THE FUTURE OF ELECTRONIC COMMERCE: A SHIFT FROM THE EC CHANNEL TO STRATEGIC ELECTRONIC COMMERCE

KEN PEFFERS, Hong Kong University of Science and Technology
Department of Information and Systems Management, School of Business and Management, Clear Water Bay, Kowloon, Hong Kong SAR. Tel +852 2358 7636, Email kpeffers.com URL http://peffers.com.

ABSTRACT

Poor business performance and lost equity values have cast doubt for some on the future viability of electronic commerce. Most of this attention focuses on the EC channel, just one aspect of electronic commerce. The paper examines the effectiveness of the EC channel for seven types of products and infers that for four of them, the EC channel is unlikely to be the best way to sell and deliver goods and services. Much of the value to be had from this channel has already been captured and overinvestment in it may result in continued contraction. A more mature EC model, the Strategic Electronic Commerce Model (SECM), is proposed that provides a framework for balanced EC investments across the value chain and continued opportunities for EC investment.

Crashing prices for technology-related equities and the failure of many electronic commerce (EC) businesses have caused many to question the future of EC. In this paper I will examine the popular notion of EC and will draw some inferences about its future. Then I will propose a more complete EC model, the Strategic Electronic Commerce Model (SECM) that can serve as a basis for continuing investment in information technology to improve the effectiveness of the firm.

THE EC CHANNEL: THE POPULAR DEFINITION OF EC.

Since early 2001, the popular press has focused on failures of the “dot.com” companies, such as pets.com and Webvan.com, and the failure of many firms to make a transition from early loss-taking, designed to enable them to achieve dominating market shares, to profit-making maturity. The focus on “dot.com” firms to define EC implicitly defines EC in terms of selling products and services using the Internet. This is the “channel view of EC.”

In marketing literature, a channel consists of all of the means of bringing a product from the producer to the end user (Jobber 2001). The channel starts after the product has already been invented, designed
and produced. Six major activities, information distribution and selling, ordertaking and negotiation, payment, delivery, and service define the channel view of EC. In this popular view, firms have been urged to “e-volve or die (Levy 2001),” as all transactions move toward the new, obviously superior, electronic medium. People who think that things like autos, electricity production, or real estate, are important are told that they are engaged in “old economy thinking (Connexus Resources, LLC 1999).” In the channel view of EC, firms may begin by using the Internet only for providing information about their products and services, but then they move toward a more mature position in which they perform all channel activities in the new media. It is important for them to continue to add activities until the entire transaction is handled over the Internet channel. Old economy businesses must re-invent themselves to become e-businesses or (more likely) upstart new EC companies will replace them.

**IS THE EC CHANNEL ALWAYS SUPERIOR?**

The EC channel is superior to prior existing channels in several respects, generating enthusiasm and optimistic expectations that it will displace the prior channels. It allows businesses to achieve immediate global scope. It allows firms to take advantage of economies of scale by consolidating global markets. It permits businesses to position themselves to serve tiny niche markets as such markets achieve sufficient scale with global scope. It allows customers to inexpensively search for the best product at the lowest price. It is immediate, faster, and more personal than other distribution channels.

**THE PROBLEM OF EXTRA TRANSACTION COSTS IN THE EC CHANNEL.**

Little attention has been focused on the EC channel’s limitations. The EC channel is burdened with several types of higher costs. These include payment system limitations, delivery costs, returns costs, transaction repudiation, fraud, and product specification requirements. These higher costs may limit the universal application of the EC channel for every product type.

**Payment systems.** Almost all of the world’s economic transactions are paid for using variations on five types of payment systems, cash, checks, giros, credit cards, and electronic funds transfers, that have become fine-tuned over years, even centuries, for in-person transactions (Peffers, 2001). Payment systems designed for in-person transactions have been adapted for online transactions, but at higher cost to the transaction parties. We have identified dozens of new payment systems that have been designed to facilitate payment for a variety of new online transaction circumstances. Some of them have been implemented, however, none seems obviously likely to be successfully diffused throughout the economy, at least not soon.

**Delivery.** Delivering physical goods directly to individual customers is almost always more expensive than delivering goods to an intermediary, who breaks producer bundles and provides a portfolio of goods to customers.

**Returns.** Selling goods to customers, where customers haven’t been able to examine the goods in-person, often means effectively delivering goods and services on approval, where a customer can return goods that don’t satisfy. This results in higher levels of returns than for goods that have been inspected prior to purchase.

**Repudiation.** When a transaction is conducted online, rather than in-person, the customer is may be provided with an opportunity to repudiate it more easily than with an in-person transaction. He or she can claim never to have received the goods or services or that they were not of satisfactory quality. In many circumstances sellers have little recourse but to accept all of the costs for repudiated transactions. A growing proportion of online transactions are repudiated at great cost to sellers.

**Fraud.** Buyers or sellers misrepresent themselves and their products and services. This problem is worse for online transactions because information available to buyer, e.g.,
appearance of the physical premises, and seller, e.g., appearance and demeanor of the buyer, in an in-person transaction is missing.

Information requirements for product specification. Products that can be specified very precisely with little information, e.g., “Sony Model DVP K360,” can satisfactorily described over the Internet at reasonable cost. Other products require much more information. For example, a customer can only observe the quality of an apple if he can hold it in his hands, ascertaining its firmness and weight; turn it over to observe, at very high resolution, whether its surface shows any bruises, blemishes, mold, or rot; slice it open to take in the aroma of its flesh; and bite into it to verify the nuances of its flavor, firmness and juiciness. Such information is more difficult to convey to the customer online than in-person and products with high information requirements for product specification place special burdens on the EC channel.

EC CHANNEL TRANSACTION CHARACTERISTICS.

While the EC channel is generally affected by these extra costs, several characteristics of products and services determine their importance.

Information vs physical content. Since EC makes use of technology to process information and to transmit it among transaction partners, one might expect information products and services to be more suited to the EC channel than purely physical products.

Customization and personalization. The extent to which products require customization and the manner in which the customization can be implemented affects the way that they can be effectively delivered.

Economies of scale. Economists have suggested that information goods are very different from physical goods because they have high economies of scale (Varian and Shapiro, 1999). Industries where goods have high economies of scale may be ripe for use of the EC channel to consolidate the industry to just a few firms.

Margins. The relative size of product margins determines whether the sale of goods can be profitable in the face of higher channel transaction costs.

Logistics cost. The cost of ordertaking, delivery, acquisition, and payment relative to the value of the product.

Specification cost. The cost of satisfactorily specifying the characteristics of a product for the customer.

HOW WELL SUITED IS THE EC CHANNEL FOR PRODUCTS?

Next we examine several types of products that have been sold through the EC channel, in light of transaction characteristics that we have identified and extra transaction costs in this channel. We would like to see if we can draw some inferences about the likelihood that businesses using this channel will be successful. Table 1 contains a summary view of this discussion.

Pure generic information. Downloaded software, news and other forms of pure information are examples of this type of product. Perhaps nearly every Internet user has been delighted by his or her access to valuable information either free or at very low prices through this medium. The characteristics of these products make them well suited to distribution through the EC channel. The products have no physical content, are massed produced, require only automated customization, and can be precisely specified. Because they have insignificant marginal cost, they have extremely high economies of scale and practically no marginal delivery cost. Profitability for these products depends on barriers to imitation to prevent prices from being competed away to zero.

McAfee Corporation is an example of a firm that focuses on this type of product. McAfee develops anti-virus, security and related products and focuses on selling them primarily on a subscription basis (McAfee, 2001) over the Internet. McAfee’s products are customized to the extent required for them to work well with each customer’s equipment and architecture, however, this level of customization is automated, so the product
McAfee delivers to the customer can be generic. Expected to have positive earnings by the end of 2001, its revenue is expected to grow at an average of 57% annually over the next five years. With high expected rates of growth and zero marginal cost products, the firm should be very profitable unless competitors compete away profits in this industry.

Pure customized information. Consulting services, university teaching, investigation and similar services can also be thought of as pure information products, but information products that must be customized in complex ways that are difficult to automate. Extensive customization requiring human intervention changes several important characteristics for a product. Economies of scale are no longer high because human agents are required to produce and deliver the product to each customer. Logistics and specification costs are also high. Characteristics of this type of product suggest offline delivery.

Cap Gemini Earnst & Young offers teaser generic knowledge at their website (Cap Gemini Earnst & Young, 2001). They make it clear, however, that the real value of services they provide comes directly from the knowledge of their professional consulting staff. Cap Gemini Ernst & Young is a public company listed on the Paris Bourse, with sales growth of 44% for 1998-2000 and investor expectations resulting in a price earnings ratio of more than 60. Recent margins are a modest 6.7%. It seems likely the most of the value produced by this firm will come from services produced and delivered in person, albeit assisted by electronic communication and IT. Although the EC channel will be a medium for providing information to prospective customers, it is unlikely to become a major medium for delivery of value for this firm.

Mostly information product, producer sales. Packaged software and similar products are mostly information, with some physical components. Since most of their value comes from generic information, they share most of the characteristics of generic information products. They have low physical content, require no customization, other than that which is done automatically by the product itself or by the user. Their economies of scale are extremely high. With very high margins and very low logistics and specification costs, relative to margins, they seem ideally suited to distribution through EC channels.

Intuit sells TurboTax packaged software through its web site (Intuit Inc., 2001), which resembles an on-line bookstore, with many well-defined products at a variety of prices. Intuit’s five average growth rate has been more than 21%, with gross margins of 77%, boding well for a profitable business.

Mostly information product, reseller sales. From the perspective of the customer, books and similar products are mostly information products, but from that of the online retailer, they are physical products with modest margins. This is because upstream producers, such as authors and publishers, capture most of the information value of these products in the wholesale price. Consequently, for the online retailer margins for these products are relatively low and economies of scale are quite modest, even though the products are mostly information. Logistics costs are moderate, but potentially consume much of the small margins. Specification costs are low. Selling this kind of product in the EC channel is technically very feasible, but it may never be very profitable.

Amazon is one of the largest and earliest major EC retailers (Amazon.com, Inc., 2001b). Starting in 1995 at $511,000, its sales grew at an astonishing average rate of 5578% annually to reach $2.76 billion by 2000. Over that period its gross margins have stayed very stable at 22% in 1996 and 23.7% in 2000. This suggests that economies of scale for this business are very weak, although the firm makes strong claims to be in a business with high scale economies (Amazon.com, Inc., 2001a). Consequently, Amazon has been a very dependable money loser, burning through lost equal to 51% of annual sales in 2000, compared with 59% of its 1996 sales. Loses have almost precisely kept pace with sales, effectively confirming poor scale economies. Mostly information resellers compete head-to-head with brick and mortar retailers at what the physical stores do most effectively, breaking
bundles of merchandise, displaying it, and delivering it to customers. They may be limited to niche markets or very weak profitability.

**High value products with low specification requirements.** Examples of this kind of product include electronic gadgets, computers, and industrial parts. Customization levels are low and the products can be easily and well specified, however, product diversity can be very high. This diversity, combined with the high value of the products suggests substantial economies can be realized from keeping the product out of inventory through supply chain and channel integration and by reducing the number of intermediaries in the value chain. Economies of scale are moderate. Relative to value, logistics and specification costs are low. These characteristics suggest that firms can be profitable selling these products in the EC channel as part of a low cost strategy or as part of a strategy to aggregate profitable niches globally.

Dell Computer, started in 1984, has become the world’s number one computer system producer, focusing on building systems to order and selling them directly to consumer, industrial and institutional customers. “Every Dell system is built to order (Dell Computer Corporation, 2001).” Its margins have been consistently very narrow at about 9% of sales over the last 5 years, while growing dramatically, but it has managed to capture most of those margins (83% in 2000) as net income (Dell Computer Corporation, 2001). Consequently it has become a very profitable computer system assembly company. Low specification and logistics costs, relative to product value, and cost savings from value chain integration make it likely that this business will continue to be very profitable. This may be one business in which the failure to use the EC channel may have been a major strategic error for some industry members.

**High value goods with high product specification requirements.** Examples of this type of product include fashion clothing and real estate. These products are characterized by high information requirements, particularly requirements for information that is difficult to specify in a way that satisfies the customer. Traditionally, most such products have been sold after customers personally inspect the physical goods and interact with in-person sales staff. Fashion clothing, for example, is characterized by subtle differences in material and fit that are appreciated by customers, but difficult to express in standardized parameters. For example, in purchasing slacks, one customer who values flexibility might focus on roominess for the crotch and thighs, while the next customer is primarily interested in achieving an appealing visual effect from the drape of the material in the seat area. Since customers vary in their physical characteristics and values, only a physical try-on can insure that the product works for the customer.

Levis Strauss backed off from its 1998 attempt to sell jeans and other clothing on its own Internet site, choosing instead to use its site to advertise its brand and referring the minority of customers interested in online sales to retailers, such as JC Penny and Macy’s (Olsen and Wolverton, 1999). Separate Internet site sales for Levis aren’t available, but it seems likely that few customers thought it worthwhile to chance clothing that fit poorly, when they could easily try it on in a nearby retail store. Others have explained Levis’ withdrawal on the basis of channel conflicts, but of course, if customers had been willing to buy online in substantial numbers, channel conflicts wouldn’t have mattered much. Historically, mail and telephone order (MOTO) retailers have solved the fit problem by over-sizing products and by offering very stable product catalogs over time, so that when the customer finds a clothing item that fits, she can use the same size for repeated purchases, even years later. Nonetheless, like MOTO clothing sales, EC channel fashion clothing sales promise to remain a tiny niche in the retail fashion clothing industry, dominated by firms that make such sales a core competence.

**Low value products with high information requirements.** Examples of these products include groceries, especially fruit, vegetables and fresh meat. High levels of information and physical content characterize these products. They can be very hard to specify because the products vary substantially along dimensions that are complex and critical to the product’s value. Economies of scale and
The future of EC: a shift from the EC channel to strategic electronic commerce.

Margins are very modest. Logistics costs are very high, relative to value, and customers are reluctant to pay extra charges for delivery. These products would seem to be the antithesis of the ideal EC product, described by Keen (2001) as “expensive to buy and easy to ship.” It is difficult to imagine how an online retailer could compete with a local physical retailer in breaking bundles, displaying and delivering these products.

Webvan Group Inc, an online retailer of groceries, non-prescription drugs, pet supplies, and general merchandise saw its sales increase by 1241% in the year before it filed for Chapter 11 bankruptcy in July 2001. In its four years of operation it acquired net losses of $614 million on a mere $191 million in sales. The amazing thing about online grocery shopping is how many people thought that this was a viable business idea, outside of very small niche markets.

DISCUSSION

The analysis and examples above suggest some tentative conclusions about what kind of products might be sold in successful EC businesses. Clearly pure generic information is ideally suited to this channel. Mostly information products, where the information value is captured by the seller, can also be successful, but where the producers have already captured this value, leaving the seller with a low value physical product, success is doubtful. High value, low specification requirements products can be successful if the vendor is able to develop cost advantages through supply chain integration, while adding customer value through mass customization. There seems to be little justification for trying to sell high specification requirements goods, whether high or low value, over the Internet, when local retailers can be much more effective at breaking bundles, displaying, selling, and delivering these products.

This suggests that many products and services that are not already sold in EC transactions won’t be profitable in this channel. Indeed, the EC retrenchment may not be over. We may still witness the demise of additional seemingly well-established businesses because they have little hope of ever making money. Much of the potential value from selling through the EC channel may already have been captured by the early successful firms. Indeed, it seems likely that the excess value placed on EC firms by 1999 has resulted in over-investment, as suggested by the ability of ventures with little likelihood of ever making money, like Webvan, to raise capital and by the continued capital infusions into dependable money losers like Amazon.com.

HAVE WE SEEN THIS BEFORE?

EC enthusiasts, who expect the EC channel to eventually displace local physical retailing, may argue that the current shakeout merely represents a temporary setback for EC. There are several precedents, however, which suggest that the excess enthusiasm for EC innovations may be followed by dramatically scaled back expectations. In the early 1960s, at the height of enthusiasm for mechanical commerce, vending machines, one could read articles suggesting that by the end of the century, most retailing would be performed by machine, eliminating the need for sales clerks, waitresses, and similar service job categories. After the novelty wore off and it became obvious that customers weren’t enthusiastic about purchasing goods from machines, vending machines were relegated to the niche they occupy today in most markets, low volume sales of low-value goods.

Later, in the 1970’s, US banks thought that the newly introduced automated teller machine (ATM) would dramatically change banking. ATMs would provide all but the most cerebrally demanding banking services, branches would disappear, and employment in banking would plummet. In addition, ATMs would distribute welfare benefits, stamps, movie tickets and a variety of other information products, providing vast new revenue streams for the banks. Of course, ATMs have been designed, built and installed to perform all of those tasks at one or another time and place, but, after more than 30 years since the first ATMs were installed, customers really value only one ATM service, convenient, around-the-clock access to cash.
Table 1. Electronic commerce product types and strategic characteristics.

<table>
<thead>
<tr>
<th>Product Type</th>
<th>Example</th>
<th>Example Firm</th>
<th>Information Content</th>
<th>Physical Content</th>
<th>Customization</th>
<th>Economies of Scale</th>
<th>Margins*</th>
<th>Logistics Cost*</th>
<th>Specification Cost*</th>
<th>Viable EC Channel?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pure generic information</td>
<td>Downloaded software; news</td>
<td>McAfee</td>
<td>VH</td>
<td>None</td>
<td>None</td>
<td>VH</td>
<td>VH</td>
<td>VL</td>
<td>VL</td>
<td>Yes</td>
</tr>
<tr>
<td>Pure custom information</td>
<td>Consulting services</td>
<td>Cap Gemini</td>
<td>H</td>
<td>L</td>
<td>High</td>
<td>L</td>
<td>H</td>
<td>H</td>
<td>H</td>
<td>No</td>
</tr>
<tr>
<td>Mostly information, producer</td>
<td>Packaged software</td>
<td>Intuit</td>
<td>H</td>
<td>L</td>
<td>None</td>
<td>VH</td>
<td>VH</td>
<td>VL</td>
<td>VL</td>
<td>Yes</td>
</tr>
<tr>
<td>Mostly information, reseller</td>
<td>Books</td>
<td>Amazon</td>
<td>H</td>
<td>L</td>
<td>None</td>
<td>L—M</td>
<td>L</td>
<td>M</td>
<td>VL</td>
<td>Doubtful</td>
</tr>
<tr>
<td>High value, low specification</td>
<td>Gadgets, computers, business</td>
<td>Dell, Land’s In</td>
<td>L—M</td>
<td>H</td>
<td>L</td>
<td>M</td>
<td>M</td>
<td>L—M</td>
<td>L</td>
<td>Yes</td>
</tr>
<tr>
<td>requirements</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>High value, high specification</td>
<td>Fashion clothing</td>
<td>Levis</td>
<td>H</td>
<td>H</td>
<td>L</td>
<td>L</td>
<td>H</td>
<td>L—M</td>
<td>H</td>
<td>No</td>
</tr>
<tr>
<td>requirements</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low value, high specification</td>
<td>Groceries</td>
<td>Webvan</td>
<td>H</td>
<td>H</td>
<td>L</td>
<td>L</td>
<td>L</td>
<td>H</td>
<td>H</td>
<td>No!</td>
</tr>
</tbody>
</table>

* Relative to value
withdrawals, and most ATM machines provide only a very limited set of routine services. Another EC innovation, 800 toll free long distance telephone numbers in the U.S. made access to MOTO retailers more convenient, but failed to shift large amounts of retailing to an online channel.

A STRATEGIC ELECTRONIC COMMERCE MODEL

If much of the potential value has already been realized from investments in the EC channel can we look elsewhere to find potential for positive value investments in electronic commerce? The answer is yes, if we take a broad view of EC.

Figure 1 shows a graphical representation of a strategic electronic commerce model (SECM). The SECM shows the firm disaggregated into five potential EC businesses, supply chain management, innovation, infrastructure management, operations, and the EC channel. Together, these five businesses make up the complete EC business.

Supply chain management. This business involves managing the process of procuring resources for the firm. It involves activities associated with seeking out resources, ordering, inbound logistics, etc. Federal Express specializes in providing supply chain management services for firms. IT investments focus on integration, cost reduction, reducing inventory stocks, and improving coordination, and reducing cycle time.

EC innovation. This business involves inventing, designing, investing in, and implementing new EC products and services. This may be an entrepreneurial, planning, engineering, or marketing role. Activities focus on adding value to products and capturing more of it in margins. IT investments focus on support for knowledge management and collaborative work. Cap Gemini and other EC consulting firms focus on this business.

EC infrastructure. This business involves investing in and managing the IT infrastructure required to operate EC businesses. CheckFree Corporation provides payment-processing services for banks and firms engaged in EC. Application service providers provide the infrastructure for EC channel applications. IT investments center on such infrastructure elements as telecommunications networks and database management systems.

EC operations. This business involves doing the routine processing functions of the business, such as assembly, facilities management, and payroll processing. EC operations include activities that are primary activities in the product value chain and activities that are primarily supportive. For many firms operations are good targets for outsourcing. Alternately, they can make excellent candidates for niche businesses, e.g., ADP. IT investments focus on efficiency and process redesign.

EC channel. This business involves all of the activities required to manage the relationship between the producer and the customer, including displaying, selling, delivering, getting paid, and aftermarket service. This is the EC business that is commonly associated with EC and is typified by EC retailers such as Amazon. IT investments focus on sales and transaction oriented activities.

Together these five EC businesses make up the complete EC business. In this model, the term “electronic commerce” means the use of information technology to create new value by inventing new products, processes and business architectures; providing infrastructure for the business; marketing, selling, and servicing products; acquiring and managing resources; and operating the business efficiently and effectively. Strategic IT investments can be made in any of these businesses to add value to the firm. Using this model, most businesses are potentially EC businesses.

For most firms, not all parts of the SEC model are equally important. Analysis of the business would reveal that the firm captures more value from one or more of these EC businesses than from the others. Often firms outsource part or all of one or more of the components of the model. Which parts of the SEC model should be performed in-house or
outside is an important decision for senior managers. These decisions should be based on the potential for these components to create value that can be captured by the firm as profits.

Few firms can be very effective in all five of these areas. Consequently, as part of the firm’s strategic planning process, managers should evaluate these businesses in terms of their current profitability and potential for the firm. Managers should ask, “Which parts of the SEC model are most profitable, potentially most profitable, and least profitable?”

- **Most profitable SEC components.** Managers should evaluate this part of the EC business to seek opportunities to enhance and protect its profitability.
- **Potentially more profitable SEC components.** These components should be the primary focus of planning for IS investments to create and capture value.
- **Least profitable EC components.** This area should be the focus of planning to seek out activities that provide opportunities for disinvestment to free up capital for potentially profitable EC investments. They are good candidates for outsourcing.

The SEC model allows managers to move beyond a naïve model of electronic commerce, focusing only on the EC channel, to a broader view of EC that is sustainable for the longer term. Excessive enthusiasm for the EC channel encouraged managers to over-invest in IT to support channel activities. It also encouraged the naïve notion that every business should invest heavily in IT support for the EC channel, when, for many businesses, other parts of the EC business held and hold more potential to create value. This broader view of EC can help managers to seek out opportunities to invest in EC, based upon the firm’s core competencies and potential advantages.
The future of EC: a shift from the EC channel to strategic electronic commerce.

REFERENCES


THE AUTHOR

Ken Peffers, Ph.D. (Purdue, 1991) is an associate professor of IS at the Hong Kong University of Science and Technology. His current research focuses on making the right investments in IT infrastructure and applications to support the firm's business strategy. His research articles on IS strategy, IS project evaluation, and the business impacts of IS investments have been published in such journals as Information Systems Research, IEEE Transactions on Engineering Management, Organization Science, the Journal of Strategic Information Systems, and Information & Management. Dr. Peffers is also the publisher of a new electronic IS journal, the Journal of Information Technology Theory and Application (JITTA). See http://peffers.com.