

Association for Information Systems AIS Electronic Library (AISeL)

AMCIS 1998 Proceedings

Americas Conference on Information Systems
(AMCIS)

December 1998

Emergent Structures in the Information Economy

Edward Stohr
New York University

Sivakumar Viswanathan
New York University

Follow this and additional works at: <http://aisel.aisnet.org/amcis1998>

Recommended Citation

Stohr, Edward and Viswanathan, Sivakumar, "Emergent Structures in the Information Economy" (1998). *AMCIS 1998 Proceedings*. 121.
<http://aisel.aisnet.org/amcis1998/121>

This material is brought to you by the Americas Conference on Information Systems (AMCIS) at AIS Electronic Library (AISeL). It has been accepted for inclusion in AMCIS 1998 Proceedings by an authorized administrator of AIS Electronic Library (AISeL). For more information, please contact elibrary@aisnet.org.

Emergent Structures in the Information Economy

Edward A. Stohr
Sivakumar Viswanathan
Leonard N. Stern School of Business
New York University

Abstract

Electronic commerce is growing at a rapid, even bewildering pace. As we have no past experience from which to imagine commercial possibilities, it is hard to discern any constants except for that of continual change. In this research, we suggest that it may be possible to understand the directions of e-commerce by reasoning from the underlying functions that must be provided.

Introduction

- “Quicken and Excite premiere new business and investing channel” – Oct, 15, 1997.
- “Excite acquires MatchLogic, the leader in Internet Advertising Services” – Jan 15, 1998.
- “Microsoft Expedia.com teams with Infoseek to deliver “Best of the Web” Online travel” – March 3, 1998.
- “Infoseek and Realtor.com take the headache out of home buying” – March 3, 1998.

.... and so go the headlines heralding yet another merger, alliance or partnership in cyberspace. Today’s e-commerce environment is vastly different from the early beginnings of the information economy. Firms, or Web-based intermediaries, as we shall call them, were largely specialized, single-purpose entities to begin with. However, recent times have witnessed a significant overhaul of this initial ‘structure’, resulting in a cauldron of emerging relationships among such Web-based entities. Most intermediaries have significantly expanded their repertoire of functionalities in keeping with the growing demands of e-commerce; while some of them have taken over existing specialized intermediaries, others have resorted to cooperative arrangements.

Why are these changes taking place? Is there an underlying pattern driven by a deeper rationale? What are the implications of such changes for the structure of the information economy and the strategy and conduct of its participants? Our research seeks to answer these questions and to investigate the strategic behavior of “firms” in an information economy. In this paper we propose a framework to highlight the various functions that Web-based intermediaries serve in electronic commerce. We also identify several examples of cooperative arrangements among such intermediaries and develop an “affinity matrix” that provides interesting insights into the emerging structure of the information economy.

A Framework for Electronic Commerce

The transformation of the World Wide Web from a distributed information repository (where the focus was on retrieval) into an *electronic marketplace* (where the focus now is on transactions) calls for a whole new set of capabilities along with the creation of new institutions and control mechanisms. In the traditional economy, various forms of intermediaries have arisen to facilitate transactions and provide services to both producers and consumers. Similarly, the information economy will require the services of ‘electronic intermediaries’ serving similar roles¹ on the Web. Intermediaries, by nature of their role-specialization, help to reduce the risks and uncertainties of transacting business and add value by engaging in activities that help reduce coordination costs and provide economies of scale and scope.

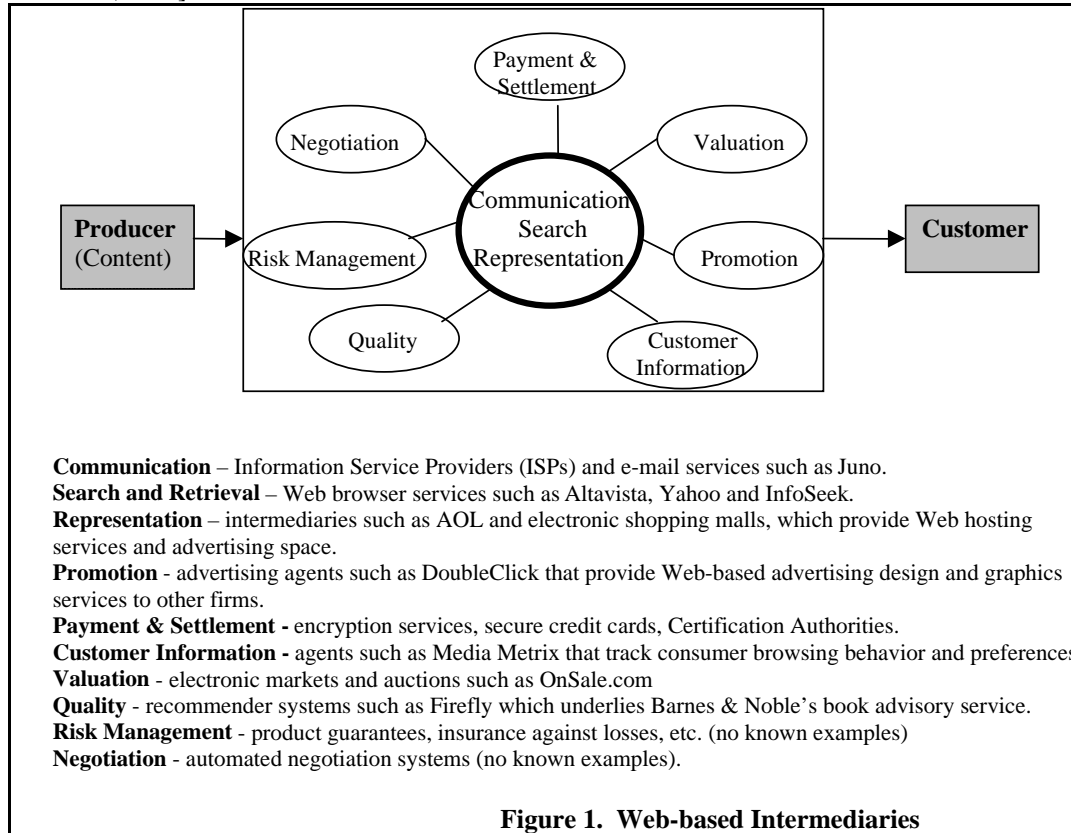
The following framework² (see Figure 1) identifies ten functions necessary for the successful growth of e-commerce. While some functions primarily focus on the needs of customers, others serve the needs of suppliers/ manufacturers. *Communication, search and representation* form the core set of capabilities for e-commerce and have been the fastest to evolve. In addition to these core functions, successful e-commerce requires a host of other intermediary functions that serve to reduce the uncertainties that pervade transactions. While the peripheral functions in Figure 1 add value to e-commerce, they are more complex and often require consensus among firms. As a result, they have been slower to evolve. While the functions could all conceivably be provided by one firm, the figure emphasizes the niche roles played by electronic intermediaries.

¹Since we are primarily concerned with ‘electronic intermediaries’ in an *information economy*, we restrict our discussion to intermediary functions that lend themselves to automation.

²This framework extends [Kambil ‘97].

Emergent Relationships among Web-based Intermediaries for E-commerce

While most electronic intermediaries began as specialized agents, we are beginning to witness a consolidation on various levels. Note that traditional industries have exhibited similar patterns of integration at various stages of their life-cycle and such relationships have been attributed to transaction costs (e.g., asset-specificity), economies of scope, asset complementarity, etc. [Langlois & Robertson, 1989].



The “affinity matrix” (see Figure 2) captures some of these emergent relationships among Web-based intermediaries. The diagonal cells in Figure 2 list intermediaries that have tended to specialize in a particular function. The off-diagonal cells potentially contain alliances between the intermediaries on the diagonal of the corresponding row and column. In Figure 2, these cells contain a number of examples of intermediaries that have strategic relationships with other intermediaries (indicated by the “+” sign.)

The shaded portion in each cell contains a pair of +ve or

–ve signs indicating the presence or absence of “supplementarity”, by which we mean a supporting functional rationale for the alliance. The first sign in the pair indicates whether or not the column function is supported by the row function, while the second sign indicates whether or not the row function is supported by the column function. A ++ pair indicates a two-way (strong) supplementarity, a +/- or -/+ pair indicates one-way (weak) supplementarity, while a -/- pair indicates no direct supplementarity. For example, *search* and *quality* go hand in hand. However, Web-based search mechanisms (for example Yahoo, Excite) have evolved from information retrieval models and therefore perform search only at the syntactic level (keywords/phrase). The diversity of sources on the Web and their effervescent nature makes quality signaling a very important function that adds value to simple search mechanisms. The first “+” sign in the search/quality cell indicates this affinity. On the other hand, since search mechanisms form the default interface to the customer, quality signaling is most effective when coupled with a search mechanism. Hence the second “+” sign. As indicated by the contents of the search/quality cell, a number of alliances have already been formed around this strong supplementarity relationship.

A “?” sign in a cell is indicative of a *potential* alliance, while a “-” sign signifies that we do not expect to encounter a direct alliance between the intermediaries corresponding to that cell. The absence of examples in the cells (marked “?”) may simply be a reflection of the early stage of development of these functions relative to others. Cells with a low affinity index (-/-) might eventually be populated due to the compounding effect (or the supplementary nature) of such functions. For instance, *search* and *payment & settlement* might not exhibit direct affinity (see matrix); however, *search* has a strong supplementarity with *representation*, which in turn has a supplementarity relationship with *payment & settlement*. Hence *search* may be indirectly affiliated to *payment & settlement* (e.g., the alliance between Yahoo and Visa.)

The matrix helps highlight supplementary functions for e-commerce and can be used to guide the direction of cooperative arrangements among existing Web-based intermediaries. By highlighting supplementary functionalities, the affinity matrix sensitizes specialized Web-based intermediaries and investors to the potential value of cooperative arrangements.

	Comm.	Search	Represen	Promotion	Payment & Settlement	Quality	Customer Info.	Valuation
Valuation								Auction Net Auction Web OnSale First Auction
Customer Information							Media Metrix, Net Ratings, Relevant - Knowledge	?
Quality						ABC Interact., Net Shepherd, SafeSurf, PICS, VCR	?	?
Payment & Settlement					Visa, MC, Cybercash, DigiCash	-	?	?
Promotion				Net Gravity, Action-Ads, Pointcast, DoubleClick.	VISA + Pointcast, Cybercash + Net Gravity	Net Shepherd + Double Click	?	Onsale + Pointcast, Onsale + Wired Digital
Representation		Amazon.com, CarPoint, Autoweb Netscape AOL	?	?	Netscape + Cybercash + AOL	Internet Explorer + Net Shepherd	?	Onsale + Net Buyer, Onsale + AOL
Search		Altavista, InfoSeek, Lycos, Yahoo, Excite Inc.	Yahoo + Autoweb, Yahoo + CarPoint	Altavista + DoubleClick, Yahoo + ABVS Interact.	Yahoo + VISA	Yahoo + ABC Interact., Altavista + Net Shepherd	AOL Net Find + Altavista	Onsale + HotBot
Communication	DejaNews, Inc. Audio Net, U.S. Email, Juno.	Yahoo + Audio Net	-	Pointcast + Juno	-	-	Juno + Market Facts	Onsale + DejaNews, Inc.

Figure 2. The Affinity Matrix for Web-based Intermediaries

Summary and Conclusions

The needs of electronic commerce extend far beyond those of just information dissemination and retrieval. To cope with the ever increasing complexities of the information economy, Web-based intermediaries will fulfill a wide range of functionalities. In this paper, we provide a classification of these functionalities and identify emerging relationships among intermediaries belonging to different classes. The “affinity matrix” serves as a useful tool for examining the relationships that exist among the intermediary functionalities and provides a platform for studying these emergent structures in the information economy.

Here, we can offer only the beginnings of our research on the emergent structure of the information economy. In addition to the functional synergies that we have examined in this paper, many other factors determine the likelihood of alliances between Web intermediaries. These factors include issues of market size, technology platform, and the ambitions of the firms' leaders. We hope to unravel other interesting phenomena in future work.

References

References are available upon request.