Electronic Commerce and Rapid Delivery: The Missing "Logistical" Link

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Introduction

In the span of just a few short years, the World Wide Web (WWW) has emerged from the laboratories of computer scientists into the homes of millions of ordinary people. A recent CommerceNet/Nielsen Media Research Survey (http://www. commerce.net/news/press/121197.html 12/11/97), estimated that 58 million adults now use the Internet in the U.S. and Canada and an estimated 48 million people use the Web. However, it is estimated that only 10 million people (16 years of age or older) have actually made a purchase on the WWW. While there appears to be a significant trend in the growth of electronic commerce (or simply, **EC**), the lack of transaction and personal security, consumer uncertainty about quality of goods of services bought over the Internet, consumer inertia in general, lack of knowledge, and the often poor performance of the WWW are frequently cited as reasons why people do not shop on the Web. The authors believe that for the present and for some time into the future, a major source of customer dissatisfaction will stem from EC's inability to deliver tangible products and services quickly and inexpensively. Consumers will come to expect not just "Next Day" deliveries, but also "Same Day" deliveries for a wide array of products in the same way that they expect to be able to make real time airline, hotel and automobile reservations today.

A Definition for Electronic Commerce

This paper is concerned with a special but extremely important segment of EC as performed by modern virtual organizations (VOs) – the segment dealing with the sale and delivery of *physical goods and services*. Let us explore the contemporary definitions for both ECs and VOs. First, let us examine the definition for Electronic Commerce.

Vladimir Zwass (1996) defined Electronic Commerce as "the sharing of business information, maintaining business relationships, and conducting business transactions by means of telecommunications networks." Zwass (1996) also developed a useful hierarchical framework for electronic commerce. Quite correctly his lead article in the **International Journal of Electronic Commerce** focused on the electronic, information-based infrastructure necessary for EC. Scant attention was given to the issue of physical good and the logistical control systems which must be provided to make this a successful business venture. Perhaps, subconsciously, Zwass and most of the IT community have focused exclusively on the virtual, information-based products, such as software, answering machine services, videocassettes, cash transactions and financial markets, information-oriented intermediaries. Physical goods which **can not** be transformed into information-based commodities or services are by in large ignored or treated as a somewhat less interesting or sophisticated form of EC by IT academic researchers.

The missing component in Zwass' EC framework is the physical logistical link or the "virtual distribution infrastructure", which is required for the transportation of physical goods (and services) or product bought and sold on the Internet. This may be the single most important barrier for the slower than expected or hoped for growth in electronic commerce. Peter Seddon suggested recently on the widely subscribed VOTalk Listserver that "Electronic Commerce is commerce enabled by Internet-era technologies" (10/28/97). More specifically, we would suggest that EC is commerce which is enabled by the *WWW-era technologies*, to includes Web-browser, Web-security, and Web-database tools along with traditional EDI and email technologies.

Finally, Rolf T. Wigand, defined EC as "the seamless application of information and communication technology from its point of origin to its endpoint along the entire value chain of business processes conducted electronically and designed to enable the accomplishment of a business goal. These processes may be partial or complete and may encompass business-to-business as well as business-to-consumer and consumer-to-business transactions." (Wigand, p. 5, 1997)

For purposes of this study we shall modify the above definitions for EC and adopt the following definition for EC:

> EC (circa 1998) is commerce, which is enabled by WWW-era technologies, to permit the seamless integration of information, communication and *logistical* technology along the entire value chain of business processes from the suppliers of raw goods and services to the final customers.

See **Project 2000 study** (7/6/96) for statistics and citations on Internet and Web usage. There are few if any documented stories of legitimate businesses making profits on the WWW, through the actual sale of a physical product or service. Companies which are often mentioned as successfully EC businesses such as Virtual Vineyards and Amazon.com are quick to report that they are yet to make a profit (**Forbes ASAP Magazine**, 4/6/98).

A Model for Creating the Rapid Delivery Virtual Organization of the Future

One important reason for the generally slow growth of electronic commerce is that most businesses are simply not organized to do business on the Internet. Venkatramen and Henderson (October, 1996) sounded the alarm that organizations must undo their vertically integrated hierarchies and recreate a virtually integrated, networked and distributed organization to be successful in the new electronic marketplace (p. 3, 1996). They proposed a framework for the virtual organization which consisted of three distinct, yet interdependent vectors: (1) *market interactions* (the virtual interfaces with our customers); (2) *competency leveraging* (or virtual sourcing, partnering or forming alliances with other firms to leverage their and our expertise); and (3) *work reconfiguration* (or restructuring both the physical and logical work places to leverage diverse sources of expertise both inside and external to the organization) (Venkatramen and Henderson, p. 4, 1996). This model serves as a basis for how to create a VO, and is essential for understanding how to build a rapid delivery EC organization which specializes in physical goods or services.

This paper is primarily concerned with the development of a new category of organization, which we shall label as, ***Rapid Order and Delivery VO's*** (See Table 1). These organizations will be characterized as having virtual storefronts, just in time (JIT) inventories, zero or near zero physical inventories, and *very* rapid delivery **(Same day)** or rapid delivery (Next day) of a physical good or service.

Several examples of rapid delivery organizations were examined. One such organization is **Amazon.com** (http://www.amazon.com), a well known Web-based retail book distributor. Amazon.com alleges to have 1.5 million customers, 2.5 million titles online, $148 million in 1997 revenues, but $27.6 million in losses in 1997. Inventory turnover at Amazon.com was an incredible 42 times compared to industry giant, Barnes & Noble, with 2.1 times inventory turnover (**Forbes ASAP**, 4/6/98). Another example is **Marshall Industries**, a distributor of computer and electronic components based in El Monte, CA. Marshall was the first industrial electronics distributor to launch a site on the WW in July, 1994. Rodin & Eliot (1997) applauded Marshall Industries for helping to define the enterprise model for *"virtual distribution"*.

A third and final example, **Monorail, Inc.,** is a computer fabricator and supplier. Their key to success was not superior technology, but superior logistics (**Wall Street Journal**, 12/29/97, Evan Ramstad, *"A PC Maker's Low-Tech Formula" Start With the Box"*, B1, B6). Founder and President, Doug Johns (a Compaq Computer, Corp. refugee), who seized upon the importance of forming a strategic alliance with his own rapid delivery distribution partner, by designing this business around FedEx Corporation's optimal size, shape and weight for a shipping carton. He next designed laptop and notebook computers that would fit inside these cartons.

Enormous innovation will be required to restructure the global supply chains for traditional retail catalog firms, such as JCPenney Company, and Lands End. Present EC projects most apparel firms represent only a few percent or less of their total non-store revenues. As they attempt to migrate to virtual, rapid delivery electronic commerce organizations, new regional and global distribution networks will be required along with a retooling of their electronic order fulfillment systems.

Very Rapid Delivery: The Missing "Logistical" Link

These entrepreneurial alliances lie at the very heart of the logistical model for Rapid and Very Rapid Order and Delivery VO's (See Table 1). More traditional articles on Global Supply Chains (Prakash, Wetherbe, & Janz, 1997 have focused on the electronic and physical linkages between the retailer and the suppliers. EDI, networked warehousing, JIT inventory are concerned with getting the product to the customer in the real store, not the virtual store. With a virtual storefront the merchandise is just out of reach of the customer. The challenge for Rapid Order and Delivery VO's. is to almost miraculously extract the goods from the virtual store shelf and place them into the waiting hands of the online customer.

Traditional solutions to this problem have generally drawn on the public and private postal networks. In fact the inability of the US Postal Service (USPS) to effectively provide reliable rapid delivery has led to the growth of many large private transportation firms, such as, United Parcel Services (UPS), Federal Express (FedEx), Airborne Express, Emery Worldwide Express, DHL Express, etc. The USPS which delivers approximately 50 times more pieces of mail per week than UPS and FedEx combined has responded with its own Two Day Priority Mail (**USPS**, 1997). The USPS's Five-Year Strategic Plan for FY 1998-2002 predicts that a new era for postal services will soon be emerging.

Summary

The age of EC and VO's is at its dawning. Important progress towards building the electronic infrastructure to create, operate and manage these types of organizations have matured rapidly and are in place. Unfortunately, the problem of very rapid physical delivery remains largely unsolved. Distribution networks created by partnerships with both new and existing shipping providers will be necessary for EC to reach its full potential. This paper provides a framework to review the types of partnerships

that will be needed. These new entrepreneurial alliances with postal-type providers will complete the virtual distribution systems for the new breed of virtual organization of the next millennium.

References
References available upon request from first author (becker@unt.edu).

Table 1. Taxonomy for EC Organizations According to Types of Goods & Services and Delivery Time

Delivery Time Requirements / Goods or Services	**VERY RAPID** Order & Delivery — **SAME DAY**	**RAPID** Order & Delivery — **NEXT DAY**	**TRADITIONAL & MODERN** Order & Delivery — **TWO (2) or more days**
Electronic Goods Software, Newspapers, Magazines, Multi-media digital audio & video, Electronic Games, etc.	MODERN DIGITAL ORDER AND Delivery VO & EC ORGANIZATIONS Newspapers, magazines, Software, Electronic games, digital audio & video		MODERN DIGITAL ORDER & DELIVERY EC ORGANIZATION Software Updates, subscriptions, electronic games, digital audio & video
Physical Goods Apparel, Medicine, Books, Parts, Household goods, Flowers, Sporting goods, Automobiles, Toys, Groceries, Computer Hardware, etc.	VERY RAPID ORDER AND DELIVERY VO (a.k.a, Virtual Distribution†) FAX letter, Perishable goods, Flowers, Medicine	RAPID ORDER AND DELIVERY VO Apparel, Books, Medicine, Parts, Toys	TRADITIONAL ORDER AND DELIVERY ORGANIZATION Refills, Books, Apparel, Household goods, Sporting goods, Automobiles
Electronic Services Insurance & Financial Services, Consulting Services, Mediation, Travel reservations, Information retrieval, video/audio broadcasting & conferencing	EMERGENCY & REAL TIME DIGITAL SERVICE & DELIVERY VO Financial services, Stock brokerage services, Mediation services, Travel reservations, Live & delayed Audio/Video broadcasts and conferencing		MODERN DIGITAL ORDER & SCHEDULE SERVICES EC ORGANIZATION Regular or scheduled financial & consulting services, delayed broadcasts (on demand audio & video broadcasts)
Physical Services Medical Diagnosis, Home Repair, Equipment diagnosis & repair, Computer hardware diagnosis and repair	VERY RAPID & EMERGENCY SERVICES VO Medical diagnosis & treatment, Equipment repair	RAPID SERVICE & DELIVERY VO Home Repair, Equipment repair	TRADITIONAL ORDER AND SCHEDULED SERVICES ORGANIZATION Regular or scheduled diagnosis and repair service appointments
† Robert Rodin & Lance Eliot, April, 1997.			