain. Service processes are for instance initiated in connection with the rating system of LetsWorkIt.de: After an order has been completed, demanders are asked to fill out an electronic evaluation form on the supplier. The data collected is then used to update the supplier profile and finally displayed when the supplier is engaged in subsequent auctions.

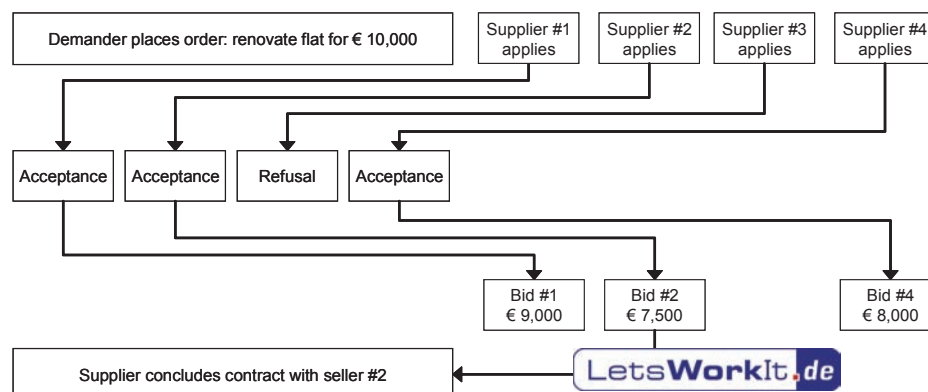
Within the reverse auction principle, LetsWorkIt.de features two different auction types: standard auctions and, so-called “selective” auctions. A standard auction features the placement of an auction for a certain time period, and every registered supplier is able to place a bid on the auction. At the end, the supplier bidding lowest obtains the job. Consequently, the demander is required to accept the supplier’s offer and pay the agreed price. In contrast, a selective auction features the possibility to reject bidders. Before being able to place a bid on a selective auction, the bidder has to address the demander and request participation; the demander may then decide whether the bidder meets the specific requirements. During the auction, bids are hidden. However, suppliers are informed in case of being underbid and may then bid again. Figure 3 illustrates the concept of selective auctions.

For both auction types, the electronic value chain process begins with the input of information. In order to provide the targeted added value (i.e. the matching function), the required information must first be gathered. In the next step, the information is processed internally such that it can then be transferred on to the customer in

the desired form as information output and in a way that specifically adds value for that customer. With this in mind, the processes of LetsWorkIt.de can be characterized as follows:

- *Information collection:* The first step involves gathering relevant data that serves as information input for the additional creation of value. LetsWorkIt.de features category-specific central questions when placing new auctions: By specifying details for the order, e.g. relating to material, period and particularities, the demander provides potential bidders with a basis for calculating their bids respectively deciding whether to apply for a selective auction or not. An important detail is the maximum price the demander is willing to pay. Based on this price, suppliers can place bids on the requested services. In the case of a selective auction, information collection also includes asking demanders which of the respective suppliers should be selected. Prior to this, the demander also needs to provide the suppliers with information pertaining to how he values some nonprice attributes (Beil &

Figure 3. Concept of selective auctions

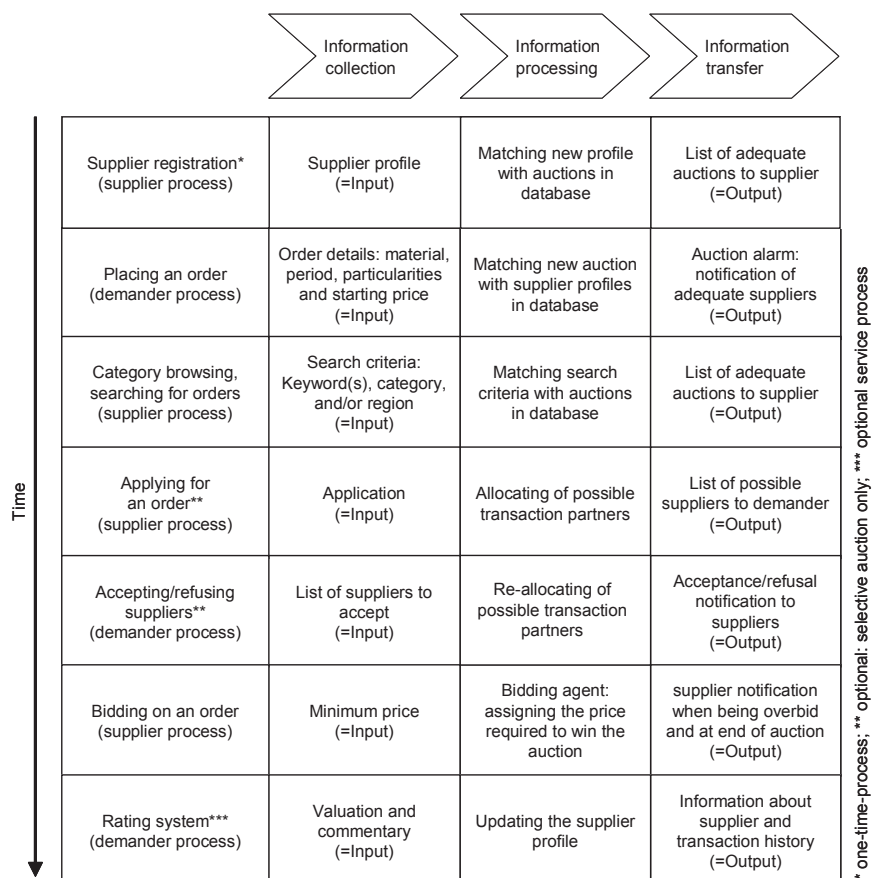


Wein, 2003), such as experience and proficiency. Seel states that the question behind gathering information on LetsWorkIt.de is: “who demands what at which level of quality and who offers this for the lowest price?”

- *Information processing:* The second step involves the conversion of the collected data into an information product for the customer. For LetsWorkIt, information processing includes matching the demanders’ requests with supplier profiles (as it is the case for abovementioned auction alarm functionality), matching the suppliers’ search queries

with appropriate orders that match their capabilities, as well as comparing the incoming bids. Building on the concept known from eBay, an incoming bid is passed to a bidding agent that treats the bid as the minimum price at which the bidder would accept the order and automatically decreases the bid by the amount necessary to win the auction. Also, with respect to the rating system, information processing includes updating supplier profiles with the abovementioned evaluation results.

Figure 4. Electronic value processes of LetsWorkIt.de



- *Information transfer*: The third step involves actually implementing the newly acquired or confirmed knowledge obtained from collected, saved, processed and evaluated data for the benefit of customer. The result is an output of information which creates value. Outputs of LetsWorkIt.de include displaying auction details, sending e-mails that inform suppliers about appropriate orders (auction alarm) and being underbid, as well as displaying the member profiles of suppliers that have placed a bid respectively applied for a selective auction. As only the bidder with the lowest bid at the end of the auction wins the order, information transfer finally also includes informing both demander and supplier(s) about the end of the auction.

It is important to recognize that it is not sufficient for LetsWorkIt.de to go through this sequence of electronic value creation just once. Rather, it is a continual process of acquiring, processing and transferring information, which is necessary. This is even more essential, as the underlying information – such as the current price – is constantly subject to change. The most important value creation processes of LetsWorkIt.de are summarized in Figure 4.

Proceeds Model

An e-marketplace operator's income may result from fixed participation fees or variable, transaction-based provisions, as well as from banner advertising, cross-selling or selling gathered market information. Direct proceeds of LetsWorkIt result from successfully completed auctions and are variable provisions. For the demander, all services offered by LetsWorkIt are free of charge. Successful bidders, however, have to pay a commission fee based on the order volume. Table 1 shows the proceeds model of LetsWorkIt.de.

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Due to the nature of electronic processing, customer's switching costs of switching from one e-marketplace to another are nearly none (Porter, 2001). The decision to participate on a platform is more or less made by mouse-click (Kollmann, 2000). Due to the fact that switching barriers for the market they were operating in are so low, the three founders soon realized the necessity to differentiate their electronic product from the competition.

Table 1. Proceeds model of LetsWorkIt.de

Order volume (€)			Commision fee (+ VAT)
	<=	5,000.00	4,00%
5,000.01	to	50,000.00	3,00%
50,000.01	to	100,000.00	2,00%
	>=	100,000.01	1,00%

Market situation

Shortly after LetsWorkIt.de entered the German market for service and handcraft auctions as a second-mover in summer 2004, two additional competitors joined the market. As a result of this development, competition between the four site operators took on a greater importance. “At the beginning, our competitors were as weak as ourselves”, Bugge stated. “Hefty competition, however, became quickly visible. What’s more, we feared that a big-budget player such as eBay could enter the market”, he further elaborated. “Fortunately, this has not happened up to now.” However, competitors have become significantly stronger. Although all competitors follow the same main principle, they differ in the variety of services and in details relating to the bidding process:

- *Undertool.de*, founded in October 2003, became the first German e-marketplace for service and handcraft orders. Although the venture held the highest number of registered customers, they were unable to transfer this advantage to a higher number of running auctions.
- *Jobdoo.de* launched its e-marketplace in August 2004, facing a similar market

position as LetsWorkIt. After one year of operating business, the venture counted 11,000 registered customers and an average of 1,000 running auctions – and thus held a leading position until the market entrance of the fourth player in the market.

- *My-Hammer.de* is the youngest, and soon also became LetsWorkIt’s most threatening competitor. It went online in May 2005, accompanied by a big advertising campaign on federal TV stations. With an average of 1,000 running auctions in September 2005, the venture had quickly caught up with both LetsWorkIt.de and Jobdoo.de.

Table 2 summarizes the competitive situation in September 2005. Due to high marketing expenses in the following months, My-Hammer.de soon reached higher brand awareness than its competitors and very quickly attained a leading market position. “First, we thought that we would not been able to keep up with them”, Holtmann remembers. “But then I realized that their TV spots were also boosting our sales – probably because they helped to form the market for service and handcraft auctions. Actually, they did a good deal making the concept of reverse auctions known to the general public.” However, Holtmann and his two friends were aware that they were operating

Table 2. LetsWorkIt.de and its three main competitors in September 2005

	<i>Undertool.de</i>	<i>Jobdoo.de</i>	<i>My-Hammer.de</i>	<i>LetsWorkIt.de</i>
Platform launch	October 2003	August 2004	May 2005	July 2004
Users	70,000	11,000	1,000	14,000
Auctions per month	1,000	1,200	1,000	1,000

in a winner-takes-all market and that, on the long run, there would be no reward for being second best. Consequently, they made some important business decisions with respect to their competitive strategy. The main question was fairly simple: How could LetsWorkIt.de promote its performance and sustain competitive advantage in spite of its low marketing budget?

bilateral Marketing

Particularly at the beginning, LetsWorkIt.de was confronted with start-up problems that were related to critical masses, as e-marketplace success requires a critical mass of both supplier and demander participation (Yoo, Choudhary, & Mukhopadhyay, 2002). For the supplier, a certain number of demanders of a certain quality had to be present to make the marketplace attractive. At the same time, a certain number of suppliers with certain characteristics had to exist so that demanders enter the marketplace. In other words, an e-marketplace faces a two-sided network effect, with demanders reacting to suppliers, and suppliers reacting to demanders (Galbreth, March, Scudder, & Shor, 2005). It is characterized by the presence of two distinct sides whose ultimate benefit comes from interacting through the marketplace platform.

Consequently, also LetsWorkIt needed to address this “chicken and-egg problem” and be careful to get both sides on board (Rochet & Tirole, 2003). The need for a balanced ratio of marketplace participants implicates a constant bilateral marketing strategy that is aiming at both demanders and suppliers (Kollmann, 1998). The three founders were well aware of this necessity. However, a custom-tailored marketing for both target groups would have gone far beyond their financial means. “Marketing was already making up 65% of our expenses. We had to carefully examine what to spend our money on”, Holtmann says. Consequently, the founders conducted a thorough analysis of their customers, especially concerning

their role on the e-marketplace. Bugge: “We were thinking about whether – from the marketing point of view – one target group might be more relevant than the other.” They soon realized that it would be reasonable to focus their activities on the demand side. The rationale behind this decision is as follows:

- First, in the real transaction process, the demander turns into a customer of the supplier. As the suppliers are *per se* interested in acquiring new orders on a regular and recurring basis, as well as increasing the workload of their own business, they do not necessarily need to be attracted to LetsWorkIt.de. In fact, ignoring LetsWorkIt as an additional distribution channel would be unwise for the suppliers.
- Second, suppliers participating on the competitors’ platforms do not harm LetsWorkIt’s revenues, as they may bid on multiple orders at the same time. Demanders, however, can place a single order only on one of the platforms, and thus represent a required, but not sufficient criterion for turning an auction into revenue.
- Third, the orders placed by the demanders are directly visible on the platform and thus represent the main criterion that customers and the media apply to compare the available e-marketplaces for service and handcraft orders.

“Actually, suppliers are not the bottleneck. If one disregards auctions that have an unattractive starting price, our regular suppliers do fully cover the demand”, Bugge concludes. “Although a quantitative definition of balance currently lacks empirical data, our estimations propose that a sufficient ratio between suppliers and demanders is one to three.”

Comparing demanders and suppliers from different perspectives, Table 3 summarizes the

Table 3. Comparing demanders and suppliers

<i>Perspective</i>	<i>Demander</i>	<i>Supplier</i>
Customer Relationship	Registered participant	Registered participant
Transaction process	Real recipient of service	Real renderer of service
Matching process	Places order	Bids on orders
Frequency	Irregular and infrequent need	Regular and recurring need
Market participation	One order, one platform	Multiple orders, multiple platforms
Transparency	Directly visible on platform	Only indirectly visible
Revenue	Uses LetsWorkIt free of charge	Pays for successful intermediation

rationale for focusing on the demander as the primary target group. As a consequence, LetsWorkIt particularly aligned its whole marketing mix with the demander. At the beginning, increasing the sheer quantity of new auctions and getting ahead of the competition in terms of numbers became the focus of LetsWorkIt's competitive strategy. As described in the following, the respective communication and distribution strategies of LetsWorkIt.de grounded on three distinct building blocks from the very beginning: public relations, performance marketing and cooperation.

Public relations

"We have strongly benefited from the mass media", Holtmann replies when asked about public relations. Due to several reports on federal radio and TV stations^b as well as in the press^c, the concept of service and handcraft auctions in general, as well as LetsWorkIt.de in particular, became known to the wide public. "After appearing on TV, the number of auctions was boosting by up to 300%",

Holtmann explains. The same phenomenon could be observed when the press dealt with the subject. To fully leverage the potential of the mass media, the founders soon decided to engage a PR agency that continually releases news items about LetsWorkIt.de. Bugge: "This was certainly one of our most important marketing decisions. They are really doing a good job."

Performance Marketing

Despite the success of the abovementioned PR campaigns, the major advertising channels for LetsWorkIt.de are, of course, web-based. One of the major advantages of online advertising is the possibility to measure detailed metrics for the respective channel, such as the number of page impressions and click-through rates. The utilization of advertising channels that are paid on a performance basis can be referred to as performance marketing. For LetsWorkIt.de, this concept became the basis of a very cost-effective marketing controlling: "From the very begin-

ning, we strongly aligned our online marketing campaigns with clear-cut performance targets”, Bugge explains. In order to measure a channel’s performance, this first means defining a target cost for each metric – for example, a target cost of €2.00 for a new registration. Thereafter, the campaign is continually adjusted regarding both qualitative and quantitative aspects in order to generate as many prospects as possible within the given campaign budget. LetsWorkIt.de focused on two main performance marketing measures:

- *Keyword advertising:* Via Google’s Adwords program, LetsWorkIt purchased sponsored links that guarantee a top Google rank in searches for relevant keywords like “Handwerk” (handcraft) or “Dienstleistung” (services). This classical Internet advertising effort was especially intended to raise overall brand awareness for LetsWorkIt.de.
- *Affiliate advertising:* Instead of implementing a software solution to control online advertising channels, LetsWorkIt decided to make use of affiliinet.de, an affiliate network provider that offers a standardized solution to efficiently acquire many small advertising partners and effectively control the performance metrics of the respective channel. LetsWorkIt’s affiliate program includes miscellaneous banners and links that can be integrated into the affiliates’ websites. The program features attractive remuneration terms that have already attracted a lot of affiliates (€2.00 for a new registration, €10.00 for a new registration followed by an auction placement). The program started in August 2005. Two months later, a total of 1,300 affiliates had mediated 250 registrations and 60 auctions.

After some time, LetsWorkIt was able to identify notably diligent affiliates and individually approached them in order to transform the respective business connections into more ef-

fective, strategic partnerships. “Beyond that, I began to personally approach web portals offering information and services related to the topic of service and handcraft orders”, Bugge remembers. Strategic cooperation soon became the third building block of LetsWorkIt’s communication and distribution strategy.

s strategic c cooperation

As a lack of financial means often leads to deficits in the areas of sales and market positioning, cooperation strategies play an elementary role regarding the growth of Internet-based ventures (Kollmann & Häsel, 2006a; Kollmann & Häsel, 2006b; Volkmann & Tokarski, 2006). Cooperative agreements with topic-related partner sites thus have become a fundamental building block of LetsWorkIt’s competitive strategy, intended to decrease the high acquisition costs per customer.

Table 4 lists the most important partner sites cooperating with LetsWorkIt.de. With each partner, LetsWorkIt.de negotiated one of the following cooperation modes, depending on the scope of integration into the partner’s website:

- *Banner/link integration:* This merely refers to integrating a banner, button or a text link into the partners website, pointing to LetsWorkIt.de.
- *Editorial integration:* The partner seamlessly integrates an editorial content that actively promotes LetsWorkIt.de.
- *Content frame sharing:* This cooperation mode features the possibility of directly displaying a list of current auctions on the partner’s website. Depending on the website visitors, the partner may follow different strategies: Being redirected to LetsWorkIt.de, potential bidders can directly bid on the respective orders. Potential demanders, on the other hand, can experience the different kinds of auctions placed on the e-marketplace.

Table 4. Cooperation partners in January 2006

<i>Partner</i>	<i>Platform description</i>	<i>Cooperation mode</i>
ImmobilienScout24.de	Real estate marketplace (catalogue)	Co-branded marketplace
Immoauktionen.de	Real estate marketplace (auctions)	Banner/link integration
Bauen.com	Building portal	Content frame sharing
Bauen.de	Building portal	Co-branded marketplace
Quoka.de	Publishing house (small advertisements)	Link integration
Sebworld.de	Insolvencies, mortgages and auctions	Link integration
Meldebox.de	Moving house portal	Content frame sharing
Baubeteiligte.de	Building/real estate web directory	Editorial integration

- *Co-branded marketplace:* Applying this cooperation mode, LetsWorkIt offers its partners to adapt the LetsWorkIt.de platform and offer it as a supplementary service. The affiliate can choose between either a co-branded version of the marketplace opened in a new browser window (with the website header and colours adapted to the partner's look and feel), or a version that is directly integrated into the partner website. Both versions are hosted on LetsWorkIt's web server.

Applying these cooperation modes, the partners enhance their own offers by a complementary product that represents an added value for their customers. In banner/link or editorial integration modes, the partner is additionally remunerated for new registrations, respectively, registrations followed by an auction placement. Particularly in connection with the co-branded marketplace mode however, the partner is remunerated by revenue sharing, i.e. the revenue generated on the

basis of the adapted platform is shared between LetsWorkIt.de and its strategic partner. The ratio depends on the acquisition potential of the partner. "Current models feature ratios between 30% and 50% for the partner", Bugge says.

Product s strategy

Besides the quantitative problem of acquiring marketplace participants, e-marketplaces also needed to provide for qualitative marketing problems in their competitive strategy. The number of participants as such on the demander and supplier side does not yet allow any conclusions about the level and quality of the assigned transaction partners. Therefore, it has to be clarified to what extent the demand on both sides can be satisfied (Kollmann, 1998). "At the beginning, many auctions were simply unattractive for the suppliers – either because of the starting price, or in terms of descriptions that have been just too opaque to be used as a basis for calculating the amount of work to be done", Seel says. Apparently, the

decision to actively participate in the marketplace also depends on the way transactions are coordinated, i.e. the design and features of the matching function. This goes along with research by Soh, Markus, & Goh (2006), who find that differences in features such as content creation are important because they not only contribute to the strategic alignment between value creation activities and the target market(s), but also are highly consequential for the benefits demander and suppliers get from an e-marketplace. Consequently, only a few months after launching the initial version of the platform, Seel revised the core process of placing an order, adding central questions and pieces of advice depending on the type of order to be placed.

Additionally, the number of auctions that have been concluded does not say anything about the quality of the respective business deal, i.e. form, degree and dimension of transactions done and their effect on the whole market system. Correspondingly, as revenues result from a market fee that depends on the order volume, the value of each transaction plays an important role for LetsWorkIt. “Unfortunately, order volumes have been alarmingly low at the beginning. People were

lacking trust into the concept of service and hand-craft auctions”, Holtmann says. “Probably they first wanted to gain experience with low-volume orders, or simply minimize risk”, Bugge amends. “This is why we introduced the concept of selective auctions at a very early stage – outrunning our competitors, who did not offer such a concept.” As illustrated in Figure 5, the concept of selective auctions is intended for high-priced orders with a high demand of quality. “As the demander may rather control the actual outcome of the auction, the introduction of selective auctions significantly increased the average order volume, and thus our revenues“, Seel remembers.

Similarly, LetsWorkIt’s rating system became part of a product strategy that emphasized quality aspects as key to success. An experimental study conducted by Ba & Pavlou (2003) confirms that demanders develop trust in a supplier’s credibility as a result of feedback mechanisms. “The rating system builds trust into the transaction partner, and is an important instrument for deciding which suppliers to select for a selective auction”, Seel states. The system makes the quality of work directly visible on the platform. “Basically, due to the transparency of the rating system, our suppliers cannot afford to provide bad quality”, he adds. Indeed, results from Ba & Pavlou (2003) indicate that negative ratings carry a much stronger effect than positive ones on a demander’s trust level and consequently the individual order volumes that a demander is willing to handle via the platform.

Concerning its product strategy, LetsWorkIt still needs to achieve an advantage over other competing marketplaces so that the coordination via LetsWorkIt.de would be more reliable than via comparable platforms. However, the management team still has to assure that the coordination is based on a balanced ratio of e-marketplace participants. “The reason for this is the comparison that is performed by both demanders and suppliers”, Holtmann says. It is this comparison that determines the participation of quality-oriented demanders and suppliers.

Figure 5. Selective auctions as an essential part of product strategy

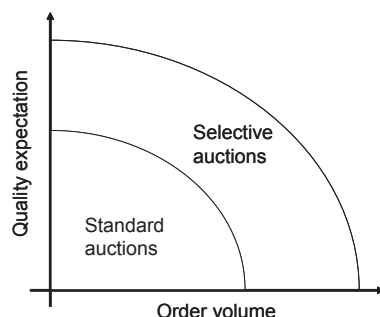
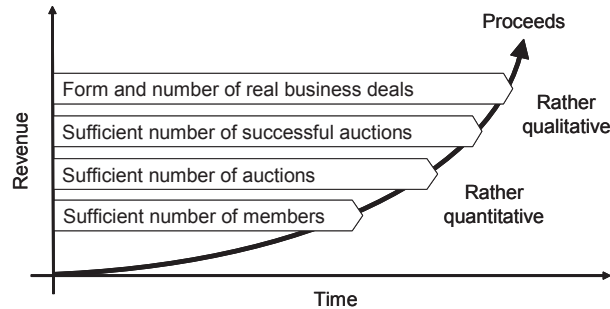


Figure 6. The development of coordinating problems (according to Kollmann, 1998)



Against this background, it can be expected that in the course of the expansion of LetsWorkIt.de, quality aspects will be of primary importance. Apparently, over time, a shift of the relevance from the quantitative to the qualitative problem area can be postulated for being competitive in the market of service and handcraft auctions. Figure 6 illustrates the development of coordination problems on LetsWorkIt.de. Before reaching the quantitative critical masses, the acquisition of further market participants is in the foreground. For LetsWorkIt.de, this is still the case. However, as LetsWorkIt's proceeds model builds on order volume, a product strategy focusing on the quality of individual transactions has already become a key component of the venture's competitive strategy. "It is the form and the number of real business deals that decides whether we will be successful or not", Bugge summarizes.

From LetsWorkIt to Quotatis

Looking back on two years of operative business now, LetsWorkIt.de has evolved into one of the leading German e-marketplaces for service and

handcraft auctions. "Competition has become even stronger. But we are confident that we will be able to stand up to them. Currently, we are number two in the German market", the three founders state. And they are no longer alone: in early 2006, LetsWorkIt was officially taken over by Quotatis S.A., a French competitor expanding its business to the German market. Since May 1st, 2006, LetsWorkIt.de is officially named "Quotatis" and has recruited six new employees, including a new chief executive officer. Chief marketing officer Bugge: "At last, the take-over strengthened our marketing budget." Renaming the e-marketplace was accompanied by a TV campaign with commercials during do-it-yourself and interior design shows on five German TV channels, as well as a new online advertising concept that includes cooperation with several well-known German portal sites.

With 3,500 orders per month and 60,000 marketplace participants, Quotatis is now number two in the German market for service and handcraft auctions (see Table 5). It will remain exciting to watch this market and, in particular, to keep track of the competitive strategy of Quotatis.

Table 5. Quotatis and its three main competitors in May 2006

	<i>Undertool.de</i>	<i>Jobdoo.de</i>	<i>My-Hammer.de</i>	<i>Quotatis.de</i>
Orders per month	1,400	1,500	5,500	3,500
(compared to September 2005)	(+40%)	(+25%)	(+450%)	(+350%)
Users	87,000	31,000	60,000	60,000

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The case of LetsWorkIt.de provides evidence that the intermediation of handcraft and service orders is suitable to form the basis of an Internet-based B2C business model. This solely electronic business model is based upon a concept that involves the electronic creation of customer value by matching supply and demand on an electronic platform of the Net Economy. In this regard, the case confirms existing theory postulating that e-marketplaces can add value by simplifying information search in highly fragmented markets, where purchase decisions are complex and varied (Giaglis, Klein, & O'Keefe, 2002). For the service sector, reverse auctions have proven to represent an ideal matching mechanism. However, introducing the concept of selective auctions, the case also suggests that especially for high-priced orders with a high demand of quality, demanders should be enabled to minimize risk by rejecting non-compatible bidders.

Furthermore, this case study points out that for Internet-based ventures, which are unknown and have limited capital, an ideal combination of public relations, performance marketing and strategic cooperation represents a very effective communication and distribution strategy. In par-

ticular, e-marketplaces are well advised to make use of such approaches to overcome quantitative marketing problems in the early phases of business development. The case underlines the importance of considering the complex interrelations of two-sided network effects and confirms the chicken-and-egg problem that is well-documented in current literature on electronic markets (Galbreth, March, Scudder, & Shor, 2005; Rochet & Tirole, 2003).

Finally, supplementing existing theory that postulates a well-balanced bilateral marketing (Kollmann, 1998), the case of LetsWorkIt.de suggests that, depending on the concrete business model, it may be feasible for an e-marketplace to concentrate marketing activities on a primary customer group. By primarily aligning competitive strategy with the demand side, LetsWorkIt was able to reach a sufficient number of successful auctions. Besides quantitative aspects, strategy must include qualitative means that positively affect the form of the *real* business transactions standing behind an auction. The strategic combination of selective auctions and feedback mechanisms supports existing theory on the positive effects that rating systems may have on the demander's trust level (Ba & Pavlou, 2003), respectively, the individual order volumes

that a demander is willing to handle via the platform. As revenues depend on the order volume, a product strategy covering the whole range of the demander's quality expectations, while at the same time signaling trustworthiness, turned out to be the key to success.

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ENDNOTES

- * A prior version of this chapter titled ‘Reverse Auctions in the Service Sector: The Case of LetsWorkIt.de’ has been published in the *International Journal of E-Business Research*, 3(3), 57-73.
- ^a According to the sales numbers in September 2005, the most successful categories have been: building & renovating, painters & varnishers, gardening, moving & transports, heating installation & sanitary, and furniture & furnishing.
- ^b TV reports about LetsWorkIt.de have been broadcasted on PRO7 (BIZZ), ARD (Ratgeber Geld), ZDF (WISO), and KABEL1 (K1 Journal).
- ^c Articles about LetsWorkIt.de have been published in BILD am Sonntag, Stern, Focus, DIE WELT, and Tomorrow, among others.

Section III

E-Business Management

Chapter XII

Evolving E-Health Systems: Symbiotic Constructs Between Corporate and E-Healthcare Worlds in International Space

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Abstr Act

The 21st century continues to witness the transformation of organizational systems globally through the deployment of Information and Communication Technologies (ICT). The emerging future is witnessing the convergence of artificial intelligence, biotechnology, nomadic information systems, and nanotechnology. This promises to further transform the nature of inter-organizational systems between the corporate and public sectors. The evolution of e-health systems is a case in point. In the light of the Wuli-Shili-Renli (WSR) approach, this key informant study explores the strategic perceptions of corporate ICT and health care executives in Canada and Sweden. Public governance values play critical roles in evolving and sustaining symbiotic e-health networks in Canada and Sweden. The chapter exposes the unique transgenic dimensions of evolving e-health systems. The findings and implications of the study underscore the need for further international e-business research on the socio-cultural domains in which inter-organizational systems evolve.

INtr ODUct ION

The 21st century continues to witness the transformation of organizational systems globally through Information and Communication Technologies

(ICT), which drive and evolve systemic goals. The implementation of ICT, such as business intelligence systems, data mining and warehousing, e-business systems, e-procurement systems, knowledge management, security systems and

systems integration, continue to compel the corporate sector to engage in forging inter-organizational systems (Li, 2007; Senge, Carstedt and Porter, 2001). With the cogent and ubiquitous developments such as nomadic systems and wireless and wearable technologies, the emerging future is witnessing the convergence of artificial intelligence, biotechnology and nano-technology (Orlikowski and Iacono, 2001; Pearson, 2001). Strategic dyadic partnerships, with its characteristics of longevity, management control and direction, mutual beneficence and stability, exemplify one type inter-organizational system. The literature underscores the role of strategic symbiotic networks in fostering efficiencies, sectorial growth and social actualization through innovation and knowledge management and transfer internationally (Amaravadi and Lee, 2005; Burgelman and Doz, 2001; Etemad, Wright, and Dana, 2001; Fedor and Werther, 1995; Kodama, 2001; Oliver, 2001; Robinson, Savage and Campbell, 2003). These linkages have the potential to liberate thinking beyond closed organizational paradigms and embrace complex changes and uncertainty inter-organizationally and proactively (Dickson, Farris and Verbeke, 2001; Murray and Zhu, 2003; Urbaczewski, Jessup, and Wheeler, 2002).

The health care sector is no exception to the inter-organizational change imperatives driven through ICT innovative advances. Regionally integrated e-health networks promises less resource duplication, lower operational costs, reduced clinical waiting times and lengths of stay and greater quality care, in the face of care provider and clinician shortages. E-health is the transformational wave of the future in health care systems (Adewale, 2004; Gutierrez, 2001; Sahney, 2003). The upcoming generation of consumers and providers instinctively understand the transformational power of ICT to improve delivery efficiencies and quality of health care regionally through inter-organizational interactions (Caro, 2005). On the basis of extant literature, this paper

proposes a conceptual model of symbiotic e-health networks. The model dimensions are posited on a key informant approach and content analysis of the strategic perceptions of international ICT and health care executives interacting through dyadic partnerships. The findings and implications of the study underscore directions for future e-business research.

INT Er -s Ect Or IAL DYDADIC r ELAt IONs HIPs: GENE r Ic AND t HEOr Et Ic AL PErs PEct IVEs

This paper posits that strategic partnerships and alliances are, in essence, symbiotic information networks. These are, in essence, mutually advantageous inter-organizational systems between informational cultures differing in values, missions, perceptions and evolutions. Moreover, these informational cultures incubate and thrive in informational cultural polities, which are articulated through the governance sector. Networks are systems of interconnected individuals and organizations through which informational and resources flow (Ford, Wells and Bailey, 2004). These networks interact and coalesce through an exchange of informational, relational and transactional capital and sustained through transactional and transformational processes. Moreover, these processes are articulated through skills sets exercised through system participants, called executives. Coupling of different sectors occurs when relational capital and transactional capital is leveraged through transactional and transformational skill sets. Where the capital and process resources are inadequate, a supra level (governance sector) foster and leverage evolving symbiotic information network. Symbiotic information networks are the result of the interplay of management and technical processes.

The extant literature on inter-organizational systems, strategic alliances and partnerships is germane to the evolution of symbiotic informa-

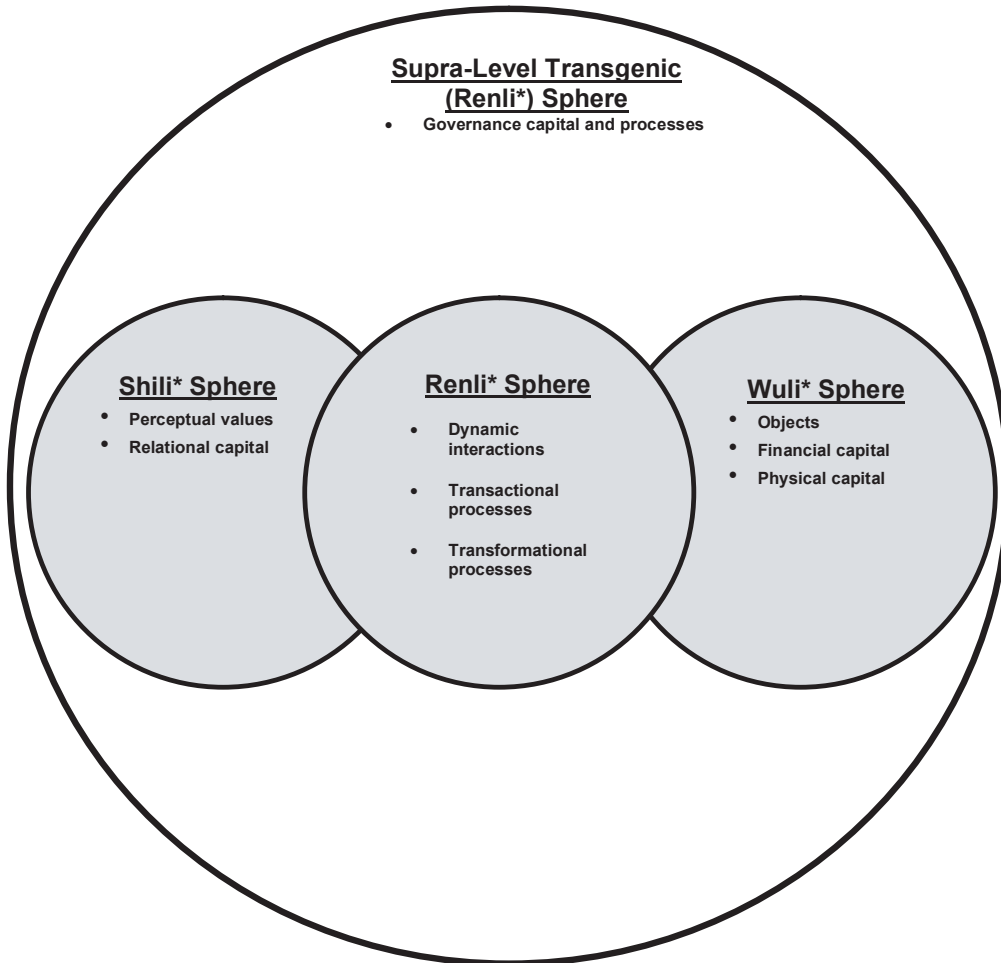
tion networks that incubate in meta-cultural information domains. This chapter subsumes a realist approach, rather a strictly positivistic, or phenomenological, one to the exploration of inter-sectorial networks (Stiles, 2003). It responds to the call for a polity system perspective, where dynamic social-political elements influence inter-sectorial network behaviour and integrate elements of trust within economic, political, socio-cultural and strategic dimensions (Boonestra, 2005; Boonestra, 2003; Chen, 2003; Dhillon, 2003). The underlying tenets reflect a pluralist epistemology, where the emphasis is on an understanding “of-the-becoming” (de Rond and Bouchikhi, 2004). Moreover, it views the organizational and national cultures as heterogeneous elements that interact dialectically and dynamically in the evolution of information networks (Cooper, 1994; Townsend, 2003).

The literature points to management control factors that implicitly form the basis for effective inter-sectorial strategic dyadic partnerships (Dyer, Prashant and Singh, 2001; Judge and Ryman 2001; Weech-Maldonado and Merrill, 2000). Such elements include: leadership with executive vision; solid strategic and operational planning constructs; rigorous feasibility studies and cost-benefit analyses; stable financing through a range of innovative and flexible financial instruments; and specific performance metrics and targets. Other extant elements to effective inter-sectorial dyadic links, or strategic partnerships, include the mutual understanding of business models, motivations, priorities, resource strengths and limitations; the clear and explicit definition of mutual benefits, expectations, and priorities; and the mutual sharing of financial and political risks (Das and Teng, 2001). Structural bonding (economic and functional factors that involve explicit benefits) and social bonding (emotional and affective resources) are the prerequisites to relationship cohesion (Rodriquez, 2002). Mutual trust, or relational capital, fosters a climate of good faith and open collaboration in forging congruent goals and objectives.

Perception, mutuality, trust and understanding are the drivers of inter-organizational system behaviour. This points to the critical need to understand the inter-sectorial cultural and organizational climates. Zhu’s Wu-Shi-Ren (WSR) Li-stage model underscores the perspectives, sensing and the psycho-cognitive elements (Shili) which interact synergistically with socio-political elements or power structures (Renli) to release technical ICT resources (Wuli) forces (Gu, Nakamora, and Zhu, 2002; Zhu, 2007; Zhu, 2001). “Sensing and caring” transform the “knowing” (Zhu, 2002). This study explores inter-sectorial informational networks transcending national cultural contexts. It extends Zhu’s WSR-Li framework into the Realpolitik of e-health systems internationally. In particular, the proposed model in this study centers on the following five symbiotic information network dimensions, which are not explicitly reported in the extant literature:

- **Relational Capital (Shili) Dimension:** whereby inter-sectorial executives harmonize perceptions, values and motivations in an atmosphere of trust and benefit to effect symbiotic information networks;
- **Transactional Capital (Wuli) Dimension:** whereby inter-sectorial executives effectively avail and access strategic resources to effect symbiotic information networks;
- **Transactional Skills (Renli) Dimension:** whereby inter-sectorial executives mobilize internal power resources to effect symbiotic information networks;
- **Transformational Skills (Renli) Dimension:** whereby inter-sectorial executives exercise vision and strategic leadership to effect external symbiotic information networks; and
- **Supra-Network Transgenic (Supra-Renli) Dimension:** whereby external third parties engage, enable and sustain symbiotic information networks through transactional

Figure 1. Transgenic symbiotic dyadic information network model



*From Zhu's WSR-Li Model (Zhu, 2002)

capital and fostering transformational skills externally.

This fifth dimension extends Zhu's WSR-Li framework to an external power element, which manifests through culturally influenced socio-political dynamics. It is posited that this dimension is a particularly potent transgenic Renli force that

reflects the importance of socio-cultural contexts in which symbiotic information networks evolve. The WSR- Li dimensions in Zhu's model constitute "bubble entities" (Zhu, 2002). It appears that a transgenic, or transcending, supra-level Ren-Li bubble encompasses the three. Building on Zhu's WSR-Li model, Figure 1 proposes a generic transgenic symbiotic information network model.

sYMBIOTIC E-HEALTH NETWORK MODEL

The symbiotic information network model is applied to strategic e-health partnerships, to illustrate symbiotic dyadic networks, between the corporate sector in Information Communication Technology (ICT) and the health care sectors. Strategic partnerships give active expression to the corporate sector to fulfill social responsibilities and meet community needs, while increasing long-term return on investments, market visibility and revenues. The health care sector seeks strategic partnerships in order to capitalize on core ICT competencies and services to lower operational

costs, increase system efficiencies and improve quality of care. The actualization and expression of the dyadic e-health network model is articulated through participants, which include health care and corporate ICT executives respectively. These parties exchange relational capital in the form of informational capital, knowledge and resources through transactional and transformational processes. In socio-political environments, these processes are enabled through a supra level articulated through governance executives in the governance sector. The extant literature does not report on the interplay of perceptual and experiential dimensions of corporate ICT and health care executives engaged in dyadic strategic partner-

Table 1. Symbiotic e-health network dimensions

Symbiotic Intersectorial Network Dimensions	Zhu's WSR-Li Stage Model Equivalence*	Characteristics	E-Health Network Articulation
1. Relational Capital	Shili	Sensing Perspectives Psycho-cognitive Weltanschauung	Mutual understanding between the ICT and health care domains Intersectorial understanding
2. Transactional Capital	Wuli	Knowing Resources Conditions	Resourcing e-health networks
3. Transactional Skills	Renli	Internal Socio-political	Internal cooptation of care providers and clinicians
4. Transformational Skills	Renli	Dyad External Socio-political	ICT-Health care dyadic partnership leadership
5. Transgenic Level	Renli	Triad External Socio-political	Governance countervailing forces Supra-cultural Interaction and understanding

**From Zhu's WSR-Li Model (Zhu, 2002)*

ships internationally. In response to the dearth of investigation in this area, this study proposes the following model dimensions to characterize the inter-sectorial interplay between the corporate and health care sectors to develop effective symbiotic e-health networks.

- **Relational Capital Dimension.** ICT and health care executives harmonize perceptions, values and motivations in an atmosphere of mutual trust and benefit.
- **Transactional Capital Dimension.** ICT and health care executives avail and access “intra-sectorial”, or internal, resources, such as finances and human resources, within their respective sectors.
- **Transactional Skills Dimension.** ICT and health care executives effectively and mobilize “intra-sectorial”, or internal, power processes, such as internal co-optation and cooperation.
- **Transformational Skills Dimension.** ICT and health care executives exercise vision, leadership and effective negotiation skills interactively.
- **Transgenic Supra-Network Dimension.** Executives in the governance sector leverage and sustain symbiotic e-health networks through “extra-sectorial”, or external, transactional capital and transformational skills.

Table 1 summarizes the symbiotic e-health network dimensions consonant with Zhu’s WSR-li model equivalents (Zhu, 2002).

KEY INFORMANT STUDY DESIGN AND METHOD

This key informant study specifically examines the perception of select corporate and health care executives of the management challenges in sustaining symbiotic e-health networks in Canada

and Sweden. The current literature underscores the relevance of key informant methodologies in diverse settings, such as AIDS (Elamon, J. 2005; Kebaabetswe, 2007); ecotourism (Winson, 2006); governance (Carley, 2006); health impact studies (Heath, 2007); health informatics (Buckridge and Goel, 2001); higher education (Fowler, 2005); international business (Shi and Wright, 2001); managed care (Hall, 2006); marketing (Hansen, 2004; McNally, 2007); mental health services (Toward and Ostwald, 2002); and pharmaceutical services (Schmidt and Pioch, 2001). Key informant studies in international e-business are rarely reflected in the extant research literature. This is particularly the case in studies of the interface of the corporate and public sectors in the developing e-health systems (Caro, 2007).

This study was confined to Canada and Sweden given the time constraints. Both nations are members of the Organization of Economic Cooperation and Development (OECD) nations and are technologically advanced with cogent socio-political traditions of public support and financing of health care systems. Moreover, regional governance organizations in both these advanced nations have major decision-making involvement in e-health systems development.

The criteria for participation and inclusion in this key informant study included: 1. in the case of the corporate sector, only senior lead executives at ICT firms with an IPO designation, 2. in the case of the health care sector, only senior lead health care executives actively engaged in e-health partnerships in their respective jurisdictions, 3. active engagement in the development of e-health systems in the select nation, and 4. a willingness to participate within the time study parameters.

In Canada and Sweden, the number of corporate ICT firms with an Initial Public Offering (IPO) designation that conduct e-business in health care systems is limited. This made it possible to invite all the major ICT firms in Canada,

including multinational corporations, such as EDS Canada, EMC Canada, IBM Canada, MDS Inc., Microsoft Canada Inc., and Oracle Corporation Canada. Each major multinational subsidiary in Canada has a health market division with a senior ICT executive lead. In Sweden, the Ministry of Health and Social Affairs and the county health organizations play a significant part in ICT decision-making with the private sector. The Ministry identified the senior executives of key Swedish ICT firms with an IPO designation, such as Alleato AB, that were engaged in the e-health systems development. Only lead executives with central and key strategic engagement in e-health network developments were invited to participate in one-on-one interviews.

A total of 49 semi-structured interviews were conducted over a 15-week period. Eight were in Sweden and 41 in Canada. Each participant received a pre-tested questionnaire in advance. Interview results were duly recorded, summarized and analyzed. 31 senior ICT executives from organizations with IPO designations and were actively engaged in strategic partnerships with the health care sector. Of these, 27 were in Canada and 4 in Sweden. Eighteen were senior health care executives active in ICT strategic partnerships. Of these, 14 were in Canada and 4 in Sweden. Table 2 highlights the salient study dimensions of the semi-structured interviews.

Table 2. Key informant semi-structured interview focus sample questions

Theoretical Dimensions	Key Perceptual Focus
Relational Capital	<ul style="list-style-type: none"> As an executive, what management challenges do you perceive that executives of the other sector face in strategic partnerships with your sector? To what extent are these differences, if any, important? Are these differences unique to your particular national region?
Transactional Capital	<ul style="list-style-type: none"> What is the role of resource availability and accessibility of resources to the evolution of strategic partnerships between ICT-health care sectors from your perspective? From your personal experiences as an executive involved in strategic partnerships, what are the key management lessons you have learnt?
Transactional Skills	<ul style="list-style-type: none"> To what extent are care providers and clinicians important in the evolution of strategic partnerships between ICT and health care sectors, from your executive perspective?
Transformational Skills	<ul style="list-style-type: none"> As an executive, what do you see as the key management catalysts/ inhibitors to ICT development in health care?
Transcending Supra Network Transformational Leverage	<ul style="list-style-type: none"> What is the role, if any, that governance bodies play in the evolution of ICT and health care partnerships in your nation, from your executive perspective?

KEY INFORMANT PERCEPTUAL FINDINGS

Content analysis of the semi-structured interview summaries indicated perceptual agreement on management challenges of forging strategic dyadic partnerships between the ICT and health care sectors across the two OECD nations. The major findings of this inter-organizational systems study in the light of the symbiotic e-health network dimensions follow.

Inter-sectorial relational capital

Inter-sectorial executives must invest the time, energy and effort in understanding each other's mindscapes and Weltanschauung or views of the world (Zhu, 2007). Parties to inter-organizational systems need to explicitly define their respective parameters, roles and responsibilities. Inter-sectorial executives must work towards win-win partnership agreements, where there is significant relational capital in the form of mutual trust and

understanding to promote sectorial benefits. All key informants underscored the existence of a significant perceptual divide between the respective corporate ICT and health care sectors. Forging relational capital remained a challenge for all parties in the evolution of symbiotic e-health information networks. All participating ICT executives perceived radically different inter-sectorial assumptions, political motivations, organizational pressures, values and views that were often underestimated. Table 3 highlights a sample of the most frequently articulated views and perceptions of corporate ICT executives in their interaction with health care executives. Corporate executives felt strongly that health care executives needed a greater knowledge of the potential of ICT technology to effect substantial benefits in the health care system.

Inter-sectorial transactional capital

There were perceived differences in inter-sectorial transactional capital that posed major challenges

Table 3. Relational capital divides between corporate ICT and health care sectors

CHARACTERISTICS	CORPORATE ICT SECTOR	HEALTH CARE SECTOR
TIME DIMENSIONS	"Web" time Rapid and volatile pace	"Bureaucratic" time Deliberate slow pace
STRATEGIC PARTNERSHIP MOTIVATIONS	Client satisfaction Long-term profitability Market growth	Cost-effective operations Health care outcomes Patient /care provider Satisfaction
DECISION POWER FOCUS	Corporate Governance	Diffuse political power Public governance
MANAGEMENT CULTURES	Competitive Fluid and dynamic Growth-driven Innovative Predominantly proactive	Care provider-driven Compliance-driven Conservative Ideological-driven Predominantly reactive

to the evolution of symbiotic e-health networks. Participating ICT and health care executives understood that stable and consistent transactional capital, such as financial and human resources, is crucial to the evolution of dyadic partnerships. All key informants acknowledged significant resource limitations in the health care system, which often hindered the growth of effective strategic dyadic partnerships. ICT executives underscored their perception that unstable prospective health care financing is a powerful disincentive to investing significant resources, time and energies to the formation of long-term partnerships in health care. In both Canada and Sweden, public budgeting systems limited the availability of capital and operational financing for ICT development. All interviewees acknowledged that the deployment of skilled ICT professionals is essential in effective e-health systems deployment. In the light of pressing clinical staff shortages, health care executives emphasized that doing so at appropriate compensation rates presented significant challenges.

Executive transactional skills

The sustainability of symbiotic e-health networks is dependent on generating sufficient transactional capital, in the form of internal co-optation of care providers and clinicians. Swedish executives maintained that effective strategic partnerships are ones where care providers and clinicians see demonstrable and direct benefit to patient care and participate actively in all partnership initiatives. For example, ICT executives at Alleato AB cooperated closely with clinicians at the Huddinge and the Karolinska Hospitals in Sweden. The resulting ICT partnership fostered clinical research, promoted evidence-based medicine and enhanced patient care with fewer resources. Interestingly, in Canada key informants underscored that the roles of care providers are less engaged in ICT partnerships. It would appear that transactional

skills set requirements in inter-organizational systems are different in Canada from those in Sweden. These apparent clinical environmental differences in both nations deserve further study it would appear.

Executive transformational skills

There were noted differences in inter-sectorial transformational skills also posed major challenges to the evolution of symbiotic e-health networks. All inter-sectorial key informants unanimously asserted that effective executive leadership and transformational skills are a crucial ingredient to bridging perceptual divides and building shared visions in strategic dyadic partnerships. Reengineering of internal operations and management processes became important, as health care organizations evolve to capitalize on IT advancements. The question is: who should lead IT initiatives? For 31 corporate executives, the answer was unanimous: the vision and leadership for strategic partnerships rests entirely with health care executives. ICT executives maintained that health care executives were the central change agents, who need to initiate and lead significant socio-cultural and process changes within their sector. ICT executives perceived their own roles as strictly supportive of the leadership roles and responsibilities they expected from their health care counterparts. In contrast, 18 health executives were not as emphatic on the importance of their specific leadership roles in strategic partnerships with the ICT sector. Eight health care executives perceived their involvement as primarily monitoring parties to assure that privacy legislative standards were adhered to. These transformational skill set differences posed challenges for ICT executives, particularly where health care counterparts did not appear to have the requisite knowledge base, experience and core competencies in ICT management.

transgenic supra-Level transformational

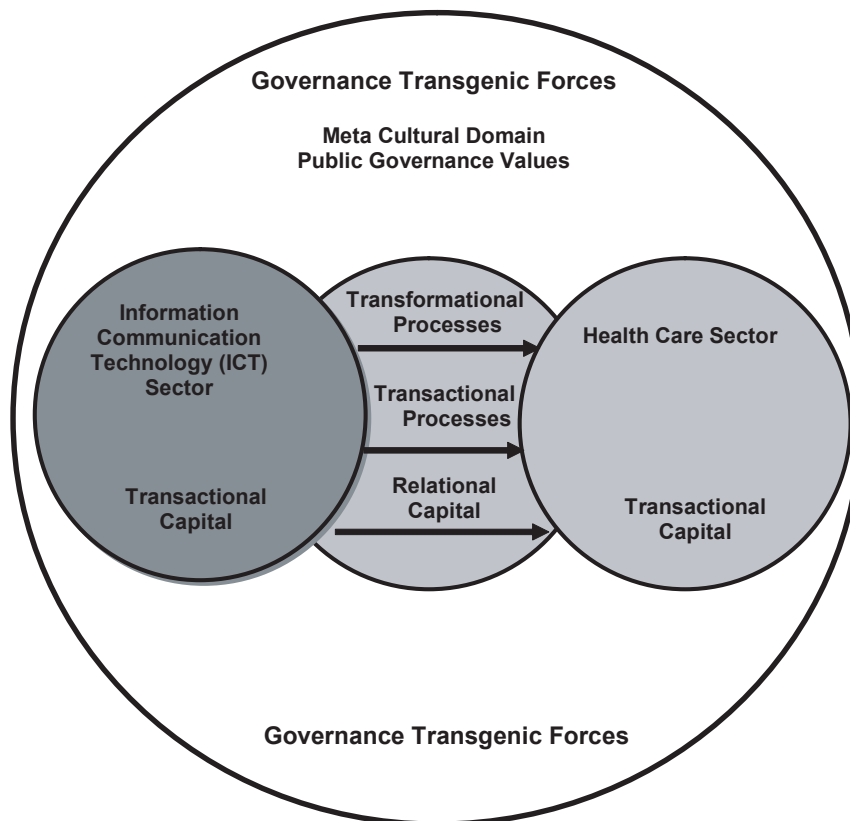
All key informants stressed the need for a third party, or a supra-network level in the form of a governance organization, to galvanize and support the evolution of symbiotic e-health networks. All stressed the need for active engagement and financial and political support of the governance sector was of paramount importance to the evolution to effective inter-sectorial partnerships. This “transgenic”, or supra, level of public governance is essential in fostering, stabilizing and evolving symbiotic e-health networks. Indeed, leadership at this higher level appeared to be a potent force in the setting of strategic e-health directions, the

provision of essential transactional capital and the innovative reengineering of health care systems for the public benefit. Governance policy in public financing, technological standards, bidding processes, information management, privacy and security, all have a paramount place in the positive transformation in e-health systems. This legislative power accentuates the transformational, or transgenic, potential of this supra-level, as in Figure 2.

IMPLIcAt IONs AND c ONc LUSION

Symbiotic e-health networks are the lodestar of future health care sector. Effective inter-organiza-

Figure 2. Symbiotic e-health network model



*Based on Zhu's WSR-Li Model (Zhu, 2002)

tional systems, in the form of corporate and health care partnerships in Canada and Sweden, require a full scrutiny of diverse sectorial perceptions, assumptions and values. It is crucial that underlying assumptions and perceptual differences remain overt, open and explicit a priori in the evolution of inter-sectorial partnerships and in order for systems benefits to manifest. Both corporate and health care executives must invest the time, energy and effort in understanding each other's mindscapes and Weltanschauung (views of the world) in order that the transformational power of ICT to promulgate quality health care services. Using Zhu's (Wuli-Shili-Renli) WSR paradigm, executives must have the requisite transactional (Wuli) and transformational (Shili) skill sets and the necessary relational capital (Renli) to effect and sustain positive system changes.

Moreover, the most effective and stable symbiotic e-health networks are ones where corporate and health care executives collaborate directly and closely with governance agents. It is axiomatic that where the ultimate transactional power rests, there lies the ultimate transformational base for change. In both Canada and Sweden, cogent values in public governance of health care systems form the underlying meta-cultural frame. The governance organizations in effect hold the transgenic power to leverage the growth, stabilize, sustain and transmute symbiotic e-health networks into public values and goods.

In effect, this key informant study of inter-sectorial executives in the Realpolitik world of corporate and health care lend support to Zhu's WSR-li model, with its metaphorical "bubble entities." It would appear that transgenic supra levels "bubbles", or the governance "Renli" forces, are potent prerequisites to drive and sustain e-health systems in nations with cogent social governance values. This study points to the need for further e-business research in the area of symbiotic e-health systems internationally. For example, other OECD e-health care systems, such as Australia, France, Germany, Japan and the United

Kingdom have been relatively under-represented in the extant literature hitherto and the impact of the full impact of the corporate sector only surmised. Further studies would shed light on symbiotic processes between these sectors and provide inter-organizational learning paradigms to foster innovation, positive growth and social responsibility. Key informant studies provide a rich qualitative means in which to investigate inter-organizational systems evolution in diverse socio-cultural settings.

The symbiotic e-health network model has potential relevance as a generic transmuted information network model in diverse sectors in a global community. This key informant study focused on the strategic perceptions of Canadian and Swedish corporate and health care executives engaged in symbiotic e-health networks in cultures, where public governance values are cogent and well articulated. Inter-organizational system dynamics continue to propel symbiotic e-governance systems in an internationalizing world with converging global values and imperatives. This scenario remains an unexploited and titanic area for future exploration in e-business research.

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Chapter XIII

Socio–Economic Impacts of Offshore Outsourcing of Information Technology

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Abstr Act

Offshore information technology (IT) outsourcing has been becoming mainstream alternative to in-house operations. While offshore development is a relatively new trend in IT, the concept of outsourcing manufacturing and service operations has been going on for more than 50 years. Many Asian countries are driving their economic success through taking offshore projects from developed countries. These countries have advantages of low-cost and available labor force. Various studies conducted over the last 10 years have shown that outsourcing allows firms to reduce high overhead costs, improve productivity, contribute flexibility, and thus improve overall performance of the firm. However, offshore IT outsourcing brings new challenges and risks. The skeptics believe that outsourcing may weaken the local business competitiveness of the region, investors' confidence in investing in local businesses, and may create a spiral effect on economic indicators such as: unemployment, enrollment in schools, living styles, housing, and construction, and so forth`. This study investigates the socio-economic impacts of offshore IT outsourcing in the United States using a system dynamics model.

INtr ODUct ION

Offshore information technology (IT) outsourcing has grown rapidly in recent years. Outsourcing now spans across IT, operations and call center functions. Offshore IT outsourcing has become a major trend as it harnesses the power of information technology from distant locations to bring economies of scale and cost competitive operations. The term offshore IT outsourcing has variously been defined in the information systems (IS) literature. We define offshore IT outsourcing as: "...the contracting of various information systems' sub-functions by user firms to outside information systems vendors" (Chaudhury et al., 1995, p. 132) or "...the organizational decision to turn over part or all of an organization's IS functions to external service provider(s) in order for an organization to be able to achieve its goals" (Cheon et al., 1995, p. 209).

In today's high-tech world, the terms 'onsite', 'offsite', and 'offshore' only refer to the physical locations. Outsourcing has enabled firms to reduce cost, improve cycle time and speed time-to-market (Quinn, 1999, 2000, Quinn, and Hilmer, 1994, Gurbaxani, 1996; Sheperd, 1999, Carmel and Agarwal, 2003, D'Costa, 2002, DeLooff, 1995). Offshore IT outsourcing is becoming mainstream for a variety of business processes in retail, banking, financial services, insurance, and telecom industries. The larger Fortune 1000 firms are aggressively moving forward by offshoring to service providers in India, Singapore, Hong Kong, China, the Philippines, Vietnam, Thailand, Hungary, South Africa, Malaysia, and Russia. A study by Logica CMG predicts that "the outsourcing of IT and other business processes is likely to move from a 2005 average of 12 per cent of organizational costs to 20 per cent by 2008" (2005). According to Forrester Research Inc., 3.3 million white-collar jobs will go overseas by 2015 (McKinsey Global Institute Report, 2003, Tekrati, 2004, Susan, 2003, Computerweekly,

com, 2003). International Data Corporation (IDC) also reports that offshore outsourcing is the dominant trend in the IT services industry, with 42% of the application management contracts now having some offshore component (Tekrati 2004, Computerweekly.com, 2003, Benko, 1992, 1993, Muthuswamy and Crow, 2003). Indian IT exports have increased an estimated 36% from \$13.3B in 2006 to an estimated \$18.1B in 2007 (National Association of Software and Service Companies, 2007).

The purpose of this study is to investigate the macro-economic and social impacts of IT outsourcing using a system dynamics model. The study identifies and examines significant relationships among the macro- and socio-economic variables relating to offshore IT outsourcing. The research also documents varying perceptions of practitioners from the perceptions of those in academia. The socio-economic effects and potential disconnect with the reality of the IS professional market may have long term impact on the IS educational field. A great deal of this debate is covered recently in practitioners' professional and trade journals, yet little deliberate research has been conducted to date. Most of the research in offshore IT outsourcing has been largely focused on justifying how offshore IT outsourcing will help both outsourcer and its partners in a win-win situation. There has been no serious attempt to study potential socio-economic loss from outsourcing. Our intention in this paper is to concentrate solely on research that directly addresses offshore IT outsourcing.

bAc KGr OUND

Offshore outsourcing is simply moving work from high-cost, developed countries to low-cost, developing ones. At a time when resources are scarce and competition fierce, there are few reasons in favor of outsourcing as persuasive as a

reduction in costs. Cost savings from outsourcing typically fall in the 15% to 40% band. IT labor costs in India are 50% to 80% lower than in the US and Europe. For most companies employee and related overhead costs are fixed, regardless of market needs and realities. Outsourcing converts these costs into variable costs and gives companies the flexibility to adapt to changes in the marketplace. Maintaining a workforce calls for ongoing investments in employee training, infrastructure, etc. Companies can move this cost to an offshore service provider. These factors allow companies to manage their cash flow better and redirect resources to strategic areas.

At the same time, offshoring raises new societal issues. White-collar job losses in the developed regions dominate the political agendas in the US and Europe, although some economists tend to emphasize beneficial implications of offshoring. Because the developed nations are now heavily reliant on its service-based economy and the recent acceleration of the trend to offshore outsourcing of software and service jobs has raised concerns and political debate in those nations. As much as 72 percent of stated cost savings of typical offshore projects is lost to the costs of start-up, transition, productivity and maintenance (CIO 2003). When considering that a primary objective to going offshore is to trade \$100-an-hour development work for \$20-an-hour work, it hardly seems worth the trouble. In fact, in many cases, if a company could simply find a way to reduce current costs (through efficiency, quality and cycle time improvements), they might not need to go offshore at all.

For most Western European and North American multinationals, offshore outsourcing has become an essential component of their long-term IS/IT strategy (Beulan, Fenema, Currie, 2005). Many argue that IT offshoring is an inexorable trend since IT skills have become a global commodity and they are vastly cheaper in other parts of the world. According to this view, most IT work would be drained from the US to overseas locations (Dutta, & Roy, 2005). Making

outsourcing decisions also means confronting the social stigma that comes with sending jobs out of the U.S. Employment in the technical sector has fluctuated and Congress continues to face a voting populace more worried about themselves than other countries (The Wall Street Journal, January, 2004). The current debate regarding immigration has fueled the debate regarding foreign workers and foreign sourcing. Along with the potential social stigma, offshore IT outsourcing brings new challenges, risks and uncertainties (Barthelemy and Geyer, 2001, Barthelemy, 2001, Dibbern et al. 2002). The risk areas include the legal and regulatory environment of the outsourcing country, the geopolitical, economic, and physical stability of the offshore country, regional turmoil, poor infrastructure, intellectual property and data security issues, loss of control over physical protection of data and quality monitoring, and cultural and human resources issues and lack of exposure to Western business culture (Quinn, 1999, 2000, Quinn, and Hilmer, 1994).

Lit Er At Ur E r EVIEW

Information systems play a key roll in the US economy. During the 1990's firms increased their investment in information systems seeking strategic advantage. Some of this increase is attributable the firms' strategic reactions to the rise of the Internet. In the late 1990s firms felt increasing pressure to hold down costs in order to increase profits. As information systems budgets grew, they became targets for cost reduction. Cost savings has often been cited as the main driver for the IS outsourcing decision (Ang and Straub 1998; Ang and Slaughter, 1998; Due 1992; Loh and Venkatraman 1992a, 1992b). The transaction cost of these arrangements has also fallen (Ang and Straub 1998; Ang and Slaughter, 1998). Firms may also outsource to an external supplier so that they can better focus on their core business or gain access to scarce skills (Quinn 1990;

Grover and Teng 1993; Huber 1993; Lacity and Hirschheim, 1993a, 1993b; Palvia, 1995; Aubert, Rivard, and Patry, 1996; Lacity and Willcocks, 1998). Companies also consider outsourcing when the internal IS function is perceived to be inefficient, ineffective or technically incompetent (Lacity and Hirschheim 1993a, 1993b).

Some critics (Due 1992; Lacity and Hirschheim 1993) argue that IS outsourcing can result in loss of control over information systems and technology assets, the loss of IS expertise, and a decline in the morale and performance of the remaining employees (Richey, 1992). They also suggest that the anticipated cost savings might also be achieved internally (Carlyle 1990; Benko 1992; Davis 1992; Due 1992; Lacity and Hirschheim 1993a; Sharp 1993). Most controversy regarding IS outsourcing remains around the issue of balance between strategic implications and financial returns (DiRomualdo and Gurbaxani, 1998).

Other studies conducted demonstrate that offshore outsourcing was in the interests of business (Dibbern et al., 2004). Their argument is that when jobs move offshore from the US, they not only allow US firms to procure cheaper labor abroad, but they also free up talent within the US that can be re-skilled and used elsewhere. Freenstra and Hanson (1996) found that outsourcing production jobs has contributed substantially to the increase in the relative demand for non-production labor for the period of 1970 to 1990. Outsourcing also accounts for more than 30 percent of the increase in the non-production wage share that occurred in the 1980s (Freenstra and Hanson, 1995). However, a recent report generated much media attention when Gartner Inc. predicted that one out of 20 US corporate IT jobs and one out of 10 jobs in IT vendors and technology service firms will be moved offshore (Hoffman, 2003). Displaced IT workers and organized labor are lobbying to prevent government agencies from outsourcing their IT services offshore, either directly or indirectly (Glasner, 2003; Thibodeau, 2003).

Research Methodology

Both practitioner and academic populations were surveyed to measure perceptions of socio-economic consequences of offshore IT outsourcing. The sample includes members with responsibilities throughout the entire spectrum of information systems tasks and is representative of trends in the mid-western information systems labor market. 76 former members of an information systems department dislocated due to a merger 2 years prior to the study comprised the largest information systems sample. This group contains 56 information systems professionals and 13 managers. This group provides insight into both the perceptions of information systems professionals on offshore outsourcing, as well as information on the IS job market. Their dislocation was in no way related to outsourcing, although most are aware of this trend. In order to provide a balanced and statistically valid sample of information systems managers, the 30 member central Indiana chapter of the Society for Information Management (SIM) is also included in the analysis (SIM 2004).

Two groups from the Miller School of Business at Ball State University represent the academic perspective in the study. These groups include the 110 members of the business school faculty, who are informed about the topic of offshore outsourcing, but from different academic disciplines. The second group from the Miller School of Business includes three sections of a required junior-senior level course in operations management taught by one of the authors. These sections include 130 students from a similar representative range of business disciplines. 103 students participated in the survey. The students had engaged in a variety of discussions over the course of the semester regarding the evaluation of make-buy (outsourcing) decisions, cross-cultural challenges and opportunities of international business, and the micro- and macro-economic theories and consequences of outsourcing.

The survey instrument was designed to specifically test the hypotheses under study. The instrument was pilot-tested and refined with the same four groups (IS professionals, IS managers, educators and students) drawn from similar but different firms and institutions. The pilot-test groups are representative of the sample population. For information systems professionals and managers, the instrument is also designed to gather information regarding recent personal employment and personal financial experience. The survey instrument was developed in both paper and electronic forms. The electronic form is the preferred method so as to reduce cost and potential transcription error of the survey. The electronic form of the survey was utilized to reach the information systems and educator populations. Their participation was solicited through electronic mail announcements of the study that included a link to the survey web site. Two subsequent reminder notices were sent during the course of a three-week period in order to increase the response rate. The electronic form of the survey was anonymous and set up without specific login parameters. Participants were offered the opportunity to receive copies of the final study by entering their email address along with their survey answers. For those that chose to enter this information, their perception of the anonymity of the study may have been somewhat compromised, depending on the ease of identification of the email address. Links to the web-address of the survey were limited to those contained in the solicitation email messages and no search engines or other web sites provided access to the survey. This process was utilized to limit the participants of the survey to those specifically solicited. The student sample was measured using a paper-based version of the same online survey instrument. In order to ensure that the paper and online instruments were identical, the web-site software utilized in the online survey was used to print the paper version of the instrument.

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We model the offshoring phenomenon using the system dynamics methodology. The system dynamics approach maps the dynamic relationships between variables to understand the possible consequences of those relationships. This allows exploration of the effects of different levels of intervention, or enables theories to be developed about them. Causal loop diagrams are used for this study consisting of arrows connecting variables in a way that shows how one variable affects another - a theorized cause-and-effect relationship.

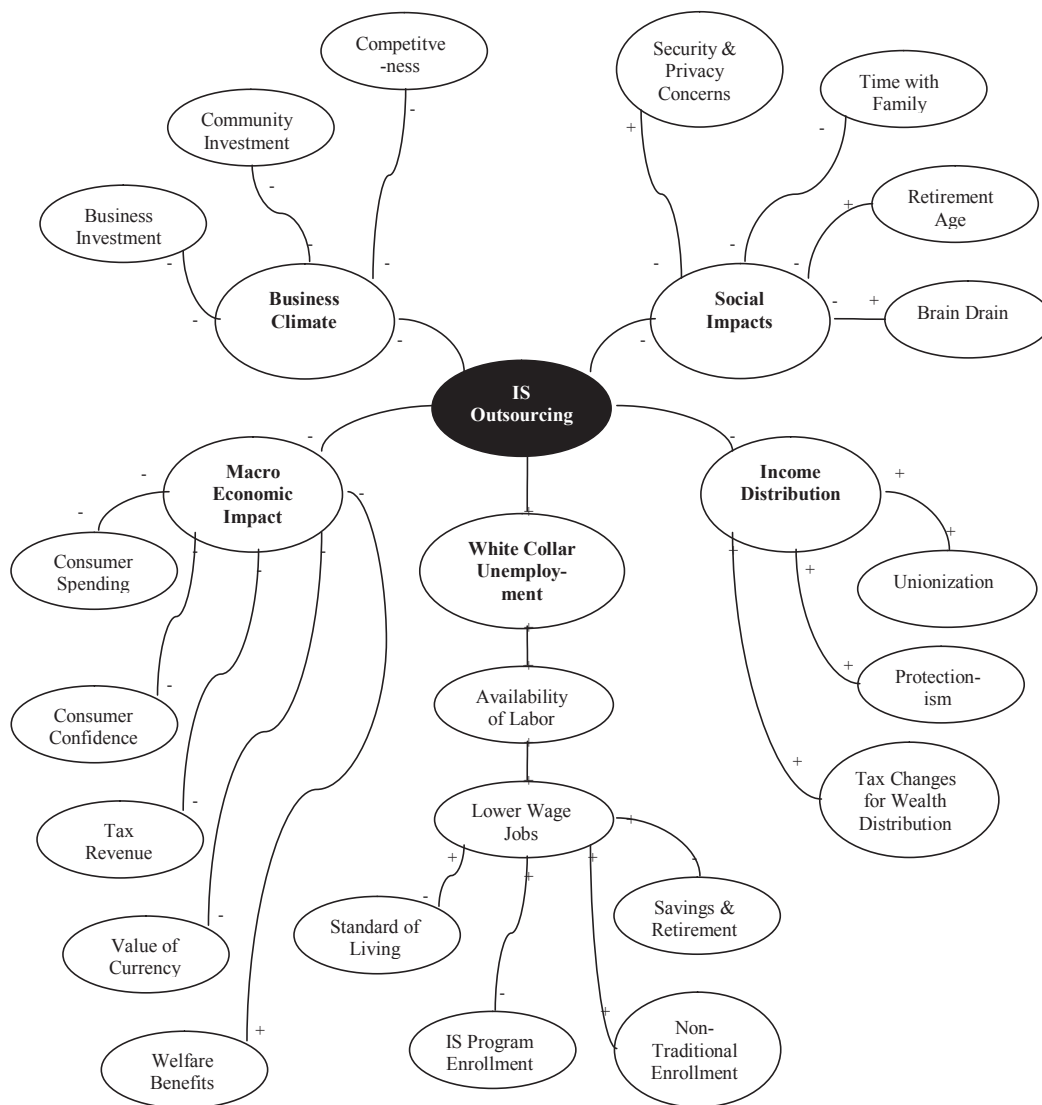
The offshoring phenomenon is behavior generated by a socio-economic system consisting of different components. Therefore system dynamics approach is especially well suited to capture this behavior containing positive and negative feedback loops (Richardson, 1996). Based on the literature review, the following figure (Figure 1) shows a possible set of causal relationships. A plus (+) sign implies that a change in the variable will cause a change in the variable in the same direction. Similarly, a minus (-) sign implies that a change in the variable will cause a change in the variable in the opposite direction. Because system dynamics involves the study of the relationships between feedback structure and dynamic behavior, there is a great impetus to try to infer dynamic behavior from representations of structure. That impetus has apparently led to a set of definitions of the polarities of causal-loops which are phrased in terms of behavior over time (Goodman, 1974, Coyle, 1998).

In this study we drew several hypothesis. These were to examine unemployment effects, income distribution effects, business climate effects, and spiral effects.

Unemployment Effects

The rise of the Indian IT outsourcing destination has been almost simultaneous with the rise in unemployment of U.S. information systems

Figure 1. Systems dynamics model of information systems offshore outsourcing



workers. The economic theory of labor / capital inequality between India and the U.S. predicts a rise in the unemployment rate for U.S. information technology workers as the movement of labor is facilitated by enabling communication technologies.

An increase in unemployment has the effect of increasing the availability of skilled labor. With an oversupply of skilled labor, laborers must seek employment in other areas, frequently in lower classes of employment. Workers that are displaced often experience a decline in occupational status,

or 'occupational skidding' which includes decline in job status, pay, or lower work satisfaction upon reemployment (Bluestone and Harrison 1982). Displaced workers experience earnings declines from 9 to 15 percent as compared with continuously employed workers (Moore 1990; Farber 1993; Stevens 1997). Declines are most significant for high tenure workers (with six or more years tenure) (Jacobson and LaLonde 1993). Displaced workers frequently endure significant drops in earnings and benefits, experienced decreased work satisfaction and unstable employment patterns (Dorsey 1967; Aronson and KcKersie 1980; Knapp and Harms 2002).

Older displaced workers suffer greater amounts of earnings loss than do younger displaced workers (Koeber and Wright 2001); they experience longer spells of unemployment (Love and Torrence 1989; Knapp and Harms 2002); they may experience not only a loss in earnings but in assets (Chan and Stevens 1999); and are less likely to be hired in jobs that provide fringe benefits (Scott, Berger et al. 1995).

The employment and wage attractiveness of a particular industry has an effect on the number of students interested in that area of study. If students see potential employment and wage growth opportunity, they will be drawn to that field. On the other hand, if students see an increase in unemployment and reduction in wages in a particular field, they may be less likely to study and subsequently seek employment in that field. This effect may lag because students who are already enrolled in programs either may not wish to change, or may not be aware of the changes in the labor market.

Income Distribution Effects

Globalization and the increase in free trade reduce poverty. But as competitive systems produce winners and losers, they do not necessarily reduce the inequality that is increasingly visible in a globalized world (Pitts 2002). The inequality of wealth

and income is increasing in the U.S. despite the fact that nationwide the level of education, which has traditionally been associated with higher income, has risen. In an economy which is energized by high levels of technology, a reduction in disparities of income is not easy to obtain (Stewart 2002). Outsourcing of information systems is a part in this drive toward globalization.

The widening distribution of income may, in turn, have significant effects in the attitudes of workers in the markets with this widening distribution. A world in which the assets of the 200 richest people are greater than the combined income of the more than 2 billion people at the other end of the economic ladder should give everyone pause. In global terms, this mix of rising inequality, slow growth, and falling or stagnant wages increases excess capacity across the globe. As big business has gone global the labor movement has become more internationalist. Globalization is most destructive in countries where independent unions do not exist and organizing is suppressed (Mazur 2000).

Some displaced workers adopt more critical attitudes toward big business and government and strengthen support for organized labor (Knapp and Harms 2002). The workers' attitudes toward their employers and toward government as a result of globalization and job displacement may provide motivation for employees to seek structural changes in the economy including an increase in protectionist sentiment (Atkinson 1997).

social Effects

As workers' income levels, status, education, and attitudes about business and the role of government change, clearly several significant social effects may arise from these changes (Earl, 1996). As workers attempt to maintain their standard of living on lower wage rates in lesser status jobs, they may be forced to work longer hours to earn the same total wages. This may have the unfortunate direct effect of workers spending less time with

their families. Offshore outsourcing also raises concerns about extended retirement age, deleterious effects on U.S. intellectual capital and the security of information stored at offshore firms.

business climate Effects

The local / regional economy may face several deterioration effects as a result of outsourcing of information systems. Information systems jobs have historically been attractive because of higher average wage rates and the positive economic effect of these higher paying jobs. Offshore outsourcing of these kinds of jobs creates negative economic effects for the local and regional economies affected.

spiral Effects

Some firms will be unable to take advantage of the lower price of local labor in the information systems area due to internal equity issues with current employees. If a firm has several incumbents in a particular area in information systems, the firm is limited in the amount it can offer to new employees. Internal equity issues must be addressed in employee compensation. The lure of the available skilled labor at lower wage rates can cause firms to make drastic changes in order to reap the benefits. Because of internal equity issues, some firms may seek to outsource an entire functional area in IS in order to reap these benefits. The lowered wages rates caused by structural changes in the information systems area can cause a spiral effect on outsourcing. Outsourcing increases supply of available skilled labor and lowers labor cost. Internal equity issues cause firms to outsource in order to take advantage of the lower wage rates (Garaventa and Tellefsen, 2001). This in turn can lead to additional outsourcing until equilibrium is reached with the offshore market in terms of total cost of the internal versus external costs.

DATA ANALYSIS AND FINDINGS

The hypothesized increase in IS unemployment yields homogeneous perception between the four groups, widely varying perceptions among the four groups, and is not supported by actual IS unemployment statistics. An analysis of variance indicates the perception of the four population groups (IS professionals, IS managers, college educators and students) is statistically homogeneous ($F=1.40$, $df=3$, $p=0.25$). Hypothesized IS unemployment has the widest variation in perception within respondents with 49% overall believing that IS unemployment would rise. This hypothesis is not supported by actual unemployment statistics from the U.S. Department of Labor and industry sources showing the opposite of the hypothesized trend: a decrease in the unemployment rate of computer and mathematical occupations from 6.0% to 2.0% for the period April 2003 to June 2007 (Murphy 2007).

IS unemployment is related to the availability of IS labor. The hypothesized increase in availability of IS labor yields homogeneous perception between the four groups and is supported by actual IS employment statistics within the largest IS job category (programmers). An analysis of variance indicates the perception of the four groups is statistically homogeneous ($F=0.86$, $df=3$, $p=0.46$). The perception of the survey respondents shows that 55% believe that the supply of IS labor would increase. The hypothesis and perception of an increase in available IS labor is not supported by the actual overall IS employment statistics from the U.S. Department of Labor. The seven-year employment level for computer occupations has increased by 10.1% for the period from April 2000 to April 2006 (Labor 1999; 2000; 2001; 2002; 2003; 2004; 2005; 2006). However, when looking at programmers (the largest IS job category in 2000), the hypothesis is supported by a decline in the number of programmers employed (and subsequent increase in available program-

mers) of 25.4% for the six-year period from April 2000 to April 2006 (Labor 1999; 2000; 2001; 2002; 2003; 2004; 2005; 2006). The Department of Labor data from 2000 to 2006 also shows decreases in the number of IS managers (-11.4%), systems analysts (-3.6%) and support specialists (-1.6%). The overall employment for computer-related occupations is buoyed by the increase in network analysts (+70.9%), software engineers (+25.7%) and network administrators (+23.7%). The network-related positions are not as easily outsourced offshore.

The hypothesized decrease in IS wage rates yields statistically significant differences in perception between the four groups and is supported by actual IS wage statistics. An analysis of variance on indicates the perception of the four population groups is statistically different ($F=26.23$, $df=3$, $p=4.13E-14$). A post-hoc Scheffe test reveals that the perception of students on the effect IS wages is different than the perceptions of the other three groups. Students generally believed that IS wages had risen (45%) while the other groups perceived that IS wages had fallen (educators 54%, IS professionals 68%, and IS managers 84%). This is supported by actual wage statistics from the U.S. Department of Labor.

Overall wage statistics show that the mean annual wages for all computer-related occupations has increased a modest 2.7% when adjusting for inflation from 2000 to 2006 (Labor 1999; 2000; 2001; 2002; 2003; 2004; 2005; 2006). The two most likely candidates for offshore outsourcing, support specialists and programmers experienced declines in real wage rates by 4.1% and 2.1% respectively according to the Department of Labor. This decline in actual wages is also reported by the IS professionals and managers in the study. Nearly half (49%) of the participants report a decline in wages where only 29% report an increase. The same pattern of students having different and more positive perceptions than the other groups (educators, IS professionals and IS managers) continues for the individual and local

economic hypotheses and also for interest in non-IS and IS training.

Students' perceptions are mixed regarding IS workers standard of living. The other groups' perceptions are in alignment with hypothesis that IS workers standard of living has fallen (educators 68%, IS professionals 73%, and IS managers 78%). 41% of IS professionals and managers report that their standard of living has decreased over the past three years where only 14% report that it has increased (45% unchanged). Students perceptions are mixed regarding IS workers savings accounts. The perceptions of the other groups were more negative and in alignment with hypothesis believing that savings accounts for IS professionals and managers have fallen (educators 76%, IS professionals 81%, and IS managers 88%). 46% of IS professionals and managers report that their savings accounts have decreased over the past three years.

Student perception is positive regarding interest in both non-IS and IS training programs. 62% and 67% reporting increased interest in non-IS and IS training respectively. The perception of educators is more positive for non-IS training (82% perceive increased interest) than for IS training (only 27% perceive increased interest). This same distribution holds for IS professionals and IS managers, but is more pronounced. 87% of IS professionals and 79% of IS managers perceive increased interest in non-IS training programs but only 13% of IS managers and IS professionals perceive increased interest in IS training programs. 73% of IS professionals and managers report that their interest in non-IS training programs has increased. This hypothesis is also supported by lack of actual personal interest in IS training programs.

The last set of hypotheses where students held significantly different perceptions about the impact of offshore IS outsourcing than the other three groups were in the local macro-economic effects. Again, students' perceptions are more positive than the other three groups. The percent-

age of students reporting that the competitiveness, infrastructure and development and business investment in the local economy has increased is 58%, 35% and 26% respectively. This is contrasted by the perceptions of educators, IS professionals and IS managers who are more pessimistic about changes in local economic competitiveness, development and investment as a result of offshore IS outsourcing. Educators' perceptions were moderately more negative than IS professionals and IS managers. The most negative group, 44%, 50%, and 64% of IS managers perceived declines in these areas.

For most of the hypotheses relating to the individual social impacts and attitudes toward income distribution, the perceptions of IS professionals statistically differed from those in academia (students and educators). All four groups perceive that the distribution of wealth has widened in the U.S. with between 71% and 81% supporting this view. The attitudes towards unionization were significantly different between those in academia and IS professionals. 74% of IS professionals believe that there should be union protections against offshore IS outsourcing. This is opposed to only 50% of students, 28% of educators, and not surprisingly 58% of IS managers who support greater unionization of IS work. Similarly, attitudes toward U.S. protectionist measures against offshore IS outsourcing were more strongly supported within the IS professional group as compared with those in academia with 79% supportive. Only 34% of students and 27% of educators support trade protections. Attitudes toward tax law changes for a wider distribution of wealth are different between educators and two groups, students and IS professionals. Educators are generally negative on this issue with 62% against tax law changes. Students and IS professionals are generally more positive with 49% of students and 58% of IS professionals supporting tax law changes for a greater distribution of wealth.

The perceptions of IS professionals is statistically different than those in academia on the

changes in time that IS professionals spend with their family. 71% of IS professionals perceive that they will spend less time with their family as a result of offshore IS outsourcing, where only 41% of students and 30% of educators perceive this negative result. Surprisingly, the IS professionals perception of the overall impact is significantly different than the actual experiences that they report. Only 36% of IS professionals report that they spend less time with their family than they did three years ago. The perceptions of the four groups were statistically similar on the issue of changes in IS retirement age. The perception results were statistically different than the actual plans of IS professionals and IS managers. 54% of IS professionals and 75% of IS managers report that their actual planned retirement age had increased. On the issue of a drain in intellectual resources as a result of offshore IS outsourcing, those in academia held different views that those in practice. 60% of students and 34% of educators perceived that the intellectual capital of U.S. firms has increased. This is in stark contrast with the negative perceptions of IS professionals and IS managers where 70% and 84% report that intellectual capital has decreased.

All of the four groups report increased data security and privacy concerns as a result of offshore IS outsourcing. The perceptions of IS professionals and IS managers were once again, much more negative. 70% of students and 55% of educators report increased data security concerns where 94% of IS professionals and 92% of IS managers perceive increased data security concerns. 72% of students and 50% of educators report increased privacy concerns where 95% of IS professionals and 88% of IS managers have increased privacy concerns. All of these four groups support hypothesis 15, but the IS practitioners report overwhelming concern in this area.

Student perceptions on the macro-economic impact of offshore IS outsourcing are generally different than those of IS professionals and IS managers. In regards to impact on consumer

spending and tax revenues, student perceptions were generally mixed (34% perceived spending had decreased and 40% perceived tax revenues decreased). IS professionals and IS managers were both negative on these issues (73% of IS professionals and 63% of IS managers perceive that consumer spending has decreased; 70% of IS professionals and 75% of IS managers perceive that tax revenues have decreased). The perceptions of IS professionals and IS managers support the hypotheses that consumer spending and tax revenues have decreased.

The perceptions of students and IS professionals were both negative, but differ on the issues of consumer confidence and the value of the U.S. currency. 61% of students perceive that consumer confidence has decreased and 76% that the dollar has decreased. This is compared with 76% of IS professionals perceiving that consumer confidence has decreased and 87% that the value of the dollar has decreased. The negative perceptions of consumer confidence and the value of the dollar are also shared by educators and IS managers.

The perceptions of the four groups were in alignment on the issue of changes in welfare benefits as a result of offshore IS outsourcing. The perceptions were moderate and mixed. The hypothesis that the amounts paid out in welfare benefits as a result of offshore IS outsourcing is not supported.

Discussion

Since 2001, according to the U.S. Bureau of Labor Statistics, more than 500,000 people in IT professions in the United States have lost their jobs. Some were caught in the dot-com bust, others were laid off by cost cuts, shrinking budgets, a poor economy and a desire to satisfy shareholders quarter by quarter. Now, a growing number of IT professionals are having their jobs displaced as IT work moves to offshore providers. The advantages of offshore IT outsourcing

are convincing, but the challenges and impacts are equally intimidating.

The study reveals significant differences in perception between students and the other three groups in the study: educators, IS professionals, and IS managers. Students' perceptions are consistently positive regarding factors such as IS professional wage rates, standard of living, savings, retirement accounts, and local macro-economic factors. These positive perceptions exist in the face of actual declining wage rates for IS professionals. Not only do the actual statistics differ, the perception of educators, IS professionals and IS managers are consistently negative regarding these same variables. These differences suggest a disconnect between student expectations and reality (current and anticipated future) of the IS profession in the United States.

The study also reveals significant differences in perception between those in academia and IS practitioners. While educators are in agreement with practitioners in regard to the micro-economic impact of offshore outsourcing on the IS profession, they differ on some of the macro-economic factors and prescriptive measures. Where IS practitioners are generally supportive of greater unionization and protectionist measures, those in academia are not. This same difference exists with the social impact of outsourcing on time with family and drain on intellectual capital. Although the IS practitioners held negative views on these social issues, they do not report a significant decrease in their own time spent with family. It may be that these are anticipated changes that have not yet been experienced.

US Department of Labor statistics and IS practitioners in the study suggest that IS outsourcing has at least a short-term negative impact on practitioners in the IS field. As noted, inflation-adjusted IS wage rates have declined 4.1% for programmers and 2.1% for support specialists from 2000 to 2006. The IS practitioners in the study note a decrease in their wages, standard of living, savings accounts and retirement accounts.

They also report an increase in their planned retirement age.

All of the groups agreed on several perceived impacts of offshore outsourcing of IS. They perceived that IS unemployment would rise; they shared concerns about the impact on data security and privacy; and they theorized that planned retirement ages for IS practitioners would rise.

It would be difficult to generalize from this relatively small sample to the overall population of IS practitioners. Indeed, given the complexity of global macro-economic systems, the effects reported by the practitioners may only be partly attributable to the offshore outsourcing of information systems. Nevertheless, practitioners hold a very negative view of offshore outsourcing of information systems and share perceptions that the practice raises negative economic and social issues. IS practitioners' concern regarding information security and privacy is important to note.

The apparent disconnect between those in academia and those in practice raises some very important issues - especially the disconnect with students. Students may be disappointed as they graduate from IS programs with unrealistic expectations about the availability of jobs and the wage rates that they expect to command. In the short-term, this disconnect can cause a large amount of dissatisfaction with recent graduates. In the long-term, if these negative perceptions ultimately yield negative actual experience in the IS field, we can expect a decrease in interest in IS educational programs and careers as employment and wages decline.

This study gives rise to several additional areas of inquiry. Further study with a larger sample of IS practitioners would provide replication and increases the ability to generalize the findings. The perceptions of those in governmental and policy-making positions would also provide valuable insight. The specific issues of data security and privacy raised by offshore outsourcing are also an important area of additional study.

c ONc LUsION

The results of this study strongly suggest that system dynamics modeling will help explain socio-economic components to obtain a more holistic view of offshore IT outsourcing. This research raises questions for evaluation of offshore IT outsourcing. More research needs to be conducted, particularly in light of the positive findings about the relationship between IT offshore outsourcing and negative socio-economic results. Future research should also be directed more broadly to identify the appropriate levels of IS investment, and appropriate IS management structures. Investigating these issues will not only help practitioners make informed decisions regarding IS investment and management but also enrich management and organizational theory.

The results of this research show that there are significant negative socio-economic impacts to the individuals and local economies as a result of offshore IS outsourcing. Negative impact to real IS wages are being perceived and also experienced by IS professionals. The IS professionals report significant negative impacts to their financial and social situations. These individual experiences are supported by the larger economic data on real wages in IS technical professions. These negative impacts are perceived and understood by educators in the academy, but are largely unknown to students. This significant difference in perception regarding salary and job prospects in IS fields may create significantly negative experiences for recent graduates. In the long-term, if these negative pressures on real wages in IS fields continue, enrollment in IS programs will likely experience long-term declines in enrollment. Additional research is certainly warranted to broaden and also to replicate these results. It is hoped that this research will provide a framework and initial findings to carry this research agenda forward.

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Chapter XIV

Towards Theory Development for Emergent E-Business Innovations: Using Convergent Interviewing to Explore the Adoption of XBRL in Australia

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Abstr Act

The eXtensible Business Reporting Language (XBRL) is an emerging XML-based standard which has the potential to significantly improve the efficiency and effectiveness of intra- and inter-organisational information supply chains in e-business. In this chapter, we present the case for using convergent interviews as an appropriate and efficient method for modelling factors impacting the adoption of emerging and under-researched innovations, such as XBRL. Using this method, we identify environmental, organisational, and innovation-related factors as they apply to XBRL adoption and diffusion. Contentious factors, such as the role of government organisations, XBRL education and training, and the readiness of XBRL as an innovation, and its supporting software solutions are also examined in detail. Taken together, these discussions constitute an important step towards theory development for emergent e-business innovations. Practical adoption strategies and their implications are also discussed.

INtr ODUct ION

The aim of financial reporting is to communicate useful, relevant, and reliable information timely to both internal and external stakeholders of an organization. However, current reporting practices require the exchange of financial information in a variety of non-interchangeable formats including traditional print, portable document format (PDF), spreadsheets or Web pages formatted using HTML (Doolin & Troshani, 2004). Because further processing and analysis financial of information has to be carried out manually, current reporting practices are time-consuming, labor-intensive, and error-prone (Bovee *et al.*, 2005; DiPiazza & Eccles, 2002). Further, in their current form financial reports are opaque, in that, they provide limited help to external stakeholders to verify whether management has presented a relevant and reliable view of the organisation's performance and position (Bergeron, 2003; Hodge, Kennedy, & Maines, 2004; Roohani, 2003).

Based on XML, eXtensible Business Reporting Language (XBRL) is an open standard innovation which can be used to improve the process of the production, consumption and exchange of financial information among disparate computer platforms, software applications, and accounting standards (Locke & Lowe, 2007; Willis, 2005; Hannon, 2003; Hannon & Gold, 2005; Hasegawa *et al.*, 2003; Jones & Willis, 2003; Weber, 2003; Willis, Tesniere, & Jones, 2003). Particularly, XBRL enhances the efficiency and the effectiveness of the current practices used for generating and exchanging financial reports (Kull *et al.*, 2007; DiPiazza & Eccles, 2002). Thus, XBRL facilitates intra- and inter-organizational information supply chains via digital networks, and in the process, it enhances e-business collaboration and integration. Some argue that the efficiency of the entire information supply chain will be considerably enhanced when XBRL is adopted (Garbellotto, 2006a, 2006b, 2006c; Garbellotto,

2007a; Boyd, 2004a, 2004b), and it is expected to lead to "wondrous new financial reporting capabilities" (Abdolmohammadi *et al.* 2002, p. 25). Further, XBRL facilitates continuous auditing, thereby maximizing the transparency with which financial information is reported while also facilitating the enforcement of corporate disclosure and accountability legislation (Bovee *et al.*, 2005; Pinsker, 2003; Rezaee, Elam, & Sharbatoghilie, 2001; Roohani, 2003).

As a derivative of XML, XBRL takes advantage of the 'tag' notion which associates contextual information with data points in financial statements. For example, with XBRL, the relationship between a value and the appropriate tag is established as follows: <payroll currency="US Dollars">15000</payroll>. Similar relationships are established between other tags and their respective values for specific financial statements such as annual reports, cash flow statements, and tax returns. When formatted with XBRL tags, financial statements are called XBRL instance documents and can be easily processed by XBRL-enabled software tools. The tags themselves are based on accounting standards and regulatory reporting regimes and are defined in XBRL taxonomies (Pinsker, 2003; Richards & Tibbits, 2002; Bovee *et al.*, 2005). These are developed for specific countries, accounting jurisdictions, and even specific organizations (Deshmukh, 2004; Wallace, 2001). Sometimes, multiple instance documents produced using different taxonomies need to be processed by the same software tool. Capabilities of this nature are enabled by the XBRL specification, which constitutes the technology platform determining how XBRL works. The specification is central to the operation of XBRL (Willis, Tesniere, & Jones, 2003).

XBRL can benefit a wide range of heterogeneous stakeholders. These include individual organizations, accounting firms, investors and stock analysts, stock exchanges and regulatory authorities (Bergeron, 2003; Deshmukh, 2004;

Jones & Willis, 2003; Phenix, 2004). Further, as XBRL is an open standard innovation it requires an international body, such as XBRL International to synchronize the efforts of its various stakeholders and oversee the development of its specification. In addition, XBRL International coordinates the efforts of the local jurisdictions which are based on countries, regions and internationally recognized business reporting regimes (Doolin & Troshani, 2004). For example, currently, local jurisdictions which are managed by local consortia, have been established in several countries such as Australia, Canada, UK, The Netherlands, Ireland, Japan, Sweden, and New Zealand.

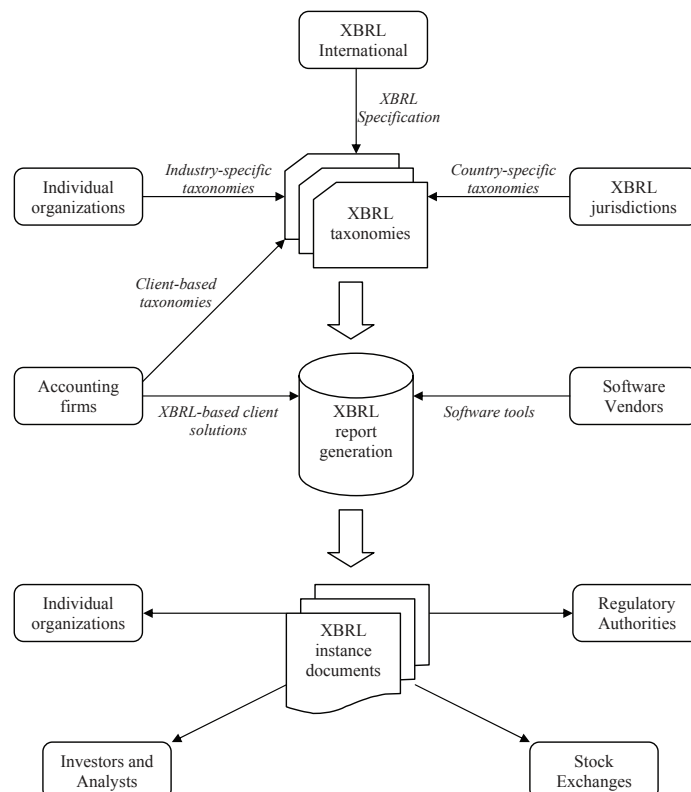
Also, because XBRL is complex, software tool support is a necessity (Garbellotto, 2007b). These tools are developed by software developers and distributed by vendors. Therefore, there are a

variety of stakeholders in the community that can potentially achieve many benefits in their business information supply chains if XBRL were to be successfully implemented. Consequently, XBRL is a network innovation.

The basic concepts surrounding XBRL and its stakeholders are summarized in Figure 1 which has been adopted from the work of Doolin and Troshani (2004). Further information concerning the technical aspects of XBRL, including an XBRL tutorial and illustrating examples can be found in (Deshmukh, 2004; KPMG, 2005).

The adoption of complex network innovations, such as XBRL, is an emerging phenomenon and it constitutes an under-researched area in e-business development and integration research. There is agreement in the literature that theory development in this area is lacking (Reimers & Li, 2005;

Figure 1. Summary of basic XBRL concepts. Source (Doolin and Troshani, 2004)



Zhao, Xia, & Shaw, 2005; Gerst & Bunduchi, 2005; Chang & Jarvenpaa, 2005). In this article, we aim to show how the relatively new qualitative methodology of convergent interviewing can contribute to theory development in this under-researched area.

Essentially, we describe, justify, and apply convergent interviewing as a useful inductive, qualitative method to investigate under-researched areas, and illustrate its use with a research project investigating into the drivers and inhibitors of XBRL adoption in the Australian setting. We believe that our contribution is the first reported, comprehensive treatment of the use of convergent interviewing in XBRL adoption and diffusion research. This chapter is organised as follows. Firstly, extant XBRL research is reviewed followed by an analysis of the convergent interviewing method. Then the research objectives of the illustrative research project are identified before its findings are discussed, concluding remarks made, and future research directions identified.

REVIEW OF Extant XBRL Research

With its espoused benefits, XBRL has caught worldwide attention. Although some argue that the benefits of XBRL have been overstated and 'hyped' by enthusiastic participants (Locke & Lowe, 2007), more than 40 large XBRL projects have been initiated across Europe, Asia, Australia and the U.S., with the U.S. Securities and Exchange Commission (SEC) US\$32 million commitment for the XBRL enablement of its EDGARⁱ system being amongst the most prominent (Kull *et al.*, 2007; Hannon, 2006c).

Generally, extant published work has mainly been descriptive in nature focusing on the espoused benefits of using XBRL for financial reporting as well as on the technical mechanisms by way of which XBRL works (Abdolmohammadi, Harris, & Smith, 2002; Bergeron, 2003;

Boyd, 2004b; Deshmukh, 2004; DiPiazza & Eccles, 2002; Doolin & Troshani, 2004; Jones & Willis, 2003; Garbellotto, 2006a; Devonish-Mills, 2007; N. J. Hannon, 2006a, 2006b; N. J. Hannon & Gold, 2005).

Although limited and at embryonic stages, empirical XBRL studies, are starting to emerge in the literature. Some have developed proof-of-concept applications and have tested them in experimental settings in attempts to demonstrate that the benefits that XBRL purports to provide can, in fact, become available in practice (Bovee *et al.*, 2005; Hodge, Kennedy, & Maines, 2004). For example, XBRL-enhanced prototype applications based on search-facilitating technologies were found to contribute significantly in helping both professional and non-professional financial statement users extract financial information from complex financial statements, such as balance sheets, income statements, and statements of cash flows. These applications were also found to be effective in helping users integrate the extracted information relatively easily when making investment decisions whilst also enhancing the transparency of firms' financial statement information and the managers' choices for reporting such information (Bovee *et al.*, 2005; Hodge, Kennedy, & Maines, 2004).

Other studies have examined the early phases of XBRL development in the U.S., Australia and Europe by examining XBRL as a network innovation and its impact on a range of heterogeneous institutional stakeholders (Chang & Jarvenpaa, 2005; Doolin & Troshani, 2007; Troshani & Doolin, 2007; Locke & Lowe, 2007). For example, Chang and Jarvenpaa (2005) focus on the change dynamics of institutional stakeholders when developing and adopting XBRL as a standard. Troshani and Doolin (2007) use stakeholder and social network theories as guiding frameworks to examine the impact of stakeholder salience and their instrumental and normative interactions in the diffusion of XBRL across institutional networks. Doolin and Troshani (2007) employ

the technology-organization-environment model with an emphasis on the interaction of contextual factors that affect the organizational adoption of XBRL. Locke and Lowe (2007) examine the impact of the governance structure of the XBRL consortium (i.e. XBRL International) on the development of XBRL. Specifically, they find that the paid membership requirement for stakeholders to participate within the consortium and the focus on transacting business at related physical conferences and meetings are particularly critical and have an impact on the development and acceptance of XBRL by a wide range of stakeholders. Yet, another category of XBRL studies have been conceptual and have mainly focused on providing arguments how the complex nature of XBRL unfolds a plethora of avenues for further e-business research which have also been identified, elaborated and justified (Baldwin, Brown, & Trinkle, 2006; Doolin & Troshani, 2004; Debreceeny *et al.*, 2005).

Yet, limited research has been found in the literature addressing drivers and inhibitors of XBRL adoption. XBRL is a unique complex network innovation (Bergeron, 2003) which suggests that existing theories may not be readily applicable to its adoption. There is much instability in innovation research which “confounds and dilutes [existing] research outcomes” (Wolfe, 1994, p.409). This is attributed to different characteristics of innovations, including compatibility and relative advantage, and their interactions which have the potential to determine innovation adoption and diffusion patterns (Wolfe, 1994).

Further, other innovation adoption theories, such as the Technology Acceptance Model (TAM) which have received significant attention may not be appropriate for XBRL adoption because they only predict the attitude of individuals towards a particular technology and, therefore, their intention to use it based on their perception of that technology’s usefulness and ease of use (Davis, 1989; Subramanian, 1994). XBRL is a grammar rather than a software or a ‘computer program

(Locke & Lowe, 2007) which is used as a universal language for formatting underlying business data. Because, XBRL is transparent to individual users, our focus is on its organisational adoption rather than on its adoption by individual users.

THE QUALITATIVE THEORY-BUILDING METHODOLOGY OF CONVERGENT INTERVIEWING

This section describes and justifies the choice of convergent interviewing in our research project. Convergent interviewing is an in-depth interview technique with a structured data analysis process - a technique used to collect, analyse and interpret qualitative information about a person’s knowledge, opinions, experiences, attitudes and beliefs by using a number of interviews which converge on important issues (Dick, 1990; Nair & Riege, 1995). That is, the process in itself is very structured but the content of each interview only gradually becomes more structured to allow flexible exploration of the subject matter without determining the answers (Nair & Riege, 1995). In this process, more is learned about the issues involved (Dick, 1990).

Essentially, convergent interviewing is a series of in-depth interviews with experts that allow the researcher to refine the questions after *each* interview, to converge on the issues in a topic area. In each interview after the first one, the researchers ask questions about issues raised in previous interviews, to find agreements between the interviewees, or disagreements between them with explanations for those disagreements. That is, probe questions about important information are developed after each interview, so that agreements and disagreements among the interviewees are examined in the next interview. The interviews stop when stability is reached, that is, when agreement among interviewees is achieved and disagreement among them is explained (by their

different industry backgrounds, for example), on *all* the issues (Nair & Riege, 1995).

In early stages of theory building, not much is known about the topic area and convergent interviewing is a suitable method to reduce uncertainty about the research topic (King, 1996). Essentially, we argue that convergent interviewing was appropriate to be used in our research because it provides:

- a way of quickly converging on key issues in an emerging area,
- an efficient mechanism for data analysis after each interview, and
- a way of deciding when to stop collecting data.

The following section discusses the strengths and limitations of convergent interviewing for theory building.

STRENGTHS AND LIMITATIONS OF THE CONVERGENT INTERVIEWING TECHNIQUE

Convergent interviewing offers three main strengths. Firstly, convergent interviewing is useful for the exploration of areas lacking an established theoretical base, as was the case for this research. Specifically, convergent interviewing constitutes “a series of tasks which lead to the progressive reduction of uncertainty” (Phillips and Pugh, 1987, p. 72). That is, the flexibility provided by the convergent interviewing method allows for the refinement of both research process and content issues throughout the course of the interviews, resulting in “successive approximations” (Dick, 1990, p. 3) which in turn allow for the consolidation of the existing body of knowledge and a more precisely defined research problem (Dick, 1990). Secondly, it provides a flexible, efficient and structured instrument to allow all issues related to the research problem to be identi-

fied and explored. This flexibility of convergent interviewing allows researchers to use a funnelling process in which they control the flow of the type of information being sought while continuously narrowing down broad research issues into more focused ones (Dick, 1990).

Finally, with convergent interviewing, the subjectivity inherent in qualitative data is largely overcome by the interviewer attempting to always explain answers after each interview, that is, to ‘disprove the emerging explanations of the data’ (Dick, 1990, p. 11). That is, subjective data is refined through the use of convergence and discrepancy which adds objective methods to the refining of subjective data (Dick, 1990).

Despite these strengths, there are limitations associated with the convergent interviewing technique. Firstly, convergent interviewing may allow potential interviewer bias to occur (Dick, 1990), like most qualitative methods. To guard against this bias, the *interviewers* need to be not only skilful and experienced, but also have sufficient knowledge about the subject matter and be able to maintain data quality when recording and analysing the data obtained from the interviews (Aaker & Day, 1990). For example, in this research, the researchers had previous qualitative research training, and had begun to review the literature about the separate, broader literature of innovation adoption and diffusion.

Secondly, the convergent interviewing method requires the *interviewee* to be knowledgeable about the research subject matter and so be able to contribute meaningful information to the exploratory research. Using the snowballing technique (Aaker & Day, 1990), the researchers were able to access experts who could provide their information and experience about the research topic. After each interview, the interviewee was sufficiently familiar with the aims of the research to refer the researchers to other experts. It is advisable to ask each interviewee for *more* than one other expert, at the end of an interview, to reduce the chances of a snowballing

research project being locked into a mindset of one network. For example, probe an interviewee for experts from other industries or for experts that the interviewee has rarely or not met. Finally, convergent interviewing may affect the validity of the research because it is not sufficient on its own (Gummesson, 2000) to provide results that can be generalised to the wider population, like most qualitative research (Marshall & Rossman, 1995; Maykut & Morehouse, 1994).

On balance, however, the strengths of convergent interviewing largely outweigh its limitations.

EstAbLIshING tHE VALIDItY AND rELIAbILItY OF tHE cONVERGENT INTerVIEWING rEsEArCH

This section examines the issues of achieving validity and reliability in convergent interviews in this research. Validity and reliability in quali-

tative research can be achieved through forms of cross-checking. These in-built checks and controls for qualitative research can be summarised under four tests of the research design, being construct validity, internal validity, external validity and reliability (Yin, 1994). Table 1 outlines research tests for validity and reliability of this research.

Construct validity refers to the formation of suitable operational measures for the concepts being investigated (Emory & Cooper, 1991). Our convergent interviewing achieved construct validity through three tactics. Firstly, triangulation of interview questions was established in the research design stage through two or more carefully worded questions that looked at innovation adoption constructs from different angles. Secondly, the convergent interview method contained an in-built negative case analysis where, in each interview and before the next, the technique explicitly requires that the interviewer attempts to disprove emerging explanations interpreted in the data (Dick, 1990). Finally, the flexibility of the mode allowed the interviewer to re-evaluate

Table 1. Tests for validity and reliability of qualitative research such as convergent interviewing

Test	Research design	Phase of research
Construct validity	<ul style="list-style-type: none"> data collected from multiple sources (convergent interviews) provide multiple measures of the same phenomenon establishment of triangulation of interview questions in-built negative case analysis flexibility of the proposed theoretical framework 	research design and data analysis research design and data analysis data analysis research design and data collection
Internal validity	<ul style="list-style-type: none"> sample selection for information richness 	research design
External validity	<ul style="list-style-type: none"> sample selection for theoretical replication 	research design
Reliability	<ul style="list-style-type: none"> interview guide developed for the collection of data structured process for administration and interpretation of convergent interviews use of a steering committee 	data collection and analysis data collection research design data collection and analysis

Source: developed from (Yin, 1994) and (Healy & Perry, 2000)

and re-design both the content and process of the interview program, thus establishing content validity.

Internal validity refers to causal relationships and the validity of the influence of one variable on other variables (Patton, 1990; Zikmund, 2000). Internal validity in the convergent interviews in this research was achieved through purposeful sample selection on the basis of “information richness” (Patton, 1990, p. 181).

External validity is concerned with the ability of the research findings to be generalised beyond the immediate study (Emory & Cooper, 1991; Sekaran, 2000). In this research, some external validity was achieved through theoretical replication in the interviewee selection. That is, experts from various categories of the XBRL community were selected to ensure that a cross-section of opinions was provided. However, given the current levels of XBRL adoption in Australia, we anticipated that attempts to achieve external validity through quantitative research would have been significantly hindered by low statistical power effects (Baroudi & Orlikowski, 1989; XBRL Australia, 2004).

Reliability refers to how consistently a technique measures the concepts it is supposed to measure, enabling other researchers to repeat the study and attain similar findings (Sekaran, 2000). The qualitative studies of this research secured reliability through the use of four tactics. Firstly, reliability was attained through the structured process of convergent interviews. Secondly, reliability was achieved through organising a structured process for recording, writing and interpreting data.

Thirdly, the other procedure recommended by Dick (1990) in which at least two interviewers conduct the interviews and that they work individually but in parallel with each other, was adopted in this research when a co-researcher was available. In addition, research reliability was also achieved through comparison of this research’s findings with those of other, albeit few, researchers

in the literature. The use of a steering committee to assist in the design and administration of the interview program is another way that reliability can be achieved (Guba & Lincoln, 1994). If a number of the members of the committee agree about a phenomenon, then their collective judgment is relatively objective. Thus, with two researchers conducting the interviews and three analysing them, reliability was addressed as best it could be.

FINDINGS FROM THE CONVERGENT INTERVIEWS ON THE XBRL PROJECT

Before illustrating the outcomes resulting from the application of the convergent interviewing method above to the XBRL phenomenon, we provide additional details concerning the research project on XBRL adoption in Australia. Some preliminary issues for this research project were identified in the literature about innovation adoption and diffusion before the interviews took place.

Environmental and organizational context factors as well as technology or innovation-related ones play a significant role (Al-Qirim, 2003; Elliot, 2002; Wolfe, 1994) in organisational innovation adoption as shown in Table 2. The environmental context constitutes the arena where adopting organizations conduct their business, and includes the industry, competitors, regulations, and relationships with the government (Cragg, Mehrrens, & Mills, 2001; Kalakota & Robinson, 2001; Tidd, Bessant, & Pavitt, 2001). The organizational context includes characteristics such as quality of human resources, availability of financial resources, and managerial structures (Basu *et al.*, 2002; Fillis, Johansson, & Wagner, 2004; Warren, 2004). Innovation related factors focus on how technology characteristics influence adoption (Frambach, 1993; Gilbert, Balestrini, & Littleboy, 2004; Parasuraman, 2000; Rog-

Table 2. Summary of environmental, organizational and innovation factors

Environmental Context Factors	Organizational Context Factors	Innovation Factors
External pressures Culture Legal issues Government Industry associations Successful adoptions	Human capital and employee education Management attitudes Resources	Perceived relative advantage and benefits Perceived costs Compatibility Triability Observability Complexity Associated costs

Source: (Troshani & Doolin, 2005)

ers, 1995; Russell & Hoag, 2004; Tornatzky & Fleischer, 1990).

Research objectives. In brief, the literature suggests that organisational innovation adoption depends on environmental characteristics, organizational resources, innovation characteristics and readiness, and the process by which the innovation is communicated. However, there have been limited empirical attempts to examine the adoption of XBRL in Australia. Indeed, most of what is known about the organisational innovation adoption process seems to be anecdotal, experiential, *ad hoc* and descriptive. Based on the literature above, the following objectives were identified for this research:

1. What, if any, are the drivers of XBRL adoption in Australia?
2. What, if any, are the inhibitors of XBRL adoption in Australia?

Innovation adoption literature suggests that adoption is a mixture of push and pull influences (Warren, 2004) from innovation suppliers and users (Markus, 1987, 1990). Thus, the suppliers of the XBRL innovation such as XBRL International, the local consortia, and software developers and vendors, and the organizational users were included in the convergent interview sample. All 27 organizational members of XBRL Australia Ltd. were approached via the XBRL-AU user group and by phone calls. Only 11 key informant

representatives of these organizations agreed to be interviewed. To maintain anonymity, only the categories of these organizations have been identified in Table 3.

The penultimate outcome of convergent interviewing process is a list of issues or themes progressively raised and investigated in the interviews. Table 4 contains the list of the themes that arose from our interviews about our research objectives. The table shows how the number of issues involved in the topic area increased as each interviewee in turn added their insights to what had been said before, until the final interview added no new issues. Agreements between interviewees are shown, as are disagreements that could be explained. The disagreements are explained next.

Mandating XBRL production and consumption. Most interviewees suggested that XBRL community members with legislative powers, such as the Australian Stock Exchange (ASX) or the Australian Taxation Office (ATO), should mandate the use of XBRL. While two interviewees agree with the strategy in principle, they are sceptical about the success of its application in practice.

First, XBRL adoption would mean that many employees in adopting organisations would suddenly become redundant. XBRL evangelists recognise this implication (Bergeron, 2003), but they argue that employees can be redeployed to more value-adding functions. With XBRL for

Table 3. Categories of organizations and number of interviews

Organization Category	Number of Interviewees	Interviewees
Large accounting firms	4	B, D, F, I
Software Developers and Vendors	3	E, H, J
Regulatory Agencies	1	A
Local XBRL Consortium (XBRL Australia Ltd.)	1	C
Academics ⁱⁱ (Tertiary Accounting Education)	2	G, K
Total Interviews	11	

instance, accountants save significant time in creating reports for their clients, but they can use the saved time to provide high-level consultation services which have “the potential to increase the quality and frequency of customer interactions” (Bergeron, 2003, p. 41). Second, making XBRL compulsory may be a labour-intensive and complex undertaking as it requires amendments to relevant legislation which is an intricate endeavour. Third, before XBRL can be made compulsory, guarantees are required that its adoption will not cause problems. For instance, it is not clear how XBRL instance documents can be assured. While some argue that digital certificate technology can be applied to ensure XBRL instance documents are not tampered with (Pyman, 2004), we have been unable to find any evidence of this in the literature.

XBRL education and training. Most of the interviewees were of the opinion that providing high-level education and training concerning XBRL to employees would constitute a driver for the adoption of XBRL in Australia. The rationale for this is shown in the following statement:

“It’s easier to use a[n XBRL enabled software] tool when you understand the fundamental technology underneath it because you know what it can and can’t do when you try to push it” (Local XBRL Consortium Interviewee)

However, two interviewees disagreed with this view suggesting that XBRL education and training should be demand-driven and, therefore, carried out when adoption becomes more widespread. Currently, XBRL is not a dominating standard. Therefore, it is likely that XBRL education and training may lose its relevance, if it is replaced by competing standards.

Instability of XBRL specification. Some interviewees view the progression of XBRL through its previous versions as lack of stability. In addition, the different versions of the specification were not compatible. These views indicate that specification instability is a major inhibitor to adoption because it not only adversely affects the useability of XBRL driven software tools, but it also affects the observability and the trialability of XBRL results (Rogers, 1995). Consequently, this affects the ability of XBRL enthusiasts to make a case for XBRL in their organisations. As a result some supporters have withdrawn funding and further support. The other interviewees, however, consider XBRL progression as an incremental evolution which is normal for all innovations. Further, incremental development constitutes an opportunity for all members of the XBRL community to provide input into XBRL development, which is likely to result in a solid and widely accepted standard.

Table 4. Summary of issues raised in convergent interviews

	Interviewees										
	A	B	C	D	E	F	G	H	I	J	K
<u>Environmental factors</u>											
Lacks of effective, flexible and responsive local adoption strategy			√								
A “wait-and-see” business culture contributes to slow adoption	*	√	√	√	√	√	*	√	√	*	√
Global pressures can have a positive impact	√	√	√	√	√	√	√	√	√	√	√
Limited local XBRL success stories and champions	√	√	√	*	*	*	√	*	√	√	√
XBRL adoption adversely affected by other pressing priorities that potential adopters face	√	√	√	√	√	√	√	√	√	√	√
Relatively small market and potential adopter size	√	√	*	*	*	*	√	√	*	√	√
Mandating XBRL production and consumption	√	√	×	√	√	√	√	√	*	×	√
<u>Organizational Context Factors</u>											
Employees need to be educated with XBRL advantages	*	×	√	*	√	√	√	√	√	×	√
XBRL adoption has been adversely affected by the limited time, expertise, and funding resources	√	*	√	*	√	√	√	√	√	√	√
Unwillingness to invest as the payback of XBRL investment is blurry	√	*	*	√	√	√	*	*	*	*	*
<u>Innovation Factors</u>											
Limited software tools and support	√	√	√	√	√	√	√	√	√	√	√
Lack of standardization in the way XBRL instance documents are produced and consumed	√	*	*	*	√	√	√	√	√	√	√
Instability of XBRL Specification	√	√	×	*	√	*	*	×	√	×	*
Complexity of XBRL	√	*	√	*	√	*	√	√	√	√	√
Lack of awareness about XBRL and its advantages	√	√	√	√	√	√	*	√	*	*	√

Notes: √= interviewee is in conformity with the statement

×=interviewee is in disconformity with the statement

*= question had not been raised

Source: analysis of field data

Disc Uss ION

The findings in Table 4 from the convergent interviews provided evidence that there are more inhibitors than drivers in XBRL adoption in Australia. The current status of XBRL adoption in Australia is a manifestation of the “chicken and egg syndrome” or a “catch 22 situation” between software developers/vendors and innovation adopters on the one hand as well as producers and consumers of reports on the other. This idea constitutes the general sense of all interviews and is encapsulated in the following statement:

“I think the software providers are very unkeen to invest in developing their software to be XBRL-enabled when their clients aren’t demanding it. Because their clients would only demand it if the regulators were saying we need it [regulatory filings] in this [XBRL], but on the other hand you can probably see that the regulators are probably sitting back and waiting too.” (Large accounting firm interviewee)

The software developers/vendors presented factors supporting their argument for the need to wait before addressing the Australian market aggressively. These factors include, market size and size of potential adopters, cultural factors, lack of global XBRL adoption pressure, other adoption priorities, lack of managerial support resulting in limited resources and the instability of XBRL specification. The local accounting industry has been under pressure from the Australian Financial Reporting Council (AFRC) to adopt the International Accounting Standards.

The viewpoint of XBRL adopters is slightly different. Generally, they stressed on factors such as lack of a local adoption strategy, lack of widespread awareness of XBRL benefits, and other adoption priorities as major factors justifying the slow XBRL uptake. However, all informants were consistent in arguing that they cannot build up demand for XBRL-enabled solutions, unless

these become available allowing them to experience the XBRL benefits.

The “wait-and-see game” is occurring within the XBRL users themselves, namely, between the potential producers and consumers of XBRL reports. This is manifested as follows: the producers do not produce XBRL-based reports unless required by the consumers; and consumers do not require XBRL-based reports unless producers can make them available.

Most informants forwarded the idea that consumers with legislative powers, including regulatory government bodies, such as the Australian Securities and Investment Commission (ASIC), the Australian Tax Office (ATO), the Australian Bureau of Statistics (ABS) are the only ones who can break these deadlocks. Accordingly, these bodies should mandate XBRL reporting by enforcing it as law. This action would not only start mass XBRL adoption, but also boost it significantly. While making XBRL adoption mandatory has not occurred in Australia, there are indications that government organizations such as the ABS are currently making infrastructure investments to support XBRL as part of a federal government initiative called Standard Business Reporting (SBR) which is aimed at minimizing reporting burden for businesses (Gedda, 2007; Ewing, 2007). It is unclear at this stage whether the ABS or other regulators in Australia intend to follow the U.S. SEC model whereby XBRL submissions were first made voluntary (Hannon, 2006c), and now, in a recent announcement SEC appears to be moving closer to mandating XBRL by requiring (at least) all large companies to use XBRL tags when preparing their financial reports (Barlas, 2007).

IMPLIc At IONs

Qualitative evidence suggests that a critical mass of both adopters and suppliers at the present time is lacking. While this continues to be the

case, XBRL may not have a prosperous future in Australia. With XBRL, it is probably practical for adoption to start with pairs of producers and consumers (Grant, 2004). Aggressive awareness campaigns featuring successful champions are likely to start bandwagon effects enticing partners who are linked via information flow requirements identify stronger reasons for adopting XBRL. As XBRL becomes more ubiquitous, it also becomes increasingly valuable. This is likely to pool further management support and necessary resources. Also, non-adopters are now likely to face the dangers associated with non-adoption, and therefore, have stronger incentives towards making decisions favoring XBRL. This is likely to spiral until the number of adopters in the XBRL community reaches a critical mass in order for its adoption to spread further.

Some likely implications warrant serious attention if the strategy of mandating XBRL is undertaken. First, if regulatory bodies and other adopters were to move their entire operation to XBRL, many of their employees would suddenly become redundant. Second, regulatory bodies can force adoption for their specific needs, which is likely to narrow down the focus of XBRL, and therefore, be a limiting factor to its widespread adoption. Third, making XBRL mandatory may be a labor-intensive and complex undertaking as it requires specific procedures to be followed. This includes ensuring that XBRL will not cause problems to adopters. It also requires amending the relevant legislation accordingly. All this, combined with a democratic-styled economy and the Australian character which is “very suspicious of authority” would make mandating XBRL adoption time consuming and a highly intricate endeavor.

Although probably difficult to implement, the idea of mandating XBRL may sound promising for the future of XBRL in Australia. However, the counter argument should also be considered. For XBRL to become the standard language for financial reporting, it should be a desired standard

rather than an imposed one. Therefore, having to mandate XBRL as a standard before the XBRL community demands it, may suggest that its use in Australia is premature. It is possible that the Australian market may not be ready for XBRL yet. Potential adopting organizations may not be ready to adopt because of lack of motivation which may be underpinned by limited awareness about XBRL benefits, functionality and related costs. And yet, these are important as they determine an organization’s readiness to adopt an innovation (Parasuraman, 2000).

c ONc LUsION AND Fut Ur E r EsEArc H

In summary, there is little research about the organisational adoption and diffusion of the XBRL innovation. Using the existing limited literature and the empirical findings from our convergent interviews, we adopted the environment-organisation-innovation model to the context of an emerging e-business technology. One contribution of our chapter is it has confirmed the usefulness of this model in researching specific instances of e-business technologies, such as XBRL, thereby making important inroads into theory development in this area.

However, the major contributions of this chapter are its comprehensive analysis of the convergent interviewing method and the illustration of its application in the convergence of environmental, organizational, and innovation-related drivers and inhibitors influencing the adoption of XBRL in Australia. In brief, we argue that convergent interviewing is appropriate to be applied in under-researched areas where there are few experts. This is because it provides a way of quickly converging on key issues in the area, an efficient mechanism for data analysis after each interview, and a way of deciding when to stop collecting data. In conclusion, convergent interviews could become a useful qualitative research

method to explore new issues concerning the phenomena of organisational adoption and diffusion of emerging innovations such as XBRL. In addition, these may have practical implications for the adoption strategies of the local XBRL consortium in Australia.

As also suggested in the interviews, there is lack of standardization in the way XBRL instance documents are produced and consumed. Related e-business research suggests that lack of standards can determine the success or failure of e-business initiatives (Reimers & Li, 2005). Given the heterogeneity and the multitude of XBRL stakeholders, their representation in standardization processes can be problematic because these stakeholders have different and sometimes even conflicting agendas. Therefore, we argue that further research is required for investigating the social processes that characterize the emergence of complex network e-business innovation standards such as XBRL. Such research becomes particularly relevant in 2008 when the U.S. SEC's XBRL-enabled EDGAR system is expected to come on stream (Kull *et al.*, 2007). Various accounting jurisdictions that are still behind in terms of XBRL adoption may now have to be quick in both assessing how the XBRL-enabled EDGAR might impact their capital markets and finding ways to respond to the U.S. XBRL standard setting agenda. As theory development is currently lacking in this area (Zhao, Xia, & Shaw, 2005; Gogan, 2005; Gerst & Bunduchi, 2005; Reimers & Li, 2005; Chang & Jarvenpaa, 2005) we recommend adopting convergent interviewing as a useful exploratory and investigative method.

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- ENDNOT Es**
- ⁱ EDGAR, the Electronic Data Gathering, Analysis, and Retrieval system performs automated collection, validation, indexing, acceptance and forwarding of submissions by companies, both foreign and domestic and others who are required by law to file forms with the U. S. Securities and Exchange Commission (SEC). See <http://www.sec.gov/edgar.shtml> for further information.
- ⁱⁱ The interviewed academics had both been involved in teaching XBRL in tertiary institutions in Australia and also they are members of XBRL Australia Ltd.

Chapter XV

An Introduction to the Management and Protection of Intellectual Property Rights

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Abstr Act

Copyright protection is becoming an important issue for organizations that create, use, and distribute digital content through e-commerce channels. As online corruption increases, new technical and business requirements are posed for protecting Intellectual Property Rights, such as watermarking, use of metadata, self-protection, and self-authentication. This chapter gives a review of the most important of these methods and analyses of their potential use in Digital Rights Management systems. We focus especially on watermarking, and argue that it has a true potential in e-business because it is possible to embed and detect multiple watermarks to a single digital artifact without decreasing its quality. In conjunction with parallel linking of content to metadata there is true potential for real life copyright-protection systems. Furthermore we attack the problem of DRM systems' interoperability with Distributed License Catalogues (DLCs). The DLC concept, borrowed from Web engineering, makes available ('advertises') content or services concerning DRM functionalities, enabling multiparty DRM eco-systems.

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The wealth of information provided by digitization devices and sensors has grown dramatically while

the available communication channels for faithfully transmitting that data face serious security threats. Digital media in the form of still images, video, sound and multimedia (digital artifacts)

offer many advantages in their use since they enhance human-machine interaction in numerous areas. E-commerce (B2C and B2B) channels are becoming a primary distribution channel for the digital media market which in turn has seen a dramatic growth in the last few years (Eskicioglu, 2003). However, where there is profit there is also a big chance for corruption. The ease with which perfect digital copies are produced by virtually any user, creates great concern to content providers and on-line resellers.

The discussion behind copyright violation in e-commerce (especially B2C) is of course justified by the considerable financial losses of content providers and legal distributors. The International Intellectual Property Alliance estimated the annual loss of revenue in the U.S. copyright-based industries due to piracy of at least USD 30 billion, for the financial year of 2006-2007 (IPR, 2008). It is also worth noting that a large portion of Internet bandwidth (approximately 30%) is consumed by users exchanging illegal copies of digital media (mainly video). The recent legal battle between U.S. filmmakers and companies that support free distribution technologies such as Peer to Peer, has resulted in a crisis for the software industry: software developers are directly deemed responsible for the use of their products (McCalman, 2005). The ruling of the US supreme court in favor of content developers in the case of MGM vs. Grokster somewhat shook the so-called 'Sony Safe Harbor' (a 1984 court ruling in the case of Sony vs. Universal according to which h/w and s/w developers are immune from liability for the infringing acts of their users) (Samuelson, 2005). It is certain that there will always be people with enough motivation to illegally use copyright material by bypassing protection mechanisms.

Although IPR protection was and is still considered a strategic goal for many organizations, vendors are not yet convinced to invest the needed, and in many cases substantial resources to achieve it (Schneider, 2005). Cost effectiveness

is emerging as a major requirement for protecting IPR (Cohen, 2003). Many solutions have been proposed for addressing the problem of copyright protection and in the recent years the community has witnessed some huge security failures and partial successes. The initial movement for the development of advanced and cost-effective techniques for IPR (Intellectual Property Rights) management and protection of digital media was accompanied by great enthusiasm. Soon, as efforts were advancing, several technological, economic and cultural shortcomings were identified. Some efforts for producing security standards failed, others merged (Felten, 2005). A perfect IPR protection solution still eludes us, partly because the industry cannot or will not agree in common standards. This does not mean, however, that copyright protection is impossible, it just emphasizes the need for coordinated actions.

From a technological point of view, two major categories of IPR protection techniques can be identified: a-priori (copy prevention) and a-posteriori protection (copy detection). Copy prevention methods include software techniques such as cryptography, password authentication and physical media protection techniques such as CD/DVD copy prevention systems. Software techniques are more successful but experience has shown that these methods alone are still not as effective as predicted. Copy detection methods, such as digital watermarking are becoming extremely popular (Memon & Wong, 1998). They do not directly avert theft but rather discourage it by supporting detection of stolen copyrighted material. New methods also enable tracking of the source that provided the media and, in many cases identification of the distribution path. Copy detection provides proof that stands as evidence in legal courts. The popular anti-piracy motto of the US film industry 'steel it and we will catch you' is based on this concept. Other methods include futuristic ideas such as self-protecting content (Rosenblatt, 2004) or utopic proposals such as

a small scale internet for hackers to tangle with; they have only demonstrated the urgency to find efficient solutions.

Complete solutions to IPR protection and management in e-business such as Digital Rights Management (DRM) systems have been proposed for the persistent protection of digital content and management of licenses throughout its lifecycle (Memon & Wong, 1998). Technologically, the area of DRM is unique in the sense that it involves many diverse sub-areas: cryptography, signal processing and information theory, e-commerce, business modeling, legal and social aspects just to mention a few. Current DRM systems are complicated, expensive and inherit many of the shortcomings of the methods they use. They are considered however by many, a solution of great prospect.

DRM is a relatively new technology, and as such it also faces a definition problem; there is no clear agreement of what DRM is “in the whole” (Koenen et al., 2004). The first days of the Internet saw a similar problem. The lack of standards caused a misuse of the term. Only when standards and architectures were placed, the Internet took the form we all know and use today. The lack of widely accepted standards is the source of one of the main obstacles in the adoption of DRM systems: the lack of interoperability. This is not a simple problem since for interoperability to be achieved many issues have to be dealt with including the definition and management of usage rules by third parties, the automation of licensing processes and the tracking of the lifecycle of digital products. But who is going to handle all this, will it be one authority world-wide or many authorities? The question of who is handling content licenses in the national or global DRM value chain is of technological, political, social and legislative concern. Does a single authority guarantees equal management of rights? On the other hand could many authorities cooperate with each other when different laws apply in different parts of the world? The most successful on-line,

single-authority model is the one handling the DNS addresses of internet servers. It is handled by a US-based institution, and although it has attracted some criticism from abroad it is working well until now. But digital rights are equally important; local governments would like at least some control over the management of their national content. Professional associations or private organizations could also claim the role of authorities. So there is a need for research both in the business model that would support multiple authorities and the technological solutions that would enable its operation.

In this work we review standards, business and technological solutions for IPR protection and management for digital media, namely watermarking and metadata with a special focus on Digital Rights Management systems and new standards such as MPEG-7, MPEG21 and JPEG2000. We argue that watermarking combined with metadata is essential to the e-business domain, especially when multiple watermarks are used. Although DRM encompasses a wide range of security, workflow and authentication technologies, we focus especially on security as the most important of the three. Having many authorities in the DRM value chain may possibly become a real need in the future, a need that will certainly create a whole lot of new questions of business, social and technological extensions. In this work, we examine a DRM business model where many authorities are handling digital content licensing. Discovery mechanisms are a critical factor to this distributed model. Its wider adoption requires addressing, among others, problems such as publication, description, discovery and security. We address the discovery issue by means of Distributed License Catalogues (DLCs). DLC is based on a web engineering concept, and more particularly UDDI (Universal Description, Discovery and Integration) catalogues, a standard for publishing and discovering web services (OASIS, 2008). Based on a previous work (Vassiliadis et al., 2006), we also propose a new DRM business

model where content providers or associations may act as authorities using thematically-oriented directories, to publish licenses and content rights. Although these catalogues are distributed, their architecture can be either client-server or Peer to Peer.

The first section of this chapter describes current and future technologies for IPR protection while the second presents DRM systems and discusses technological, architectural and business issues. Subsequently an insight on watermarking (and in particular multiple watermarking) as an efficient technique for managing IPR on-line. Furthermore, a discussion on the advantages and disadvantages of current technologies used in DRM systems with a special focus on security is provided. Future prospects are also discussed with a focus on standardization and new computing models such as mobile and Peer to Peer computing. The DLC proposal is subsequently discussed and finally, the conclusions are drawn.

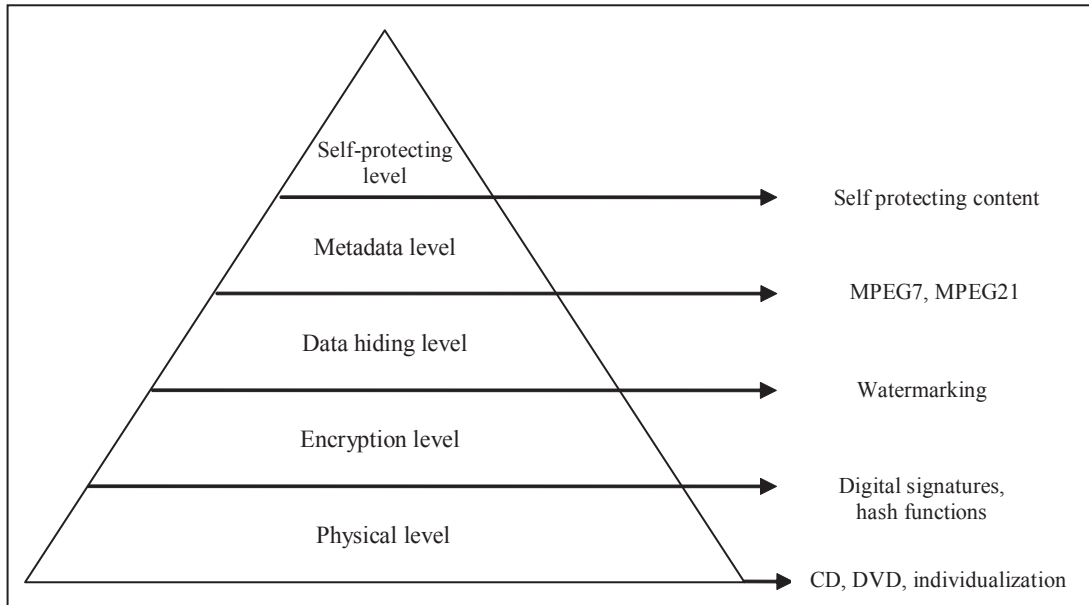
t E c H N O L O G I E s F O r I P r P r O t E c t I O N

IPR protection technologies provide persistent or non-persistent content protection without managing directly digital licenses to authorized users. Restrictions of content usage rights have to be maintained after the content is delivered to the end-user including data protection to protect against unauthorized interception and modification, unique identification of recipients to enable access control for the digital content and effective tamper-resistant mechanisms to process protected data and enforce content usage rights (Koenen et al., 2004). There is a large number of security methods used for IPR protection in e-commerce applications that can be categorized in five levels: the physical, the encryption, the data hiding, the metadata and the self-protecting level (figure 1).

The Physical level involves IPR protection techniques that are associated with the storage medium or the user device that accesses the content. The DVD copyright protection mechanism and individualization (the unique identification of user devices) are two such examples. This category of techniques suffers from two drawbacks. The first is the high possibility of circumventing the protection mechanism (as in the case of DVD) and the second is the 'analogue hole'. The latter refers to the process of making illegal copies of digital content by legally accessing the content and copying the analogue output of the player. For example, a user buys a MP3 coded song, accesses it through a player and records the analogue output of the sound card (although internally), re-digitizes it and produces an illegal copy for distribution.

Symmetric and asymmetric encryption techniques comprise the next level as we move up the pyramid of IPR protection techniques: the content is encrypted using a symmetric key algorithm (digital signatures, one-way hash functions, or both). These techniques are persistent since they are directly and permanently associated with content. Their use is focused mainly on access control and piracy prevention. Encryption scrambles data into a form that can only be decrypted using a specific key. Encryption is also a key technology for any DRM system since it is used to ensure that public-key certificates owned by the Buyer and the Distributor are digitally signed by an Authority. A handshake protocol makes sure that both sides have the secret keys that correspond to the public keys described in the license to use the digital media. Newer approaches such as broadcast encryption avoid the costly, in terms of data transmitted, two-way handshake with single way broadcast of public keys (Lotspiech et al., 2004). An interesting variation of DRM systems uses special plug-ins to decode digital information and communicate with the creator or the content provider. Nevertheless, this model

Figure 1. The five main technology categories of IPR protection



suffers from the obvious lack of interoperability since there is no common framework for encoding the information prior to its use. This situation has led to a number of different plug-ins which are used with specific systems only and thus are inflexible. Plug-ins are usually content viewers or players. Although strong encryption techniques are successfully used in a variety of applications, encryption for IPR protection of digital media has some drawbacks. First of all, this kind of applications uses weaker encryption schemes because they require less calculations (and thus CPU power) for the user machine to decrypt digital information. This means that there is an increased possibility to break encryption keys. E-commerce applications also make use of previewing of audio or visual content. Encrypted

media files are hard to preview or decrypted when used in large numbers.

Data Hiding techniques are used for binding (embedding) information to digital content such as information about content owners, the buyer of the content and payment information. The most popular and promising method in this category is watermarking. Digital watermarking subtly alters parts of the information that forms a digital work by inserting a weak signal. Usually, watermarks are not visible to humans, they can only be traced and linked to copyright information by special software. Watermarking does not preclude copying but may preclude playback on compliant devices (Wayner, 2002). This technique will be analyzed in detail in the following section.

The use of metadata is a relatively new method to overcome interoperability problems posed by different media formats and devices, the lack of structure and efficient modeling techniques for distributing, exploiting and protecting digital content. The MPEG (Moving Pictures Expert Group) working group of ISO (International Organization for Standardization) has initiated a set of metadata standardization efforts in order to increase interoperability through the MPEG21 Multimedia Framework Initiative and MPEG7 (Manjunath et al., 2002).

MPEG-7 (Multimedia Content Description Interface) provides a common interface for describing multimedia content. MPEG-7's objective is to provide additional functionality to other MPEG standards by providing a set of description tools for multimedia artifacts that is, complex audio-visual units. It addresses interoperability, globalization of metadata resources and flexibility in data management. MPEG-7 can be classified into the group of standardized description schemes, but in contrast to many implementation schemes, it has not been developed for a restricted application domain. It has rather been intended to be applicable to a wide range of application domains. Complex and customized metadata structures can be defined using the XML-based Description Definition Language (DDL). Using XML, MPEG-7 provides descriptions about both static/spatial (text, drawings, images, etc.) and time-based media (such as video, audio, animation). Further content organization is possible into three major structures: hierarchical, hyperlinked and temporal/spatial.

MPEG21 provides a framework for delivery and consumption of multimedia content to work together. It supports the whole content delivery chain from content creation to consumption by a wide range of devices and through a plethora of networks. Some of the key elements used include digital item declaration, identification, description, content handling, intellectual property

management, digital item rights management and others. Metadata enable rights management, a basic requirements for advanced IPR protection. For example, the MPEG21 REL (Rights Expression Language), XrML (initially named DPRL by Xerox), has been chosen for wider adoption in DRM systems (Rosenblatt et al., 2002). These standards in conjunction with new media coding standards such as JPEG2000 (for still images) and MPEG4 (for sound, video) bear great promise for IPR protection.

On the top of the pyramid a new proposal for IPR protection, self protecting content (Rosenblatt, 2004) is placed. It was recently suggested as a solution to the ever-increasing problem of DRM interoperability and immature economics. This type of content includes special logic which can decide by itself how it will be used by the client machine which provides only basic functionality (Koenen et al., 2004). For example, an image encoded with a self-protecting standard is loaded in a palmtop. The logic is loaded into the palmtop, reads the appropriate information (ID, user acquired licenses etc.) and decides whether it will be viewed in full or reduced resolution, whether it will be copied or reproduced etc. It is obvious that apart from the logic encapsulated into the content, appropriate mechanisms need to be available to the user machine. These mechanisms should at least include a virtual machine for the code to run and a ROM for storing keys and licenses. If the end-user machine is a personal computer there is no obvious disadvantage but what happens when it is a CD-player or a home DVD device? Although the notion of self-protecting content is extremely innovative and attractive in many aspects, several shortcomings of technological, cultural and economic nature exist: there are no standards for encoding logic into content, what happens to the size of the media artifact when code is added to it, are the manufacturers of player devices willing to add new hardware to their products, are content creators willing to pay for new content

creation tools? The self protecting content idea has already attracted criticism and it remains to be seen if it will be adopted in the future.

The above mentioned technologies offer either a-posteriori or a-priori protection, their efficiency however cannot be estimated accurately. Current practices entail their combined use for stronger IPR protection, an approach used in systems designed for managing a wide range of functionalities: DRM systems.

DIGITAL RIGHTS MANAGEMENT SYSTEMS

Digital Rights Management is a set of technologies that enable the management of licenses for media artifacts throughout their lifecycle, in other words it provides a complete set of functionalities for managing IPR (Koenen et al., 2004). DRMs can either be stand-alone systems or part of a larger on-line selling system. They rely on licenses which specify the content usage rules. Content is distributed with or without licenses but it cannot be used without them. Rules can be either attached or embedded to content or delivered independently (Cohen, 2003). It is important to note that DRM is about both digitally managing rights and managing digital rights (Rumb, 2003); modern DRM systems cover the full range of IPR management including the description, identification, trading, protection, monitoring and tracking of all forms of rights' usage. They are applied over both tangible and intangible assets including rights workflow, modeling and owner relationships management (Iannella, 2001; Hwang et al., 2004).

Recent attempts to deploy DRM systems have shown that their success depends not only on technology but business issues as well. The underlying business model, actually the mechanism by which a business intends to generate revenue and profits, is of paramount importance. The business model defines the plans to serve customers involving both strategy and implementation. It greatly af-

fects, and is affected, by the technology used. In the typical business model of a DRM system, the creator produces the digital content and provides the usage rules to a third party (authority) which is responsible for supervising its proper use. Distributors receive the content from the creators and distribute it through the appropriate channels (e.g. e-shops) to the end-users (buyers). In order for the buyer to use the content, the appropriate license must be obtained by the authority. This happens after the appropriate request is sent to the authority by the buyer. The transaction is concluded when the authority pays royalties to the creator. There is a plethora of DRM payment models: pay as you use, try-first buy-later, pay-per-view etc. Payment rules are closely connected to the way the content is supposed to be used.

Rosenblatt et al. (2002) discusses two definitions for DRM systems, the narrow and the broad. The narrow definition refers to systems that persistently protect content using mainly encryption techniques. The digital content is packaged (encrypted and metadata enriched) and then provided through distribution channels. Users need special controllers (client side s/w) in order to be authenticated and gain access through the decryption of content. License servers may be used to manage licenses describing access rights and conditions. The broad definition includes the above-mentioned functionalities and further extends rights management. It includes definition, management and tracking of rights (business rights, licensing, access tracking etc.). A DRM system is defined by two kinds of architectures, the functional and the information architecture. The first one describes the basic functions of the system while the latter and most important, the modeling and flow of information inside the system (Rosenblatt et al., 2002). There are several variations of the functional architecture for DRM systems. In this work we distinguish two as the most important: the create/manage/use model or CMU and the create/distribute/authorize or CDU. Although these two models have many

functionalities in common, CDU functions are better mapped to the basic DRM business model used in practice (discussed in detail later in this section). A typical CDU functional architecture is, in general, comprised of three modules: creation/provision, distribution and authorization (figure 2). The creation/provision module organizes functions such as initial packaging of content and royalty distribution before initial provision. These functions define, create and record the IPR of a digital artifact during its development. The distribution module is used for delivering content through e-distribution channels. This includes recording user rights, distribution paths and managing transactions. Finally, authorization functions manage licensing (who is the owner of what information, use restrictions), monitoring of use and reporting to the IPR owners.

The information architecture models the flow of information between the modules of the functional architecture of the DRM system. In general, such an architecture must address three main problems: what are the main information taxonomies, how they are modeled and described and how IPR are defined and expressed. The information architecture of a classic DRM system is depicted in figure 3.

The literature provides a relatively small but significant amount of works that deal with DRM architectures and systems. This implies that DRM systems are a new and difficult research problem. The most significant references include Park et al.'s (2000) eight mechanism functional framework, Pucella and Wessman's (2002) rights definition framework, Ianella's DRM architectures (2001), the balanced user-owner approach (federated

Figure 2. The functional architecture of a classic DRM system with three main components

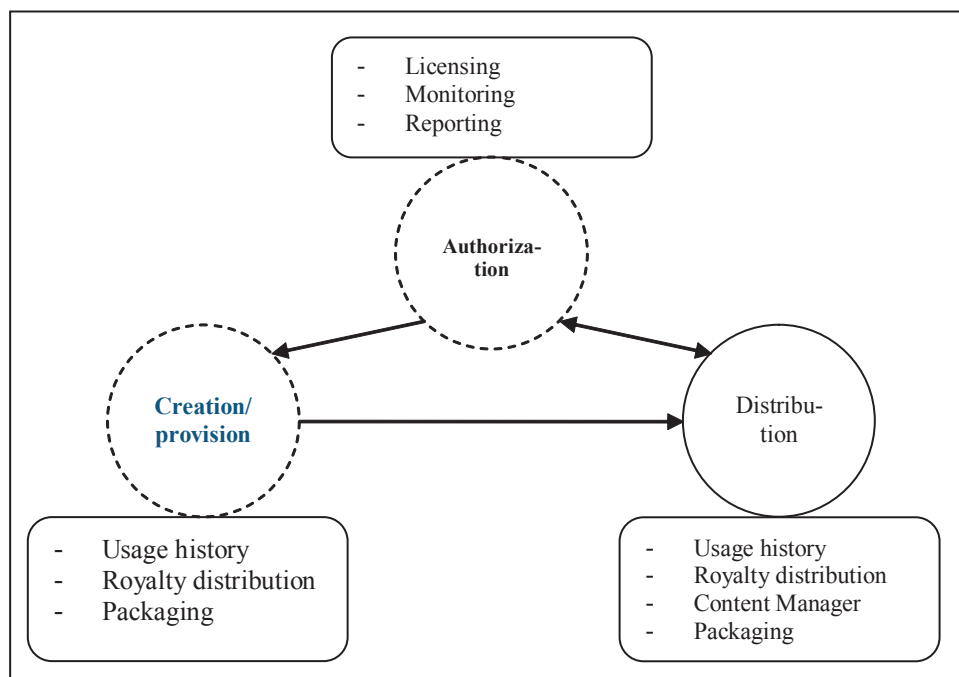
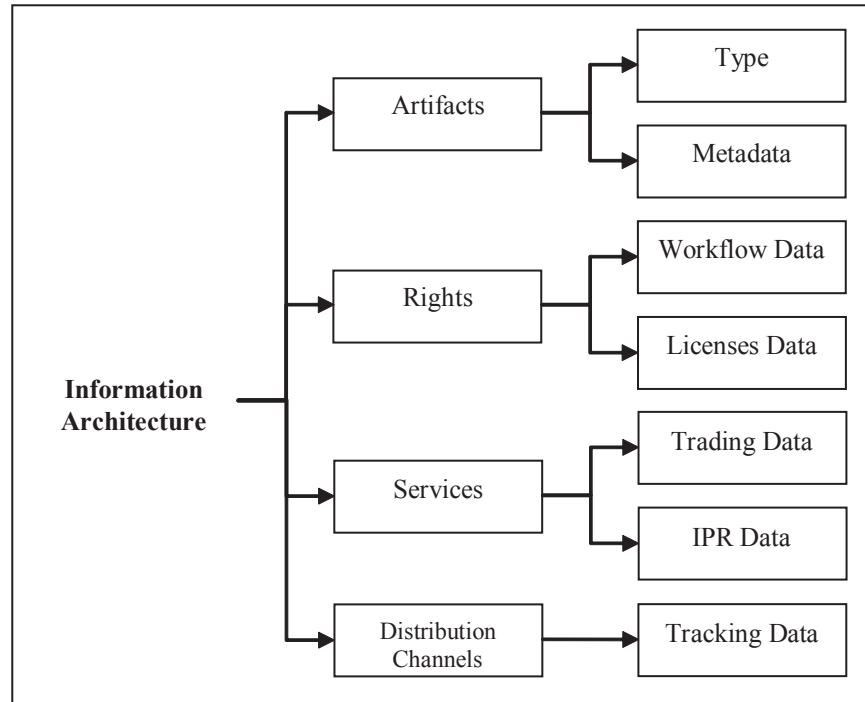


Figure 3. The Information architecture of a classic DRM system (modified from (Iannella, 2001))



DRM) of Martin et al., (2002) and the Imprimitur (1999) results. Commercial solutions include Adobe's e-book for pdf documents, IBM's EMMS, Real Network's RMCS, Microsoft's WMRM for audio/video and Digimarc's family of products for video/audio and still images. A useful analysis of DRM business models, standards and core technologies can be found in (Koenen et al., 2004; Hwang et al., 2004; Rosenblatt et al., 2002). The increasing use of mobile devices has also initiated research efforts for mobile DRMs (MDRMs); technological challenges in this area differ from classic DRM including mobile device limitations, bandwidth, usability and other (Beute, 2005).

IPR protection using DRM systems has posed many non-technological questions. The univer-

sal request to raise standards of protection does not necessarily contribute to faster diffusion of new products and services (McCalman, 2005). Economists have raised questions mainly on two subjects, funding for developing common and viable solutions and fair use (Schneider, 2005). The first is about the willingness of large content and software providers to generously fund DRM standardization efforts and overcome interoperability issues. The second, concerns the increase in creation and transaction costs when IPR protection is too strong. Law experts have also pointed out the need for a balance of interests between private rights (the rights of the creators/owners) and the public interest (Maillard, 2004). Public policy should also ease the strong emotions

posed to both content owners and end user; the first see DRM systems as a barrier to innovation and a threat to their use rights while the latter as their last defense against piracy. According to many, US and EU legislation needs to be more consistent on this contentious topic (Felten, 2005; Towse, 2005).

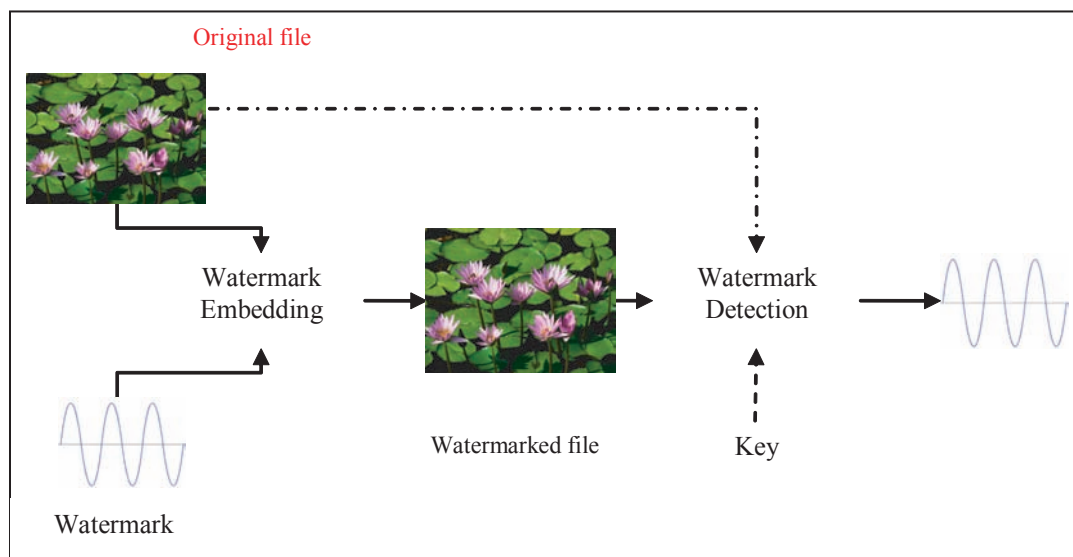
DIGIt AL WAt Er MAr KING: A Pr OMIsING sOLUt ION FOR IPr Pr Ot Ect ION

What is Watermarking?

Watermarking and authentication for digital media are relatively new technologies, descendants of research in the field of image processing of the previous decade. Digital watermarking has been proposed as a valid solution to the problem of copyright protection for multimedia data in

a networked environment (Fotopoulos et al., 2003). The two most important characteristics a watermarking scheme should provide are imperceptibility and robustness. A digital watermark is usually a short piece of information, which is difficult to remove, intentionally or not. In principle, an invisible mark is inserted in digital content such as digital images, video and audio so that it can be detected at a later stage as evidence of copyright or it can generally be used against any illegal attempt to either reproduce or manipulate the content. The watermarking process includes two procedures, embedding and detection (figure 4). In the embedding process the original file is slightly altered by inserting a weak signal, producing a watermarked version. The detection process analyses the watermarked file in order to detect a watermark. Depending on the type of the watermark, the original file or a key may be needed to conclude the detection.

Figure 4. The watermarking process (embedding and detection) for a still image



The main reason for the introduction of watermarking in IPR protection was the fact that digital artifacts are quite easy to duplicate, forge or misuse in general. Watermarking is mainly focused towards the protection of the content's copyright while detection (authentication) aims at the verification of content, investigate if an image is tampered or not and if it is, to identify the locations that the alterations have occurred. For both technologies to succeed, side information needs to be embedded and/or linked with the original media file. This is obviously the reason why lossy compression schemes are often difficult to be used. Part of the watermarking or authentication information is unintentionally discarded along with insignificant parts of the original image information to achieve better compression.

Watermarking has been extensively researched in the past few years as far as common image formats are concerned. By identifying the rightful creator/owner, watermarks may be used to prevent illegal use, copy or manipulation of digital content, as proof of ownership or tampering (Koenen et al., 2004). The problem that these techniques have to encounter is the robustness of the watermark against common processing tasks. Any attempt to remove the ownership information from the original image is called an 'attack'. For example, some common attacks for still images include

filtering, compression, histogram modification, cropping, rotation and downscaling. Recent studies (Fetscherin & Schmid, 2003; Maillard, 2004) have shown that, apart from standard security technologies such as password protection and encryption, most recent DRM implementations use watermarking as well. Several commercial systems offer special crawling functions that scan the Internet for instances of the protected (watermarked) artifacts and produce usage reports. This method works only for on-line content and it might be successful in preventing piracy (Hwang et al., 2004). Several, sometimes overlapping, categorizations of watermarking techniques can be produced according to a set of characteristics (Fotopoulos & Skodras, 2003) (table 1).

Visibility categorization refers to whether a watermark is visible to humans (e.g. like a logo in an image) or invisible and as such, detectable only after analysis. The detection output characteristic refers to whether an invisible watermark can be read without the need for any additional information. For example, a visible watermark in the form of a logo or a text message is a readable watermark. These schemes are also encountered in the literature as public watermarks because they can be read without having a secret key. Detectable watermarks on the other hand, can be read only by authorized users, i.e. users that

Table 1. Categorization of watermarking techniques

Watermark characteristic	Categories
Visibility	Visible, Invisible
Detection output	Readable, Detectable
Type	Logos, Serials, Pseudorandom noise sequences
Need for initial image for detection	Blind/public, Private
Embedding area	Spatial, Frequency
Taking advantage of special image characteristics	1 st , 2 nd generation

have a key that helps read the invisible mark inserted in digital media. These are called private watermarking schemes.

Watermark types are also used as a distinction characteristic. They include logos, serial numbers and pseudorandom noise sequences. The first two categories are visible watermarks and the third one is invisible and detectable. Pseudorandom noise sequences are produced by generators that are initialized using a specific key; without this key these sequences cannot be detected. Under certain conditions however, logos and serial numbers can also be detectable provided that they have been coded prior to the embedding procedure.

Categorization depending on the detection process includes watermarking schemes that need the original file to identify the watermark (private) and those that do not (blind or public). Blind watermarks are more interesting for researchers but not so robust to attacks. Hybrid schemes have also been proposed. Blind watermarks are best suited for resolving the rightful ownership in open environments such as the Internet because their use is not restricted to authorized users or content owners, who have the access to the original media. Moreover, requiring the original digital artifact to detect the watermark needs extra storage at the detector's side or extra bandwidth to transmit it from the embedder to the detector.

In the case of visual content, a most common categorization depends on the processing domain of the host image/video-frame that the watermark is embedded in. One such category is the spatial domain group of techniques, according to which the intensity values of a selected group of pixels are modified. The other is the frequency domain group, where a group of the transform coefficients of the image/video frame are altered. Frequency domain approaches have been proved more successful for image watermarking. The transforms usually employed are the discrete versions of the Fourier, Cosine and Wavelet transform (DCT, DFT and DWT) (Fotopoulos et al., 2003; Voyatzis & Pitas, 2000; Arnold et al., 2003). In these schemes,

information is being transformed via one of the aforementioned frequency transforms and watermarking is performed by altering the resulting transform coefficients of the image.

In spatial watermarking a weak signal is embedded, usually in the lesser significant bits of multimedia data. For example, in a color image, the lesser significant bits of the information that codes every pixel are altered in one (usually the blue) or all color channels. In this case the watermark slightly alters the luminosity of each pixel. This category of techniques are quite fast to perform and do not seriously affect the quality of the original file. They are not however widely used because they are generally not robust to attacks; simple alterations to the original file result in great difficulties in detecting the watermark.

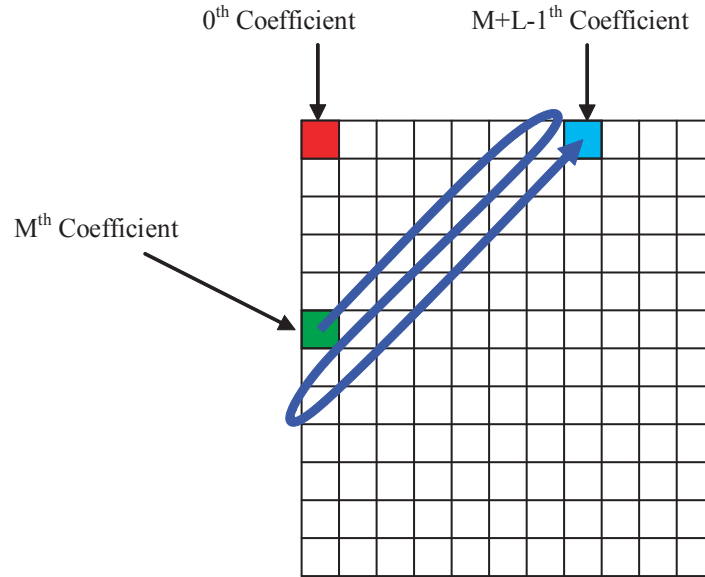
the Watermarking Process Detailed

Watermarking in the frequency domain is considered quite robust by the scientific community and hence those methods are more popular. In these schemes digital information is first transformed to its equivalent representation in the frequency domain. For this purpose, a reversible transformation like FFT (Forward Fourier Transform), DCT (Discrete Cosine transform) or DWT (Discrete Wavelet Transform) is used. The output is a set of coefficients that describe the frequency content of the image data. A subset of the coefficients is chosen and altered using a simple mathematical equation with the following being one of the most commonly used:

$$C_{M+i}' = C_{M+i}(1 + \alpha x_i) \text{ where } i=1,2,3,\dots,L$$

with C being one of the selected image coefficients, M being the position of the first altered coefficient (assuming coefficients are reordered in a 1D-vector basis), L stands for the watermark length, α is the embedding strength and x_i is one of the watermark vector elements. The watermark is a pseudo-random noise sequence. Usually middle

Figure 5. Selection of middle frequency coefficients after image transform has been applied (for embedding)



frequency coefficients are used, as shown in the following figure which describes the selection strategy over a full frame image transform.

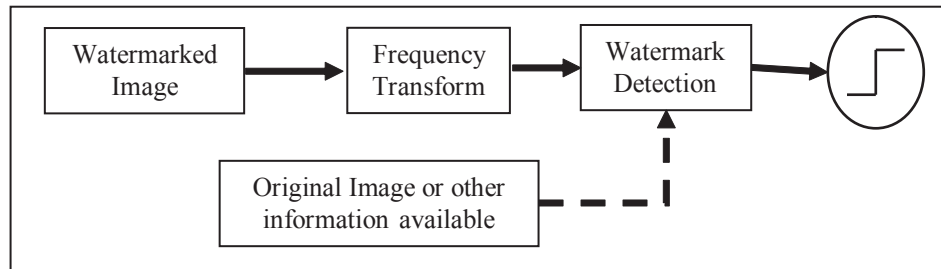
$$S(X, C) = \frac{1}{L} \sum_{i=1}^L x_i C_{i+M}$$

In such methods, the watermark is detectable. This means that the detector's calculates a number; if this number is above a specific threshold, then the image is marked, otherwise it is not. To obtain the output, the watermark-suspected test image is transformed with the same transform, the coefficient selection strategy is applied and the detector's output is given by the following equation:

This procedure is described in figure 6. The dashed line from the original image implies that in some methods, the original image is available and can be used (non-blind method) or that some other knowledge of the original image is given (informed method). If none is available, then the scheme is blind.

A significant question that occurs in such approaches is the number and the position of the altered coefficients set in the frequency representation of the image. Many different ideas have been proposed, however methods that process the image as a whole are more popular. In such cases the number of coefficients altered is in the order of a few thousands (e.g. 3000-15000 in the case of a 512x512 pixel image). The altered series is back-transformed to a digital representation of

Figure 6. Detection procedure for a classical frequency based watermarking scheme



the initial object by applying a reverse transformation (e.g. the reverse FFT). The watermarked object is slightly different from the original. In any case the differences should not be detectable by human vision.

Digital watermarking can be CPU demanding especially when large images, video or large numbers of artifacts are processed. Time is critical in on-line applications where delays increase costs and user drop-out rates. The complexity of frequency domain watermarking techniques is large. For example, for a square image of size N , the complexity of the Discrete Fourier and the Cosine transform is $O(N \log N)$ while for the Wavelet transform it is $O(N)$. For large values of N , these transformations are becoming extremely demanding in terms of CPU cycles; however respective algorithms are suitable for distributed processing or parallelization. A common method is to partition the original object to pieces (e.g. an image to 16×16 tiles) and apply the above mentioned procedure to these pieces.

Recently, a new approach for watermarking has been proposed, the so-called 2nd generation. First generation watermarking was either frequency or spatial and did not take into account any special characteristics of the original digital object. Sec-

ond generation watermarking firstly analyses the digital artifact into smaller components (e.g. an image to the distinct objects it depicts) and then hybrid techniques appropriate for each situation are applied. These schemes are more complex but also more effective in terms of robustness, visibility and quality. Second generation watermarking also includes adaptive embedding and coding, asymmetric watermarking, detection with limited or zero previous knowledge and genetic programming schemes. They are not however suitable yet for commercial use.

Multiple Watermarking

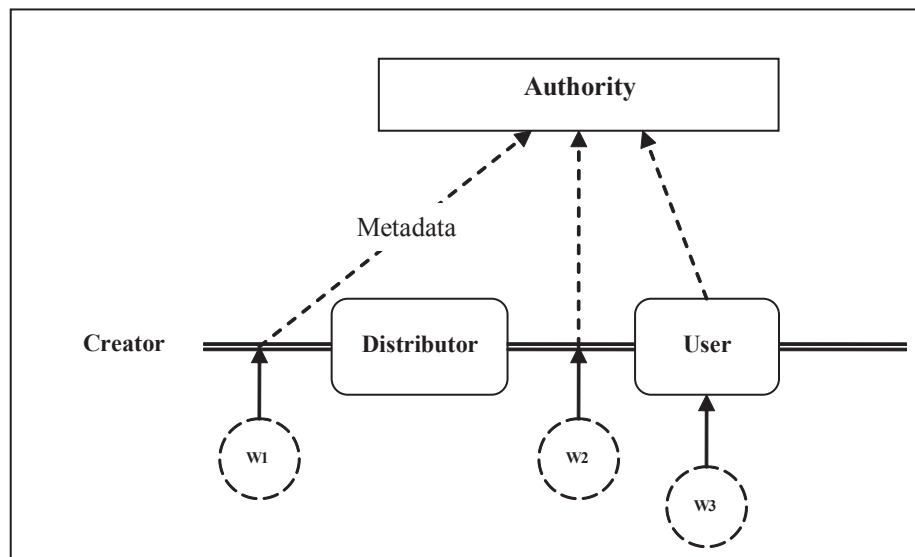
An interesting application of watermarking in e-commerce is multiple embedding/detection. A digital artifact can be marked more than once with different watermarks that can be efficiently and individually detected later. Multiple watermarks can be used to monitor distribution of digital content in e-commerce channels. A digital artifact may be marked with a watermark each time it is tunneled through a different distribution channel. Watermarks can be also associated with metadata (like keys corresponding to specific records in a database) which describe rights, owners, use,

alterations to content, distribution channel characteristics etc. Figure 7 depicts a distribution monitoring example using multiple watermarking. The digital object is marked before distribution (*W1*); the initial watermark is associated with author and owner metadata and usage rules. Next, the object is tunneled through distribution channel *CI* (e.g. an e-shop) which inserts a second watermark *W2*, associated with its characteristics. A user acquires the object and, at this point, a third watermark *W3*, is embedded associated with new owner metadata. This procedure may be repeated for a finite number of steps. The distribution path from the developer to a user, along with usage, owner and alteration information can be traced by retrieving watermarks and accessing the appropriate metadata. This metadata must be located in a central authority. Watermarking embedding should also follow the same standards in all steps of the above-mentioned procedure.

It must be noted that there is an upper limit for the number of watermarks that can be embedded in a digital object, before the quality of reproduction is significantly altered. In order to maintain a high Quality of Service, a consensus must be found between multiple watermarking and its perceptibility in the digital object. Multiple watermarks have already been proposed for the identification of the distribution path and/or to identify the end-user path of digital television broadcasts (Cheveau, 2002).

In the years to come, digital watermarking will be used even more as an IPR protection technique, combined with metadata methods. Metadata may be linked and not directly inserted into an image. For this purpose, a special kind of watermarking is used: annotation watermarking. Watermarks, combined with digital signature methods, may contain information about proprietary, copyright,

Figure 7. Embedding of multiple watermarks for monitoring distribution channels in an e-business environment



the author, the user, the number of copies and/ or other important information.

Watermarking combined with new coding and metadata standards such as JPEG2000 creates new possibilities for the IPR protection industry and have already attracted much attention by the scientific community (Vassiliadis et al., 2005). The JPEG2000 coding standard for still images offers features such as Region of Interest Coding, Scalability, Error Resilience and Visual Frequency Weighting (Taubman & Marcellin, 2002). Although all of the above mentioned features of this compression standard are very important, the application of watermarking in JPEG2000 compressed images is closely related with its IPR capabilities. These capabilities include the embedding of XML-formatted information into the image file in order to annotate/link image data with metadata. These metadata are associated with the image vendor, the image properties, the existence of IPR information in the image data etc. The new format (JP2) gives the opportunity to accompany the data that correspond to the image with extra metadata but it doesn't replace the watermarking mechanisms that are used today for copyright protection and authentication. It rather complements them.

In order to address the increasing need for security, the international community is already researching the incorporation of IPR protection characteristics within the JPEG2000 standard. This initiative will produce JPEG 2000 Secured (JPSEC) also known as Part 8 of JPEG2000 (JPEG, 2000). Applications addressed by JPSEC include, among others encryption, source authentication, data integrity, conditional access, ownership protection etc.

Watermarking and JPEG2000

Watermarking against lossy compression has always been an interesting challenge. Most of the existing literature techniques are having a very bad time against the JPEG standard. But

times are changing and now the time has come to face the next generation in image compression standards: JPEG2000. With the new standard, superior quality for the same compression ratio can be achieved or similar quality for higher compression ratio, you can take whichever view suits you best. Since it is easier now to retain quality by achieving smaller file sizes, this is quite desirable. Thus compression ratios of less than 0.5bpp will become common practice. The problem is, that although these images will be visually pleasant, watermarking methods have to evolve in order to survive such high compression.

Very few works directly relate watermarking with JPEG2000. In the majority of the literature, the new standard is considered as yet another attack. Others examine the effects that the various JPEG2000 coding parameters cause to the watermark's detection. There is also a third category that proposes incorporating watermarking into the JPEG2000 coding pipeline or using it as an important factor in the marking/retrieval process. These may be few but they are of great practical interest. Of course there are lots of papers that deal with watermarking in the wavelet domain. Since the heart of the new standard is the wavelet transform, these works may be seen as the pioneers of watermarking in the JPEG2000 domain.

An alternative application of watermarking technologies in JPEG2000 domain is image authentication. While one of the major directions of digital watermarking aims to protect the ownership of digital images, the safeguarding of the image content is essential. The research community has been activated during the last years to construct effective mechanisms following this direction. Since a lot of work has been done in order to design watermarking mechanisms for image authentication in previous image formats, the new compression standard meets the research community in a moment that very few attempts have already approached this topic.

Standardization organizations have adopted the deployment of content authentication mecha-

nisms that can be offered in companion with the digital images or by embedding them in the image data.

The image authentication field is stretched to cover the questions of whether a digital image is altered, whether the content of the image has been tampered, which particular regions, colors or image parts have been altered and finally if these changes can be recovered.

Considering the nature of the watermark and the application that uses an image authentication technique, the image authentication techniques are classified in different categories. The first category of image authentication techniques aims at the integrity check of the image data. Authentication in terms of data integrity originates from cryptography. According to these techniques, if even one bit of the data that composes the image changes, the watermarked image is regarded as non-authentic. In these methods, the watermark information is embedded in the original image in a way that it can easily be destroyed after any modification of the data. By this watermark property, in these methods the watermark is called fragile.

A second category includes the techniques that authenticate the image content. The main idea behind these techniques is that some modifications of the image data do not affect the image content. If for example a watermarked image has to be JPEG compressed (with high quality) then the data of the image will change but the image content will be identical. In these techniques the watermark information must be robust to actions that do not alter the image content and at the same fragile to actions that destroy the image content. The watermark in these techniques is called semi-fragile.

Some of the techniques that belong to the previously mentioned categories can also localize the alterations of a watermarked image. This extra characteristic is related with the algorithmic design of those techniques and the nature of

the watermark that is embedded in the original image.

Finally the self-embedding techniques have not been appeared yet in JPEG2000 authentication domain. In the past such techniques have been proposed in order to embed a highly compressed version of the original image into itself. This operation is giving the opportunity next to the watermark detector to localize the alterations and to reconstruct the content of the image that has been destroyed.

Image authentication techniques can be combined with techniques that protect the copyright ownership in order to have a multipurpose watermarking scheme. Approaches in JPEG2000 domain have not been appeared yet, but since these schemes have been applied in other image formats with excellent results, similar methods can be expected with application to the new compression standard.

Distri bUted LicENsE cAtALOGUES

A Dr M Eco-system

In figure 7 we described a one-authority business model for managing IPR. Having in mind the gaps and difference in legislation between most countries (with a characteristic example the US and the EU), it is more likely that in the future there will be many authorities, not one. These authorities will probably have a limited scope in terms of geography (since the legislation they will operate under will have the same scope). The digital products that should be protected though won't have such a limited scope: they have a worldwide scope. So the business model includes a mix of local authorities, worldwide digital artefacts to manage and worldwide users, distributors and meta-sellers of these artefacts. If we consider the distribution channel of this model to be the

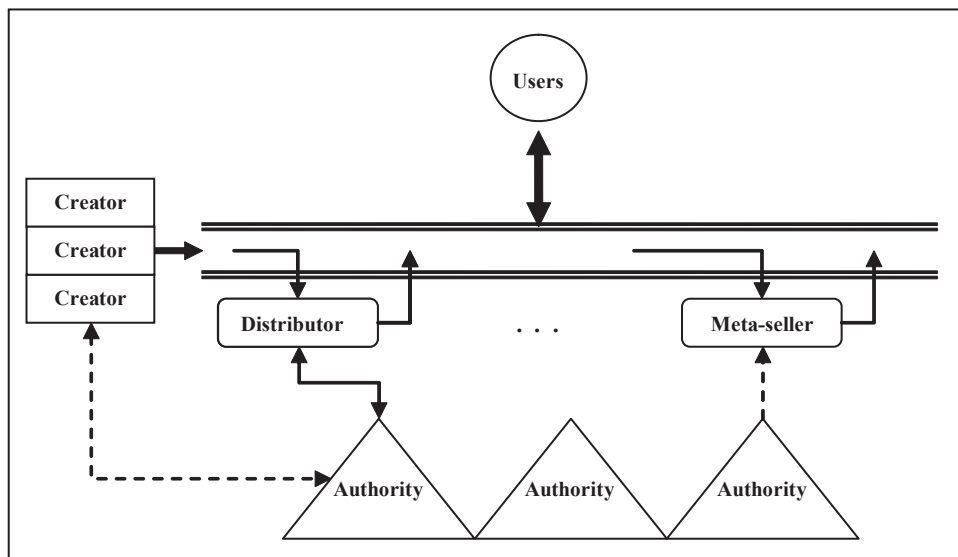
Internet (in the form of the WWW, email or any network-based software), most of these authorities would not be able to provide the full functionality of an authority as described in the previous section; they could provide at least some kind of licensing services and accept payments (through integrated e-banking solutions). For the sake of simplicity we overlook the significant political, cultural and social implications and consider the technology solutions that would support such a model.

The network model upon which the model resides is usually client-server. Most DRM designs rely on such a model especially when dealing with Authority-related transactions. In the case of multiple authorities that need to coordinate their actions with users, agents capable of performing Application-to Application (A2A) operations need to be used in order to ease interaction with different providers and authorities. In such a service-oriented networked environment, the peers will

be able to provide different services of a classic DRM system. Such service-oriented models are already being used with web services as their building blocks (Singh & Huhns, 2005). In a more distributed mode the Peer to Peer computing model could be used (Androutsellis-Theotokis & Spinellis, 2004).

Figure 8 presents the possible configuration of the ‘many authorities’ business model. In the beginning of its lifecycle, a digital artifact is “stamped” with its creator electronic seal and the usage rules before entering the distribution pipeline. The proper authority stores this information and is responsible for the management of rights. At some point, a distributor may purchase the rights of the content or a user may rent the use of the content. In both cases the proper authority handles the transactions and new seals are generated. If the distributor uses another authority, the previous one and the new authority should exchange the proper information. In order for his kind of

Figure 8. A multi-party DRM eco-system (adopted from Vassiliadis et al., 2006)



transaction to be smooth, A2A operations need to take place. Otherwise the user burden may be intolerable and lead to a usability bottleneck (one must not underestimate software usability especially when complex processes take place).

A2A interaction is based on service-orientation: a connected network of functionalities (services) available operating within and across different organizations. Services that utilize the basic processes are employed by authorities, creators and distributors. They are made public, searched, reused and combined to form complex business processes. They must however retain a significant level of flexibility.

Again many technological questions arise. We attach the problem of how to implement an efficient discovery mechanism. How can a user for example, find a digital artifact, the authority that is responsible for its rights and the services that negotiate usage transfer? In an eco-system of many Authorities, Creators and Distributors, with vast digital content on-line this is not a simple task. A simple search engine won't do. The goal is not only to perform the task but doing so with ease. The Web Engineering community has faced the same problem in the case of numerous software vendors that make available on-line their web services. The solution relies on registries that help to narrow down the negotiation and searching time needed for service discovery. A matching mechanism compares the metadata describing the contractual and technical profile of the query to that of the services. The use of metadata ensures A2A interaction so the searching procedure is automatic and fast. The metadata repositories storing this information are based on the Universal Description, Discovery and Integration standard - UDDI (UDDI, 2008). Besides UDDI, more decentralized approaches such as Peer-to-Peer can also be used although they exhibit low fault-tolerance (Sakkopoulos et al., 2005). So in our model, each authority operates one such repository. With the current technology,

this is an ideal representation for intra-enterprise communication.

The form of the repositories is again not a simple one. Many different information need to be organized. The concept of Distributed License Catalogues (DLCs) organizes such information for use in a service-oriented DRM environment. DLCs are registries or indexes that advertise content and/or services concerning DRM functionalities, interfaces, creators, pricing etc. A DLC may be used by creators and authorities alike, either hosting a total DRM solution or providing a subset of DRM functionalities. The structure of these registries should follow some kind of a standard following the example of UDDI.

the DLC Architecture

In a multi-party DRM eco-system there is an overlap in the provision of services: the same or nearly the same services are provided by different organization (e.g. web services that digitally watermark images). Besides the functionality there is an actual diversity in services that is a natural consequence of the diversity between organizations. For example, different corporate culture and strategic goals may lead to different implementations of asset management services. Other sources of diversity may include differences in the definition and organization of media and metadata types or different representation of media artefacts. Each node in the model provides a version of some of the core services. Core services can be coordinated using workflow management to build larger, more complicated services. Services may also use digital artefacts from different repositories; for example, a user designs a multimedia presentation using digital video from node A and 3D representations from node B. DLCs publishing services and information of nodes should enable the choreography of services automatically hiding the underlying complexity which is due to negotiation of usage rules and IPR management.

A DLC is primarily used to publish services and artefact information using metadata. Low level storing functions such as storage and retrieval can be handled by a database tier. For this reason DLCs are of semantic nature: metadata descriptions of services and artefacts and one multilayer ontology scheme for cross-searching are used following the architecture proposed in (Alexakos et al., 2006). In the 3-tier models of web systems we add another layer, the DLC which sits on top of the storage implementation. This makes a 4-tier model. The multi-layer ontology scheme is used for faster local searching and for enabling service/content composition using information from other nodes. It can also be effectively used when a node is comprised by a set of sub-nodes. Similarly to the approach described in (Alexakos et al., 2006), we introduce a four layer semantic description of node contents: the Upper Ontology layer which describes the basic concepts of the domains of knowledge of the content/services, a set of description ontologies (Domain layer) which represent a more detailed description of each domain and the Semantic layer where the different semantic description of the cooperating nodes or sub-nodes lays. Finally, there are different layers for content, services and IPR metadata. The indexing scheme includes mapping information between the ontologies in the three upper layers. This mapping enables search engines to navigate inside the ontology-based index.

There are two approaches for utilizing an architecture that uses DLCs a centralized and a decentralized approach. In the centralized client-server model services and content are registered in the DLC repository and clients are able to search it in order to find the appropriate solution. Access to some parts of the information is restricted and only authenticated users should gain access to information. A multi-level security scheme should provide different access rights to different users. In the decentralized approach, a P2P architecture may be used based on a structured or an unstructured infrastructure.

Discussion: Technology Comparison and Future Trends

DRM systems inherit the advantages and weaknesses of the technologies they use. The complexity of a DRM system is greater than the sum of the complexities of its parts: the complexity of the individual system components that use different technologies. Such complex systems have more pressing requirements for higher levels of security, interoperability and usability than any simple system (i.e. a system that uses one or more technologies that are highly compatible with each other).

Security is naturally one of the main concerns in DRM system adoption. Perfect security cannot be offered by any DRM system, partly because 'perfection' requires the adoption of costly methods. Furthermore, the mosaic of technologies comprising a DRM system deteriorate security; connection points between different system components are often security holes in the whole system. However, not all methods are used in a DRM system since they are usually linked to specific functionality. For example, some technologies either prevent the illegal use and other the re-use of digital content. A DRM implementation may use only one of them.

Technologies that prevent illegal re-use of content include watermarking and fingerprinting techniques. Their functionality within a DRM system is different; watermarking is used for the assertion of rights while fingerprinting for content identification during searching in large corpora. The advantage of watermarking is the fact that it persistently marks content, possibly more than once (multiple watermarks). However, watermarks are not always persistent to content changes such as compression, cropping, rotation and other content processing functions. Durability depends on the specific watermarking technique and is often connected to increased CPU costs. Another weakness is the so-called deadlock

problem where a false watermark is inserted into the content and ownership is difficult to assert (Kwok, 2003). The good thing in such a situation is that no illegal watermark can stand up legally as ownership evidence.

Technologies that prevent illegal use of content include encryption, cryptography and metadata use. The later is usually combined with some other technique. Encryption of content uses symmetric key algorithms such as AES, RC4 or RSA. It is used to encrypt licenses and identities and has significant value to ensure content integrity. Portability is major concern when using encryption. Encrypted content may be compatible only with a single computer/device (e.g. the computer that downloaded it from the internet). This content is not portable and thus cannot be used in other devices decrease its value to the users. Encryption methods that prevent cross-device or cross-media copying (e.g. from a hard disk drive to a CD) have resulted in hardware incompatibilities. Table 2 summarizes the pros and cons of the main technologies used in DRM systems.

Agreeing on industry-wide standards is a major issue in DRM that is not yet resolved. Common

standards are especially important for metadata, since their use enables application-to-application interaction and thus task automation. Besides ISO, other standardization bodies continue to work on media standards in order to provide a common approach to enable interoperability, better quality and efficiency under specific constraints. W3C's standardization effort is wider known as the semantic web. The 'Semantic Web' aims to make A2A (application to application) interaction possible through metadata. XML, RDF, RDF(S) and ontologies are some of the technologies that will possibly make the Semantic Web a reality. Somewhat similarly to MPEG's standards, the Semantic Web is based on XML/RDF. The schema language adopted by W3C is RDF Schema and OWL. A popular misconception is that both efforts are compatible or supplement each other, since they use XML as a basis. This is not true yet. Although the general goals of W3C are the same with MPEG group's the approach is different. First of all, W3C works on the Web context and does not pay so much attention to the content of the multimedia itself. For example, low level, visual feature descriptions are not explicitly

Table 2. A comparison of the main security technologies/methods used in DRM systems

Enabling Technology	Relation to content	DRM task	Advantage	Weakness
Watermarking	Prevention of illegal re-use	Assertion of rights	Persistence, multiplicity	Deadlock
Cryptography	Prevention of illegal use	Containers	Ensures content integrity	Flexibility, portability
Fingerprinting	Prevention of illegal re-use	Content identification	Alternative search mechanism	High false reject rates
Metadata	Content identification/description	Rights expression	Flexibility	Lack of common standards

taken into account in the sense that there are no explicit descriptors for them as in MPEG-7. Another obstacle is the fact that the conversion from the schema language to XML is ‘lossy’. This means that the reverse conversion (from XML to the Schema language) is possible but the description may differ significantly. Parsing is also difficult. Metadata descriptions in XML derived from MPEG-7 DDL may not be parsable by Semantic Web tools. MPEG’s effort is more concentrated in the digital media domain, and as such it can be considered as a subset of the Semantic Web effort, although this is not entirely true. For example, MPEG-7 can be considered as an ontology and an ontology language at the same time. These differences affect IPR management in the e-business domain as well. Depending on the type of metadata used, different functionalities are supported. In general, when dealing with digital media, the MPEG’s approach is more appropriate because it is focused on the specific domain.

Standardization is a difficult process and in the IPR field many attempts started with enthusiasm only to run out of steam (actually support by large vendors) a couple of years later. Current efforts seem to be more stable as they rely on advances on complementary research fields such as multimedia and computer/network security (table 3). Standards should be used as a framework and not a panacea to technology problems (Cheng & Rambhia, 2003). Especially for DRM systems, fair use, interoperability and usability are key

requirements. The viability of a standard strongly depends by the support provided by large DRM market players from the first steps of its specification to its final deployment.

DRM has to deal with not only technical problems, but with the increased expectations of the market as well. Increased bandwidth has enabled the exchange of digital content through the WWW and Peer to Peer networks. Large DRM implementations (i.e. systems with a full set of functionalities) are not used extensively yet, especially from small-size users such as small and medium companies or individuals. However, subsets of DRM functionalities have begun to penetrate the market as lightweight content protection systems. The partial failure of large DRM solutions’ adoption has not eliminated the need of the market for content protection. Besides the move towards more lightweight and cost-effective solutions, new trends involve the seamless embedding of DRM functions into operation systems, mobile DRM solutions and technologies/business models for Peer to Peer networks.

The inclusion of DRM functions as standard operation system functions started with Microsoft’s Vista (formally Longhorn) operating system, the new version of Windows OS that was released in 2007. DRM support for multimedia will be heavier than ever and already some features have already drawn heavy criticism: Blu-ray videos will appear in low resolution if no licenses for this content are acquired. Similar DRM features are

Table 3. Standards currently used in main DRM mechanisms

DRM mechanism	Standard
Transmission and storage	MPEG-4, JPEG2000, OpenEBook
Rights Expression	XrML, XMCL, ODRL
Authentication	X.509, PGP, S/MIME
Metadata description	XML, RDFS, OWL

expected to be added to operating systems such as OS X in the near future.

3G mobile networks is another recent advance that opened the way for digital content distribution to mobile users. Cell phones and PDAs pose new requirements in the IPR/DRM area and architectures, business models and standards need to be reconsidered in order to be applied successfully. One consideration is the fact that mobile hardware and software architectures are more closed than their internet counterparts and quite different for each manufacturer. Thus, the impact of an attack to a specific mobile device or software is significantly reduced by diversity. In contrast, the personal computer market enjoys a well known software and hardware architecture, not necessarily an advantage when dealing with content security. However, diversity prohibits the adoption of 'one-size-fits-most' solutions. Another consideration is hardware capabilities of mobile devices, although greatly enhanced in the past few years, they do not permit the use of sophisticated DRM software. Costly watermarking and cryptographic algorithms cannot be applied in these devices so less CPU-intensive techniques need to be applied. A significant advantage for mobile-DRM solutions is the actual lack of user anonymity in mobile networks. The large majority of users in mobile cell phone networks is known by name (and not by IP as in the case of the Internet), and this is a significant prohibitor for illegal acts. Additionally, owners, users and licenses can be more easily recognized and managed. The area of mobile-DRM is fairly new and standardization efforts have only recently begun to take place.

Besides the WWW and mobile networks, another computing paradigm will inevitably integrate DRM: Peer to Peer (P2P) (Rosenblatt, 2003). P2P is a relatively new, highly distributed computing paradigm that enables sharing of resources and services through direct communication between peers (Androutsellis-Theotokis &

Spinellis, 2004). Extending the traditional model where most computers on a network act as clients, P2P introduces the concept of the simultaneous client/server mode: peers act both as clients and as servers. P2P networks are responsible for the distribution of huge volumes of pirated digital content especially damaging the music and film industry. The main difference between the P2P and the client-server model (used in the WWW) is its distributed business model while basic technologies remain the same. A social factor that prohibits the adoption of content protection technologies in P2P networks is the unwillingness of the users to perform transactions that are controlled or monitored in any way.

c ONc LUs IONs

The extensive use of digital media in networked applications increases security requirements. The protection of IPR of digital media is increasingly gaining attention as a prominent research area. Increased concern by companies and academia has led to the development of numerous methods and techniques that manage and protect IPR. DRM will probably stand on the forefront of technology debates for the years to come.

In this work we surveyed recent developments in the area of IPR protection of digital content distributed through e-commerce channels. DRM is one of the most important and complete frameworks that enable end-to-end management of digital rights through the media lifecycle. Enabling technologies for DRM systems include, among other, watermarking, an information hiding technique. Watermarking can be used for embedding or connecting usage rules in/with the content itself. The true value of watermarking lies in its multiplicity, that is its ability to embed and detect more than one watermark to a single digital artifact without decreasing its quality. Watermarks travel with content through the

distribution channels and they are resistant to its altering. Combined with metadata stored in central or distributed repositories, watermarks enable tracking and managing of legal rights on-line. A relatively small number of software vendors has already formed an initial group for exploiting digital watermarking for IPR protection. Some of these companies are spin-offs coming from Universities or research institutions and others are venture capital efforts. Large companies such as NEC and IBM have also expressed their intention to use this technology.

New standards offer new possibilities for IPR protection and DRM systems that involve watermarking, and may lead to the development of more advanced security services. The popularity of mobile devices and P2P networks increases the pressure for the development of new DRM business models and concrete standards. Standardization efforts, both in content representation and metadata, will hopefully contribute towards more secure transactions and media use.

The chapter also reviewed a solution to DRM interoperability, namely the DLC. Although still in a conceptual level they may prove the basis for a viable solution in the future. The main idea is to move beyond monolithic architectures that are inflexible and costly, towards service-oriented DRM eco-systems.

In conclusion, it seems that in the next years the field of IPR protection in e-business will attract even more interest from the research community. The increasing adoption of watermarking as a main protection mechanism by important vendors denotes its strategic role in IPR protection.

r EFER ENc Es

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Chapter XVI

Intelligent Contracting: An E-Supply Chain Management Perspective

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Abstr Act

The unprecedented advancements witnessed in the field of information and communication technology over the last couple of years are significantly affecting the nature and magnitude of B2B interactions, as well as their operational effectiveness and efficiency. However, interaction and contracting among global enterprises continued to be challenged by the difference of laws, authentication requirements, and endorsement constrains. With the rapidly increasing proliferation of mobile devices, wireless communication systems, and advanced computer networking protocols, the deployment of electronic contracting platforms and applications has provided many opportunities to enterprises; dictated new axioms for doing business; and gave rise to new paradigms. Together with the increasing institutional transformations, technological advancements motivated businesses to engage in an interactive process of contract formulation and negotiation.

INtr ODUct ION

The use of internet technologies is enhancing distributed business processes through improved information generation, retrieval, and storage, cost reduction, disintermediation, and the transformation of organizational boundaries. The

resulting global repositories of generic, volatile and heterogeneous data originating from different systems are significantly affecting B2B interaction (Klusck, 2001; Chrysovalantou & Petrakis, 2004; Daniel, 2003) and are resulting in alternative e-business models, strategies and enabling frameworks.

The use of such technologies in e-business allows firms to integrate core and support business processes and enhance information sharing efficiency. It addresses connections among enterprises (B2B) as well as between enterprises and customers (B2C) by speeding information processing and responsiveness and shifting the emphasis from optimizing the efficiency of individual enterprises to optimizing the efficiency of a network of enterprises in pursuit of improving competitive advantage (Xirogiannis & Glykas 2007).

According to Lumpkin & Gregory (2004), there are seven e-business models that account for the vast majority of business conducted online. Commission-based models are used by businesses (third-party intermediaries) to provide services for a fee such as brokerage services. Advertising-based models are used by companies that provide content and/or services to visitors and sell advertising to businesses that want to reach those visitors. Markup-based (merchant) models are used by businesses that add value in marketing and sales (rather than production) by acquiring products, marking up the price, and reselling them at a profit for both wholesalers and retailers. Production-based (manufacturing) models are used by companies that add value in the production process by converting raw materials into value-added products. In this respect, the internet adds value to this model by lowering marketing costs and enabling direct contact with end users to facilitate customization and problem-solving. Referral-based models are used by firms that steer customers to another company for a fee. Subscription-based models are used by businesses that charge a flat fee for providing either a service or proprietary content such as Internet service providers. Fee-for-service based models are used by companies that provide ongoing services similar to a utility company. Unlike the commission-based model, the fee-for-service

model involves a pay-as-you-go system because activities are metered, with payment being made only for the amount of service used such as it is the case of application service providers.

However, the capacity of these e-business models to facilitate an organizational migration towards dynamic e-business and ERP applications will be improved with the existence of enabling platforms mainly electronic payment and contracting systems. Because dynamic e-business allows organizations to integrate systems across intranets, extranets, and the internet in a dynamic fashion and permit them to modify existing systems quickly and easily when the business process requires (Andrew et al, 2006), enabling systems align e-business technologies with organizational processes and competitiveness.

Within the context of globalization and organizational transformations, firms are starting to use information technology as instruments to support their trading relations, manage their contractual matrix of rights-and-obligations and reduce risk. Electronic contracting that provides means for a high level of automation of the contract establishment, contract management, and enactment processes presents significantly more opportunities to the trading parties (Angelov & Grefen, 2004; Sallé, 2002). However, the growing multiplicity of data modeling and organization tools, content representation algorithms, ontologies, vocabularies, and query languages that account for heterogeneity and global information overload is promising firms to gain much faster and cheaper processing than traditional contracts.

While different approaches are being used to conceptualize the context of electronic contracts, the basic aim of this paper is to address the context of electronic contracting by using multiagent concepts to develop a framework that describes the process of formulation of these contracts using Sudatel as a case study.

E-SUPPLY c HAIN MANAGEMENT

Within the context of complicated business environment, the improvement of supply chain management process emerged as a critical success factor for many enterprises. They came to realize that competitiveness requires more emphasis on improving and optimizing their connections with their partners and stockholders through competition-oriented supply chain management processes. While emphasis on JIT delivery of inputs is growing, there has been an increasing need to adopt a comprehensive architecture that considers both involved “channels” and “partners”. The re-engineering of business processes has also been accompanied with the growing need for benefiting from technological developments and aligning them to the re-invented processes.

One of the main basic aims of improving the supply chain management process is to improve the industrial environment through the use of effective methodologies enriched with supplier and customer orientations to address the production–distribution problems. According to Ch et al (2007), considering the viewpoints of the supplier and consumer simultaneously is particularly required, because multiple manufacturing and demanding steps are performed at separate situations, concurrently. While emphasis tend to be oriented towards establishing interactive relationships (strategic alliances/partnerships) between upstream and downstream enterprises, additional benefits can be gained from the incorporation of cost, speed, and coordination dimensions. Angappa et al, (2008) advocated the development of responsive supply chain framework to realize these benefits through product service customization, risk mitigation and variability management associated with demand pattern, ordering policy, demand-information sharing, and lead time.

The improvement of supply chain management practices has been accompanied with the growing importance of developing powerful

models to orchestrate and efficiently streamline the leading attributes of the supply chain such as flexibility (labour, machine, routing and system), integrity and responsiveness. E-supply chain management emerged as a promising models and integrated frameworks that can be used to enhance supply chain management processes. In order to achieve coordination/integration of all the links in the supply chain, advanced information and communication systems have been used to facilitate coordination and allow for the virtual integration of the entire supply chain. The focus of this integration in the context of Internet-enabled activities is generally referred to as e-SCM. The internet can enhance SCM decision making by providing real-time information and enabling collaboration between trading partners.

Different techniques such as point-of-sales scanners which read, on real time what is being sold allow companies not only collect information on real-time to make decisions about what to order or how to replenish the stores but they also send this information, through the Internet, to their suppliers in order to make them able to synchronize their production to actual sales (Cristina & Lourenço, n.d). The Internet affect supply chain management through its impact of e-commerce, which refers mainly to how companies can respond to the challenges posed by the Internet on the fulfillment of goods sold through the net. It also affects the process of information sharing through web enabled access and transmission of information among supply chain partners. However, the Internet not only enables supply chain partners to access and share information, but also to access results of data analysis and modeling for collaborative planning and decision making.

Although with varying degrees of impact, electronic contracting plays a central role in all of these processes. It assists in channel coordination, supply chain collaboration, corporate responsibility and improved use of information.

sUPPLY cHAIN MANAGEMENT Pr Act Ic E IN sUDAN

The process of optimizing the acquisition of inputs and goods from different sources and destinations is gaining paramount importance both in business enterprises and international non-governmental organizations in Sudan. While the phenomena tend to be an international one, it gathered quantum momentum in Sudan over the last couple of years. Such importance originates from the following:

1. The migration to free economy and competitive market forms of efficiency through which considerable foreign investment is being attracted, international and multinational companies engaged in business transactions and different economic (agriculture, industry, oil, construction, services etc) are being established.
2. The expansion of peace keeping activities and relief activities undertaken by many international and UN agencies within the context of their emergency and rapid response processes.
3. The growing investment of business enterprises in the field of supplies and input provision by many Sudanese companies. The transformations witnessed in the organizational and institutional domains of Sudanese enterprises made them to realize that their competitiveness depend on their capacity to manage their supply processes as well as their connections (a.k.a integration) with both their clients and supply generating processes.
4. The growing supply chain related costs due to the reaction of certain sectors (such as marine transportation and container handling) to international issues such as the so-called war on terrorism. Inspection time, costs and complexity as well as downside risks have

encouraged insurance and forwarding companies, for example, to introduce new supply chain processes and increase prices.

bottlenecks and c hallenges

Mis-Appropriation of Supply Chain Processes

The majority of Sudanese enterprises lack the concepts that derive an effective supply chain management. While the supply chain activities are used to be limited to “purchasing” its orientations continued to be focusing on “time-guided” projects i.e., when an enterprise “purchases” its supplies then it feels that the project is over. Especially for supply chain management processes in public institutions the lack of flexibility, organizational responsiveness and accountability, the management process is oriented towards using the supply chain job as a means for corruptions and opening escape gates for bad behavior.

Inadequate Coordination and Cross-Process Integration

The lack of coordination and process coordination of supply chain management activities in the majority of Sudanese enterprises can be attributed to a wide range of change agents:

Organizational Factors

Process coordination and integration is directly and inexorably related to the organizational setup of the entire enterprise. While it is basically determined by the context of division of labour, basic departmentation and task-process activity matrix, it is based mainly on the degree of task structuring, flexibility and adaptability. Especially for public enterprises, the lack of organizational flexibility and rigidity of structures is challenging them from aligning the coordination and coordi-

nation processes of their respective supply chains to the transformations that take place on their institutional and environmental landscapes.

Managerial Factors

Because it incorporates a wide range of (integrated) managerial and decision making processes, supply chain management is affected by the capacity of the entire enterprise to:

1. Take multi-criteria based decisions that focus not only on orchestrating internal functionalities (internal or backward integration) but also cultivate and maintain effective and efficient flow of supplies through “informed” vendor interaction (external forward integration) and negotiation. The higher the ability of the entire enterprise to integrate its activities (both backward and forward) the higher will be its capacity to manage its supply chain processes.
2. Improve its capacity to appreciate the modifications that take place in the context of decision making (local vs. international) especially when supplies are provided by international vendors or are provided under international considerations.

Technological Factors

The migration towards building supply partnerships with international organizations necessitate significant enterprise-wide transformation with regards to:

1. The capacity and efficiency of the entire enterprise to keep sustained “logon status” on the international networks of international supplier organizations. While those suppliers capitalize of the use of information technology as a business imperative, they invest heavily in improving the ability of

their decision makers to use it in complex decision making environments.

2. The development of organizational capabilities necessary for the management of technology intensive acquisitions and e-supply chain management processes.

The impact of such factors on Sudanese enterprises and their ability to manage their supply chains tend to harmful.

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Electronic contracting involves the exchange of messages between (the concerned parties), structured according to a prearranged format so that the contents are machine-processible and automatically gives rise to contractual obligations necessary for achieving a legally supported business relationship (Baum & Perrit, 1991; Milosevic, 1995).

While some firms use it to enhance their capacity to perform need identification, manage production and merchant brokering, and negotiate in the space of time as explained by the consumer buying behavior model, others are aiming for the dynamic customization of their “4P’s” (Product, Price, Promotion, and Placement) and “one C” (Customer relationship) and the deployment of online flexible and efficient negotiation and electronic contracting infrastructures (Dutta & Segev, 1999; Runge, 1998; Guttman et al, 1998).

In addition to technological developments and institutional imperatives, the interest of firms in electronic contracting is enhanced by the willingness of governments to develop legislations that remove barriers to electronic commerce. The Electronic Signatures in Global and National Commerce Act in the US and the European Electronic Signature Directive, among

others, include provisions relating to the liability of network service providers, digital signatures as well as the duties of digital signature subscribers and certification authorities with regards to the creation or execution of, among others, a will, negotiable instruments, and indentures. The Model Law of Electronic Commerce (UNCITRAL) introduced the concepts of “functional equivalence” and “technology neutrality” as new axioms for contract formation, authentication and implementation.

In dynamic e-business settings, electronic contracts help enterprises to (a) identify business partners, (b) match their individual offer specifications with complementary ones from other partners, (c) negotiate conditions and contractual terms, (d) collectively sign contracts, and (e) execute obligations and actions that are defined in the contract (Merz, et al, 1998; Lai, et al (2005).

However, irrespective of the wide spread of electronic contracting, business enterprises have some worries. Electronic contracts are not “definite” enough as to whether a business trader is making an “offer” or “an invitation to treat”. The information provided lacks the sense of absolute intent necessary to have a binding agreement and a conclusive intent of a binding offer in the sense that the offeror is willing and able to “deal” with all without any reservation. Such confusion affects the decision of the concerned parties as whether to communicate an “acceptance of an offer” or to discuss further. Jurisdictional concerns also arising from the disputes regarding the place where the contract is formed and the laws to be applied. Such concerns are directly related to contract validity and communication of acceptance in a legally binding form. In addition, some authentication and attribution concerns create some worries regarding the process of matching the parties contracting electronically by attributing electronic messages to the person who purports to send it. The contracting partners want to know

that they can rely on the messages to be exchanged and avoid liability in case of messages being sent by an interloper or hacker.

To minimize these uncertainties, different solutions are being proposed. The use of browsing and downloading “facilitative” capabilities, “checkboxes”, “disclaimers” and “technology filters” is relaxing some of the jurisdictional concerns by shaping out the inclusion or exclusion of certain transactions and/or specific locations. The use of metrics to account for the time in which the information is sent, received and accessed using servers, routers, TCP/IP, packet switching, client and server technologies is another development that clears out some doubts about contract validity. The use of a wide range of internet technologies such as EDI, EFT and VAN has also enhanced universal availability of global repositories of generic, reusable transaction models.

The formulation and adoption of electronic contracts contributes to the efficiency of supply chain management activities. The potential support is envisioned in procurement, delivery and fulfillment related tasks as well as in customer support and service quality. The context of supply chain management is changing both in context and scale. Realizing competitiveness is becoming increasingly based on the capacity of enterprises to develop business models that facilitate the incorporation of flexibility (labour, machine and routing) dimensions using appropriate platforms of information technology. Outputs from such models can assist in making suitable production decisions to produce multiple products under an uncertain environment (Zhejun Gong, 2008). To promote competitiveness, supply chain management is emphasizing the importance of improving the industrial environment by solving the production–distribution problem not only from supplier- or customer-oriented consideration but by presenting the interactive relationship between upstream and downstream enterprises. This is because multiple manufacturing and demand-

ing steps are performed at separate situations, concurrently (Che, et al 2007).

To combine the characteristics of Supply chain management and agile manufacturing, emphases is made on developing responsive supply chain frameworks that can be employed as a competitive strategy in a networked economy in which customized products/services are produced with virtual organizations and exchanged using e-commerce (Angappa et al, 2008).

Because of the lack of rigorous analytical models elucidating the relationships among the partners of the entire supply chain management, the use of software agents to formulate electronic contracts provide considerable added value. The migration towards e-supply chain management dictates new axioms for contracting and cross-partner interaction.

r ELAt ED WOr K

Within the context of international trade the basic question in configuring contract negotiation is “what to be negotiated” (Reeves et al, 1999; Grosf et al, 1999). In any contracting context, some features of the potential contract are fixed while others are variable and are expected to be determined through the contracting process.

The “phase model for commercial transactions” has been widely used to guide the process of decomposing architectural elements of electronic contracting services (Schmid & Lindemann, 1998). The model consists of three phases: information, negotiation and execution. Such phases are supported by different computer-based services including online catalogues, search engines, or banner advertising (information phase), tele-collaboration, negotiation protocols and strategies (negotiation phase), workflow management, business process integration among market participants, electronic payment systems, and EDI-based message exchange functions (execution

phase). Support functions like brokerage (i.e., to select and match respective offers and inquiries, to form a (service providing) consortium or to set-up the negotiation session for all parties of the commercial transaction) and signing (i.e., to enter the execution phase by establishing a contract and encouraging all parties to sign it) are being widely used also. This process has also been supported by trusted third parties such as certification authorities or electronic notaries).

Runge (1998) claimed that electronic contracting involves two processes: “agreement negotiation” and “agreement signing” through which the exchange of electronic messages among the contracting parties is supposed to lead to contract formulation and signing. The terms of the agreement (both fixed and those to emerge through negotiation) as well as the actions to be taken occur through “electronic records” or “data messages” that are generated, communicated, received or stored by electronic, magnetic, or optical means in an information system or for transmission from one information system to another (Reeves et al, 1999).

According to Milosevic & Bond (1995), the contract cycle includes “establishment”, “performance” and “post contract” phases with the rules and policies being stored in a Legal Rules Repository. The contracting process involves a Contract Validator (to perform contract validity checking), Contract Negotiator (to support contract negotiation), Contract Enforcer and Contract Arbitrator. It also includes Contract Legality and Monitoring objects. Electronic contracting is guided by “contract templates” containing the roles of the contracting parties, the period of the contract, the nature of consideration, associations between “roles” and “obligations” and the semantics to be used for the representation of alternative contracting scenarios. Using these templates, contract validity can be established through the identification of a set of mandatory elements (agreement, considerations and compe-

tence). Contract monitoring, on the other hand, can be performed by the parties or by a third party acting on behalf of one or all the parties.

Similarly, Goodchild et al, (2000) considered a valid business contract as being containing four elements: agreement, consideration, capacity, and legal purpose. Instead of using “contract templates”, they proposed the use of a standard contract as a base for the contracting process. Such a standard contract can be provided by one of the parties, a third party or a commercial organization specialized in providing general-purpose contracts.

The Reference Model for Electronic Markets proposed by Lindemann & Schmid (1998), views electronic contracting within the context of an electronic market by using two dimensions (horizontal and vertical) and four views (business, transaction, services and infrastructure) to reflect both organizational and technological aspects. Lindemann & Runge (1997) proposed the use of learning- software agents to search for offers and negotiate on behalf of users. Because agents are not capable of signing reliably on behalf of their users, it may be necessary to enable the signature of electronic contracts by separating the negotiation process from the signing process.

Alternatively, electronic contracts can be established using CrossFlow Contract Manager Modules without human interaction (Koetsier et al, 2000). The data structure of the CrossFlow contract model consists of five main parts: the concept model, the workflow definition, the enactment clauses, the usage clauses, and the natural language description. The architecture of the contract object model of the Common Open Service Market for SMEs (COSMOS) is composed of an online catalogue, brokers, contract negotiation support, signing support, and contract execution support. The project uses the CORBA Business Objects Architecture (Griffel et al, 1998).

The contract approach used to develop the TINA (Telecommunication Information, Net-

working Architecture) framework used the “Meta-broker” concept and is built around four modules: Validation, Negotiation, Monitoring, and Enforcement (Daoud, 1998). The Meta-broker concept is composed of a contract framework and catalogue facilities necessary for maintaining correct negotiation protocols, contract validation and the enforcement of constraints and interactions with virtual catalogues.

In their previous work Grosz (2001), Grosz et al, (1999) and Reeves et al, (2002), claimed that electronic contracts can be represented and communicated as modular logic-program and Semantic Web XML rules by incorporating process knowledge descriptions and ontologies represented in DAML+OIL. This is to enable the representation of complex contracts that include provisions for addressing behavioral issues and exception-handling conditions that might arise during the execution of the contract.

In their work on using software agents for electronic contracting Runge et al, (1999) and Griffel et al, (1997) used the “Customer Buying Cycle” and the “Media Concept”. The media concept is defined as an entity of a platform that facilitates the representation, processing and communication of information using an organized community of agents. It consists of three components: the logic component (representing and formalizing information for agent interaction), a community of agents (processing information and using the medium as a common information and communication space) and a set of channels that carry information and enable agents to communicate over time and space barriers. It also includes four layers (or views): community, implementation, transaction and infrastructure Views. Alternatively, Greunz et al, (2000) viewed electronic contracting using three layers: a logic layer (to manage the monitoring of the contracting process), an information layer (to provide data storage and contains the contract structured and unstructured information) and a communication layer (to in-

clude all protocols and security measures necessary for the communication among services and contracting parties). Lindemann & Runge (1997) viewed the layers differently as a business layer, a services layer, and a technical layer.

The multi-party contract model proposed by Lai et al, (2005) consists of three core components: actions, commitments and a commitment graph. The contracting parties perform actions based on the definition of their roles and functionalities. A multi-party contract includes one or more commitments including some actions to be performed by the concerned parties. A commitment is a guarantee by one party towards another that some action sequence shall be executed completely provided that some “trigger, involve, and finish” action happens, and that all involved parties fulfill their side of the transaction. To finish a commitment, more than one party can be involved in different commitments and play different roles. A commitment graph shows complex relationships among commitments (Verdicchio & Colombetti, 2002; Ervin, 2002).

METHODOLOGICAL FRAMEWORK

The proposed multi-agent framework attempts to approach the context of electronic contracting by using multiple methods to couple the functionalities of actors with the models that describe their interactions. The framework is basically based on the concept of “Management by Contracts” that aims at the development of a way for formalizing and analyzing contractual relationships and understanding their resulting impacts. This approach follows a utilitarian and deliberative approach that articulates and orchestrates objectives in pursuit of allowing the concerned parties to look at “meeting or not meeting” them as alternative viable business options (Sallé & Bartolini, 2004). It also incorporates the concepts of “Service Level Agreements” (SLA)

and extends them to incorporate Business Level Agreements (BLA) as well.

While the basic analysis and design is based on TROPOS (an agent oriented software engineering methodology), the method of “information system work and analysis of changes” (ISAC) proposed by Lunderberg et al (1978) has been basically used for analysis. According to this method, the analysis comprises two parts. The first part is the study of the organization and identification of possible feasible types of development measures (changes or improvements) that should be incorporated into its activities to solve existing problems and fulfill needs. The second part of the analysis is carried out on the information processing activities to identify and classify sub-systems, and finally design the overall architecture of the multiagent electronic contracting system. ISAC distinguished two main groups of activities in the analysis and design of information systems: (i) problem-oriented work directed towards the logical structure, and (ii) data-oriented work directed towards understanding the physical structure of the entire system. Problem-oriented work refers to those activities associated with the functionalities of the information system from the user’s point of view. Data-oriented work refers to the activities are concerned with the process of designing technical solutions that meet logical specifications. These are developed through implementation of the two methods: change analysis and activity study.

Change Analysis

The telecommunication market in Sudan is becoming increasingly competitive as it includes three companies offering cellular phone services with other two companies offering fixed lines services. The Sudanese Telecommunication Company (SUDATEL) was established in 1994 after the privatization of the Public Corporation for Wired and Wireless Communication with the objective of providing quality and affordable

telecommunication services and penetrating the regional telecommunication market by acting as a trusted carrier among countries in the Arab and African world. The company offers fixed phone services and cellular phone services in collaboration of one of its subsidiaries. The company's Investment in the acquisition and operation of telecommunication infrastructures (advanced operators, fiber optic networks and early warning and response systems) is placed on the priority list of the company's financial plans. In addition to the provision of internet services, the company is using HDSL, videoconferencing and interactive real time communications to provide distance learning services and synchronous and/or asynchronous delivery across remote trajectories. The company is, also, implementing and managing an electronic library that includes more than 20 "accessible" databases. The Sea Cable, connecting Sudan and Saudi Arabia through the DWDM technology is enhancing the capacity of the company as a regional information carrier.

Operationally, the company is currently using a multi-module computerized system to manage its functions. The "Payment" System Module (through the "budget" and "Expenses" programs) manages financial obligations including salaries, disbursements, and other financial obligations. It uses "an integrated" database to produce relevant management reports. The "Accounts" reports sub program consolidates and collects accounting information from other programs and allows financial sub-modules to classify and tabulate it and produce the annual financial report. The "Invoices Sub program" is linked to the "customer desks" and the "General ledger" program where the collected information is usually used for financial adjustment. The "Stores" Program maintains stock balances for reorder and stock-out considerations. Purchasing activities are managed through the "Purchasing sub program" which includes sub modules for domestic and international suppliers. The "Contracts" program

is a sub module through which contracts' information (e.g., contractors, obligations, maturities) is recorded and processed.

Change analysis comprises assessment of the existing situation of contracting in the company to identify the problems, requirements and, the appropriate support tools. The final product of this activity is the identification of the appropriate measures including multiagent information systems. Analysis of the current situation showed that the management devotes much attention to the use of a standard contracting process by giving a ready contract for contractors to use.

Activity study

Activity studies define the functions that a multi-agent information system may perform as well as information requirements. This can be achieved by detailed analysis and design of activities related to the planning, monitoring, and evaluation processes, based on the identification of problems and definition of information requirements for each activity. The functionalities of telecommunication companies are usually challenged by the failure to develop integrated information systems that relate different applications throughout the company. Based on their general use, individual applications and/or sub modules are usually developed by end-users and/or outsourced to vendors. The lack of an integrated framework makes the functional user-centered sub-modules to be under-utilized particularly for strategic decision making.

The increasing deployment of electronic commerce and banking services urge the company to improve its operational efficiency to facilitate electronic transactions and clearing. The use of discontinuous plans and lack of concrete visions decreases customer satisfaction and the effectiveness of B2B interactions. Because the company has started to manage the provision of cellular phone services in other countries its dependence on conventional supply chain management meth-

odologies negatively affect operational efficiency and responsiveness.

MULTI AGENT FOR MULTIFICATION OF ELECTRONIC CONTRACTING ACTS

The processes of electronic commerce have been supported by the growing deployment of software agents, particularly, in auctions, exchange, shopping, pricing and contracting (Wu & Sun, 2002). According to Lee & Lee (1998), one of the most important applications of intelligent agents in electronic commerce is comparison shopping, in which agents assist in searching for product items on the Internet on behalf of a customer. After searching the relevant online shops throughout the Internet for the items that match the search criteria, the agent returns a detailed description and price of the sought items and addresses of the virtual stores that deal with the items.

The agent approach is characterized by the use of agents to save resources and carries out processes (Angelov & Grefen, 2001). An intelligent agent is as an autonomous, computational software entity that has access to one or more, heterogeneous and geographically distributed information sources, and which pro-actively acquires, mediates, and maintains relevant information on behalf of users or other agents. The autonomous behavior of these agents is determined by their pro-activeness, reactive and deliberative actions, and social interactions. In a multiagent system, agents jointly use knowledge and resources to solve problems in a context-dependent way. Their use in a wide range of applications such as electronic commerce, traffic control, health care provisioning, portfolio management and telecommunications, revealed their suitability for complex, distributed problems involving a multiplicity of interconnected processes whose solutions demand the allocation of fusion of information and expertise from demographically distributed sources (Gasmelseid, 2007; Aaron

et al, 2004; El Fallah-Seghrouchni et al, 2004), multi-agent systems (MAS) have been used for several years as a paradigm to develop complex systems for well known reasons like autonomy, reactivity, robustness, proactivity, etc. The different approaches in the field of multiagent systems, that is to say the reactive and the deliberative approaches, are used according to the level of autonomy given to the agents.

The use of multi agent systems in electronic contracting enriches the contractual context by viewing the contracting parties as sets of agreements for satisfying the diverse interests of self interested individuals and organizations (Dellarcas, 2001) and regulating behavior among them where agents can change the interaction with and within the entire contracting domain and create obligations, permissions and new possibilities of interactions (Pacheco & Carmo, 2003; Boella & Van der Torre, 2004).

Based on their characteristics, multiagent systems assist in the process of information acquisition, management, synthesis and presentation. Viewing electronic contracting as a “phased” process, they can assist specifically in the discovery of potential contracting partners, negotiation of contract terms and execution of transactions and other contract provisions (Reeves et al, 1999).

However, the deployment of agents in the formation of electronic contracting moved a wide range of issues to the front line agenda of the research, business and legal community including:

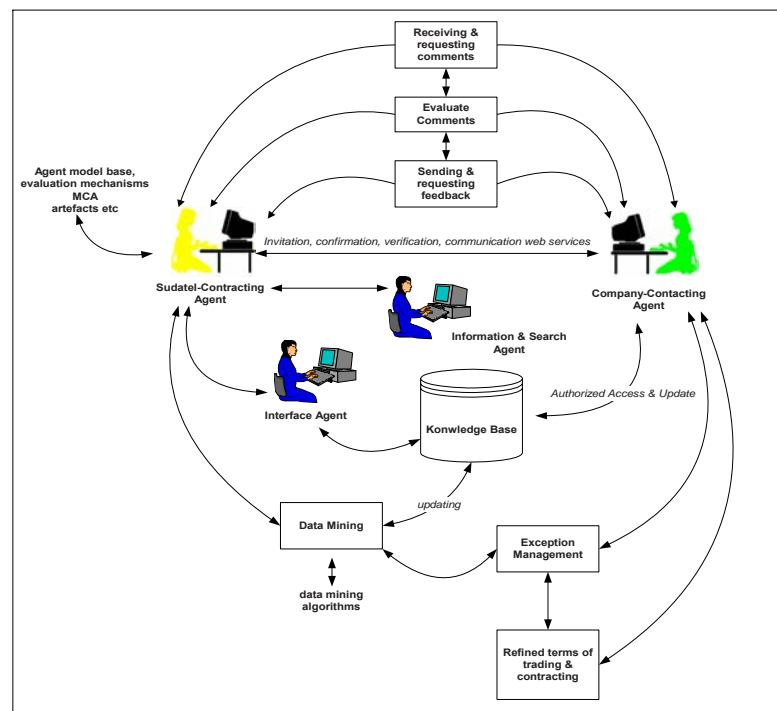
1. Procedural issues relating to dynamic negotiation & authorization, privacy, reputation, recourse (including deterrence & rollback), instant settlement and counter-party risk, decentralized access control, monitoring compliance, derived rights, and the operationalization of legal concepts of non-repudiation,
2. Typological issues dealing with the types of contracts to be formed and enacted electroni-

- cally such as trusted intermediaries, smart contracts, ricardian contracts, anonymous and pseudonymous contracts.
3. Technological issues relating to the technological infrastructure and the methodologies to be used for computer-aided negotiation, formation, and signing of electronic contracts. The list includes, among others, Contract languages and user interfaces, electronic right languages, electronic rights transfer and management, relationship of electronic and legal enforcement mechanisms, the interface between automatable terms and human judgment, electronic trans-jurisdictional commerce and contracting, decentralized data access and control, security and dynamism.

sYst EM Arc Hlt Ect Ur E

As shown in the architecture represented in figure (1) below, the agent model of the proposed framework includes two types of agents: superior and subordinate. Superior agents (e.g., Sudatel-Contracting and Companies- Contracting) have the privilege to control, direct and communicate in their own capacity as well as on behalf of their respective subordinate agent(s). Subordinate agents (e.g., search and information) act in a consultancy (staff) capacity to provide information necessary for the validation and verification of processes. As shown in figure (1) below, the architecture, at the abstract level, includes two groups of process-centered functional agents: Sudatel-Contracting (SC) and multiple Companies-Contracting (CC) agents

Figure 1. A multiagent contract formulation architecture



with the possibility to add more superior and/or subordinate agents. The basic objective of the SC agent is to locate and communicate with different companies-agents interested in the provision of services and ready to engage in the process of formulating and adhering to an acceptable electronic contract. On the other hand, each CC agent will be interested in achieving competitive advantages by engaging in international trade. Therefore, they will be concerned also about locating “customer” companies to whom they can sell their products. To enable the realization of these objectives, the proposed multi-agent system must facilitate the formation of electronic contracts by focusing on the identification of the relevant agent, their functions, relations among them, and necessary cooperation mechanism.

A brief description of the system components is as follows:

1. **Sudatel-Contracting agent:**
It is the intelligent assistant of the “Contracts” (functional) manager to whom it dispatches its search results to enable him/her to crystallize relevant information about interested suppliers and use such information to create and endorse Company-Contracting lists using multi-criteria analysis. At the same time, this agent is also responsible for providing pertinent information requested by agents representing different contracting companies by exchanging messages with them and manages contract formulation based on these contacts, feedbacks and comments received. Based on requests from the agents representing suppliers (i.e., CC) or SC agent, it can, as the stage of contract formulation permits (as the main contracting parties), terminate active contacts and discussions and make that termination public.
2. **Company-Contracting agents:**
These are the agents representing potential interested companies who can engage in the process of formulating an electronic

contract. The contacts initiated by all agents in the multiagent organization have to follow the rules of contracting to apply across several rounds of discussion. These agents also maintain their local (updatable) databases and models.

3. **Information and search agent:**
While they can also be used by contracting companies, the use of information and search agents in this article is limited to our classification of agents as either “superior” or “subordinate” from the point of view of Sudatel. Both agents are viewed as “subordinate” rather than “superior” agents. The main task of the information agent is to perform pro-active searches, maintains and communicates information within the context of electronic contracting process on behalf of the task agent (i.e., SC) that supports the “Contracts” functional manager at Sudatel. The skills of the information agent include retrieving, analyzing, manipulating, and fusing heterogeneous information as well as enhancing visualization and guidance through the entire information space. Because it searches for information, it also maintains access to multiple, heterogeneous and graphically distributed information sources on the internet. The wide range of web based technologies currently made available at the disposal of information agents (such as web-services) provide considerable support in this regard. However, access to all data contained in the databases of Sudatel is provided through the respective subordinate agents to relevant Company-Contracting agents.

Actors Decomposition

Actors’ decomposition provides more details about “system processes”, “information elements” and “agent functionalities”. The process of actors’ decomposition is based on the understanding that

electronic contracting and interactions among the contracting parties focus mainly on “what to be negotiated”. In addition to its contribution to the development of implementation-related architectures, thorough actors’ decomposition gives an insight about the ability of the concerned parties to acquire information by sending and/or receiving comments, evaluating them and sending or requesting feedback. Based on the propositions associated with electronic contracting described in this article, the actors’ decomposition diagram includes two basic components: “information acquisition, provision and management” and “information or comments, process handling and evaluation” as shown in figure (2) and (3) below. Information acquisition and provision focuses on maintaining interfaces to agents (and their owners or users”, other agents and functional modules.

Interface to users facilitates “un-modeled” interventions to be introduced by functional managers (i.e., Sudatel’s Contracts Manager) to incorporate some changes and enables cross-user or cross-agent exchange of information and verification of alternative scenarios. Interfacing to modules enables users as well as agents to handle user and agent specific functions necessary for the management of their entire activities in accordance with the dynamics of the problem domain. Interfacing to other agents provides access to general non-specific information and allows them to mutually access data from other sources in pursuit of facilitating transactions, communication and improvement of awareness.

On the other hand, the second basic functionality is “process handling and evaluation” which also incorporates multiple interfaces. The

Figure 2. Actor diagram for information management (step 1)

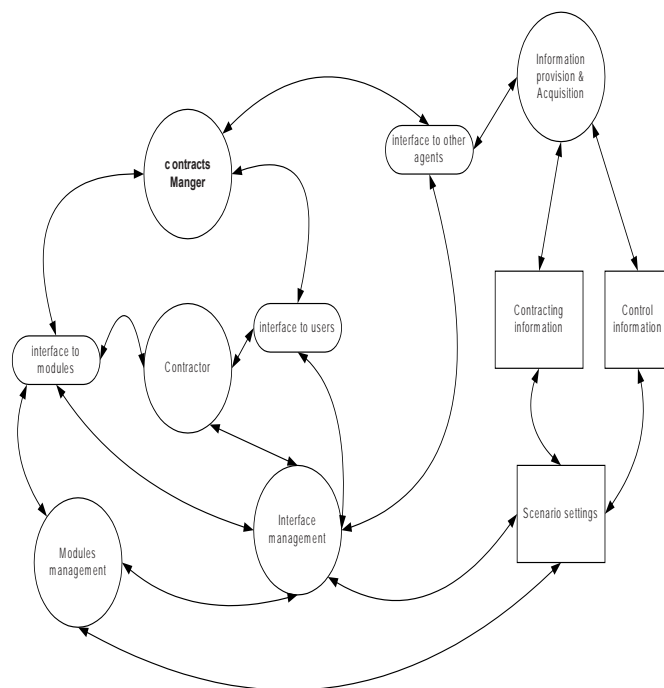
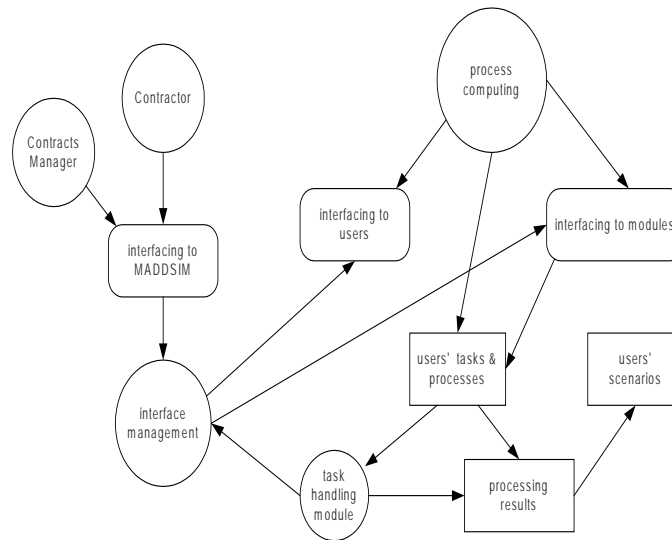


Figure 3. Actor diagram for process handling and evaluation (step 2)



development of alternative scenarios necessary for an informed electronic contracting process depends on the nature of the task or processes to be adopted by the concerned contracting parties in their pursuit to achieve their objectives by mutually agreeing on the terms of the electronic contract. In addition to the interface management component, figure (3) below describes the task handling module that supports a wide range of tasks for multiple contracting partners, including their data processing activities and the scenarios they may choose.

Agent Interaction Process

As shown in figure (1) above, the process starts by the search for potential contractors who can meet the requirements of Sudatel with regards to their willingness and ability to engage in the process of forming electronic contracts and providing goods accordingly. The information and search agent of Sudatel either searches a “roster list” of

suppliers as included into its database or search the internet for “relevant” contractors in accordance with some metrics and benchmarks embedded into its knowledge engine. The results of the “search” significantly affect the decision of the Sudatel as whether to place a full-fledged or “conditional” invitation to offer. However, the capacity of the search or information agent to search the network and locate relevant information is contingent upon its capacity to use the appropriate means to, electronically, scan the environment, discover the appropriate information and satisfy its information requirements. Despite the multiplicity of techniques being used, the capacity of such agent to learn how to locate and discover information is affected by a wide range of considerations. The use of monolithic internet indices (such as Gopher and Harvest), search engines (bots) and “facilitators” to be used to search information for agents and obtain network locations is challenged by the overwhelming work to be done by the designer particularly for complex systems and the change

of internet addresses. Moreover, agents must have some “reasoning” and “coordination” skills that enable them to use the acquired information in the process of task handling. Efforts to resolve these problems have resulted into the development of different techniques such as rule-based inference, classification planning, and constraint satisfaction, organizational structuring, and contracting tools. In addition, the capacity of agents to search information is also affected by the challenge of the lack of generally accepted programming languages as well as the complexities resulting from the growing “ontological” and “semantic” considerations.

The Sudatel-Contracting agent then screens results and interfaces with the Contracts Manager to certify information accessed and incorporate any changes with regards to metrics, benchmarks, and models in the knowledge engine of the entire agent. It is only at this point where the decision is taken about the nature of interactions among the contracting parties and whether they incorporate an invitation to “treat” or “offer”. The process is then “operationalized” by initiating contacts between Sudatel-Contracting agent and other potential Company-Contracting ones with the aim of framing out the context of contract formulation. If the Contracts Manager decided, from the beginning, to place an invitation to offer on the company’s website, then it will be waiting for replies from potential contractors. However, particularly in international trade, it is necessary that the contracting parties have to know about each other’s “way of doing business” before they can start electronic data interchange. This is necessary to facilitate reaching an agreement among the concerned parties with regards to the procedures and sequence of actions [sending and/or receiving of goods, documents or funds] to be followed, documents to be exchanged, and rules that govern their activities in an integrated context of business transactions to avoid “battles of forms” and lack of standardization.

Sudatel-Contracting agent (based on the search results provided by the concerned subordinate agents and the cross-check conducted by the Contracts Manager), can prepare a list of potential trading and contracting partners with whom communication can be initiated. Company-Contracting agents are advised, at this point, by the Sudatel-Contracting agent to confirm their willingness and preparedness to engage in the process of formulating an electronic contract. Based on their response, the Sudatel-Contracting takes all necessary arrangements to enable them to access Zone (A) of its corporate database in order to improve their knowledge about the entire context of contracting. Zone (A) is the publicly- accessible (online) portion of the corporate database which includes company information, nature of business, financial statements, standard operating procedures, technical specifications, nature of use associated with the items to be supplied, inbound and outbound logistics, and a general description of the criterion to be used evaluation. The Company-Contractor agents can, frequently, access Zone (A) and may call for “verification” or “further information”. It is also possible for Company-Contracting agents at this point to decide whether to continue in the process of formulating an electronic contract, ask for modification (eg. invitations to treat vs. invitations to offer) or “decline”. Such interaction increases the amount and richness of information accumulating in Zone (A) which can then be analyzed using appropriate data mining algorithms, multi-criteria analysis and other situation modeling techniques. The Sudatel-Contracting agent interfaces with the Contracts Manager to enable any possible modification on its model base or knowledge engine specifications to accommodate the requests and comments resulting from the interaction of multiple Company-Contracting agents across the landscapes of Zone (A) of the corporate database.

Such interactions can also be used to get an insight about serious potential Company-Con-

tracting agents who are willing and capable of proceeding into the process of electronic contracting. Those “agents” are then provided, through the relevant subordinate agents of Sudatel, access to Zone (B) of the corporate data base which includes more specific information relating directly to the contract and the offer. It includes, among others, a copy of federal and provincial clauses that govern international transactions, maps in different formats, as well as detailed information about the country’s banking, financial and prudential systems. Information about the nature of processes of the company and similar previous contracting terms can also be included. Zone (B) of the corporate data base may also include a spatial data repository. Interaction among agents can also be supported by incorporating situation-specific model-coupling mechanisms within the data analysis methods in use. While such interaction enables the concerned parties to receive, evaluate and communicate information and views, it also facilitates refining the whole context of contracting and managing exceptions.

With the facilitation of the Sudatel-Contracting agent, the agents interacting in the context of electronic contracting continue to collaborate in order to orchestrate the overall functionality by incorporating and updating their “learning skills and algorithms”. The process of communication and data refinement continues until an agreement is reached with regards to the terms of contracting and trading between the Sudatel-Contracting agent and concerned Company-Contracting agents. While the process of contract formulation is separated from contract signing, as it has been proposed previously, the process of contract signing can be also agreed upon the context of contract formulation.

To maintain corporate integrity and security of the entire framework, access to Zone (A) and (B) of the database demands the incorporation of relevant security measures including digital signatures, encrypted passwords and bio-metrics, among others, as means for strengthening

control over information access and exchange by authenticating users “agents as well as their owners” and managing optimized access to computer networks. By using special software, the recipient of messages (i.e., contracting agents) compares the digitized representation of the entered signature with a stored copy of the graphical image of it so it is more reliable for authentication because there is a biometric component to the creation of the handwritten image. If the digital signature file is sent electronically, it is subject to interception, copying, and later resubmission by parties other than the signer. The use of Biometrics ensures that the unique physical characteristics of individuals can be converted into digital format to be recorded in a file and interpreted by a computer. Among the widely used biometrics measures are voice patterns, fingerprints, and patterns present on the retina of one or both eyes. In this technology, physical characteristics are measured by a microphone, optical reader, or some other device, converted into digital code, and then compared with an authenticated copy of that characteristic stored in the computer.

Within this context, both Sudatel-Contracting and the Company-Contracting agents are represented as “packages” known as Sudatel-contracting and Company-contracting packages respectively. Interactions inside each package (among superior and subordinate agents) and among the different packages, are regarded as “communication relationships” that take place among “sending” and “receiving” agents as shown in figure (4) below.

The open communication and evaluation processes that take place within the context of the multiagent-based contract formulation process are regarded as a change-effect spectrum as shown in figure (5) below.

Interactions are governed by a variety of situation-specific considerations:

1. Information accessibility, use, update and the capacity to reconfigure processes. While

Figure 4. Agent interaction context

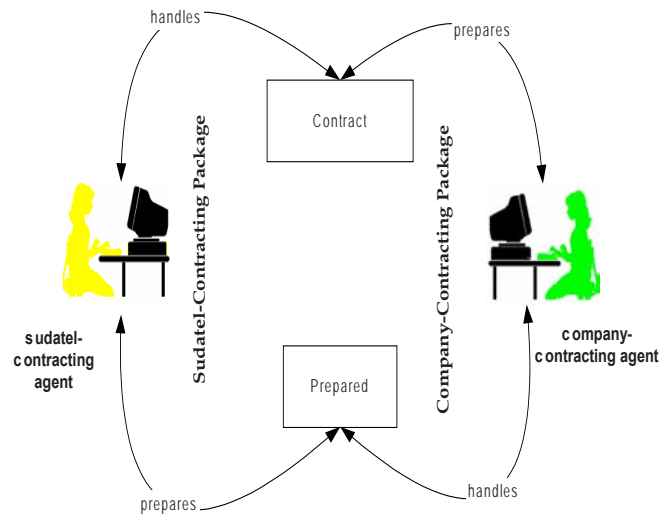
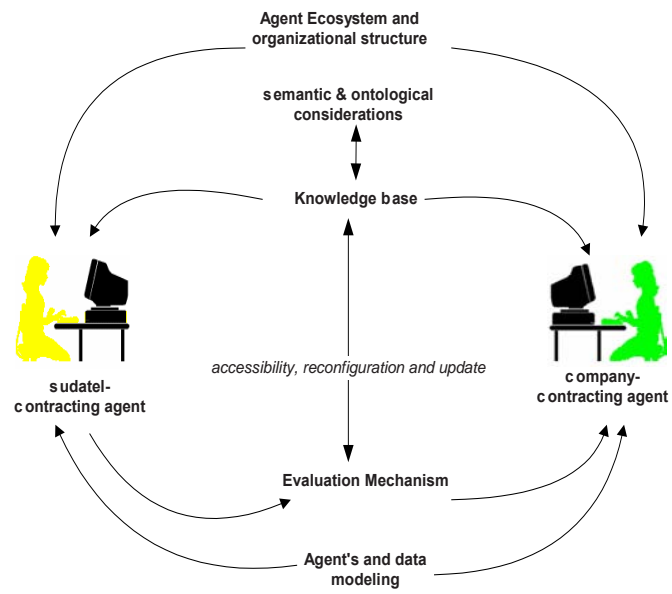


Figure 5. Agent interaction framework



different methods can be used by different enterprises, the optimality of the entire multiagent organization calls for sufficient standardization. Fortunately, such interaction is made possible by the existence of a wide range of standard protocols and technologies including Internet Open Trading Protocols (IOTP), Financial Products Markup Language (FpML), The Joint Electronic Payment Initiative (JEPI), Information and Content Exchange (ICE) Protocol, and Simple Object Access Protocol (SOAP). The development of different language specifications (E-commerce Modeling Language (ECML), Trading Partner Agreement Markup Language (tpaML), xCBL, eBIS-XML) and frameworks (ebXML, BizTalk, The UDDI (Universal Description, Discovery and Integration), and eCo Framework has also improved the ability of the contracting

parties to acquire, share and reconfigure data.

2. Corporate knowledge base and agent-specific databases to facilitate interaction and data processing. Data and knowledge bases are directly linked to the models used by agents (as individuals or groups) as well as to the dynamics of the ecosystem and interaction of the entire multi agent organization. It is also governed by some ontological and semiological artifacts.
3. An evaluation mechanism embedded into the agent's knowledge engine to guide efficient functioning within the entire context of multiagent data processing.

In addition to the concept of functional” packages, interactions among agents are also viewed in terms of “comments” that describe the exchange of ideas and terms of trading, among others. As

Figure 6. Sudatel-Contracting “comment” capability

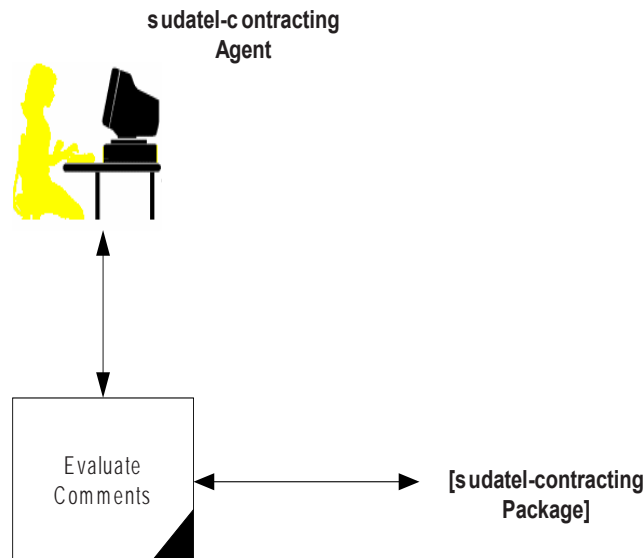


Figure 7. "Evaluate comment: DEP"

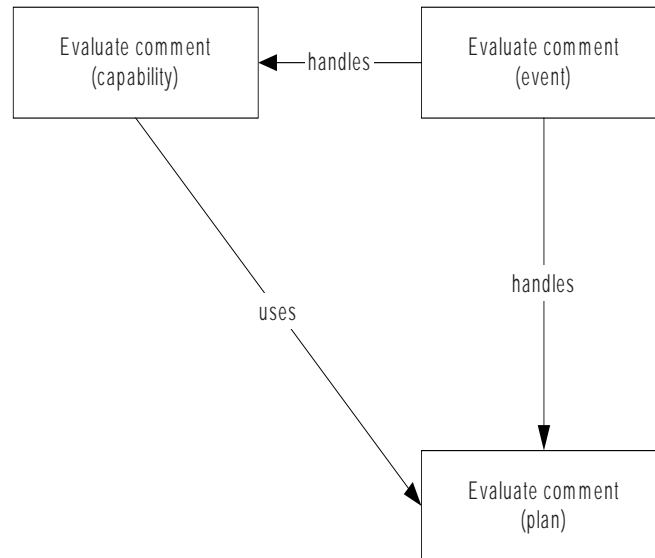
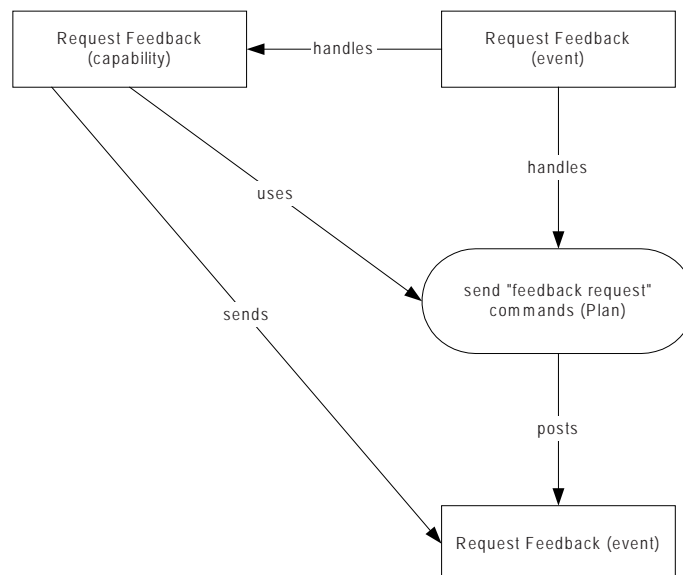


Figure 8. "Request feedback: EDP"



shown in figure (6) below the Sudatel-contracting-capability-hierarchy handles a capability named, for example, “evaluate comments” associated with [Sudatel-contracting package].

The implementation of such capability depends on the subsets of the final Data-Event-Plan Diagram (DEP) that uses an “evaluate comment” plan to implement the “evaluate comment” event as shown in figure (7) below:

It should also be noticed that “evaluating a comment” demands an evaluation mechanism as shown in figure (5) above.

The same process is applied for the activities labeled “sending feed back”, “requesting feed back” and “getting comments” among agents. Figure (8) below describes a diagram for the “requesting feed back”.

All events can then be completed based on different data types using alternative reasoning and posting methods. A “request feedback” event, for example, can be implemented using the following syntax:

```
RequestFeedback (data type variable)
{
  Fines = f;
  Message.”RequestFeedback “+data type variable;
}
```

Then posting can be done using a reasoning method as follows:

```
@send (ev.package name, ev1.package name1 (ev. data variable));
```

Disc Uss ION

The unprecedented transformations exhibited in the digital market urge enterprises to augment technological developments and improve their competitive advantages. The use of multiple tools and techniques offers a considerable advantage

with regards to the process of modeling e-business architectures and processes. While available approaches are focusing on technological integration of traditional business activities, they offer limited functionality in modeling enterprise-wide processes as they tend to visualize the enterprise as an isolated entity. Based on the need for sophisticated integration and coordination mechanisms in the digital market place, e-business practices build on horizontal interconnections between networks and coupling of value chains (Xirogiannis & Glykas, 2007).

The use of multiagent technology to enhance the process of electronic contract formulation and the enhancement of electronic negotiation supports the migration from “conventional” to contemporary e-business models and strategies by advocating. Because change is the key challenge in contemporary e-business (Jackson & Harris, 2003; Phan, 2003), enterprises could move from the quadrant of “providing information” to stakeholders and users in a supply chain to web based interactions oriented towards the development and deployment of “enablers” like electronic payment and contracting and understand their consequences on existing business strategies.

Because the proposed framework is based on the integrated functionality of multiple autonomous and semi autonomous agents capable of modeling routine and time-consuming e-business processes (Albrecht, Dean & Hansen, 2003), Sudatel could enjoy the benefits of improved transaction processing and collective decision making utilizing large amounts of pre-existing concrete knowledge.

The proposed multiagent framework is flexible enough to be extended to include additional agents, learning mechanisms and agent-oriented capabilities necessary for addressing complex contractual interactions. By giving agents the ability to do cross-referencing of contracting information, they can potentially improve the outcome of contract formulation processes. While such functionalities could potentially improve the overall system effi-

ciency, it also enables decision makers to improve their e-business strategies and models as well as their capacity to make interventions and accommodate unpredicted changes that take place at the destination of each agent. Such interventions aim at refining e-business related decisions (taken by agents and/or their owners) while considering the complexities associated with modeling the entire process of contract formulation.

Incorporating multiagent technologies at the backbone of enabling (e-payment and contracting) platforms allows Sudatel to investigate its capability to strategically manage technology-intensive acquisitions by addressing implementation related issues such as programming, representation and integration. The effectiveness of Sudatel to model interactions associated with the process of electronic contract formulation improves its capacity to create conducive environments for the inclusion of the interests of different contracting companies originating from different countries with varying legal and trading regulations. Because the structure of the multiagent framework is designed in a reasonably domain independent, the robustness of its agent and agent interaction models can be improved by understanding (and learning from) the dynamics of individual negotiation behavior of different agents on the behavior of other ones as well as on the overall behavior of the multi-agent system as a whole.

Because electronic contracting in Sudatel and other similar application domains as a part of an integrated e-business models and strategies emphasis should be made on data management and integration. Preserving the integrity of corporate (sharable) database, data processing methods and information retrieval and update algorithms assumes considerable importance because it affects the availability of management information. Particularly in developing countries, gaps experienced in time series of data originate from the nature of data and the applications using them. Some data types, such as those making up the spatial repository of the corporate data base, are

difficult to update because they are presented in map formats that require different processes to convert them into usable forms from raster to digital images. Data management issues also relate to addressing complexities associated with database inclusion dependencies in order to allow flexibility and the inclusion of different “schema” necessary for electronic negotiation, learning and reconciliation.

Because the mechanism depends mainly on the use of internet technology, there are other factors that affect the contribution of electronic contracting to e-business processes. One of the most important of these factors is content because the Internet enables parties to capture vast amounts of content at a very low cost (Lumpkin & Gregory, 2004) in the form of feedback and expertise and consequently supports the formulation of electronic contracts.

IMPLEMENTATION RELEVANT CONSIDERATIONS

The potential for having a good environment for the implementation of the proposed framework is growing due to the following factors:

- a. The expansion of the company’s processes and functionalities in the southern part of the country and other war-affected parts after the signature of the comprehensive peace agreements. Due to the success of resettlement programs the company expanded its network through fiber optics technology. The resulting operational expansion has been accompanied with an increasing need for the supply of goods and services from external vendors and promotes the use of invented tools such as multi agent formulation of electronic contracts in pursuit of efficient supply chain management processes. Moreover, the company has expanded its international operations by acting as an operator for mobile

and fixed lines telecommunication services in Mauritania and Senegal.

- (b) The increasing level of competition in the telecommunication sector in Sudan due to the existence of two other operators providing fixed lines and mobile communication services across the country. The maintenance of competitive advantage in this context tends to be driven by cost effectiveness, financial accountability and corporate social governance. The need and capacity of the company to use innovative process management techniques (such as agent based formulation of electronic contracts) is growing. The remarkable improvement in the capacity of the company to manage technology intensive applications encourages the adoption of the proposed model.
- (c) The involvement of the company in international business processes has improved its organizational capacity to maintain, manage and sustain international connections with partners. The company is motivated to adopt innovative business solutions to cope with the growing business vulnerabilities and the variety of partner-based business and operational platforms. While the current matrix of business processes and applications functioning at the company are showing a modernization trend, the environment is becoming highly conducive for the adoption of agent based formulation of electronic contracts within an innovative context of e-supply chain management.

However, the implementation of the proposed framework calls for some organizational and technological changes including:

1. The development of an integrated framework of business process re-engineering within which agent based interactions can be used to facilitate the formulation of electronic contracts. While the complexity of this exer-

cise tends to originate from the difficulty of streamlining agent and user functionalities, the whole process will go into disarray if a sophisticated business process reengineering scheme is not advocated and effectively implemented. Agent based formulation of electronic contracts is not a simple automation of the contracting process but rather a comprehensive re-consideration of business processes.

2. The adoption of a continuous review activity to ensure the incorporation of changes that take place

cON c LUs IONs

This paper presented a typical approach for the formulation of electronic contracts to support the formulation and implementation of alternative e-business strategies and models using multiagent technologies. The approach proposed a new domain-based mechanism to supplement the current phases of status analysis and objectives setting of a typical electronic contract. While the framework contributes to the infrastructure of electronic commerce it also aims at improving the competitive advantage of Sudatel and its responsiveness. By using multiagent systems, the proposed mechanism drew a causal representation (based on the identification of a role-and-task matrix) of the principles of electronic contract formulation. Therefore, their use simulates the operational efficiency of complex e-business models and the ability of decision makers to precisely understand the quantified impact of strategic change associated with the deployment of these models.

However, the proposed mechanism should not be regarded only as an effective e-business modeling support tool but also as a strategic framework for enterprises to migrate from “operational dashboards” guided by ready made contracts to intelligent, participative and situation-specific contract formulation processes. Its main purpose,

therefore, is to drive strategic change activities rather than limit itself to qualitative simulations. Moreover, it should not be seen as an end as a single decision aid but rather as a means for setting a course for continuous strategic alignment.

While forecasts show that international trade will continue to be more and more fragmented, labor and knowledge intensive and customer-centered, the deployment of information and communication technologies as enablers is expected to continue to “reshape” electronic business transactions. The migration from “traditional” to “electronic” contracts preserves the basic elements of the traditional contract (offer, acceptance, and compensation) and, at the same time, dictates new axioms for deciding on the place, timing, form of making an offer, acceptance styles and presentation. Although electronic traders are being worried about the uncertainties associated with electronic contracting, the unprecedented advancements in the field of artificial intelligence, computing paradigms (mainly mobile, ubiquitous and intelligent) and programming languages are expected to relax architectural considerations.

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Section IV

Online Consumer Behavior

Chapter XVII

The Applicability of Network Effect Theory to Low-Cost Adoption Decisions: An Investigation of Peer-to-Peer File Sharing Technologies

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Abstr Act

In this work, we examined the boundary of the applicability of network effects theory. We theorized that when adoption is cheap, the cognitive demands of estimating network effects outweigh the benefit of making optimal adoption decisions. Thus, even in contexts where network effects do exist, we predict that adopters will use simple heuristics to make adoption decisions, if adoption is cheap. We propose that adopters simply do what they observe others doing. Using the context of peer-to-peer file sharing, we conducted three studies comparing network effects against simply following the behavior of others, and found in all three cases that there was no marginal effect of network size on willingness to adopt. However, when subjects were told classmates' adoption choices, there was a strong marginal effect on willingness to adopt. Put simply, if people are offered the option of downloading a free peer-to-peer software, then changing the network size from 1,000 to 1,000,000 has no effect on their willingness to adopt, but having two classmates express a choice not to download the software, had a large negative impact on a subject's willingness to download. Thus, our subjects, when faced with the option of a free download, did not behave in accordance with network effects theory, suggesting that there is a boundary on the applicability of the theory to internet adoption behavior.

INtr ODUct ION

Network effects theory is one of the bedrock theories of information systems (IS). We use the concept of network effects from our first undergraduate classes to our PhD seminars, from our executive education to our top research journals. However, the breadth of its applicability has been challenged by both academics (Liebowitz and Margolis 1994) and journalists (Useem 2001). The criticism can basically be stated as, “[c]ontrary to common misconceptions, network effects do not come about just because business is conducted on a network. (Liebowitz 2002 p. 4).” Thus, researchers have begun to ask, “*in what sorts of environments do network effects occur?*”

In this work, we try to address the boundary conditions of network effects from a cognitive perspective. We conceive of network effects as a special case of adoption decisions, and thus, focus on the cognitive processes of the decision maker. For network effects theory to be applicable, decision makers must incorporate the network effects into their decision processes. We argue that it does not always make sense to believe that decision makers do, or should, consider network effects when making an adoption decision, even if network effects are present. Specifically, we argue that if the costs of adoption are low—for example, free downloads, which characterizes a great deal of electronic commerce adoption, particularly P2P file-sharing applications—then it is not really worth the effort of the decision maker to consider all the facts. Thus, we ask the question, “*Do individuals consider network effects when adoption costs are close to zero?*”

We propose that decision makers use computationally simple heuristics to solve low cost adoption decisions. Specifically, we propose they use observational learning or imitation. If people around them choose to adopt a technology, then they choose to adopt the technology. Thus, our second research question is, “*If decision makers*

do not consider the network effects, what should they consider?”

This approach fills an important niche in our understanding of network effects and its relationship to adoption. We follow the spirit of the Social-Economic-Psychological (SEP) model by considering that “...*complex IT-driven phenomena ... may involve a web of interdependencies related to constructs either purely of a social, economic, and psychological nature, or to constructs that lie at the interfaces between these areas.* (Konana and Balasubramanian 2005 p. 508).” We do so by tying the information in the social and economic environment to the adopters’ cognitive costs of processing that information. Thus, it addresses the decision maker’s role in network effects, rather than just looking at the role of the environment. This is particularly salient for electronic commerce researchers, because so much of the adoption that occurs online is low-cost adoption, and network effect theory is applied to these adoption decisions (Kauffman and Walden 2001). If, as we propose, decision makers choose not to process the network effect information, then researchers need to be more cautious in applying network effect theory. Also, if we are correct, then we may be able to offer some explanation of adoption in the nascent stages of a network’s growth. Finally, our study suggests that wide-scale adoption may be an emergent result of local phenomena, and that small scale adoption patterns may be quite different than those observed at the global level and predicted by network effect theory.

We perform a series of four experiments aimed at understanding how network effects and observational learning affect P2P adoption decisions. We find that observational learning has a very strong impact on people’s willingness to adopt a P2P technology. However, network effects have little effect. We attribute this to individuals’ difficulty in determining how many users a P2P technology needs to make it worth the effort of adopting.

THE GLOBAL NATURE OF P2P

We use P2P file sharing as the context for our studies because it has a number of useful properties as an environmental control. For one, the major P2P technologies are free to download, and thus capture low cost adoption situations. Furthermore P2P file sharing accounted for 60% of all internet traffic in 2006 and that number is growing (Borland 2006). P2P technologies are clear instances of direct network effects. P2P technologies enable file sharing at arms length with faceless strangers, which minimizes any social interactions. Thus, P2P file sharing technologies provide an excellent environment for our investigation of decision maker cognition about network effects in low cost adoption situations.

P2P file sharing can be defined as a sharing and delivery of user specified resources (information and content files) among groups of people who are logged on to a file sharing network (Kwok, et al. 2002). In our context, a P2P network consists of two or more computers connected by a telecommunications network, where each computer has the capability of requesting and providing files, and a list of where files are located. This is in comparison to the typical client-server relationship where internet files are located on a dedicated server which only provides files and other computers are clients which only request files. In a P2P network, all the computers are both clients and servers.

We assume that P2P file sharing technologies possess network effects. This is a fundamental assumption because our theory is concerned with the specific boundary where network effects are present and adoption is cheap. This work does not examine whether or not P2P file sharing technologies possess network effects as assumed. However, we think it is a very reasonable assumption, and prior research has found it to be the case (Asvanud, et al. 2002). Nonetheless, it needs to be justified.

The more peers in the network, the more likely any particular user is to find a specific file. Hence, a P2P network has direct network effects. This is similar to telephone service where the effect arises directly from the other users in terms of the theory posited in traditional manner. It is in contrast to indirect network effects where more users of a particular product make it more likely that complementary products will be created. For example, the more users there are of VHS players, the more it makes sense for media companies to produce VHS tapes. There may be some complementary products created for P2P networks, like skins and down-loaders, but these are peripheral to the real purpose of the networks, which is file sharing. Analogously, the more people use telephone communications, the more it makes sense for companies to produce telephone headsets. However, people join a telephone network to talk to other people, not to increase the variety of telephone accessories to which they may avail themselves.

While a P2P network is like a telephone network in that they both create value via information sharing, they are different in the relative value, in terms of local vs. global characteristics of the network. Local network refers to a close group of friends and acquaintances with whom one can interact based on social recognition. Whereas, the global network refers to all of the faceless strangers whose membership in the network may create value (Cowan and Miller 1998, Dalle 1997). For example, in a telephone network, it matters a great deal to be able to connect to their peers such as family, relatives, or friends. A great deal of the information shared over telephone networks is of a personal nature. In this context, the concept of local network plays an important role. However, P2P networks are quite different. Users are outsourcing communication to computer agents. They usually do not know or care who is providing the files they require. For example, if someone in a local social network has a file,

they can simply share it via e-mail. People do not generally procure files from friends, families and colleagues by asking them to post files on P2P networks. Friends, families and colleagues generally provide files via email or direct media exchange (i.e. they burn a disk).

Because users have alternative methods of procuring files from a local network and because the quality of a digital file is not dependant on the person who has it, P2P networks have some specific observational learning properties. If people follow the behavior of members of the local network, they do so because they think members of the local network have some knowledge about the value of the network and not because they want to share with members of the local network. This is specific to P2P networks and not a general characteristic of networks. For example, if a person's friend joins a telephone network and the person subsequently joins the telephone network, it is difficult to ascertain whether the person joined because the presence of their friend increased the value of the telephone network to them or if they joined because they thought their friend had some private information about the benefits of joining the telephone network. This is extremely important for our work because we study the latter and want to make sure that it is not confounded with the former.

The technical and social characteristics of P2P technologies give rise to specific assumptions upon which we build a theoretical argument about network effects and observational learning. Specifically, we conjecture (1) that each user of a P2P network directly generates an effect for every other user, (2) that the benefits of complementary products are small relative to the benefits of file sharing to ignore, and (3) that the benefits of having members of a social network participate in a P2P network are no greater than the benefits of having members outside a social network participate in a P2P network. Therefore, it is of value to examine P2P adoption followed by the global nature of P2P.

We use two theories in conceptualizing our research model —network effect theory and information cascade theory. We now turn to a brief review of each of those.

Network Effects

The most widely invoked economic theory for explaining how decision makers react to other decision makers in forming opinions about a technology is network effects (Katz and Shapiro 1986). Network effects occur when the value of membership in a network is a function of the number of members on the network (for a thorough review, see Economides 1996, Kauffman, et al. 2000). This theory has been used to explain the adoption of technologies ranging from spreadsheet software (Brynjolfsson and Kemerer 1996, Gandal 1994) to inter-organizational systems (Riggins, et al. 1994). The causal process posits that, as more people adopt the technology, the value of that technology increases, encouraging additional adoption. This virtuous circle continues, causing rapid adoption and leading to markets wherein a single firm promptly emerges as the dominant player (Mantena and Sundararajan 1999).

Intuitive causal processes of network effects are as follows. First, an individual forms an expectation about future network size (Economides 1996). In its purest form, this expectation is based on the current network size. Given the expectation of the future network size, the individual calculates the value of belonging to the network. If this value is high enough, then the individual joins the network. Thus, the adoption decision is based on an estimate of the future network value. At the same time, the network value is determined by all the individual adoption decisions. Network effect theory posits "*[T]he benefits that a customer derives from consumption of one unit of the good depend on how many other consumers ultimately purchase compatible units, that is, units utilizing the same technology. In other words, the extent of consumption effects depends only on the final*

network sizes (Katz and Shapiro 1986, p 826).” This is represented mathematically as $v(x)$, where v is a value function and x is the final network size. The underlying assumption of network effects theory is that there is a change in value with a change in size, so that $dv/dx > 0$ implies positive network effects, and positive and $dv/dx < 0$ implies negative network effects. Thus, if decision makers are behaving in accordance with network effect theory, the value they perceive must change as the network size changes. In other words, there must be a marginal effect of network size on decision makers’ perceptions of value. Therefore, if decision makers are considering network effects when making adoption decisions, changes in network size will lead to changes in the perceived value of a network.

Observational Learning

An alternative way that individuals can form perceptions of value about a network technology is by observing other’s behavior. Many animals (Bikhchandani, et al. 1998), including homo sapiens, imitate others. Imitation is a very sensible strategy for decision making. If a living representative of a species performs a behavior and does not die, then the behavior is probably safe. Of course, there are some behaviors that cause harm over time, and so imitation is not perfect, but that is the nature of a heuristic. Given the vast repertoires of behaviors one may perform, a simple rule for choosing safe ones is quite helpful in facilitating decision making. Not only does such a rule keep one safe, but it requires little mental effort, and it is fast. As operation researchers know, heuristics that prune bad choices can reduce computationally unsolvable problems to solvable problems. It is exactly this sort of heuristic approach that allows computers to play chess better than humans. Even for the fastest computers, finding the optimal chess move is prohibitively slow. The goal of observational learning is to find a strategy for decision making

that takes into account the mental effort required to make a decision.

Information cascade theory (Bikhchandani, et al. 1992, Bikhchandani, et al. 1998) takes into account both the value propositions of the technology and the information one should consider when making a decision. Information cascade theory explains how the uncertainty about value propositions can lead to fad-like behavior in the adoption of novel technologies.

The central prediction of information cascade theory is that individual decision makers will do what prior decision makers do. To test this, researchers propose models wherein the decision in the current period is a function of the decisions in prior periods (Anderson and Holt 1996, Walden and Browne 2002). Thus, the empirical tests of network effect theory and information cascade theory are virtually identical. It is tricky to tease out differences between the two models because, at a global level, both predict that increasing the number of prior adopters will increase the number of current adopters.

Network effect theory and information cascade theory both predict the S-shaped adoption curves so commonly observed in research (Abrahamson and Rosenkopf 1997, Gurbaxani 1990, Rogers 1995). Both theories predict that few people will adopt initially, but after some point, the number of adopters will increase exponentially for some time. However, the behavioral mechanisms underlying this adoption are very different. Network effect theory assumes that individuals base their decisions to adopt a technology on estimation of the expected network size and its expected value, based on current network size. Information cascade theory assumes that individuals do what they observe others doing because the others cumulatively have more information available to them. In network effect theory, adoption is exponential because each adoption increases the expected level of adoption, which, in turn, increases the number of adoptions, thereby forming a virtual circle.

In information cascade theory, adoption is exponential because, as the network size increases, the probability of a given individual observing other adopters increases, which, in turn, increases the number of adopters, again forming a virtual circle.

HYPOt HEsEs DEVELOPMENT

We start our theorizing with network effect theory. A rational adopter should adopt a technology if the benefits of adopting outweigh the costs. For novel technologies, the benefits are not always clear so there will be some error in adopters' decisions. Thus, a rational adopter should adopt if $v(x) + e > c$, where v is a value function, x is the network size, e is a random error term and c is the cost of adopting. If there are positive network effects, then dv/dx is positive, and increase in network size, x , will result in an increase in the belief that adoption is the correct course of action. If a technology possesses positive network effects and people are using that information in forming their adoption decisions, then the belief that adoption is the correct course of action will be increasing in network size. This leads to our first hypothesis.

Hypothesis 1 (Network effects): holding all else equal, individuals faced with a larger network size are more willing to adopt P2P technology.

Information cascade theory offers another means for potential adopters to face the adoption decision. If decision maker A observes another similarly situated decision maker, B, face the same adoption decision, then he can infer that the other decision maker's beliefs about $v(x) + e > c$. If B is adopted, then he must have thought $v(x) + e > c$, and if he did not adopt then, he must have thought that $v(x) + e < c$. Decision maker A can combine the information contained in B's decision to make a better decision. The decision can now

be expressed as a binary choice that suggests a decision maker should adopt if the probability that adopting is the correct course of action is greater than the probability that adopting is the incorrect course of action. Expressed mathematically this says adopt if $p > (1 - p)$, where p is the probability that adopting is the correct course of action and $(1 - p)$ is the probability that it is the incorrect course of action. It can be shown (Bikhchandani, et al. 1992, Walden and Browne 2002) that in this situation, observing a prior adoption increases the belief of the current decision maker that adoption is the correct course of action. This leads to our first hypothesis.

Hypothesis 2 (information in the behavior of others): holding all else equal, individuals faced with knowledge of a prior adoption are more willing to adopt P2P technology.

Information cascade theory also suggests another observable property of adoption decisions in the face of observable behavior of similarly situated others. The main interesting result of information cascade theory is the notion of cascades which occur when decision makers take action contrary to their own private beliefs. This occurs because the weight of the beliefs of others rapidly outweighs the weight of one's own beliefs. See (Bikhchandani, et al. 1992) for a full derivation, but the logic can be summarized fairly simply. If B adopts but A's personal information suggests that adoption is the incorrect course of action, then A feels less confident, but may ignore B. However, if C also adopts, then A may believe that two opinions outweigh one opinion and adopt in spite of his personal information.

Each successive adoption increases the chance that the next person will adopt. However, it increases at a decreasing rate. Intuitively, if the number of adoptions increases from one to two, that has more effect than if the number of adoptions increases from nine to ten. If a person was going to be influenced, they would have done

it after two or three, and if they held out until nine, then ten is not going to make a difference. Moreover, rational decision makers know that each successive adoption was influenced by the adoptions that came before. In other words, if A sees D adopt after both C and B adopt, then A knows that D may have been influenced by the actions of B and C. In fact, Bikhchandani (et al. 1992) show that if B and C both adopt, then D should adopt regardless of his own information because two opinions outweigh one, and hence there is no information contained in D's behavior. It can be shown (available from the authors on request) that if the error term, e , in the adoption decision $v(x) + e > c$ is normally distributed that D might still rationally choose not to adopt in the face of two prior adoptions, but that the information content of consecutive adoptions declines rapidly. This means that the effect of observing additional adoptions on the belief that adopting is the correct course of action increases at a declining rate. This yields our third hypothesis.

Hypothesis 3 (decreasing information in the behavior of others): holding all else equal, the increase in an individual's confidence will be less for a second observed adoption than for the first observed adoption (and the increase from one adoption to three will be less than twice the increase of the first).

EXPERIMENTAL ENVIRONMENT

In each of the experimental scenarios, subjects were given brief descriptions of a P2P technology and asked to rate their inclination to download the P2P technology. Thus, inclination to download is our proxy for adoption. Subjects were given details on total network size, which was manipulated to assess their sensitivity to network effect theory's core assumptions. If the subjects' behavior follows network effect theory, then they will perceive a greater value in a larger

network. Thus, the subjects will demonstrate a greater propensity to download the software if the network size is greater.

To test information cascade theory, the subjects were also given details about the adoption decisions of classmates who examined the technology. If the subjects' behavior follows information cascade theory, then the decisions of others who evaluate the technology will cause the subjects to modify their initial beliefs about the technology in the direction of others' behavior. Thus, subjects will demonstrate a greater propensity to download the technology if others evaluate it and download it, and a lesser propensity to download the technology if others evaluate it and do not download it.

Each experiment was performed at a different time. Each experiment used different subjects. Subjects were assigned to treatments randomly. Each experimental task took approximately 15 minutes to complete.

The responses were categorical variables (e.g. *I predict I would use the technology in the future? 1 = strongly disagree... 7 = strongly agree*). Linear regression is inappropriate in this case because the responses can fall into only seven categories. The problem arises because the likelihood of adopting is an ordered categorical variable. Namely, it is a whole number between one and seven, inclusive. At the same time, the order is important, so that moving up categories from lesser to greater indicates a decreasing likelihood of adopting the technology. To estimate such a dependent variable, we apply ordered (cumulative) logit. The model specifies that:

$$f(\Pr(Y < j)) = \alpha_j + \beta X \text{ for } j = 1 \dots k$$

where $k+1$ is the number of categories, Y is the categorical response, α_j is a separate intercept for each threshold, X is a vector of observations, and β is a vector of parameters to be estimated. **Note**, because this estimates the probability of a variable being *less* than a constant, all of the

signs will be opposite of what is intuitive. Thus, negative coefficients indicate a positive effect on the adoption decision. Put another way, a negative coefficient indicates a negative effect on the probability of being less likely to adopt.

Experiment 1

The first experiment involved 63 subjects who were given a description of peer-to-peer technology called University Universe (UU). Subjects were then told that some of their classmates had evaluated the technology (e.g. *The next day, while waiting for your first class to start, you were speaking with your classmates and one of them said (s)he had gone online to look at UU. After investigating the software, (s)he had decided to download UU*). Subjects were also given the network size (e.g. *At this point, the software has been downloaded 1,000,000 times*). The number of classmate adopters was either not given, given as one, or given as three. The network size was either not given, given as 1,000, or given as 1,000,000. The size of each treatment is shown in Table 1.

In presenting network externalities, our goal was to present a small network and a large network. The scenario established the software for academic use, so the 1,000 download network is very small. In many universities, students are in classes nearly that large, and at athletic events, they are in crowds one, and sometimes

two, orders of magnitude larger. A search on Kazaa for Madonna's American Life (which was quite popular at the time and thus more likely to be found than other files) found 295 potential hits out of 4,700,000 users, indicating a probability of a given user having the file of about 0.063%. For a 1,000 user network with the same probability of each user having the desired file, the probability of finding the file at least once is $1 - (1 - 0.00063)^{1000}$, which is about 47%. A network that yields the desired result less than half of the time delivers low value, particularly if multiple files are desired. On the other hand, a network with 1,000,000 users represents over 10% of all full-time college students in the United States. Performing the calculation above yields a greater than 99.99% chance of finding at least one instance of the desired file. Thus, these two choices of network size represent very different network sizes. One is clearly small and the other clearly large.

Subjects were also asked their gender, age, and level of computer experience, in years. These were control variables. Thus, the model estimated is:

$$f(\text{Pr}(Y < j)) = \alpha_j + \beta_1 DUM1 + \beta_2 DUM3 + \beta_3 DUM1000 + \beta_4 DUM1000000 + \beta_5 GENDER + \beta_6 AGE + \beta_7 EXPERIENCE + \text{error}$$

DUM1 and *DUM3* are equal to unity if the number of classmate adopters is one or three, respectively. *DUM1000* and *DUM1000000* are

Table 1. Number of subjects in each cell of experiment 1

		Network Size		
		Not Given	1000	1,000,000
Number of classmate adopters	Not Given	4	7	7
	One	6	7	6
	Three	7	10	9

equal to unity if the current network size is 1000 or 1,000,000, respectively.

There are two questions of interest. First, did subjects respond to the manipulations? This would be indicated if the coefficient on β_1 thru β_4 were significant. The second question is, did the subjects respond in accordance with the theory? If subjects responded in accordance with network effect theory, then β_4 should be larger in absolute value than β_3 . If subjects responded in accordance with information cascade theory, then β_2 should be larger in absolute value than β_1 . Information cascade theory would further be supported if the impact of the first classmate adopter were greater than the impact of the second, which was, in turn,

greater than the third. This suggests that the impact of three adopters is less than three times the impact of one adopter or $\beta_2 < 3\beta_1$.

These results suggest that the manipulation was effective in the sense that intentions were significantly different for those presented with the information. Information cascade theory was supported in both tests. Three classmate adopters had more effect than one classmate adopter, but the effect of three was less than three times the effect of one.

The results suggest no support for network effect theory. Not only was the effect of a network size of 1,000,000 not significantly larger in absolute value than a network size of 1000, but it

Table 2. Ordered logit results for experiment 1

Coefficient	Estimate	P-value	Odds Ratio	Notes
<i>DUM1</i> (β_1)	-2.648	<0.001	0.071	Manipulation effective
<i>DUM3</i> (β_2)	-3.984	<0.001	0.019	Manipulation effective
<i>DUM1000</i> (β_3)	-1.294	0.035	0.274	Manipulation effective
<i>DUM1000000</i> (β_4)	-1.187	0.054	0.305	Manipulation effective
<i>GENDER</i> (M) (β_5)	0.006	0.980	1.012	
<i>AGE</i> (β_6)	0.073	0.054	1.076	
<i>EXPERIENCE</i> (β_7)	-0.296	0.016	0.747	
Intercept 1	-1.552	0.195		
Intercept 2	0.149	0.895		
Intercept 3	0.655	0.565		
Intercept 4	1.417	0.221		
Intercept 5	2.626	0.028		
Intercept 6	4.712	<0.001		
$\beta_2 - \beta_1$	1.336	0.024		Support for IC
$\beta_2 - 3\beta_1$	-3.960	0.020		Support for IC
$\beta_4 - \beta_3$	-0.107	0.848		No Support for NE

was, in fact, slightly smaller. Thus, it would seem that individuals are not estimating the value of being part of the peer-to-peer network based on the size of the network.

Experiment 2

Experiment one found no support for network effect theory. However, it may be that individuals do not have a good basis for incorporating network size into their estimation of network value. For the second experiment, we offer subjects a side-by-side comparison of two peer-to-peer file-sharing technologies. The only difference between the two is the network size and the number of classmate adopters. In each case, technology A has a larger network size than technology B, but classmate adopters choose technology B. The

network size and number of classmate adopters are shown in Table 3.

This yields eight cells with counts as shown in Table 4. There were 121 subjects.

Subjects were asked, “If you were to try one of these P2P technologies, which would you choose?” Responses were recorded on a seven-point scale. The scale anchors were definitely A, most likely A, less likely A, undecided, less likely B, most likely B, and, definitely B.

The estimated model is:

$$f(\Pr(Y < j)) = \alpha_j + \beta_1 DUM2 + \beta_2 REL_DIFF + \beta_3 GENDER + \beta_4 AGE + \beta_5 EXPERIENCE + error$$

DUM1 and *DUM2* are equal to unity if the number of classmate adopters is one or two, respectively. *REL_DIFF* is the relative difference

Table 3. Manipulation variables for Experiment 2

		Technology A	Technology B	Relative Differences
Network size differences	Large	1,000,000	1,000	100
	Medium A	100,000	10,000	10
	Medium B	6,000	5,000	1.2
	Small	1,006,000	1,00,500	1.0001
Recent adoptions	Single	0	1	
	Double	0	2	

Table 4. Subjects per manipulation in Experiment 2

		Network Size Difference			
		Large	Medium1	Medium2	Small
Recent Adoptions	Single	19	24	8	8
	Double	23	23	8	8

in the sizes of the two networks, as reported in Table 3.

If individuals behave according to the precepts of network effect theory, then as the relative difference in network size increases, they should be more willing to adopt technology A. This would be indicated in the estimation if the coefficient β_2 is positive. This suggests that increasing the relative difference increases the probability of being *less than* a threshold. Because technology A is given the small numbers, being below a threshold corresponds with a high preference for A.

If individuals behave according to information cascade theory, then increasing the number of classmate adoptions from one to two should make it more likely that they choose technology B. This would be indicated in the estimation if the coefficient β_1 is negative. This indicates a lesser chance of being in a low category. The results of the estimation are presented in Table 5.

The results of the estimation suggest no support for network effect theory. Subjects do not respond significantly to differences in network size. The same result holds if we take the log

of network size (p-value = .279). The results do suggest support for information cascade theory. Increasing the number of classmate adopters of technology B from one to two results in a lesser preference for technology A, which means a greater preference for technology B.

This experiment examined the marginal impacts of network size by offering two networks in a side-by-side comparison. While there is no marginal impact of network size, there is an absolute preference for the larger network. The mean value of the adoption decision was -0.727 , which is significantly different than zero (p-value <0.001).

Experiment 3

In experiment two, two different technologies were compared where network effects favored one and information cascade theory favored the other. While there were no marginal effects of network effects, there was a preference for the larger network. However, this preference was only significant if the number of classmate adopters

Table 5. Ordered logit results for experiment 2

Coefficient	Estimate	P-value	Odds Ratio	Notes
<i>DUM2</i> (β_1)	-0.908	0.015	0.403	Support for IC
<i>REL_DIFF</i> (β_2)	0.000458	0.216	1.000	No Support for NE
<i>GENDER</i> (M) (β_3)	-0.496	0.050	2.697	
<i>AGE</i> (β_4)	-0.013	0.712	0.987	
<i>EXPERIENCE</i> (β_5)	-0.058	0.485	0.944	
Intercept 1	-1.778	0.062		
Intercept 2	1.222	0.188		
Intercept 3	1.298	0.163		
Intercept 4	2.133	0.024		
Intercept 5	2.280	0.016		
Intercept 6	4.481	<.0001		

was one (mean adoption decision = -1.024, p-value < 0.001). The preference was eliminated when the number of classmate adopters increased to two (mean adoption decision = -0.079, p-value 0.806).

In experiment three, we examine a single technology where network effects are opposed to information cascade theory. To operationalize this, subjects were told that classmates evaluated the software and chose *not* to download it. This solves a problem in the earlier experiments where classmate adoptions actually increased network size. It is unlikely that three or fewer additional network members would significantly change the value propositions of a network.

Similarly, we solve a problem with our measure of information cascade theory. Thus far, we have operated under the assumption that subjects do not believe that all others facing the adoption decision have chosen to adopt. If some people choose to adopt and some do not and one does not know the ordering of those decisions, then reacting to the most current decisions (i.e. those of classmates) does not violate information cascade theory. However, if all prior decision makers made the same decision, then the most recent decisions contain no information and hence, reacting to them is a violation of information cascade theory. While the former situation seems more realistic, the experiment can be improved. By presenting decisions not to adopt, we make explicit the fact

that not everyone who has faced the decision has adopted.

The manipulations are the same as experiment one with the exception that subjects were given details about classmates sequentially investigating and choosing *not* to adopt the technology. The cell counts are shown in Table 6.

The model estimated is:

$$f(\Pr(Y < j)) = \alpha_j + \beta_1 DUM1 + \beta_2 DUM3 + \beta_3 DUM1000 + \beta_4 DUM1000000 + \beta_5 GENDER + \beta_6 AGE + \beta_7 EXPERIENCE + error$$

DUM1 and *DUM3* are equal to unity if the number of classmate adopters is one or three, respectively. *DUM1000* and *DUM1000000* are equal to unity if the current network size is 1000 or 1,000,000, respectively.

As in experiment one, network effect theory suggests that β_1 thru β_4 should be significant. The coefficients β_3 and β_4 should be negative and β_1 and β_2 should be positive. If subjects responded in accordance with network effect theory, then β_4 should be larger in absolute value than β_3 . If subjects responded in accordance with information cascade theory, then β_2 should be larger in absolute value than β_1 . Information cascade theory further suggests that the impact of three adopters is less than three times the impact of one adopter, or $\beta_2 < 3\beta_1$. The estimation is presented in Table 7.

Table 6. Number of subjects in each cell of experiment 3

Number of classmate non- adopters		Network Size		
		Not Given	1000	1,000,000
One	Not Given	11	15	15
	One	13	14	17
	Three	13	16	18

The manipulations for network effect theory are significant. However, the results offer no support for network effect theory. Not only does the difference in preferences for network size not achieve significance, it also has the wrong sign.

The results for information cascades are different from previous tests. The manipulation for only one dissenting classmate was not significant, but the manipulation for three dissenters was. This means that observing one dissenting opinion is not different than observing no dissenting opinions. As predicted by information cascade theory, the effect of three dissenters is greater in absolute value than the effect of one dissenter. However, contrary to the theory, the effect of three dissenters was significantly greater than three times the effect of one dissenter.

These results suggest that information cascades work differently when the cascade is opposed to an action than when the cascade is supportive of an action. This is consistent with other novel approaches that challenge the underlying behavioral assumptions of economic theory, such as prospect theory (Kahneman and Tversky 1979). Prospect theory also finds that individuals treat logical inverses differently.

Discussion

Overall, the results are very consistent, across three different groups, in three different experiments. We find no support for the idea that individuals follow the behavior assumptions

Table 7. Ordered logit results for experiment 1

Coefficient	Estimate	P-value	Odds Ratio	Notes
$DUM1 (\beta_1)$	-0.031	0.938	0.970	Manipulation ineffective
$DUM3 (\beta_2)$	0.937	0.016	2.552	Manipulation effective
$DUM1000 (\beta_3)$	-0.891	0.027	0.410	Manipulation effective
$DUM1000000 (\beta_4)$	-0.736	0.065	0.479	Manipulation effective
$GENDER (M) (\beta_5)$	-0.105	0.528	0.811	
$AGE (\beta_6)$	-0.049	0.277	0.952	
$EXPERIENCE (\beta_7)$	-0.047	0.492	0.955	
Intercept 1	-1.268			
Intercept 2	-0.315			
Intercept 3	0.286			
Intercept 4	1.347			
Intercept 5	2.376			
Intercept 6	4.120			
$B_5 - \beta_1$	0.967	0.011		Support for IC
$B_5 - 3\beta_1$	1.028	0.312		No Support for IC
$B_5 - \beta_2$	0.155	0.673		No Support for NE

of network effect theory when evaluating the benefits of adopting a peer-to-peer network. It is important to qualify this and understand what it really means.

We do not suggest that network effects are non-existent. Nor do we propose that individuals are unaware of the phenomena. To the contrary, our data suggests that people are aware that network size is an important decision variable. However, they do not incorporate that size properly into their decision making.

For individuals making network adoption decisions, it does not make sense to fully evaluate the benefits of membership because the cognitive effort required to do so outweighs the incremental value gain over simple heuristics. This view has several components. First, we are talking about individuals who largely make decisions about networks with relatively small personal value. For the bulk of these individuals, the cognitive resources required to make full evaluations are enormous because individuals simply lack the training. Moreover, these individuals have reasonably effective heuristics to help with the decision. Thus, the incremental gain from full processing is marginal.

Individuals are faced with decisions such as, should I get a phone? Should I download Kazaa? Should I buy a DVD player? These are minor decisions for an individual and are not worthy of hours of evaluation in order to achieve optimal outcomes. A sub optimal membership decision is acceptable for individuals if it saves scarce cognitive resources.

Clearly, all theories are subject to the criticism that other factors come into play. To make this a valid criticism, the critic must demonstrate that these other factors are non-separable from the theory of interest and that these other factors are major drivers of outcomes. With respect to the first criteria, network effect theory assumes that economic agents are rational optimizers of value. Thus, the idea of optimizing scarce cognitive effort flows directly from the assumptions

of network effect theory, hopelessly entangling the two effects.

This would be acceptable if network effects are relatively larger than cognitive optimizing effects. However, for the case of economic agents that are individuals in the general population, this is not the case. Network membership value is relatively small compared to the cognitive effort required to optimize membership decisions in most real-world situations. Therefore, the criticism that individuals in the general population do not behave according to the tenets of network effect theory is valid. This means that it is imperative that theorists be very careful about applying the concepts of network effect theory to all network membership decisions made by individuals in the general population. Assuming that people behave differently than they actually do can lead to misleading suggestions for practice. Some authors attribute the internet market bubble and subsequent crash to misapplication of network effect theory (Useem 2001).

Network effect theory can be reasonably applied to situations where the potential value gain from optimizing membership decisions is large enough to justify the cognitive effort required to perform the optimization. This may happen with particularly important individual decisions, but is more likely to occur when firms are the decision makers. For example, Kauffman, McAndrews and Wang (2000) use network effect theory to examine banks' decisions to join ATM networks (Kauffman, et al. 2000). This seems reasonable because the potential value benefits of optimizing could be in the millions of dollars. Making a wrong decision is costly enough, both in terms of technology and loss of customers. Moreover, correcting the decision is costly.

Compare this to an individual's decision to establish an account at a bank with an automatic teller machine (ATM) network. The wrong decision could lead to some inconvenience, but it is easily and quickly corrected by transferring the account to another bank.

The level of cognitive effort required to evaluate the decision does not change, but the costs and benefits are dramatically different. The individual would be foolish to expend the effort to fully evaluate the network effects of bank ATMs. The bank would be foolish not to do so. The practical problem is that the bank would be foolish to believe that the customer is making the same rigorous evaluation that the bank is making.

To reiterate, the typical network membership decision faced by an individual is minor to the individual. Membership mistakes are easily corrected, and effective heuristics exist to facilitate the decision process. At the same time, cognitive resources are both scarce and valuable. Thus, it does not make sense for an individual to fully evaluate network membership decisions, and therefore she instead relies on heuristics. However, when the potential value of a decision becomes large, such as is the case for most firm decisions; it does make sense to fully evaluate the network membership decision according to network effect theory.

Though individuals do not behave according to network effect theory in any of our three experiments, they do behave according to information cascade theory to a high degree. This has several implications for network membership decisions that are not considered by network effect theory. It is likely that individuals are not evenly distributed, but rather that they are clustered in groups. Information cascade theory posits that an individual's decision is based on what she observes others doing. An individual is more likely to observe the behavior of members of groups to which she belongs. Thus, adoption should occur in clusters, with members of the same group making the same decision, but members of other groups making potentially different decisions. If so, then large initiatives aimed at the general population will be less successful than small initiatives aimed at particular groups. Advertisers seem to implicitly understand this, as they design advertisements to appeal to specific groups.

Another implication is that different people have different influences on individuals. An individual is more likely to weight the behavior of an expert, friend, or trusted advisor more heavily than the behavior of a stranger. Again, advertisers seem aware of this in that they choose experts or celebrities with good reputations as spokespersons. Network controllers might be well advised to devote more effort toward wooing key individuals.

The same applies to businesses. The membership decision of a bank like Wells Fargo probably carries more weight with other decision makers than the membership decision of the First Bank of Bozeman. This can be problematic because, in business, size is often correlated with reputation. Thus, it becomes difficult to disentangle genuine network effects caused by the size of the decision maker from information cascade effects brought about by the reputation of the decision maker.

Another very different aspect of information cascade theory is the number of others required to form a decision and the strength of the confidence in the decision. Experiment two suggests that having two classmate adopters is sufficient to remove a preference for a larger network, even if the larger network is 1000 times larger. Experiment three suggests that having three people evaluate a software and decide not to even try it, outweighs the network effects of a million other members. These numbers are incredible, but they accord well with information cascade theory.

In information cascade theory, an individual's own information is quickly outweighed by the information of the group. However, once this occurs, no new information enters the system. Everyone realizes that everyone else is joining because of what they observed others doing rather than because of any private information to which they have access. Nonetheless, because the system contains little information when an individual makes a decision contrary to the prevailing trend, it has a big impact. Thus, contrary decisions have large impacts, and prevailing trends are fragile.

This is very different from network effect theory, where the strength of the trend grows (exponentially) with more adoptions.

The question is often asked about how to successfully reverse a membership trend in a market with network effects. For consumer markets, the answer may be that it is not difficult, but it requires targeting influential individuals.

Network effects almost certainly exist, but network effect theory may have been overzealously applied to situations where other factors offer a better explanation of behavior. For minor, individual membership decisions, it makes sense to believe that individuals apply simple heuristics in order to conserve cognitive resources. Information cascade theory offers very simple but useful heuristics for decision-making. Our results suggest that information cascade theory is a better explanation of individual behavior in markets characterized by network effects. Therefore, it is crucial that both research and practice exercise caution about applying network effect theory and further examine the applicability of information cascade theory.

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Chapter XVIII

An Empirical Analysis of Cellular Phone Users' Convenience Perception and Its Impact on Shopping Intention in Mobile Commerce

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Abstr Act

Two mutually reinforcing forces currently are at work to propel an upward spiraling in the business arena. As wireless communication technology continues to advance in providing broadband connection to both static and mobile users, innovative user-centric Web-enabled services also are routinely being experimented to provide an unprecedented level of convenience for online shopping. Although the concept of convenience has been discussed extensively in retailing and consumer behavior literature, there still is a dearth of research that empirically validates the construct in the context of m-commerce. This chapter presents a study that was conducted to examine the effect of convenience on customers' intention of shopping via their mobile communication devices. Three research hypotheses were formulated to test the claims derived from the literature. Hypothesis 1 states that the customer perception of convenience is significantly related to m-commerce customers' demographical characteristics. Hypothesis 2 states that m-commerce customers' convenience perceptions are significantly correlated with product/service features. Hypothesis 3 states that m-commerce customers' shopping intention is significantly affected by their convenience perception. Primary data collected from college students in Taiwan were analyzed to examine the relationship between perceived convenience and shopping intention. The result shows a significant relationship between the two variables, and a positive effect of convenience perception on shopping intention. The findings have practical implications for m-commerce strategists by providing more understanding of the m-commerce success factors from a consumer behavior point of view.

INtr ODUct ION

In e-retailing, an upward spiraling propelled by two mutually reinforcing forces is actively taking place to transform business operations and challenge traditional business thinking. These two forces are wireless communication technologies and innovative Web-enabled user-centric services. The marriage of online shopping and wireless communications is speeding up further development of an emerging market for mobile e-commerce, or m-commerce. As the business impact of e-commerce has been witnessed in almost every facet of the business arena, the continual advancement of broadband wireless Internet access capabilities is only adding to the even greater flexibility of the online shopping process for today's business shoppers (Haskin, 1999). Specifically, Web-enabled wireless devices support shoppers to search for, communicate on, and purchase products and services from any location at any time. These convenient features are generally embraced by today's busy customers and are helping to make e-commerce grow even further.

Wireless communications technology has received much attention in both voice and data communication markets. A marketing research firm called iSuppli predicts that the global wireless market will increase from the \$520 million of 2004 to \$430 million by 2010 (Focus on Internet News and Data, 2006). Telecom Trends estimates that almost 100 million people are m-commerce users today, and their numbers are expected to double in the near future (Fitchard, 2004). Lewis (1999) predicts that, as the average cost of wireless usage will drop substantially in the next several years, wireless Internet devices will outnumber wired devices. Wireless Business Forecast (2005) predicts that U. S. wireless customers will expand from the current 175 million to 200 million by 2008. Portio Research, a British research firm, estimates that a half of the world population will become mobile phone users by the year 2009

(Wu, 2006). China currently adds 3 million to 4 millions cellular phone users each month. By the end of January 2006, its cellular phone population has reached 400 million, the largest in the world (Focus on Internet News and Data, 2006). Although these specific forecast numbers don't match, as is typical with other types of forecasts, it appears clear that, as wireless technologies and standards for security, bandwidth and interoperability continue to advance, the impact of online shopping via wireless communication devices is bound to become a crucial issue for information system professionals as they strive to support their organizations' marketing and strategic initiatives.

Most of the existing literature on mobile commerce developments is a collection of anecdotal reports that centers on either technological advancement (e.g., Olla, et al., 2003) or business activities of technological service providers. Systematic empirical investigation into major aspects of m-commerce development to support theory building in this field is relatively limited. This problem was pointed out by Clarke (2001), saying that "Despite tremendous interest in the melioration of m-commerce, there is little, if any, research that examines how to develop a comprehensive consumer-oriented mobile e-commerce strategy (p. 134)." In attempting to furnish a theoretical basis for academic research, Clarke (2001) proposed four value propositions for m-commerce applications: ubiquity, convenience, localization, and personalization. Zhang, et al. (2002) also suggested three driving forces to account for m-commerce success: technology innovation, evolution of a new value chain, and active customer demand. Two related themes stand out in these researches regarding m-commerce: the importance of integrated business strategies that truly accommodate the unique features of mobile communication devices, mobile phone users and the significance of consumer-perceived convenience provided by the mobile devices.

The concept of service or product convenience as a research construct has primarily been discussed in the marketing and consumer behavior literature (for example, Berry, et al., 2002; Ng-Kruelle, et al. 2002; Gross and Sheth, 1989; Brown, 1990; Seiders, Berry, and Gresham, 2000). Although mostly conceptual and speculative in nature, the literature on the significance of convenience consistently argues for the positive impact of product and service convenience on customers' shopping and the satisfaction resulted from the use experience (Brown, 1989; Berry, Seiders, & Grewal, 2002; Litan & Rivlin, 2001). Little research has been reported, however, about the effort that empirically investigates the impact of service or product convenience on various aspects of customer behaviors, such as shopping intention. The need for research regarding the significance of convenience that is conducted in the context of m-commerce is especially important, given the unique features and appeals of wireless communication products and services. The primary purpose of this study is to help bridge this gap by investigating the perception of cellular phone users concerning the effects of m-commerce service convenience perception on the intention of shopping via the Internet-enabled cellular phone. The relationship between perception of specific cellular phone service features and convenience perception is also examined.

The remainder of the paper first briefly reviews the existing academic literature on consumer-perceived convenience as well as some distinctive characteristics of m-commerce. The literature review serves as the basis for the formulation of research hypotheses. The paper then describes the research method of the study, including questionnaire design, collection of the research data, and the statistical techniques employed to analyze the data. The results of data analysis and our interpretations as related to hypotheses testing are presented in the subsequent section. The final section summarizes the research findings, highlights the implications for practice and research,

and also proposes some promising directions for future research.

Lit Er At Ur E r EVIEW AND HYPOt HEs Es

Distinctive c haracteristics of M-c ommerce

Briefly, m-commerce can be defined as the use of wireless communications networking technology as the primary interaction vehicle between buyers and sellers of products or services. Currently, the Web-enabled cellular phone is the most popular device used by the customers of m-commerce. This definition is based on a number of slightly different definitions found in the literature. For example, Siau & Shen (2002) defined m-commerce transactions as those conducted via mobile devices using wireless telecommunication networks and other wired e-commerce technologies. In O'Dea's (2000) study, m-commerce was defined as an extension of e-commerce beyond the static terminal of the PC/TV to anytime, anyplace, anywhere on mobile and other wireless devices. As the wireless communication technology continues to advance along many directions (e.g., bandwidth, security, user interface, pricing strategy, etc.) (White, 2002), the substantial growth potential of m-commerce in the near future has been predicted by both practitioners (Fitchard, 2004) and academicians (Zhang, et al., 2002).

Innovative business strategies must be developed to leverage the unique features of wireless communications in order to offer unique and appealing customer value. Contrasted with the traditional, wired telecommunication networks, a wireless communication infrastructure is relatively less expensive to construct in terms of capital requirement and time frame. This cost advantage is applicable to wide-area, metropolitan-area, and local-area network installations (White, 2004). Wireless communication devices

are also more tightly tied to the service users than desktop personal computers or fixed line-based telephones. This personalization capability has allowed m-commerce companies to more closely connect customer with their major business processes, such as new product development, in the attempt to enhance customer satisfaction and loyalty (Napier, et al., 2003; Ng-Kruelle, et al., 2002). In addition, when equipped with wireless cards and Web browsing capability, user wireless devices, such as laptop computers or even cellular phones, can be used to access internal as well external information resources with little concern of wiring for network connection.

Researchers have identified major advantages of m-commerce that can be derived from these unique features of wireless communications. For example, Wen and Gyires (2002) indicated the key ingredients of m-commerce to be portability, connectivity, usability, and ubiquity. Ng-Kruelle, et al. (2002) listed six advantages of m-commerce: ubiquity, reachability, security, convenience, localization, and personalization. Clarke (2001) pointed out four value propositions of m-commerce that set m-commerce apart from conventional e-commerce: ubiquity, localization, personalization, and convenience. Frolick and Chen (2004) indicated that m-commerce contributes to overall business operations through real time interactions with customers and immediate dissemination of decision support information to employees. Thayer (2002) emphasized the advantage of expanded contact points with customers. In explicating major differences between m-commerce and e-commerce, Zhang, Yuan, and Archer (2002) contended that "M-commerce is not simply a new distribution channel, a mobile Internet or a substitute for PCs. Rather, it is a new aspect of consumerism and a much more powerful way to communicate with customers (p. 83)." Rather than treating m-commerce merely as an extension of e-commerce, a new way of thinking has been called for in order to unleash the value of m-commerce associated with the role

of mobility (Nohria and Leestma, 2001; Clarke, 2001). From a strategic perspective, the potential of m-commerce can be realized only through the development of mobile-specific business strategy (Clarke, 2001). Viewed from customers' point of view, the technical capability of mobility essentially forms the basis of convenience.

the concept of customer convenience

Convenience is an important value proposition to customers in the e-commerce business. Merriam-Webster's online dictionary defines convenience as, "something (as an appliance, device, or service) conducive to comfort or ease; fitness or suitability for performing an action or fulfilling a requirement." While the first definition links to a psychological dimension and the second refers to problem solving, both definitions suggest the subjective and perceptive nature of the concept.

In business literature, convenience is typically viewed as a multidimensional construct. It first appeared in the business literature as Copeland (1923) defined convenience goods as a class of consumer products that were intensively distributed and required minimal time and physical and mental effort to purchase. Some later definitions of convenience also focused on resources such as time and effort required of the consumer in shopping for a product (Brown, 1990). Other researchers, however, expanded the concept of convenience to incorporate non-shopping activities. For example, Yale and VenKatseh (1986) identified six aspects of convenience: time utilization, accessibility, portability, appropriateness, handiness, and avoidance of unpleasantness. However, this framework was criticized for the lack of theoretical underpinning and means of measurement (Brown, 1989; Gehrt and Yale, 1993; Berry, et al., 2002). In the context of Internet-enabled commerce, the five-dimension framework of convenience proposed by Brown (1989) appears to be both inclusive and measurable: time dimension, place

dimension, acquisition dimension, use dimension, and execution dimension. Some researchers even contend that convenience is the most critical benefit of the Internet. Economists Litan & Rivlin (2001), for example, suggested that "Much of the benefit from the Internet is likely to show up in improved consumer convenience and expanded choices, rather than in higher productivity and lower prices (p. 317)," as a conclusion of a team research conducted to examine the economic impact of the Internet.

The notion of convenience perception also receives much attention in the field of information systems. Studies in the technology acceptance model (TAM) (Davis, 1989; Gefen & Straub, 2000; Liu, et al., 2003), for example, examine the impact of perceived ease-of-use on intended adoption of information technology. In a simulation study conducted to validate a theoretical explanation of the effects of perceived ease-of-use on IT adoption, Gefen & Straub (2000) distinguish between the extrinsic vs. intrinsic aspects of IT characteristics with regards to IT adoption. Citing purchasing a book through a Web site as an example, they clarify that the purchasing itself is a task extrinsic to the IT because the IT serves only as an interface of an integrated system. The entire system typically consists of many other components such as shipping and payments handling system modules. Conversely, using the same Web site to inquire about a book represents an intrinsic IT task because the Web site provides a complete application associated with the actual service. Their data support the proposition that perceived ease of use only affects intended use of tasks that are intrinsic to the IT. In light of unique characteristics of mobile commerce such as personalization and localization, however, our study adopts Brown's framework described above for the operational definition of convenience perception. The question items devised to measure the extrinsic and intrinsic characteristics of perceived ease of use in Gefen & Straub (2000) appear to indicate that Brown's framework seems to define convenience

perception in a broader sense than perceived ease of use in TAM.

In summary, the literature in consumer behavior indicates that convenience is a multi-dimensional and context-dependent perception. An empirical investigation of its impact on customers' shopping behavior must treat convenience as a composite variable and be conducted in a specific context, such as mobile commerce in the case of this research. In addition, since the perception is subjective in nature, it may be measured differently between the mobile commerce companies and their customers.

r esearch Hypotheses

In order to investigate of role of customer perception of convenience in the context of m-commerce, three research hypotheses are established for statistical testing. First of all, due to its subjective nature, it is assumed that the value of convenience may be affected by individual differences. In Bergada's (1990) study, consumers' perception of convenience was found to vary with their demographical characteristics as well as their shopping patterns. Specific individual characteristics that are capable of affecting convenience perception include: time inclination (Luqmani, 1994; Gagliano and Hathcote, 1994), tolerance of time pressure (Landy, et al., 1991), empathy (Aaker and Williams, 1998), and experience (Brucks, 1985; Krumer, et al., 1997). The first hypothesis is set up to explore the influence of demographical characteristics on the perceived customer convenience.

H₁: The customer perception of convenience is significantly related to m-commerce customers' demographical characteristics.

Secondly, the convenience features of m-commerce are provided by specific product/service items offered by the wireless communications service providers and the m-commerce websites.

Given the subjective nature of customer convenience perception, although service providers usually strive to incorporate customer-friendly features in their offerings, all specific product/service items may not be equally associated with customers' convenience perception. The second research hypothesis is formulated to test the relationship between the product/service features and the customers' convenience perception:

H₂: M-commerce customers' convenience perceptions are significantly correlated with product/service features.

Finally, the concept of convenience has strategic and tactical implications in marketing. Brown (1989) proposed a five-dimension convenience model (time dimension, place dimension, acquisition dimension, use dimension, and execution dimension) and demonstrated its value for marketing decision analysis. Berry et al. (2002) also developed a decision model that centered on service convenience. This model identified five classes of service convenience: decision convenience, access convenience, transaction convenience, benefit convenience, and post-benefit convenience. Viewed from the life cycle perspective, each of these conveniences may contribute to customers' shopping or re-shopping decision. In an empirical study, Anderson and Srinivasan (2003) found that consumer's convenience motivation was a major factor affecting the impact of e-satisfaction on e-loyalty. As indicated by Anderson (1972), when properly integrated into marketing decisions, the concept of convenience may become a powerful enabling tool. This leads to the following research hypothesis:

H₃: M-commerce customers' shopping intention is significantly affected by their convenience perception.

Research Methodology

Data Collection and Analysis of Research Data

In order to investigate the effect of convenience on m-commerce customers' shopping intention, a questionnaire survey was conducted using young cellular phone users in Taiwan as the convenience sample. The questionnaire contained three sets of questions that were devised to collect primary data from the research sample about the three research constructs: the perception of Internet services offered to Internet-enabled cellular phone users, the perception of product/service convenience associated with m-commerce, and the demographical distribution of the respondents. A total of twenty three cellular phone services were compiled from the providers' company Web pages, covering most of the popular services offered by wireless communication service providers. The development of the convenience feature perception questions was based on an expanded version of Brown's (1989) model. In addition to the original five dimensions (time, place, acquisition, use, and execution), three questions representing Web-based service are included to account for the specificity of m-commerce. Sixteen questions in total were developed to measure these five dimensions of the convenience construct. In the attempt to determine how basic demographical characteristics affected the usage of service items as well as convenience perceptions, we include three questions regarding gender, age, and usage experience in the questionnaire. Shopping intention is measured with a question that asks cellular phone users to indicate their general shopping intention via cellular phones. With the exception of demographical characteristics, the questions are not necessarily all mutually exclusive and are evaluated using the Likert scale with 1 indicating very unimportant and 5 very important.

As a pilot test, the questionnaire was administered to one hundred cellular phone users to evaluate the adequacy of the questionnaire. The reliability measures of the questionnaire evaluated by Cronbach's α values as well as the feedbacks from the questionnaire respondents were used to refine the questionnaire subsequently. According to Nunnally (1978), a data collection instrument that has a Cronbach's α higher than 0.7 is considered to be highly reliable. The evaluation of the construct validity of the questionnaire was based on Kerlinger's (1986) suggestion: The correlation coefficients between the individual question item scores and the total score were used as the construct validity measures. As shown in Table 1, the questions in all categories have Cronbach's α values higher than 0.8, and the item-total correlation coefficients are all close to 0.7 or above. The former value indicates that the questionnaire

is reliable and the latter suggests a good validity of the data collection instrument.

College students were used as the convenience sample in this study for both the pilot test and the formal survey because they represented the most active group of cellular phone users as well as m-commerce customers in Taiwan (Jih and Lee, 2004; Lin, et al. 2001). Another reason is that, although the widespread use of the cellular phone for shopping is still at the initial stage of innovation diffusion, the experience of the current college students will grow in synchronization with the maturing process of the technology itself. College students' perception of m-commerce will serve as a good referencing and thereby facilitates sound business decision-making on the part of m-commerce companies. Students of a variety of majors in six colleges participated in the study. A total of 400 copies of the questionnaire were distributed.

Table 1. Measuring convenience: Item-total correlation and dimension reliabilities

Convenience Dimensions	Question number	Item-Total Correlation	Cronbach's α Value
Use Dimension	1	0.56	0.8058
	2	0.66	
	3	0.62	
	4	0.66	
	5	0.48	
Time Dimension	6	0.82	0.9023
	7	0.83	
	8	0.77	
Place Dimension	9	0.70	0.8218
	10	0.70	
Shopping (Execution) Dimension	11	0.69	0.8347
	12	0.74	
	13	0.68	
Service Dimension	14	0.74	0.8805
	15	0.80	
	16	0.76	

Of which, 370 were deemed effective responses. The high response rate was achieved because the questionnaires were distributed in class and the students were encouraged to respond on an anonymous and voluntary basis. The effective respondents consist of 43.2% of males and 56.8% of females; 48.1% with ages 17-20, 41.6% with ages 21-25, and 10.3% with ages outside these typical college student age ranges.

The research hypotheses were tested using t-test, analysis of variance (ANOVA) canonical correlation analysis, and regression analysis. The difference of convenience perception between different demographical groups (H_1) was tested using t-test and ANOVA. Canonical correlation analysis was used to test the correlation relationship between specific service items and convenience factors (H_2). Regression analysis was employed to determine the impact of convenience factors on shopping intention (H_3).

r EsULTs OF DAT A ANALYsIs

s service and c onvenience Preferences

An issue of practical concern regarding the Internet services via wireless communications and the perception of convenience features in m-commerce is how they are ranked by customer preference. Mean scores are used to provide the rankings. Among the 23 specific service items offered by most service providers, the five most welcome ones are: emergency service, short message, e-mail, medical information, and transportation acquisition service. Among the 16 convenience perception items reviewed by the cellular phone users, the five most desirable ones are: portability of user device, light weight and compactness of user device, convenience of information search, transaction or information search not limited by location, and service on demand. These responses are not surprising.

Other than psychological and other non-technical reasons, these top-ranked desires reflect, to a certain degree, the problem of crowded traffic on the densely populated island as well as the phenomenon that most people, especially the young generation, appear to be extremely busy in this fast-paced world. The services provided by the wireless communications technology and m-commerce service providers are increasingly becoming an essential part of many people's lives (www.find.org.tw/news/).

Factor Analysis of Internet services and c onvenience Perception

Before the research hypotheses were tested, factor analysis was performed to compress the number of Internet service variables from twenty three to four (Table 2) and the number of convenience perception variables from sixteen to two (Table 3). The four latent variables that represent the observed Internet service variables and the two representing observed convenience perception were then used to test the research hypotheses. In addition, the Bartlett's sphericity test was computed to validate significant correlation between the observed variables, and the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy was obtained to further establish the adequate use of factor analysis on the data. A significantly high χ^2 value indicates significant correlation between the observed variables and a high KMO value ($\geq .80$) indicates high shared-variance and low uniqueness in variance. Both evaluation criteria measures signify that the data are appropriate for factor analysis. Both sets of variables were analyzed using principal component analysis to extract the factors and varimax rotation to achieve a simplified factor structure.

As summarized in Table 2, the result of factor analysis produced four factors for Internet services on cellular phone: Life-Enhancement Services, Value-Added Services, Entertainment Features, and Basic Services. The accumulated variance

of these four factors is 58.358% with the overall reliability 0.9162. The reliability measures of the four factors are 0.8946, 0.8357, 0.8019, and 0.5338, respectively. Nunally (1978) suggests a Cronbach's α Value 0.7 as the cutoff point for acceptable reliability. A less strict criterion for reliability

evaluation is suggested by Cuieford (1965). This criterion contends that a Cronbach's α Value 0.7 or higher indicates highly reliable, that between 0.35 and 0.7 indicates acceptable, and that below 0.35 unacceptable. Due to the exploratory nature of the questions, Cuieford's criterion was adopted

Table 2. Factor analysis of Internet services for cellular phone users

Factors	Variables	Factor Loading				Cronbach's α Values
		1	2	3	4	
Life-Enhancement Services	Ticket Shopping	0.774	0.136	-0.007	0.108	0.8946
	Medical Information	0.741	0.138	0.138	0.063	
	Service Reservation	0.677	0.106	0.183	0.166	
	e-Learning Service Use	0.647	0.434	-0.003	-0.051	
	Transportation Service Acquisition	0.639	0.032	0.080	0.218	
	Employment Information	0.634	0.147	0.309	-0.130	
	Online Banking	0.621	0.161	0.176	-0.095	
	Discount Coupon	0.618	0.158	0.186	0.137	
	Transportation Information	0.614	0.243	0.250	0.056	
	Emergency Service Use	0.613	-0.145	-0.004	0.303	
	News	0.567	0.352	0.127	-0.168	
	E-mail	0.480	0.175	0.368	0.276	
Value-Added Services	Horoscope	0.034	0.834	0.299	0.107	0.8357
	Psychological Testing	0.057	0.830	0.283	0.102	
	Food Menu Information	0.443	0.627	0.145	-0.006	
	Online Shopping	0.493	0.598	0.105	0.103	
	Lottery Shopping	0.328	0.492	0.265	-0.259	
Entertainment Features	Game	0.058	0.067	0.852	0.115	0.8019
	Entertainment Information	0.239	0.200	0.752	0.010	
	Fellowship and Social Interaction	0.122	0.332	0.646	-0.111	
	E-book	0.315	0.336	0.642	-0.009	
Basic Services	Short Message	0.196	-0.085	-0.010	0.799	0.5338
	Ring Pattern Download	0.101	0.413	0.177	0.636	
Eigenvalue		8.337	2.410	1.433	1.242	Overall Reliability 0.9162
Explained Variance (%)		36.246	10.480	6.230	5.401	
Accumulated Explained Variance (%)		58.358				

Table 3. Factor analysis of convenience perception of cellular phone users

Factors	Variables	Factor Loadings		Cronbach's α Values
		1	2	
Transaction Convenience	Immediate payment for shopping	0.821	0.110	0.9069
	Individual password for shopping payment	0.802	0.141	
	Multiple means of payment for online shopping	0.722	0.182	
	localization service	0.649	0.442	
	Transaction inquiry on holidays	0.611	0.521	
	24-hour-based online Inquiry	0.596	0.540	
	Any-time Internet connection	0.588	0.316	
	Service not limited by location	0.568	0.528	
	Convenience of information search	0.547	0.541	
Operational Convenience	Portability of user device	0.009	0.830	0.8789
	Light weight and compactness of user device	0.166	0.792	
	Ease of operation	0.400	0.647	
	Reduction of information search time	0.567	0.593	
	Transaction or information search not limited by location	0.563	0.580	
	Multimedia-based communications	0.437	0.544	
	Service on demand	0.530	0.532	
	Eigenvalue		8.518	
Explained Variance		53.240%	7.695%	
Accumulated Explained Variance		60.935%		

to accept the fourth factor, Basic Service, in our analysis. The χ^2 value from the Bartlett's test is 4075.727 at the p value < 0.01 and the KMO measure is 0.906. Both measures suggest that the data is appropriate for factor analysis.

The result of factor analysis of convenience perception is shown in Table 3. The two factors produced are labeled Transaction Convenience and Operational Convenience. The accumulated variance extracted by these two factors is 60.935%, with the overall reliability measure 0.9401. The reliability measures for the individual factors are 0.9069 and 0.8789, respectively. These are high reliability measures even by the more strict, Nunnally's (1978) standard. The χ^2 value from the Bartlett's test is 3850.51 at $p < 0.01$. The KMO coefficient is 0.94. Both measures indicate that the data is also appropriate for factory analysis.

r esults of Hypotheses t esting

In order to test the hypothesis H_1 (The perception of convenience is significantly related to m-commerce customers' demographical characteristics), a t-test was conducted with each of the two convenience perception factors as the dependent variables and gender and age as the independent variables. T-test was also conducted with wireless Internet service factors as the dependent variable and gender and age as the independent variables to determine the effect of gender and age on the evaluation of Internet services offered to cellular phone users. The hypothesis is accepted according to the results of the analysis:

1. Females have significantly higher perception of both transaction convenience and operational convenience than males at $p < 0.05$.
2. The perception of older users of both transaction convenience and operational convenience are significantly higher than their younger counterparts at $p < 0.01$.

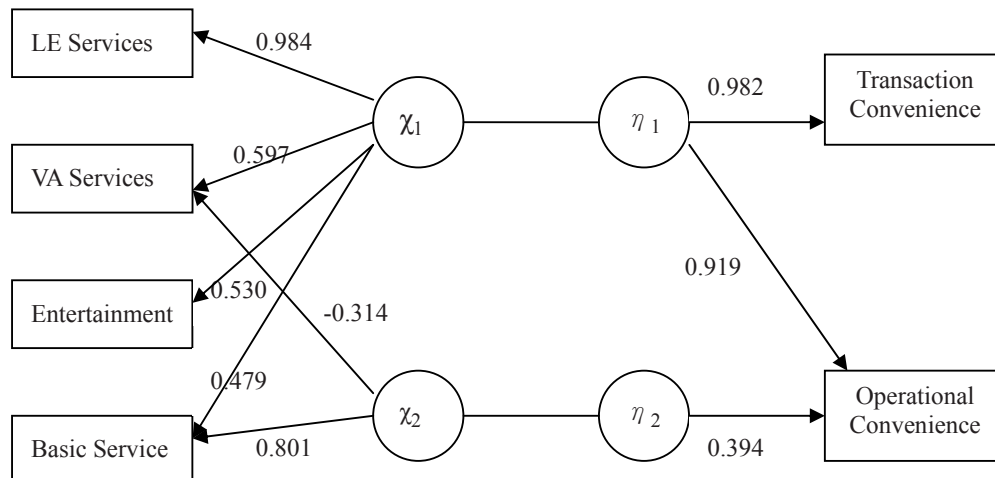
With regard to the effect of gender and age on the evaluation of wireless Internet services, it is found that while females have significantly higher evaluation of life-enhancement services at $p < 0.05$, males' evaluation of entertainment services are significantly higher than females at $p < 0.01$. Age is also found to be a significant factor regarding the evaluation of wireless Internet services: Older cellular phone users' evaluations are higher than their younger counterparts on life-enhancement services and lower on entertainment services, both at $p < 0.05$.

The second hypothesis, H_2 : M-commerce customers' convenience perceptions are significantly correlated with product/service features, was tested using canonical correlation analysis. Two sets of canonical variates were produced as the result (Table 4 and Figure 1). The first set of canonical variates significantly relates all four service categories (life-enhancement services, value-added services, entertainment features, and basic features) with both types of convenience perception at $p < 0.01$ (canonical correlation coefficient $\rho = 0.692$). The second set of canonical variates significantly relates two service categories (value-added services and basic services) only with operational convenience at $p < 0.05$ (canonical correlation coefficient $\rho = 0.227$). According to these analysis results, those cellular phone users who favor life-enhancement services, value-added services, entertainment features, and basic features tend to place more emphasis on all types of convenience offered by m-commerce businesses. In addition, those who emphasize basic services and neglect value-added services tend to favor the aspect of convenience associated with handling and operation of the cellular phone. These results lead to the acceptance of the second hypothesis.

Table 4. Canonical analysis of relationship between convenience perceptions and service categories

Service Categories	Canonical Variates		Convenience Perceptions	Canonical Variates	
	χ_1	χ_2		η_1	η_2
Life-Enhancement Services	0.984	-0.164	Transaction Convenience	0.982	-0.189
Value-Added Services	0.597	-0.314			
Entertainment Services	0.530	0.028	Operational Convenience	0.919	0.394
Basic Services	0.479	0.801			
Percentage of Variance Extracted	46.0	19.2	Percentage of Variance Extracted	90.4	9.6
Redundancy	0.221	0.099	Redundancy	0.433	0.005
ρ^2	0.479	0.052			
Canonical Correlation	0.692	0.227			

Figure 1. Path diagram of significant relationship between service features and convenience perceptions



The impact of convenience perception on shopping intention stated in the third hypothesis, H_3 : M-commerce customers' shopping intention is significantly affected by their convenience perception, was tested using regression analysis. The results show that the type of convenience perception labeled Transaction Convenience has a significant impact on customers' intention to shop with mobile commerce companies using their cellular phones (regression coefficient = 0.497, $p < 0.01$). The fact that operational convenience does not exhibit a significant impact on shopping intention (regression coefficient = 0.172, $p = 0.139$) suggests that it may take more than just commonly available features to attract customers' attention in the mobile commerce business. The high F-value ($F = 53.920$) indicates that, in general, customers' shopping intention is significantly affected by their perception of convenience offered by mobile commerce businesses ($p < 0.01$). The third hypothesis, "M-commerce customers' shopping intention is significantly affected by their convenience perception.", is accepted.

The results of hypotheses testing, stated in the alternative form, are summarized below,

H_1 : The customer perception of convenience is significantly related to m-commerce customers' demographical characteristics. (Accepted)

H_2 : M-commerce customers' convenience perceptions are significantly correlated with product/service features. (Accepted)

H_3 : M-commerce customers' shopping intention is significantly affected by their convenience perception. (Accepted)

CONCLUSION

Successful deployment of information technology requires leveraging value-creating capabilities of technological tools to drive innovative customer-centered business processes. The convergence of Internet-based services and wireless communications creates technology-enabled business operational models which, if properly harnessed, have the potential to enhance and sustain a company's competitive advantage. Specifically, the rapid advancement of wireless communication

Table 5. Regression analysis of the impact of convenience perception on shopping intention

Convenience Perception	Regression Coefficient	t-value	p-value
Constant Item	0.561	2.164	0.031*
Transaction Convenience	0.497	4.540	0.000**
Operational Convenience	0.172	1.485	0.139
R^2	0.227		
F	53.920		0.000**

*: $p < 0.05$

** : $p < 0.01$

technology has allowed for multimedia messages and data being smoothly and securely exchanged with little regard for geographical distance or time consideration. The capability to transmit voice and data over the same network connection and the convenience provided through such feature as location-based service offer virtually unlimited possibilities for innovative businesses in designing product and service offerings.

When contrasted with traditional electronic commerce using desk-top personal computers, one of the most cited attractions of using mobile devices as a consumer shopping vehicle is convenience (Frolic and Chen, 2004; NG-Kruele, et al., 2002; Seager, 2003; Siau and Shen, 2002). A subjective perception that typically varies between different people and across different contexts, convenience can significantly influence consumer behavior in various stage of the shopping process (Anderson, 1972; Brown, 1989; Gehrt and Yale, 1993).

In light of the unique business value of wireless communication applications and the important role of convenience perception, this study was conducted to empirically investigate the impact of convenience on customers' shopping intention in the context of m-commerce. The primary data regarding customers shopping on the Internet via cellular phones was collected using a survey questionnaire. The results of data analysis revealed a positive correlation between convenience perception and demographical data (gender and age). Females were found to value convenience more than males. Older m-commerce customers were found to value convenience more than their younger counterparts. A positive correlation relationship also exists between the convenience perception and the user evaluation of wireless Internet services. Those who appreciate the use of wireless communication services also tend to value the convenience of shopping in m-commerce. Most notably, the study showed that customers' intention of shopping on the Internet via their cellular phones was positively affected by

their perception of convenience features offered by m-commerce businesses, wireless communication service provider, and vendors of user devices. In other words, convenience offering should be viewed as an importance element in an m-commerce company's business strategy.

The findings have implications for practicing functional managers as well as for information system professionals. The major implications of the research findings for practicing functional managers are twofold. The impact of product and service convenience in consumers' shopping decision making has been well-documented in marketing and consumer behavior literature (Brown, 1989; Berry, et al., 2002). This study demonstrates that the concept can be even more important in the context of m-commerce. Faced with rapid proliferation of offerings in the cyber space, consumers are only attracted to and retained by the companies that consciously build convenience into their websites and the entire customer relationship management program.

The second implication presented to practitioners by the research findings is associated with the way a convenient customer interface may be designed. Through regression analysis, the study found that, although both categories of convenience (transaction convenience and operational convenience) have significant impact on customers' shopping intention, transaction convenience appears to exhibit more positive influence than operational convenience does. In other words, it tends to be the transaction convenience, rather than the operational convenience, features that provide differentiating customer value.

Information system professionals must take into consideration the importance of consumer perceptions of the mobile commerce offerings and design a website that is both technically versatile in processing capability and convenient in its user interface. Traditionally, user-friendliness of user interface primarily requires ease of operation and ease of learning. In mobile commerce, however, integrating transaction convenience with

operational convenience is essential to winning customer attention in the vast cyber business market space.

Due to several research limitations mentioned below, the findings reported herein must be interpreted and applied with due caution on the part of the reader. The use of college students in Taiwan as the source of research data may restrict the external validity of the study. The difference between college students and other age groups must be accounted for. As in many other survey research projects, this study assumes that the questionnaire respondents fill out the survey instrument seriously. In addition, the convenience perception factor in different consumption cultures may play a different kind of role in m-commerce.

The results of this study shed some light on an important characteristic of business applications of wireless communications technology, convenience. An inter-disciplinary research field, m-commerce is still in its infancy in many ways and requires more systematic inquiries being conducted from different angles. First of all, this study operationalizes the concept of convenience based on Brown's (1989) definition of convenience. A different framework may be used to determine if significant difference would result from different definitional frameworks of convenience. For example, the model of service convenience proposed by Berry, et al. (2002), which characterizes consumer's time and effort perceptions in terms of decision convenience, access convenience, transaction convenience, benefit convenience, and post-benefit convenience, should also be empirically validated for comparison. Secondly, as mobile communication devices are increasingly used as an avenue of advertisement, it is important to know how users perceive, through an independent research, this new mode of advertisement. Thirdly, since convenience usually interacts with other factors, such as service characteristics and individual differences, in affecting user perceptions, researches that investigate compound ef-

fects of these relevant factors would contribute to formulation of effective business strategy for m-commerce. Another interesting and important area of research involves cross cultural comparative studies. Currently, European and Asian customers are ahead of American customers in using the cellular phone as a shopping tool. The results of this study should also be validated in different cultures, such as between older and younger adult groups, to allow for more general conclusions to be drawn. In the technology area, information system researchers may examine possible impacts of technological capabilities, such as screen display or bandwidth, on user perception of convenience and shopping intentions. The best ways in which commerce contents, such as product display or promotion messages, ought to be presented on the small screen for relatively impatient consumers also deserve more research. Another interesting research area involves the popularity of social networking services and the use of context-dependent advertisements. These products or services information automatically pushed to the users may affect customer perception of shopping convenience in some way.

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Chapter XIX

The Effects of System Features, Perceived Risk and Benefit, and Customer Characteristics on Online Bill Paying

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Abstr Act

Along with the exponential increase in online business transactions, the online payment system has gained in popularity because vendors and creditors realize its growing importance as a foundation to improve their information infrastructure and to achieve “paperless” operating efficiency. However, due to perceived different characteristics among customers and Web-systems, both sides’ perspectives and technology factors could cause a significant level of variation in customers’ acceptance of online payment methods. Our research involving 148 subjects who participated in a field survey, examined the impact of a series of possible decision factors, including perceived risk, perceived benefits, vendor’s system features, and customers’ characteristics, on the intention to use an online payment system by customers. The results suggest that vendors/creditors should: one, pay particular attention to improving the security and the ease-of-use of their transaction network; and two, focus on adding necessary option features, such as recurring automatic deductions, so that they can speed up the transformation process and encourage customers to switch to using online payment methods.

INTR ODUCT ION

It was estimated that by 2007 approximately 71.4% of US residents would be using the Internet. This is complemented by the fact that there has been a growth of 125.6% in Internet use from 2000 to 2007 (Internet World Stats, 2007). Also, eMarketer's (2005) report estimated that US e-commerce retail sales would rise from \$56 billion in 2003 to \$84.5 billion in 2005, growing at above 20% annually, and that number will further grow to \$139 billion by 2008, significantly outpacing traditional retail commerce spending over the next couple of years. This e-commerce growth has provided the impetus and opportunities for traditional business processes (e.g., sales, marketing, payments, collection, financing and investing) to transfer online. Consequently, the online payment method has become more popular, as it has been increasingly important for financial sectors to improve their information infrastructure (Lee & Cata, 2005). Online payment, also addressed as an electronic payment or an Internet payment, is defined as "an electronic payment made via a web browser for goods and services using credit or debit cards" (Bitpipe, 2006). Compared with traditional payment methods such as pay-by-check, pay-by-phone or wire transfer, online payment is considered more time- and cost-efficient, convenient, and flexible for customers and businesses (Sorkin, 2001; Yu, His, and Kuo, 2002). However, customers can differ and web-based systems can vary in terms of services and features offered, perhaps leading to a significant level of variation in the intention to use online payment systems. What makes e-customers more widely accept online payment methods? What should e-vendors focus on to accelerate such a technology acceptance process? Our study thus focuses on the impact of these decision factors on the adoption of an online payment system by customers, with a framework exploring how the adoption factors drive or impede customers to accept online payment systems.

Recent empirical studies have investigated the impact of key factors on the customer adoption process of various e-commerce activities, such as consumer shopping, entertainment, and stock trading (Eastin, 2002; Gefen, Karahanna & Straub, 2004; Hsu & Lu, 2004; Huang, Hung & Yen, 2004). These findings jointly suggest that individuals' behaviors could be explained by perceived characteristics of the online transaction methods, vendors' Web site and product/service characteristics, and customer characteristics, not only supporting but also extending the widely-accepted Technology Acceptance Model (TAM) (Davis, 1989) which emphasizes the importance of perceived usefulness (PU) and perceived ease of use (PEOU) on e-commerce customer decision-making. Lui & Jamieson (2003), for example, incorporate factors such as perceived trust and risk into the TAM; and Ilie et al. (2005) incorporate perceived relative advantages, perceived compatibility, and gender difference into the TAM framework. Yet, given that online payments are increasingly accepted in the business world, so far few published empirical studies have specifically addressed the underlying factors that could materially affect customers' decisions to adopt online payments. Research progress in this area will help vendors make better plans regarding the replacement of traditional billing and payment tools with integrated online systems that are facilitated with modern technology.

Existing research has analyzed the assessment dimensions for a variety of electronic payment systems. According to the study by Yu et al. (2002), the systems to be assessed include online credit card payment, electronic cash, and electronic checks; and their assessment dimensions cover the technological, economic, social, institution and legal aspects. However, Yu et al. (2002) have not yet empirically estimated or tested the effects of such aspects, nor have they specified the importance of customers' characteristics (Internet experience, age, gender, education, income level, etc.), which could strongly influence a customer's

new technology adoption (Akhter 2003; Eastin, 2002). In attempt to fill in this research gap, our study will:

1. Incorporate possible determinants that are previously summarized into an empirical research framework;
2. Empirically estimate the influence of those identified determinants.

The remainder of this article is organized as follows. Section 2 discusses the advantages of the online payment method and the barriers for switching to online payments. Section 3 presents a research model that illustrates proposed links between determinants and a customer's decision to adopt online payments. Section 4 explains the research method; Section 5 analyzes empirical results; and Section 6 provides a discussion focusing on implications, limitations, and suggestions for future research.

CHARACTERISTICS OF ONLINE PAYMENT METHODS

Today, there could be no thriving e-commerce without a robust, secure and standardized e-payment infrastructure. One of the more prominent points of discussion related to online purchases and payments has been the issue of trust (Odom, Kumar and Saunders, 2002). Odom et al. (2002) also investigated consumers' fears and the use of web assurance seals. Notwithstanding the importance of these trust-related matters, there are other advantages and disadvantages associated with online payment methods. As follows, our study focuses on the importance of understanding the role of benefits (efficiency, convenience, and flexibility) as well as the role of barriers (privacy, security and reliability) of adopting online payment systems.

Major Advantages of the Online Payment Method

Efficiency - Entrepreneurs adopt online payment systems in order to speed up cash inflow, and save money and time by reducing paperwork (Chou, Lee & Chung, 2004). Within online payment methods, credit cards are particularly favored by consumers because of the efficiencies and protections provided by issuing banks against transaction dispute risks, so they are used for 93% of all online transactions (Caldwell, 2001).

Convenience - Customers can pay their bills at any time and any place where they can access a networked computer because of the versatility of electronic payment methods (Yu et al., 2002). That is, online payers can check and pay their bills at their own time and convenience, without having to wait for their paper bills to be sent to the pre-specified mailing address at a fixed time interval; this is consistent with our earlier definition of online payment.

Flexibility - Online payments provide customers with the same features as automatic deduction from customers' checking accounts by allowing customers to set and maintain automatic recurring payments (Wright, 2003). Moreover, some online payment systems, including many credit card services (e.g., American Express, 2006) offer customers more flexibility and control over how much they want to pay and when they want the payment to be made.

Major barriers of Adopting Online Payments

Privacy - The online payment method involves the disclosure of sensitive personal information online. And the service providers may potentially misuse such personal information either purposely or accidentally. For example, having long been trusted by cardholders, banks can always access sensitive data of their cardholders. However,

negative incidents such as banking scandals, bank closures and mergers due, for example, to poor management, and security problems with Internet banking can all undermine cardholders' trust in banks (Hwang, Yeh & Li, 2003).

Security - People could feel reluctant to transact and pay online, fearing that their financial account information may fall into the wrong hands. Behrens (2001) reports that 86% of on-line American adults are very concerned about the security of their bank and brokerage accounts when doing on-line transactions. A more recent study by Entrust, Inc. (2005) involving 700 online banking consumers in the US found that *18 percent of all respondents* have decreased or completely stopped their use of online banking due to fears about the security of their online identity. This research indicates that there is a trend for customers' loss of confidence involving online banking leading to more costly channels such as call centers or brick-and-mortar branches.

Reliability - Online system breakdowns can deeply frustrate buyers and sellers, preventing them from sending/receiving payments, confirming transactions or accessing funds. Also, online payments may lead to an inadvertent error, intentional misappropriation of funds or fraudulently going out of business (Sorkin, 2001).

DEVELOPMENT OF RESEARCH MODEL

conceptual Model

In order to address the above issues, the proposed research framework, as shown in Figure 1, consists of the three categories of possible online-payment-adoption determinants, namely, perceived characteristics of online payment methods, vendors' online system characteristics, and customers' characteristics. Some of these possible decision factors have been summarized by prior

research regarding various e-business areas (Hsu & Lu, 2004; Huang et al., 2004), while our study extends these research studies by examining the impact of these factors specifically on the payers' intention to adopt online payment methods. Furthermore, as was addressed earlier, there are strong linkages between our research model and Davis' (1989) Technology Acceptance Model (TAM). Similar to previous research, our research model, while not specifically testing TAM, does incorporate parallels to it. Recent research by Venkatesh and Remesh (2006) took a similar path by augmenting variables that can complement and strengthen TAM.

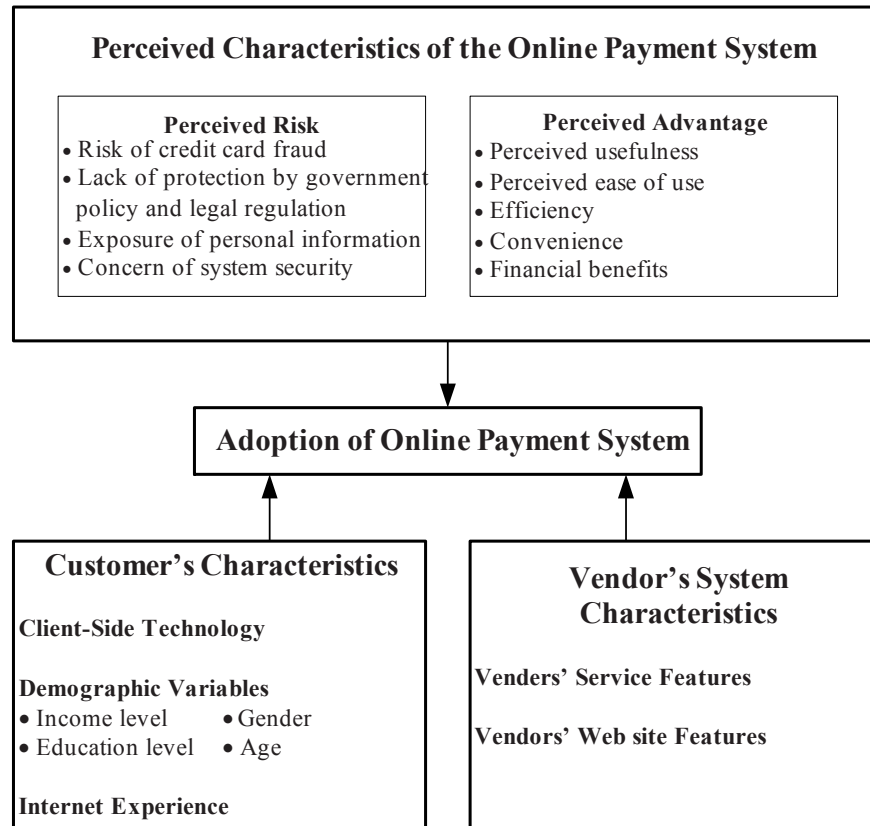
FACTORS THAT COULD AFFECT THE ADOPTION OF ONLINE PAYMENT

Perceived characteristics of the Online Payment system

Perceived Risk

Pavlou (2003) and Koufaris, Kanbil & LaBarbera (2002) examine the impact of relative risk on consumer decision-making in using new online transaction tools (web-based commerce, software agents, etc.), and their findings suggest that when customers consider that the risk of adopting new transaction tools is relatively higher than following the old methods, they will be less willing to adopt. In the current context, the old way to make payments was by regular mail which may be perceived as more risk-free by individuals. If a customer chooses to pay his/her bills online instead, the risk of postal theft/fraud will diminish, but the risk of online theft/fraud (e.g., Email interception, network hacking, password stealing and spyware usage) is present. Therefore, how a customer selects between pay-on-line and, say, pay-by-mail would then be affected by his/her

Figure 1. Research frameworks for online payment adoption



perception of the relative risk between those two payment methods.

A common and widely recognized obstacle to e-commerce adoption has been the lack of financial protection, legal regulation, security and privacy over the Internet (Bhimani, 1996; Featherman & Pavlou, 2003). This had led many to view e-commerce as a risky undertaking. Customers are very sensitive with regard to services that involve monetary transactions, in which case they concern about losses in both money and information (Hourahine & Howard, 2004). Thus, it is expected that only individuals

who perceive using online payment system as a low risk undertaking would be inclined to adopt it. Featherman and Pavlou (2003) did find a significantly negative effect of perceived risk on the adoption intention of online bill paying.

Risk of Credit Card Fraud – Risk of credit card fraud is customer perceived financial risk associated more with an overall fear of using the credit card on the Internet than with the amount of money spent (Bhatnagar, Misra & Rao, 2000). Credit customers have been beset for a long period of time by the risk of fraud/theft related to bill paying activities. In a study by Bhatnagar et al.

(2000), significant negative impact of credit card fraud risk was found. In the context of online payment systems, a potential exists for intercepting credit card information, such as by transacting business over an unsecure wireless network. Whether transferring the transaction/payment process online will increase the customers' perceived risk of credit card fraud thus emerges as a hypothesis to be empirically tested.

Lack of Protection by Government Policy and Legal Regulation - Protection by government policy and legal regulation includes financial and privacy protection. González (2004) reviews the regulatory status of PayPal, the popular Consumer-to-Consumer (C2C) payment system that is incorporated by auction site eBay. Consumer friendly as it is, such an online payment system causes sensitive legal concerns, including possible liability in cases of fraud, money laundering, the use of the system to pay for illegal or restricted goods/services, or the transactions due to errors or negligence. When feeling the lack of affirmative regulations for online payment systems and legal protections for customer interests, consumers may be less certain to pay their bills through those online systems.

Biukovic (2002), Strauss and Rogerson (2002) and Baumer, Earp and Poindexter (2004) compare the Internet privacy law systems between the United States (US) and the European Union (EU). Baumer et al. (2004) summarize the similarities and differences between the 2002 EU Directive on Privacy and Electronic Communications and the projected US Online Privacy Protection Act, and they conclude that with regard to regulations of Web sites and online service providers, the EU provides more strict protections of the right to privacy than the US. Biukovic (2002) and Strauss and Rogerson (2002) also argue that self-regulation by the private sector is insufficient to effectively protect clients' online information privacy, so EU-style legislative intervention is needed in the US. If consumers feel that there is a lack of governmental and legal policies for

online privacy protection, they may be less willing to provide their personal information for online payments.

Exposure of Personal Information—Customers can hesitate to use online payment systems because of privacy concerns. When making purchases online, customers are required to provide some private information to complete their transactions, therefore deterring many of them from online purchase activities. Smith, Milberg and Burke (1996), for example, found that personal privacy concerns could be divided into four categories: data collection, errors, unauthorized secondary use and improper access. Moreover, invasion of privacy in the area of e-commerce includes the unauthorized collection, disclosure, or other use of personal information such as selling it to another e-vendor (Wang, Lee & Wang, 1998), and safeguarding privacy would typically cause an added cost to the consumers (Luo, 2002). This too is similar to Pavlou's (2003) environmental uncertainty involving perceived risk associated with exposure of personal information.

Concern of System Security - In the network security area, Hwang et al. (2003) indicate that the existing Secure Electronic Transaction protocol needs further revisions to sustain credit cardholders' trust in banks' online card payment networks, particularly in the environment of growing bank mergers and acquisitions. The more customers are concerned about the security of an online payment system, the greater the risk and less trustworthiness they would perceive in using pay-on-line transactions, and the less their intention would be to adopt the system.

Perceived Advantage

Perceived Usefulness (PU) and Perceived Ease of Use (PEOU) - The adoption of online payments can be explained in part by the TAM (Davis, 1989). According to TAM, the intention to use a new technology is determined by the PU and PEOU for the specific technology. This model has been

widely used and extended by researchers to study technology acceptance behavior and to identify the adoption decision determinants of various e-commerce activities (Gefen et al., 2004; Hsu & Lu, 2004; Luarn & Lin, 2005). When customers perceive the online payment system as more useful and/or easier to use, they should be more willing to adopt it.

Efficiency - Daft and Lengel's (1986) media richness theory argues that the selection of communication media depends on the task characteristics and the cost of media usage. The theory suggests that for a rather low-equivocality task of "paying bills at a specific amount by a specific deadline", some leaner media (such as the paperless online media) is better at lowering costs and minimizing excessive message decoding. In addition, Chou et al. (2004) argue that the adoption speed of business innovations (e.g., e-payment system alternatives) is positively affected by technological efficiency and established customer base, but not necessarily affected by technological complexity. By using online payment systems, a buyer can submit a payment "paperlessly" or even "speechlessly", and a seller can receive payments after office hours and ship the goods soon after, instead of answering phone calls (for credit card payments), waiting a few days to receive a mailed payment or taking even longer to clear a check (Sorkin, 2001).

Convenience - Unlike the offline "brick-and-mortar" offices, online payment sites typically do not close. Their services are available 24 hours a day, 7 days a week. Customers favor the mobility and the associated convenience of accessing their bills at any time and any place (Yu et al., 2002). The adoption of an electronic payment method allows online payers to check and pay their bills when and where they want to without having to wait for their paper bills to be sent to a pre-specified mailing address at a fixed time interval. Therefore, when customers can conveniently access the

Internet, they should have a greater intention to adopt an online payment system.

Financial Benefits - Existing studies investigate various economic factors that might influence the outcome of credit sales, and such factors include customer search cost, membership cost and interchange fees (e.g., Wright, 2003). Adopting an online payment system will significantly reduce the paperwork, cut the postage cost of sending bills, and increase the operating efficiency of vendors such as credit-providing banks. As a result, some credit card issuing banks provide a bonus to customers who switch to a "paperless" online billing system. Chen and Tseng (2003) studied the performance of marketing alliances between Taiwan's credit card issuing banks and the tourism industry, and their findings suggest that credit card clients consider the attached promotional bonus of travel discounts as influential, therefore having positive effects on alliance performance. Nevertheless, Lucas and Bowen (2002) find that in the casino industry, promotional periods fail to significantly influence sales, and the magnitude of prize money generates a positive but insignificant economic impact. As for the e-business, Wilson and Abel (2002) examine the issues that must be considered for developing a successful Internet marketing plan. They emphasize the importance of online and offline promotional activities. So it appears that the influence of using promotional bonuses for marketing new products and/or services could be an industry- and market-specific issue. Whether a promotional bonus can materially enhance customers' willingness to adopt online payment methods is therefore tested.

The hypotheses regarding "perceived characteristics of the online payment system" are summarized as follows:

H1: Perceived risk and benefit of using an online payment system should have a significant impact on a customer's intention to adopt online payment methods.

H1-1: The intention to adopt online payments should be negatively associated with perceived risk factors.

H1-2: The intention to adopt online payments should be positively associated with perceived benefit factors.

Vendor's system characteristics

While it seems to be an understanding that online customer behavior is fundamentally different from that in a conventional consumption environment (Peterson, Balasubramanian, & Bronnenberg, 1997), little documented evidence is available on customer perception of what makes effective online payment systems, and so far there is no unified view on their key characteristics. Focusing on service features and Web site features, our research is intended to help address these gaps.

Vendors' Service Features

Customers can benefit from adopting online billing and payment systems by minimizing payment efforts ("click-to-pay"), saving postage cost, obtaining payment confirmation, circumventing mail delay, avoiding past-due penalties, and scheduling recurring payments. With regard to automated deductions, however, automated online payments require customers' careful timing and personal financial planning to work consistently, as some of these forgetful and unorganized customers could run into unexpected overdrafts. To solve this problem, some online payment systems provide customers more flexibility and control over how much they want to pay and when they want the payment to be made, and even allow online payers to cancel the pending scheduled payments if they feel need to. Debruyne et al. (2002) and Van Slyke et al. (2002) find that the market tends to be more responsive to a new product that can be assessed within an existing product category and less responsive to radical

innovations or new products that employ a niche strategy. Their evidence suggests that the public should have relatively less resistance for adopting an online billing and payment system, which is merely an extra new feature added to some well-established existing services (credit sales, automated bank deposits) rather than a "radical innovation."

Vendors' Web Site Features

Existing empirical research suggests that both the availability and the quality of design significantly affect customers' interest in and performance of e-business Websites (Ranganathan & Ganapathy, 2002; Lee & Cata, 2005). The design of an online payment Web site plays an important role in attracting, sustaining and retaining the interest of a consumer at a site. Liang & Lai (2002) argue that a good design must provide adequate functional support to meet e-commerce customers' needs at each stage of their decision processes. One of the important functional supports provided by a Web site that makes a consumer comfortable is the ease with which it could be navigated (Deck, 1997). Consistent navigation links to each page, useful navigation buttons, and an index to the Web site have been suggested as important issues when designing a B2C Website to attract customers to adopt a B2C e-commerce system (Ranganathan & Ganapathy, 2002). We thus hypothesize,

H2: Vendor's system characteristics should have a significant impact on a customer's intention to adopt online payment methods.

H2-1: The intention to adopt online payments should be positively associated with a customer's overall perception of the features offered on the vendor's Web site.

H2-2: The intention to adopt online payments should be positively associated with a customer's overall perception of the Web site's design.

customer's characteristics

Client-Side Technology

The level of anti-virus and/or anti-spyware protection could affect a customer's confidence to pay bills online, as the threat of network invasion has been increasing (Hill, 2003). The effectiveness of customers' computer operating systems and the speed of accessing the Internet could also influence their confidence for making online payments.

Demographic Variables

Existing evidence indicates that various demographic factors of online system users could be influential to their propensity of using the system. Previous studies indicate that men will be more likely than women to purchase over the Internet because on average men perceive a relatively lower level of risk in online purchasing (Garbarino and Strahilevitz, 2004). Also, when adopting specific information technologies such as Instant Messaging, men value perceived relative advantage, result demonstrability and critical mass more than women, whereas women value PEOU and visibility more than men (Ilie et. al., 2005). Using the 2001 US Census Bureau's population survey data, Banerjee et al. (2005) also found more males use the Internet than females to do financial transactions, including security trading and banking. On the other hand, as people age, they tend to exhibit more negative perceptions toward new technologies and feel greater reluctance to adopt new technologies (Pommer et al. 1980; Gilly and Ziehl, 1985). More recently, Akhter (2003) examined the influence of gender, age, education, and income on the likelihood to purchase over the Internet, and his findings suggest that males in contrast to females, younger people in contrast to elders, more educated in contrast to less educated, and wealthier people in contrast to less wealthy are more likely to use the Internet for purchasing

symphony tickets. After reviewing prior literature, our study aims to test those relevant hypotheses in the online payment context.

Internet Experience

Eastin (2002) employs the diffusion model to investigate the adoption of four e-commerce activities: (1) online shopping, (2) online banking, (3) online investing, and (4) electronic payment for an Internet service (such as online auction site or exclusive club membership). The results indicate that when users decide to adopt one of these activities, they tend to also adopt another. Therefore, a customer's e-commerce background could also influence his/her tendency to use online payments. Five factors (computer knowledge, online shopping experience, online trading experience, online auction experience, and online vending experience) are thus selected for testing the influence of customers' Internet experience on the adoption of online payment systems.

H3: Customer's characteristics have significant impact on the adoption of an online payment system.

H3-1: The reliability, effectiveness, and security of client-side technology should be positively associated with the customer's intention to adopt online payment methods.

H3-2: The customer's income level should be positively associated with the customer's intention to adopt online payment methods.

H3-3: Males are more likely to adopt online payment methods than females.

H3-4: The customer's age should be negatively associated with the intention to adopt online payment methods.

H3-5: The customer's level of education should be positively associated with the customer's intention to adopt online payment methods.

H3-6: The level of a customer's Internet experiences should be positively associated with the intention to adopt online payment methods.

The addressed factors that presumably affect one's intention to adopt online payment methods and their corresponding literature are summarized in Appendix I.

rE sEArc H MEt HODOLOGY AND DAt A DEscr IPt ION

Questionnaire Design, Data collection and Descriptive statistics

To test the series of research hypotheses, a survey-based field study was designed. Prior empirical and conceptual research (see Appendix I) was carefully reviewed to provide the basis for our survey questions, which are listed in Appendix II. The questionnaire includes 22 "subjective" items (Q1 – Q22) measured on a Likert-type scale, ranging from 1 ("strongly disagree") to 5 ("strongly agree"). As respondents may hesitate to provide their income information to a non-business-related surveyor, we did not directly inquire about their specific income level, but instead used a "subjective" item (Q22) to indirectly investigate whether a change in the income level might influence their intention to use an online payment system. There are also 8 multiple-choice questions (Q23 – Q30) related to the respondents' "objective" characteristics, including their demographic background and Internet experience.

The survey was administered to students and faculty members at a state university located in the Midwestern US. The university enrolls approximately 21,000 undergraduate and graduate

students with various backgrounds, ranging from full-time students, working people, to retired senior citizens who seek further education; all meet the age requirements to apply for credit cards and/or online banking accounts. After screening the university's Blackboard® user database (listed in alphabetical order with contact information) and selecting at random one out of each 20 users, a total of 200 surveys were randomly distributed through regular campus mail and email beginning early in the semester. A reminder was sent approximately six weeks after the survey was initially distributed. In total, one hundred seventy-two (86%) responded. To test for non-response bias, we used the Mann-Whitney "U" test for comparing the data obtained from those who responded after the first inquiry against the data obtained from those who responded after the second inquiry. Respondents were compared in several key survey areas, including use intention, perceived risk and perceived benefits. No significant differences were found between the two sets of data. After excluding those who provided incomplete answers, and who reported no online bill paying experience and thus could not assess any of the constructs that relate to online payment systems, the final sample consisted of 148 (74%) with 98 undergraduates, 43 graduate students and 7 faculty members.

Table 1a summarizes the frequency distributions of respondents' personal characteristics, including gender, age, education level, computer knowledge background, and their experience with online business. Within our sample of 148 respondents, approximately 43% are females, 90% are between 20 and 39 years old, about 5% possess a Doctoral degree, 75% have an Associate's or Bachelor's degree, and about 95% have at least five years of computer experience. In addition, more than 60% of the respondents have been involved in some sort of online business activity, including shopping, bidding, vending, and/or even security trading.

Table 1a. Frequency distributions of respondents' background information (gender, age, education, computer knowledge, online business experience)

Variable	Response (n = 148)				
Q23 (Gender)	Female			Male	
	43.2%			56.8%	
Q24 (Age)	20-29	30-39	40-49	50-59	≥60
	77.7%	12.2%	8.1%	1.4%	0.7%
Q25 (Education)	High School	Associate	Bachelor's	Master's	Doctoral
	10.8%	55.4%	20.9%	8.1%	4.7%
Q26 (Computer Experience)	≤ 1year	2-4 years	5-7 years	8-10 years	>10 years
	1.4%	4.1%	35.1%	20.9%	38.5%
Q27 (Online Shopping)	Never	1-5/mo.	6-10/mo.	11-15/mo.	>15/mo.
	13.5%	42.6%	29.1%	12.2%	2.7%
Q28 (Online Stock trading)	Never	1-5/mo.	6-10/mo.	11-15/mo.	>15/mo.
	45.3%	40.5%	8.8%	2.7%	2.7%
Q29 (Online Auction Bidding)	Never	1-5/mo.	6-10/mo.	11-15/mo.	>15/mo.
	33.1%	39.9%	17.6%	6.8%	2.7%
Q30 (Online Vending)	Never	1-5/mo.	6-10/mo.	11-15/mo.	>15/mo.
	39.9%	38.5%	16.2%	1.4%	4.1%

Table 1b summarizes the frequency distributions of user perceptions (Q1 – Q22 item scores) as follows.

Out of the 148 respondents, 38.5% “strongly agree” that they would like to use an online payment system to pay their bills (Q1), and another 31.1% also “agree”. Put together, approximately 70% of our sample respondents favor online bill paying, while only 21% disfavor it and the remaining 9% feel indifferent. The histograms in appendices also show that the frequency distributions for respondents' opinions to online payment systems are skewed to the left (Appendix III), whereas the respondents' perceived risk for their own online transactions and payments is distributed rather normally (Appendix IV). That

is, the respondents as a group consider the risk of online payment frauds to be at the normal level, and paying bills online to be preferable.

Descriptive statistics of the sample data by all 30 items are presented in Table 2:

scale Development and reliability Analysis

We use the 30 items above to measure the characteristics of an online bill payment system, including customers' use intention (UI), perceived risk (PR), perceived benefits (PB), vendor's service features (VSF), vendor's Web site features (VWF), client-side technology (CST) and customers' characteristics (CC). As shown in Appendix I,

Table 1b. Frequency distributions of survey question scores regarding use intention, perceived risk, perceived benefits, service features, Web site features, client-side technology and income prospect effects (n = 148)

Score Variable	1	2	3	4	5
Q1	6.8%	14.2%	9.5%	31.1%	38.5%
Q2	5.4%	25.0%	40.5%	21.6%	7.4%
Q3	20.9%	23.0%	21.6%	22.3%	12.2%
Q4	9.5%	39.9%	29.1%	19.6%	2.0%
Q5	12.2%	43.2%	20.9%	21.6%	2.0%
Q6	0.0%	4.1%	8.1%	28.4%	59.5%
Q7	0.0%	3.4%	26.4%	41.9%	28.4%
Q8	0.0%	1.4%	8.1%	50.0%	40.5%
Q9	0.0%	6.1%	8.1%	43.2%	42.6%
Q10	2.7%	16.2%	21.6%	29.7%	29.7%
Q11	1.4%	10.1%	23.6%	33.1%	31.8%
Q12	1.4%	10.1%	27.0%	33.8%	27.7%
Q13	9.5%	21.6	22.3%	27.7%	18.9%
Q14	0.0%	5.4%	11.5%	45.3%	37.8%
Q15	1.4%	9.5%	36.5%	37.8%	14.9%
Q16	0.0%	14.2%	41.9%	33.8%	10.1%
Q17	2.7%	8.1%	18.9%	47.3%	23.0%
Q18	5.4%	17.6%	33.8%	33.8%	9.5%
Q19	0.0%	8.1%	29.7%	33.1%	29.1%
Q20	2.0%	7.4%	22.3%	40.5%	27.7%
Q21	6.8%	8.1%	37.2%	26.4%	21.6%
Q22	8.1%	20.3%	45.3%	18.2%	8.1%

a diverse body of research was reviewed to provide the basis for the development of the items incorporated into our instrument. The twenty-two subjective items are grouped into seven latent variable scales (Q1 into UI, Q2-Q6 into PR, Q7-Q12 into PB, Q13 and Q14 into VSF, Q15 and Q16 into VWF, Q17-Q21 into CST, and Q22 into IP), with scale scores being calculated, in line with Ilie et al. (2005), by computing a mean of the items

constructing each scale. Descriptive statistics for each scale are reported in Table 3.

To assess the internal consistency of these measurement items, we conducted a reliability analysis by computing Cronbach's Alpha for each scale. All scales are within the commonly accepted range, i.e., $\alpha \geq 0.70$, for this type of research (Kline, 1999).

Table 2. Descriptive statistics of online payment survey answers (n = 148)

Item	Min	Max	Mean	t-value	Median	Std. Dev.
Q1	1	5	3.80	7.666**	4.00	1.276
Q2	1	5	2.99	-0.083	3.00	.993
Q3	1	5	2.82	-1.675	3.00	1.325
Q4	1	5	2.65	-4.416**	3.00	.968
Q5	1	5	2.58	-4.979**	2.00	1.024
Q6	2	5	4.43	21.528**	5.00	.809
Q7	2	5	3.95	14.006**	4.00	.828
Q8	2	5	4.30	23.391**	4.00	.675
Q9	2	5	4.22	17.719**	4.00	.840
Q10	1	5	3.68	7.184**	4.00	1.144
Q11	1	5	3.84	9.891**	4.00	1.031
Q12	1	5	3.76	9.173**	4.00	1.013
Q13	1	5	3.25	2.422*	3.00	1.256
Q14	2	5	4.16	16.922**	4.00	.831
Q15	1	5	3.55	7.443**	4.00	.906
Q16	2	5	3.40	5.672**	3.00	.855
Q17	1	5	3.80	9.942**	4.00	.976
Q18	1	5	3.24	2.880**	3.00	1.028
Q19	2	5	3.83	10.719**	4.00	.943
Q20	1	5	3.84	10.475**	4.00	.981
Q21	1	5	3.48	5.203**	3.00	1.122
Q22	1	5	2.98	-0.242	3.00	1.020
Q23	0	1	.57	n.a.	1.00	.497
Q24	1	5	1.35	n.a.	1.00	.746
Q25	1	5	2.39	n.a.	2.00	.954
Q26	1	5	3.91	n.a.	4.00	1.010
Q27	0	4	1.48	n.a.	1.00	.965
Q28	0	4	.77	n.a.	1.00	.919
Q29	0	4	1.06	n.a.	1.00	1.012
Q30	0	4	.91	n.a.	1.00	.989

Notes:

a) The t-statistics are derived from testing the null hypothesis that the mean value of each variable, Q1 – Q22, equals three (“indifference”) within a 5-point Likert-type scale; b) “n.a.” denotes “not applicable”, as a value of 3 does not refer to “indifference” for variables Q23 – Q30; c) * and ** denotes the rejection of the null hypothesis of “indifference” at the .05 and .01 level of significance, respectively; d) For Q23 (Gender), we assigned a value of 0 to a female, and 1 to a male; e) For Q24 (Age), we have no “age below 20” observations in our sample, and we assigned a value of 1 to respondents between 20 and 29, 2 to those between 30 to 39, 3 to those between 40 to 49, 4 to those between 50 to 59, and 5 to those above 60; f) For Q25 (Education), a value of 1 represented “high school or below”, 2 – “associate degree”, 3 – “bachelor’s degree”, 4 – “master’s degree”, 5 – “doctoral degree”; g) For Q26 (Computer Experience), a value of 1 represented “1 or less years”, 2 - “2 to 4 years”, 3 - “5 to 7 years”, 4 - “8 to 10 years”, 5 – “more than 10 years”; h) For Q27 – Q30 (frequency of various online business activities per month), a value of 0 represented the response “Never”, 1 - “1 to 5 times”, 2 - “6 to 10 times”, 3 - “11 to 15 times”, 4 - “>15 times”.

Table 3. Reliability analysis and descriptive statistics of developed scales

Scale	# Items	Mean	Std. Dev.	Alpha
Use Intention (UI)	1	3.792	1.280	a
Perceived Risk (PR)	5	3.097	0.504	0.795
Perceived Benefits (PB)	6	3.953	0.682	0.813
Vendor's Service Features (VSF)	2	3.701	0.833	0.821
Vendor's Web site Features (VWF)	2	3.468	0.775	0.788
Client-side Technology (CST)	5	3.640	0.524	0.764
Income Prospect (IP)	1	2.980	1.017	a

a: since Use Intention and Income Prospect are measured with a single item, no reliability estimate is calculated.

To assess the convergent validity of the measures, we also conducted a factor analysis by computing rotated component matrix coefficients (i.e., standardized item loadings) corresponding to each factor. In the process, we applied a principal component extraction method with varimax rotation, and specified a seven-factor solution. According to Hair et al. (1998, pp. 112), a factor loading of greater than 0.45 should be considered statistically significant for a sample size of approximately 150. We found that all measurement items significantly loaded as expected on their corresponding factor, as summarized in Appendix V. Correlation matrices by items and by scales are presented in Appendices VI and VII, respectively. This type of factor analysis has been commonly used in prior research (e.g., Gefen et al., 2004; Lee and Cata, 2005; McKnight and Chervany, 2005). In summary, we consider our item measurement and scale development to have acceptable reliability and validity.

rE s ULts

Indifference Analysis

As the aforementioned Table 2 indicates, when commenting on the survey question Q1, the average score is significantly greater than 3 at the .01 level (with t-value of 7.666). On average the respondents accept or even favor online payment methods, instead of feeling indifference or reluctance to pay their bills online. Q2 averages 2.99, not statistically different from 3. Concerning online payment frauds, the respondents perceive themselves to be exposed to the same "normal" level of risk as all the others. Q3, Q4 and Q5 average below 3 significantly, whereas Q6 to Q21 all average above 3 significantly. The income prospect Q22 averages 2.98, not significantly different from 3.

Regression Analysis for Identifying Online Payment Determinants

Using Scales as Explanatory Variables

We next performed a regression analysis with use intention (UI) as the dependent variable, and the other six “subjective” scales in Table 3 (PR, PB, VSF, VWF, CST and IP) as independent variables. The results, as represented in Equation 1, are outlined in tables 4a and 4b. To account for the possible impact of “objective” characteristics of respondents on use intention, we further incorporated items Q23 (gender), Q24 (age) and Q25 (education) into a regression model. However, in order to ensure that the effects of user perceptions (perceived risk, perceived benefit, etc.) on use

intention were not influenced by individual differences in user characteristics, we added gender, age and education factors as covariates, not as independent variables. We also grouped Q26-Q30 (Internet experience) into a new scale, IE, and added it as another covariate. The regression model hence followed without the covariates is:

$$UI_n = \phi_0 + \phi_1 PR_n + \phi_2 PB_n + \phi_3 VSF_n + \phi_4 VWF_n + \phi_5 CST_n + \phi_6 IP_n + u_n,$$

where $n = 1, 2, \dots, 148$. (Equation 1)

The regression results are presented in Tables 4a – 4b.

A covariate regression analysis was run using UI as the dependent variable, PR, PB, VSF,

Table 4a. The OLS model summary and ANOVA analysis related to Equation 1

R Square	Adjusted R ²	Std. Error	Durbin-Watson	F	Sig.
.525	.505	.901	2.011	25.806**	.000

Table 4b. The regression coefficients related to Equation 1

Dependent Variable	Coefficient	Value	Std. Error	t-value	p-value
Intercept	ϕ_0	-2.553	.721	-3.541**	.001
PR	ϕ_1	.617	.156	3.956**	.000
PB	ϕ_2	.612	.149	4.110**	.000
VSF	ϕ_3	.392	.107	3.667**	.000
VWF	ϕ_4	.381	.112	3.398**	.001
CST	ϕ_5	-.258	.161	-1.603	.119
IP	ϕ_6	.063	.076	.832	.407

Note: ** indicates significance at the .01 level.

VWF, CST and IP as between-subjects factors, and gender, age, education and IE as covariates, respectively, in the model. The regression results related to covariates are summarized in the following Table 4c. Among the four covariates, male gender is positively and significantly associated with customer intention of adopting online payments (coefficient = .538, $t = 3.624$, $p < .001$), while age is negatively and significantly associated with such a use intention (coefficient = $-.527$, $t = -4.542$, $p < .001$). The between-subjects covariate

effects of gender and age are also significant on some user perceptions (particularly PB and/or PR). Customer education background and Internet experience, however, are less influential to use intention, as they show no significant associations with UI. However, both education and Internet experience have significant covariate effects on user perceptions (all at the .001 level).

Furthermore, with covariate factors being accounted for, test results of between-subjects effects show that the coefficient estimates (Table

Table 4c. The covariate effects related to Equation 1

Covariate	Regression Coefficient with UI		Covariate Effects		
	Parameter	t-value	Correspondence	F-value	p-value
Gender	.538	3.624**	PB	3.295**	.008
			PR	3.299**	.003
			VSF	.785	.540
			VWF	10.866**	.000
			CST	1.001	.400
			IP	6.739**	.001
Age	-.527	-4.542**	PB	4.383*	.040
			PR	2.587	.082
			VSF	3.382*	.040
			VWF	1.832	.168
			CST	1.007	.371
			IP	1.713	.195
Education	.112	1.475	IP	3.428**	.005
			PB	5.754**	.000
			PR	4.999**	.002
			VSF	4.212**	.003
			VWF	5.275**	.000
			CST	5.992**	.001
IE	.178	1.438	IP	27.086**	.000
			PB	25.382**	.000
			PR	14.506**	.000
			VSF	19.481**	.000
			VWF	34.619**	.000
			CST	10.615**	.000

Note: *, ** indicates significance at the .05 and .01 level, respectively.

4b) between the use-intention dependent variable and user-perception independent variables are still robust. Regardless of the covariate effects of gender and age, PR, PB, VSF and VWF remain significantly related to UI, while CST and IP remain non-significant.

Table 4d summarizes the test results of our hypotheses specified previously in Section 3.2. Our findings support some of the hypotheses. Specifically, our respondents have shown a significantly greater tendency to adopt an online payment system if they: a) perceive a low-level risk to do so (supporting H1-1); b) perceive benefits of time efficiency or financial savings/bonus to do so (supporting H1-2); c) find flexible product/service features (supporting H2-1) or attractive Web site features (supporting H2-2) from online vendors. All these regression coefficients are significant at the .01 level. In addition, after PR, PB, VSF, VWF and IP are controlled for, the Use Intention of an online payment system is also positively associated with Gender, while being negatively associated with Age. Ilie et. al. (2005) identify a

significant gender difference in perceived innovation characteristics of communication technology adoptions, and suggest such a gender difference in perceptions can explain the gender difference in technology use intentions. Our evidence, on the other hand, supports the hypotheses that even among those respondents who perceive the same risk, benefits and vendor's transaction system features, etc., a male is still more likely to adopt an online payment system than a female (supporting H3-3), while one's intention to pay bills online decays with his/her age (supporting H3-4). We attribute this phenomenon to human nature (e.g., variety in risk tolerance) between different genders or ages. For example, even if younger and senior people understand equally well the specific risk for the online payment system itself, younger persons are still more ready to accept the system than seniors, because the former is generally, by nature, more willing to risk trying new technology innovations and abandon the old methods for most of the technology innovations (Gilly & Zeithaml, 1985).

Table 4d. Hypotheses supported or rejected related to Equation 1

Possible Determinant of Use Intention	Hypothesis	Test Result (correlation with UI)
Perceived Risk (PR) at low level	H1-1	Supported (Positive and Significant)
Perceived Benefits (PB)	H1-2	Supported (Positive and Significant)
Vendor's Service Features (VSF)	H2-1	Supported (Positive and Significant)
Vendor's Web site Features (VWF)	H2-2	Supported (Positive and Significant)
Client-side Technology (CST)	H3-1	Unsupported (negative but insignificant)
Income Prospect (IP)	H3-2	Unsupported (positive but insignificant)
Gender	H3-3	Supported (Positive and Significant)
Age	H3-4	Supported (Negative and Significant)
Education	H3-5	Unsupported (positive but insignificant)
Internet Experience (IE)	H3-6	Unsupported (positive but insignificant)

On the other hand, our findings fail to provide sufficient statistical support for the significance of the other determinants. Comprising multiple measurement items, neither the Client-side technology (CST) scale nor the Internet experience (IE) scale significantly affect customers' intention of adopting online payment methods, therefore not supporting H3-1 or H3-6. Including only a single measurement item, neither the income prospect (IP) scale nor the education background variable materially influences customers' use intention, therefore not supporting H3-2 or H3-5. Independent of their individual differences in gender and age, customers are by far more concerned about the perceived risk and benefits for using an online payment system, as well as the service option features and Web site design provided by vendors in the system.

However, we note that the regression model as Equation 1 is largely based on using scales as explanatory variables, and Table 4b shows that the regression intercept, ϕ_0 , is significantly different from zero (coefficient = -2.553, $t = -3.541$, $p = .001$). The existence of such a significant non-zero intercept suggests that there are other factors missing from our model specifications, and the explanatory power of this regression model can be substantially improved by including additional explanatory variables (e.g., Brav, Lehavy & Michaely, 2005). Additional analyses to provide extra explanatory powers are not uncommon; see Suh and Lee (2005) and Wasko and Faraj (2005) as examples.

Using All Measurement Items as Explanatory Variables

To further explore the possible underlying factors that may influence a customer's intention to adopt online payment methods, we extended our regression analysis by using respondents' use intention (Q1) as the dependent variable, the other 21 perception items (Q2 – Q22) as independent variables, and customer individual difference factors (Q23

– Q30) as covariates. The extended model and regression results are presented as follows:

$$Q1_n = \beta_1 + \beta_2 Q_{2n} + \beta_3 Q_{3n} + \beta_4 Q_{4n} + \dots + \beta_{22} Q_{22n} + \epsilon_n$$

$$= \beta_1 + \sum_{m=2}^{22} \beta_m Q_{mn} + \epsilon_n, \text{ where } n = 1, 2, \dots, 148. \quad (\text{Equation 2})$$

Table 5a indicates that the R-Square and adjusted R-Square of the model in Equation (2) are respectively .640 and .580, both showing an improvement over Equation (1) with .525 and .505. Cohen and Cohen's (1983) test result (with F-value of 10.651, $p < .01$) also indicates a considerable increase in explanatory power when comparing the item-based Equation (2) with the scale-based Equation (1). The twenty-nine variables (Q2 – Q30) which serve as proxies for customers' perceived risk, perceived benefits, online payment service features, vendors' Web site features and customers' characteristics, jointly explain approximately 64% of the variation in customers' intention to adopt online payment methods.

Table 5b estimates the possible impact that each of the explanatory variables may have on customers' payment-method preferences.

- Among the "perceived risk" items, Q3, Q5 and Q6 are significantly and positively associated with the dependent variable Q1, as β_3 , β_5 and β_6 are significantly positive at the .05 – .10 level. A customer would be more willing to adopt online payments provided that he or she feels safe to provide personal information online, considers legal regulations are sufficient to discipline those engaged in online payment fraud, and considers the vendor/creditor's online transaction network is secure ($p = .068$).
- Among the "perceived benefits" items, Q7, Q8, Q11 and Q12 are significantly and positively associated with Q1, as β_7 , β_8 , β_{11} and β_{12} are significantly positive at the .05 – .10 level. A customer will be more likely to adopt

Table 5a. The OLS model summary and ANOVA analysis related to Equation 2

R Square	Adjusted R ²	Std. Error	Durbin-Watson	F	Sig.
.640	.580	.827	2.103	12.290**	.000

Table 5b. The regression coefficients related to Equation 2

Coefficient			Test Statistic		Collinearity Statistics	
	Value	Std. Error	t-value	p-value	Tolerance	VIF
β_1	-1.207	.912	-1.323	.188		
β_2	.047	.093	.508	.612	.545	1.835
β_3	.092	.044	2.091*	.047	.511	1.956
β_4	-.098	.104	-.947	.345	.462	2.164
β_5	.422	.112	3.772**	.000	.354	2.821
β_6	.129	.069	1.870	.068	.721	1.388
β_7	.282	.115	2.452*	.022	.514	1.944
β_8	.220	.107	2.056*	.041	.470	2.127
β_9	.138	.071	1.944	.053	.537	1.862
β_{10}	-.115	.129	-.890	.375	.213	4.695
β_{11}	.227	.086	2.651**	.009	.235	4.247
β_{12}	.353	.124	2.840**	.005	.295	3.395
β_{13}	.199	.072	2.758**	.007	.565	1.769
β_{14}	.069	.124	.556	.579	.439	2.276
β_{15}	.233	.103	2.262*	.041	.338	2.959
β_{16}	.010	.119	.085	.933	.450	2.222
β_{17}	.017	.094	.184	.855	.558	1.791
β_{18}	-.189	.096	-1.956	.053	.474	2.108
β_{19}	.043	.084	.508	.613	.741	1.350
β_{20}	.023	.090	.259	.796	.593	1.687
β_{21}	.251	.136	1.838	.089	.504	1.982
β_{22}	-.087	.088	-.984	.327	.572	1.750

Notes:

a) The t-statistics are derived from testing the null hypothesis that each of the regression coefficients, $\beta_1 - \beta_{30}$, equals zero ("no influence on respondents' preferences").

b) *, ** indicates significance at the .05 and .01 level, respectively.

online payment methods provided that he or she considers meeting payment deadlines and avoiding late penalties as particularly important, considers the online payment system is easy to use and fast, and considers the access to computers and Internet is easy to obtain. However, our respondents do not consider saving postage costs will be particularly important for them to choose “pay-on-line” as β_{10} is not only insignificant but also negative. The discount/bonus (Q9) provided by creditors/vendors for placing and paying for orders online is marginally influential, as β_9 is marginally positive ($p = .053$).

- Among “vendor service features”, Q13 is significantly and positively associated with Q1, as β_{13} is significantly positive at the .01 level. A customer will be more likely to adopt online payment methods provided that the vendor’s online payment system offers customers the option feature of recurring automatic deductions. This finding is consistent with the fact that customers highly regard the importance of meeting payment deadlines and avoiding late penalties, since monthly automatic deduction with the minimum amount due is the most time- and cost-effective way to avoid late penalties. Among “vendor Web site features”, Q15 is also positively associated with Q1, as β_{15} is positively significant at the .05 level.
- Among the “Client-side technology” items (Q17 – Q21), all but Q18 are positively associated with Q1, but none of these regression coefficients are significant at the .05 level. From our observations, it appears that a customer’s preference to pay bills online does not strongly depend on the hardware or software that he or she is equipped with, including anti-virus/spyware programs, operating system, or even high-speed Internet service such as DSL, therefore reaffirming our earlier result that the scale of client-side

technology (CST) does not materially affect use intention (UI). When deciding whether to “pay-on-line”, a customer is concerned more about the vendor’s technology level than about his/her own technology level.

- We find no significant results between a customer’s intention to pay bills online and his/her family income growth prospect (Q22), as β_{22} is not significantly different from zero.

To further account for customers’ characteristics, we once again employed a covariate regression analysis using Q1 (use intention) as the dependent variable, Q2 – Q22 (individual items for user perceptions) as between-subjects factors, Q23 – Q30 (gender, age, education and Internet experience items), respectively, as covariates in the model. The covariate effect estimates are shown in Table 5c. The customer’s “pay-on-line” use intention has positive associations with male gender and with education ($p = .004$ in both cases), and a negative association with age ($p = .049$). The between-subjects covariate effects of customer gender, age, education background and Internet experience are in line with those reported in the scale-variable-based result presented in Table 4c.

The data in Table 5c reaffirms our prior findings that males, younger customers and those with higher education levels are more willing to use an online payment system than their counterparts. In addition, it is interesting to observe that those most willing to pay bills online are those customers who frequently trade securities online (between Q1 and Q28 the coefficient = .336, $t = 3.201$, $p = .002$), rather than those who frequently shop, bid or sell goods online. One of the possible explanations is that online security trading typically involves larger amounts of electronic funding. Online brokerage accounts require a certain amount of cash deposit to open, and the trader must use bank deposits rather than credit cards to pay for the trades. Compared with online shoppers and

Table 5c. The covariate effects related to Equation 2

Covariate	Regression Coefficient with Q1		
	Parameter	t-value	p-value
Q23	.506	2.945**	.004
Q24	-.322	-1.999*	.049
Q25	.252	2.933**	.004
Q26	.149	1.720	.088
Q27	.187	1.462	.146
Q28	.336	3.201**	.002
Q29	-.095	-.812	.418
Q30	.002	.017	.987

Note: *, ** indicates significance at the .05 and .01 level, respectively.

bidders who typically use credit cards (with credit card companies allowing customers to dispute unauthorized payments) and pay relatively smaller amounts for their deals, online security traders have experienced considerably greater risk within their online payment/funding process; therefore, they will be more inclined to accept online payment methods and less likely to overestimate the risk related to making online payments.

When comparing results in Tables 5a, 5b & 5c with those in Tables 4a, 4b & 4c, we find that instead of using scales, using measurement items as explanatory variables and/or as covariates can improve the statistical performance of regression analysis for online-payment-adoption determinants. 1) The R-square and adjusted R-Square improved, implying a greater explanatory power for the model; 2) The constant coefficient becomes insignificant, considerably reducing the “unexplained” portion for the model; and 3) we find some new significant evidence supporting the positive impact of a customer’s education and Internet experience on his/her pay-on-line use intention.

However, we were concerned that multicollinearity might arise for a regression model like Equation 2 that incorporates all twenty-nine measurement items as explanatory variables. If multicollinearity does exist, it would cause a severe problem of biased and unreliable regression estimates, which by far outweighs the “improvement in statistical performance.” Therefore we performed a collinearity analysis, and the resulting statistics are documented in the last two columns in Table 5b. We find that all individual VIF statistics are below 10, the average VIF value is below 6, and none of the tolerance values is below 0.1. Our regression estimates appear not to be materially affected by the multicollinearity problems. As a further proof, our regression estimates remain stable even after we drop from the model some of the explanatory variables that might seem highly correlated, such as Q4 vs. Q5, Q18 vs. Q21, etc. Thus, we feel reasonably confident with the unbiasedness of coefficient estimates obtained from the regression analysis that uses the twenty-one “user perception” measurement items (Q2 – Q22) as explanatory variables and

the eight “user individual difference” items (Q23 – Q30) as covariates.

Discussion

This study has empirically examined an individual’s intention to engage in online bill payment, and estimated the influence of a number of determinants impacting that intention. Our findings are based upon a survey of a 148 students and faculty members from a state university within the Midwestern US. The results show that:

- A majority of our respondents favor and support the option of making online payments, and they also consider the risk related to making online payments as normal. Their biggest motive to adopt an online payment system is to meet payment deadlines and avoid past-due late penalties.
- A customer’s willingness to pay bills online depends significantly on his/her perceived risk and benefits of using the online payment system, on the option features offered in the system, and on the quality of vendors’ Web site designs.
- In particular, a customer will be significantly more likely to adopt online payment methods provided that 1) the vendor’s transaction network is secure; 2) the online payment methods are easy to learn; and 3) the vendor’s online payment system offers customers the option feature of recurring automatic deductions, as it is viewed as the most time- and cost-effective way to avoid past-due late penalties.
- Those customers who are male, younger, with higher education levels, with more computer application experiences, and particularly those who have been frequently trading securities online, are significantly more willing to use an online payment system than the others.

Theoretical Implications

Like much prior research dealing with technology adoption, our research is an extension of the traditional TAM (which concentrates on PU and PEOU) with additional factors that could determine customers’ intention to adopt technology innovations. In the specific “pay-on-line” e-commerce section, such determinants beyond PU and PEOU (which are conceptually similar to Perceived Benefit) include user perceptions of risk, of vendor-side service and Web site features, of user-side technology feature, and income prospect. According to our findings, even after adjusting for the covariate effects of customer characteristics, most user perceptions of the characteristics of an online payment system significantly affect users’ adoption likelihood. For example, customers are exposed to financial risk in the pay-on-line process, and customers with background variations differ in risk tolerance (Gilly & Zeithaml, 1985). It is interesting to note, however, the impact of customers’ perceived risk on their use intention persists across customer groups differing in gender, age, education level and Internet experience. On the other hand, we do not find evidence that supports the importance of a customer’s client-side technology level (*e.g.*, Hill, 2003) or income prospect (*e.g.*, Akhter, 2003) in affecting his/her intention. It appears that when customers decide whether or not to use online payment methods, they are not particularly concerned about their own income prospects or hardware/software technology availability. The necessity to include factors such as client-side technology and customer income prospects might depend on the specific types of technology innovations or e-commerce initiatives.

Practical Implications

To speed up the transformation process and encourage customers to switch to using online payment methods, vendors/creditors should pay

particular attention to improving the security and the ease-of-use of their transaction network, and should also add necessary option features such as recurring automatic deductions. Other features that may prove to be relevant include ease with which payments can be made to payees who do not have an account number and minimizing the amount of time between when a customer directs a payment to be made and the date the payment is actually made. Although not specifically addressed in this research, these services are integral to online payment systems today, suggesting that vendors should examine their use.

Limitations and Future Research Agenda

This study empirically investigated the possible underlying factors that could affect a consumer's intention to adopt an online bill payment system. However, at this stage our survey sample merely consisted of students and faculty members from a Midwestern US public university. These surveyed students and faculty members covered a variety of courses, and many students are working people who registered in evening classes; yet to obtain results that are more convincing and to better represent the population that pay bills, the sample should be more diversified (in terms of geographical regions, ages, etc.). For example, as Table 2b illustrates, nearly 80% of the respondents are young people with ages between 20 and 29. With regard to measurement items for the questionnaire, a customer's intention to use online payment systems was measured with a single item. Consistent with much of the research today assessing intention to use, a multi-item construct would be more appropriate.

We expect that future research in this field to not only extend the sample coverage into various social settings, but also investigate whether the findings in this study hold in consumers' adoption process of various e-finance tools other than

online bill payment systems. E-finance, including online brokerage, payment, banking, insurance and other financial services, can be defined as "the provision of financial services and markets using electronic communication and computation" (Allen, McAndrews, & Strahan, 2001). Compared with other e-commerce activities such as online shopping, vending and bidding, e-finance involves more financially-sensitive information transfer through the Internet. E-finance adopters may have a higher level of risk perception than other e-commerce adopters do and therefore desire a higher level of information, system, and service quality. Moreover, given the variety in risk tolerance levels, e-finance adopters might exhibit different demographic characteristics than other e-commerce adopters. Our subsequent future study, therefore, should further examine the adoption decision factors across various e-commerce systems and the interrelationships among them.

Forthcoming Research

Besides financial risk (risk of credit card fraud), privacy risk (exposure of personal information), social risk (lack of protection by government policy and legal regulation) and performance risk (concern of system security) already examined in this current study, psychological risk (a psychological loss if the system does not fit well with a customer's self-image) and time-related risk (a waste of time fixing payment errors) are the other two dimensions of risk that customers likely perceive during the online bill paying process (Featherman & Pavlou, 2003). Using an updated survey with more items measuring some of the decision factors, so far we have found some initial evidence from our extended study that shows that the higher possibility of losing money based on all six types of risks customers are subject to, the less willingly they would adopt online payments. This finding is consistent with the past study conducted by Featherman and Pavlou (2003).

Among “vendor service features”, we found that the involvement of a trusted third party, such as TRUSTe for information privacy and Veri-Sign Secured™ for the protection of credit card information, can significantly reduce customer perceived risk and enhance customer institutional trust.

Regarding the adoption decision across different e-commerce systems (online payment, online banking and online shopping), we found that those customers frequently using online banking services would also pay bills online more often. It implies that when users decide to adopt one of two e-finance systems (e-payment and e-banking), they tend to also adopt another. However, the frequency of shopping online per month is rather irrelevant to that of the two e-finance activities. This research is continuing.

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APPENDIX I

summary of Online system Adoption Factors Addressed in r elated Literature

Category	Dimension	Factors	Literature
Perceived characteristics of online payment methods	Perceived risk	Credit card fraud	Bhatnagar et al. (2000)
		Lack of protection by government policy and legal regulation	Biukovic (2002) González (2004) Strauss & Rogerson (2002)
		Exposure to personal information	Luo (2002) Wang et al. (1998)
		Concern of system security	Hwang et al. (2003) Pavlou (2003)
	Perceived benefits	Perceived usefulness (PU)	Davis (1989)
		Perceived easiness of use (PEOU)	Davis (1989)
		Efficiency	Chou et al. (2004) Daft and Lengel (1986)
		Convenience	Yu et al. (2002)
Vendor's System characteristics	Product or Service features	Multiple functions of product or service	Debruyne et al. (2002)
	Web site features	Web site satisfaction	Lee & Cata (2005) Liang & Lai (2002) Ranganathan & Ganapathy (2002)
Customer's characteristics	C l i e n t - s i d e technology	Reliability	Hill (2003)
		Effectiveness	
		Security	
	D e m o g r a p h i c variables	Gender	Banerjee et al. (2005) Garbarino & Strahilevitz (2004)
		Age	Gilly & Ziehaml (1985) Pommer et al. (1980)
		Education	Akhter (2003)
		Income	
	Internet Experience	Computer knowledge	Slyke (2002)
		Online shopping	Eastin (2002)
		Online stock trading	
		Online auctions	
		Online vending	

APPENDIX II

Questionnaire for Pay-bills-Online Experience

Please rank the statements below from (1) Strongly Disagree to (5) Strongly Agree					
	Strongly Disagree	Disagree	Indifferent	Agree	Strongly Agree
Customers' Use Intention					
Q1: I would like to use an online payment system to pay my bills.	1	2	3	4	5
Perceived Risk					
Q2: The risk of credit card fraud for online transactions and Payments is low for me.	1	2	3	4	5
Q3: I would feel free to submit my personal information online to creditors (vendors) so that they can better serve my online-transaction needs.	1	2	3	4	5
Q4: Existing government policies are sufficient to keep online transactions and payments safe and secure.	1	2	3	4	5
Q5: Existing legal regulations for online transactions and payments can effectively protect my information privacy.	1	2	3	4	5
Q6: I have confidence in the security of the existing online transaction network.	1	2	3	4	5
Perceived Benefits					
Q7: Learning to use the online payment system is easy.	1	2	3	4	5
Q8: The online payment system enables me to pay my bills faster.	1	2	3	4	5
Q9: I would prefer to pay bills online if I can get a discount and/or bonus from creditors and vendors.	1	2	3	4	5

System Features, Perceived Risk and Benefit, and Customer Characteristics on Online Bill Paying

Please rank the statements below from (1) Strongly Disagree to (5) Strongly Agree					
	Strongly Disagree	Disagree	Indifferent	Agree	Strongly Agree
Q10: I would prefer to pay bills online if I have many credit accounts to pay off, because it can save postage costs.	1	2	3	4	5
Q11: I would prefer to pay bills online if I have many credit accounts to pay off, because it can help me better meet the payment deadline and avoid the late penalty.	1	2	3	4	5
Q12: I would prefer to pay bills online as I can easily find access to computers and the Internet.	1	2	3	4	5
Vendors' Service Features					
Q13: I would prefer to pay bills online if my payments can be scheduled for automatic deductions at regular intervals each month.	1	2	3	4	5
Q14: I would prefer to pay bills online if I have control over how much I want to pay and when I want to pay.	1	2	3	4	5
Vendors' Web site features					
Q15: It's easy to interact with the Web site of the online payment system.	1	2	3	4	5
Q16: The Web site design of the online payment system looks attractive to me.	1	2	3	4	5
Client-side Technology					
Q17: Having famous-brand anti-virus and firewall software installed on my computer(s) would make me more willing to pay bills online.	1	2	3	4	5
Q18: A higher speed (transmission rate) for my Internet access would make me more willing to pay bills online.	1	2	3	4	5

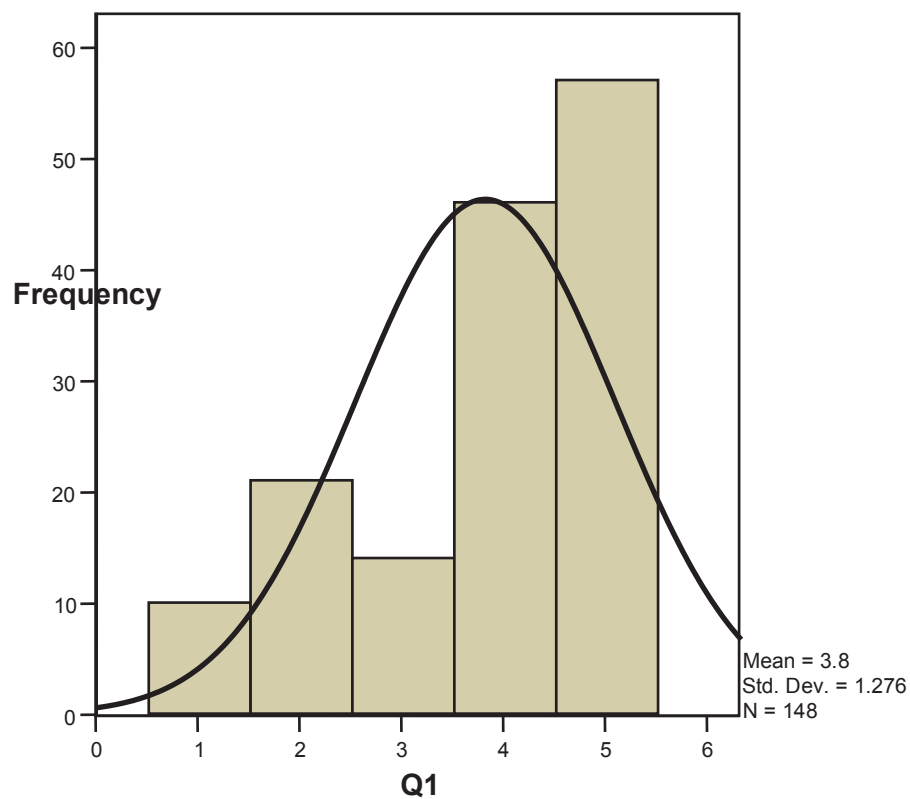
System Features, Perceived Risk and Benefit, and Customer Characteristics on Online Bill Paying

Please rank the statements below from (1) Strongly Disagree to (5) Strongly Agree						
	Strongly Disagree	Disagree	Indifferent	Agree	Strongly Agree	
Q19: The newest version of my operating system should be more secure for online payments and less vulnerable to online thefts.	1	2	3	4	5	
Q20: Having non-Microsoft-Windows operating system installed on my computer(s) would make me more willing to pay bills online.	1	2	3	4	5	
Q21: I would be more likely to pay bills online with DSL-type Internet service being available at my home or office than without.	1	2	3	4	5	
Customers' characteristics						
Q22: I would be more likely to pay bills online after my family income grows.	1	2	3	4	5	
Q23: What is your gender?		Female			Male	
Q24: What is your age?	<20	20-29	30-39	40-49	50-59	>60
Q25: What is your education background?	High school or below	Associate	Bachelor's	Master's	Doctoral	
Customers' Internet Experience						
Q26: How many years of computer experience do you have?	1 or less	2-4	5-7	8-10	>10	
Q27: How many times per month do you do online shopping?	Never	1~5 times	6~10 times	11~15 times	>15 times	
Q28: How many times per month do you do online security trading?	Never	1~5 times	6~10 times	11~15 times	>15 times	
Q29: How many times per month do you participate in online auctions (bidding)?	Never	1~5 times	6~10 times	11~15 times	>15 times	

Q30: How many times per month do you do e-business (online vending)?	Never	1~5 times	6~10 times	11~15 times	>15 times
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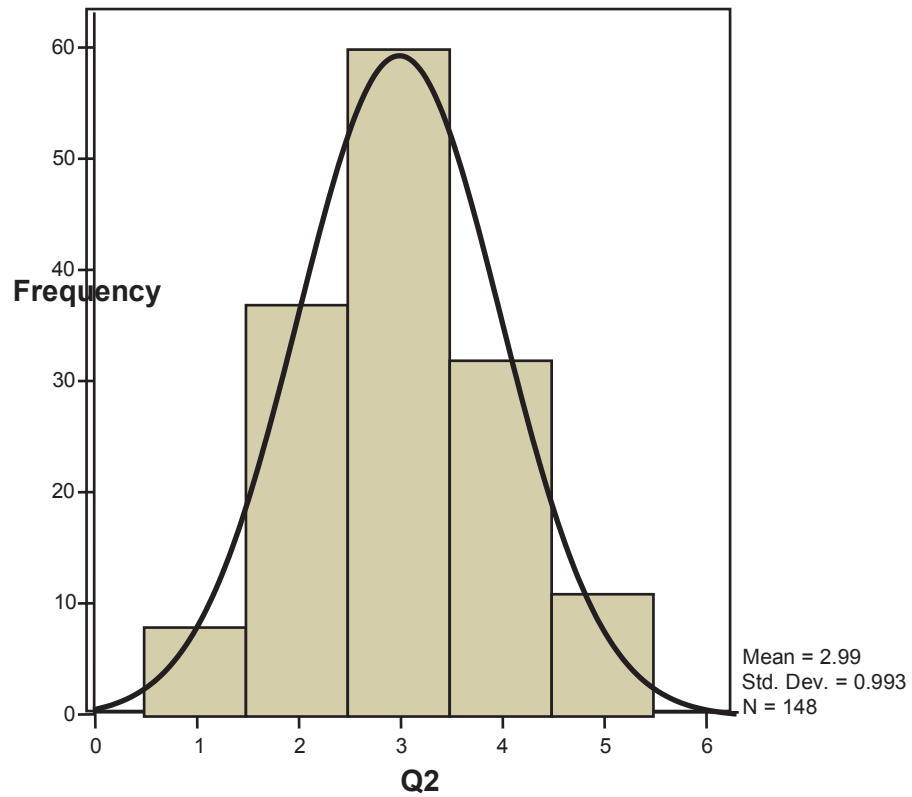
APPENDIX III

Frequency Distributions of r espondents' Intention to Pay bills Online



APPENDIX IV

Frequency Distributions of respondents' Perceived risk to Pay bills Online



APPENDIX V

Factor Analysis of Measurement Items: Loadings from r otated component Matrix

Scale	Items	Loadings
UI	I would like to use an online payment system to pay my bills.	.572
PR1	The risk of credit card fraud for online transactions and payments is low for me.	.641
PR2	I would feel free to submit my personal information online to creditors (vendors) so that they can better serve my needs for online transactions.	.531
PR3	Existing government policies are already sufficient to keep online transactions and payments safe and secure.	.819
PR4	Existing legal regulations for online transactions and payments can effectively protect my privacy of personal information.	.895
PR5	I have confidence in the security of the existing online transaction network.	.586
PB1	Learning to use the online payment system is easy.	.665
PB2	The online payment system enables me to pay my bills faster.	.733
PB3	I would prefer pay bills online if I can get a discount and/or bonus from creditors and vendors.	.719
PB4	I would prefer to pay bills online if I have many credit accounts to pay off, because it can save postage costs.	.742
PB5	I would prefer to pay bills online if I have many credit accounts to pay off, because it can help me better meet the payment deadline and avoid the late penalty.	.782
PB6	I would prefer to pay bills online if I can easily find access to computers and the Internet.	.556
VSF1	I would prefer to pay bills online if my payments can be scheduled for automatic deductions at regular intervals each month.	.555
VSF2	I would prefer to pay bills online if I have control over how much I want to pay and when I want to pay.	.665
VWF1	It's easy to interact with the Web site of the online payment system.	.773
VWF2	The Web site design attracts me to use the online payment system.	.753
CST1	Having famous-brand anti-virus and firewall software installed on my computer(s) would make me more willing to pay bills online.	.800
CST2	Having non-Microsoft-Windows operating system installed on my computer(s) would make me more willing to pay bills online.	.809
CST3	The newest version of my operating system should be more secure for online payments and less vulnerable to online thefts.	.935
CST4	A higher speed (transmission rate) for my Internet access would make me more willing to pay bills online.	.545
CST5	I would be more likely to pay bills online with DSL-type fast Internet service being available at my home or office than without.	.613
IP	I would be more likely to pay bills online after my family income grows.	.778

APPENDIX VI

**Factor Analysis of Measurement
Items: component correlation
Matrix by Items**

Item	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
UI	1																					
PR1	.69	1																				
PR2	.66	.52	1																			
PR3	.81	-.2	.25	1																		
PR4	.71	.32	.36	.65	1																	
PR5	.55	-.1	.10	.12	.07	1																
PB1	.33	.70	.28	.12	.04	-.1	1															
PB2	.33	.74	.23	.12	.10	.24	.37	1														
PB3	.44	.72	.35	.11	.12	.08	.20	.16	1													
PB4	.51	.84	.43	.09	.12	.09	.29	.40	.46	1												
PB5	.47	.81	.34	.14	.19	.09	.23	.51	.45	.39	1											
PB6	.60	.42	.69	.12	.15	.08	.27	.40	.47	.34	.42	1										
VSF1	.39	-.3	.39	.59	.10	.20	-.0	.24	.19	.38	.30	.41	1									
VSF2	.45	-.3	.26	.68	.14	.17	.17	.12	.55	.49	.51	.48	.26	1								
VWF1	.48	-.2	.41	.10	.07	.76	.60	.37	.28	.29	.23	.41	.11	.26	1							
VWF2	.28	-.1	.16	.12	-.2	.69	.28	.18	.25	.22	.14	.41	.08	.17	.53	1						
CST1	-.1	.14	-.0	.05	-.1	.18	-.1	.03	-.1	.66	-.1	-.1	.22	-.1	-.1	-.1	1					
CST2	-.2	.15	-.1	.04	-.1	.12	-.0	-.1	-.2	.79	-.2	.05	.23	-.2	-.2	-.1	.55	1				
CST3	.06	-.1	-.1	.01	.05	.04	.10	.12	.01	.06	.06	.18	.56	-.1	.14	.19	-.1	.11	1			
CST4	.15	.09	.02	.20	.04	.20	.23	.18	-.1	.18	.03	.21	.91	.19	.17	.32	.10	.23	.08	1		
CST5	.35	.05	.11	-.1	-.1	.13	.22	.39	.24	.68	.42	.37	.12	.26	.17	.28	-.1	.51	-.1	.29	1	
IP	.05	-.2	-.1	.01	.13	.29	-.1	-.1	.12	-.1	.33	-.1	-.1	.06	-.3	.37	.04	.11	.07	.01	.30	1

APPENDIX VII

Factor Analysis of Measurement

Items: component correlation

Matrix by scales

Scale	1	2	3	4	5	6	7
UI	1.000						
PR	.730 (.000)	1.000					
PB	.682 (.000)	.447 (.000)	1.000				
VSF	.596 (.000)	.371 (.003)	.543 (.000)	1.000			
VWF	.510 (.000)	.141 (.087)	.476 (.000)	.203 (.013)	1.000		
CST	-.111 (.177)	.253 (.062)	.249 (.002)	.191 (.019)	.189 (.021)	1.000	
IP	.101 (.545)	.020 (.812)	-.108 (.189)	-.035 (.671)	.194 (.018)	.151 (.066)	1.000

Note: In parentheses are p-values (two-tailed).

Compilation of References

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