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A b s t r a c t

Along with the exponential growth of e-commerce activities, the world marketplace is undergoing a rapid transformation and retailing is one of the key areas of this revolution. In this paper, we introduce a concept called 'cyber-enhanced retailing'. Cyber-enhanced retailing is a paradigm that melds the advantages of e-commerce with the advantages of traditional physical retailing. The paper introduces a framework that compares and contrasts the general advantages and disadvantages of both e-commerce and traditional 'brick-and-mortar' retailing. Based on this framework, we analyse possible approaches to applying e-commerce retailing techniques to the consumer mercantile activities in the traditional retailing realm. This analysis leads to a discussion of a number of potential scenarios for enhancing the traditional retail experience by integrating e-commerce technologies.

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A Framework for Cyber-enhanced Retailing: Integrating E-Commerce Retailing with Brick-and-Mortar Retailing

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INTRODUCTION

It will no longer be possible operationally or strategically to ignore the massive changes taking place both in the physical and virtual market places (Rayport and Sviokla 1995; Shaw 1999). Electronic commerce (e-commerce) retailing has grown dramatically since 1997 and continued dramatic increases are projected. The active user population was estimated to be 37 million in December 1998, up from 27 million in December 1997, and is estimated to grow to 142 million by 2002 (eMarketer 1998). Nonetheless, it is unlikely that Internet retailing will supplant any more than a modest amount of traditional (or physical, brick-and-mortar) retailing. According to New York-based research firm Jupiter Communications, in 1998 US Web retailers sold \$7.1 billion worth of goods and services, compared with \$3 billion in 1997. Retail online sales are expected to reach \$41.1 billion in 2002 (Hong 1999). While this is a large dollar amount, it still represents a small percentage of the overall US retailing market. For example, Wal-Mart's 1998 sales were in excess of \$137 billion (Nelson 1999). There are a number of reasons why cyber-retailing will probably not dominate retailing: including limited access to computers; shopper concerns about security; inability to physically touch and inspect

products; and delayed product receipt. Nevertheless, the growth trend shows no sign of slowing down in various electronic markets, such as flowers, clothing, automobile, music, books, airline tickets, electronic magazines, and stocks and securities (Strader and Shaw 1997).

The purpose of this paper is to propose a concept, along with a framework for analysis, that we call 'cyber-enhanced retailing,' which melds the advantages of e-commerce with the advantages of traditional physical retailing.

TWO MODES OF RETAILING

As the retail industry faces this new trend, it is natural to compare the two modes of retailing – physical and online. Only a clear understanding of the differences and their implications can help retailers establish sound strategies that can materialize (Terhune and Ferrara 1999). Thus, let us compare and contrast the general advantages and disadvantages of both e-commerce and physical retailing. To do that, we have come up with a fairly comprehensive list of attributes of the modes of retailing, and for each attribute we attempt to determine which of the two modes exhibits a relative advantage over the other. For instance, online retailing is considered at significant advantage over physical

retailing in terms of brick-and-mortar cost. Conversely, online retailing is at a disadvantage in terms of the cost associated with securing the presence on the Internet. As can be seen in Table 1, each method of retailing enjoys advantages and disadvantages relative to the other. While the relative advantages and disadvantages outlined in the table are admittedly somewhat subjective, the following explanations may help project our rationale.

- *Brick-and-mortar costs*: The costs for the physical retail space will be more expensive in the case of a traditional retail store. However, cyber stores do incur some brick-and-mortar costs to house web servers and telecommunications infrastructure. Both physical and cyber retail establishments will incur costs, either directly or indirectly, for warehousing inventory.
- *Online infrastructure costs*: The on-line infrastructure costs associated

with establishing an online presence will be greater in the case of a cyber retailer. Costs may include server hardware, software, telecommunications, and labour associated with operating the site.

- *Inventory selection*: Online retail operations can generally offer a larger inventory of items for sale because they are not constrained by physical retail space. They can also offer niche products that might be uneconomical to stock in a physical store.
- *Market area size*: Online marketers can offer their products to anyone with access to the World Wide Web. Traditional retail establishments are generally limited to individuals close enough to physically visit their store.
- *Individualized experience*: Because of the large amount of information that can be collected directly from an online shopper (such as name, address, etc.) as well as indirectly (such as site browsing and buying

patterns), the online retailer can offer an increasingly personalized shopping experience as more is learned about a customer. For example, someone who buys a book about home repair might be presented with information about related products such as repair tools when they reach the cyber checkout or the next time that they visit the cyber store. This level of personalization is hard to create in the physical retail environment.

- *Social interaction*: It is hard to create online the personal face-to-face social interactions that occur during the traditional shopping experience. For some individuals, this personal interaction with live sales personnel may be more appealing than a rather sterile interaction with a web server.
- *Touch and feel*: The online experience does not allow a physical touch and feel or physical examination of cyber store products. In many instances, this type of activity is important to the consumer in the buying decision and is a decided advantage for traditional stores.
- *Rate of information exchange*: Throughout the transaction process, information is exchanged between the buyer and seller. While direct face-to-face communications can provide more *nuanced* communication (such as voice pitch or body language), electronic communication allows for a quicker exchange of significantly more information. For example, a buyer can search a large database of thousands of products in a matter of seconds. In this way, e-commerce can increase the amount of information exchanged during the buying and selling phase.
- *Convenience*: With cyber retailing, products can be searched and paid for online and delivered to the buyer's location. Cyber retailing does not require shoppers to leave their location to conduct transactions. For many shoppers, this represents a significant convenience.
- *Personal service*: The face-to-face interactions that occur between a

Table 1. Relative advantages and disadvantages of cyber retailing and physical retailing

	Cyber retailing	Physical retailing
Brick and mortar costs	-	+
Online costs	+	-
Inventory selection	+	-
Market area size	+	-
Individualized experience	+	-
Social interaction	-	+
Touch and feel	-	+
Information exchange	+	-
Market barriers	-	+
Convenience	+	-
Personal service	-	+
Value added services	+	-
Immediacy	-	+
Monetary instruments	-	+
Taxes	-	+
Shipping costs	-	+
Anonymity	+	-
Data analysis	+	-
Customer management	+	-
Security	-	+
Channel conflicts	+	-
Customer equipment requirements	-	+

Note: '-' represents 'disadvantage' while '+' represents 'advantage'

buyer and a salesperson during the traditional retailing process allow for opportunities for human interaction and personal services. This is a significant advantage in physical retailing.

- *Immediacy*: When a shopper purchases an item from a physical store, the product can usually be immediately taken home with the shopper. This is an important advantage for physical stores because purchases on the web, unless they are downloadable (information based) products, must be shipped to the customer. Thus, the customer must wait to receive their goods. Shipping, with its inherent delays and annoyances is also necessary for customers wishing to return a product.
- *Monetary instruments*: A physical store can usually accept more types of payment options than an online store. In addition to credit cards and cheques, a physical store can also accept cash. While it is true that an online store can accept digital cash (which is typically not available to physical stores – unless you include debit cards), digital cash has not proved to yet be a popular monetary instrument with consumers or merchants. Additionally, credit card fraud is becoming a significant problem for cyber merchants (Messmer 1999).
- *Taxes*: Currently in the US, e-commerce is subject to neither federal nor state taxes. This represents a distinct advantage for cyber retailing. This advantage may not last however, because the law placing a moratorium on Internet taxes will expire in October 2001 (O'Connell 1999). It should be noted that this tax advantage is only temporal rather than an advantage inherent to cyber retailing.
- *Shipping costs*: Online shoppers will generally incur shipping costs in addition to the purchase price.
- *Anonymity*: There are advantages in being able to shop for products anonymously on the net. This is in stark contrast to traditional shopping that generally requires one to

visit the store. Of course, as soon as one purchases a product online using a credit card, one's identity becomes known. Theoretically, one can preserve anonymity during online payments using blind digital cash. However, this online payment option is currently not widely used or available.

- *Data analysis*: Because online retailing allows a retailer to collect a significant amount of information on shoppers in an electronic format, marketing data analysis is supported. Customer data collected directly from the online shopper can be combined with external data (such as credit records or demographic information) to create a powerful marketing database.
- *Customer relationship management*: High levels of individualized service and customer management can only be offered to a relatively small scale without communication channels, computer support, and information on customers. This is because effective customer management requires the collection, storage, analysis and retrieval of large amounts of customer-related data. E-commerce involves the use of computers as well the ability to collect, store, and analyse a large amount of customer information such as preferences and buying habits. A wide variety of communication channels are available to the cyber retailer to communicate with customers such as email, fax, web page, and voicemail. Thus, by its nature, cyber retailing is well suited for enhanced customer relationship management.
- *Security*: Security is a major concern with cyber retailing. Credit card and other personal information over the Internet can be intercepted *en route* from the browser to the web server (unless encryption is used) or stolen from a server. Additionally, many disreputable merchants may misuse credit card or personal information once they receive it. For example, thieves sometimes set up pirate sites to collect credit card numbers that they then sell to other criminals or misuse

themselves. Security concerns also plague cyber retailers because a relatively large number of online credit card transactions are fraudulent (Nashand and Harrison 1999). Also, the merchant, or their bank, can be held liable for their fraudulent transactions.

- *Channel conflicts*: Because the online arena represents a new distribution channel, conflicts may arise with other, more traditional, distribution channels. For example, a middleman distributor may protest at having to now compete with direct sales over the Internet.
- *Customer equipment requirements*: In order to order online, a customer must have access to a personal computer equipped with a secure browser and connected to the internet. Additionally, the shopper must possess a sufficient level of knowledge to navigate the online purchasing process. This may limit the numbers of individuals who can shop online.

CYBER-ENHANCED RETAILING: THE INTEGRATION

Given that there are relative advantages and disadvantages to retailing in cyberspace or in a traditional physical store, the question that we address in this paper is, 'How can one combine e-commerce techniques with traditional physical retailing to enhance the value of the shopping experience for both the customer and merchant?'. If we want to integrate cyber-retailing and physical-retailing experiences, and we cannot move physical stores to cyberspace, then by default we must move cyber retailing to the physical-retailing realm. In other words, enhance the physical shopping experiences using cyber-retailing techniques. We call this concept cyber enhanced retailing.

With cyber retailing competitors, such as Amazon.com, making strong inroads, the brick-and-mortar stores may be able to leverage their physical presence near the customer to competitive advantage by employing cyber-

enhanced physical retailing. They can provide additional services and functionality with their physical stores that cannot be provided by the Internet only stores. For example, traditional retail outlets can offer immediate cash and carry and allow the customer to physically inspect the product. By enhancing their mercantile processes with cyber-retailing techniques they can also provide individualized service and product database searches along with a wider exchange of goods that compete directly with cyber store services.

To develop potential cyber-enhanced retailing opportunities, we developed and exercised a model of how both shoppers and retailers conduct mercantile transactions. According to Kalakota and Whinston (1997), consumer mercantile activities take place in eight consecutive steps as shown in Figure 1, which are: product service search; comparison shopping; product selection; negotiation of terms; placement of order; payment authorization; receipt of product; and customer service and support.

Kalakota and Whinston's (1987) eight steps of consumer mercantile activities provide a useful framework for conducting this analysis. The first four activities primarily pertain to the process of gathering information about the product of service to satisfy the consumer's needs. The next two activities commit both parties to a transaction. Finally, the last two activities are necessary to fulfil the consumer's satisfaction from the transaction. In Table 2, we compare how the different consumer phases are addressed in the e-commerce and traditional physical retail environments.

As can be seen in each of the steps, the retailing process involves a significant exchange of information. It is in this area especially, the support of information exchange between buyer and seller, where cyber-retailing techniques and technologies can enhance traditional retailing.

A close examination of the details shown in Table 2 enables us to generate possible approaches to applying cyber techniques to physical retailing practices. These cyber techniques

could be employed before the customer enters the store (such as on a home computer), or when a shopper enters a store (such as on an in-store PC or kiosk). Note that, for simplicity, we use the term kiosk to represent any type of publicly accessible Internet or Intranet access located in a public place. Discussed below is how the traditional retailing activities can be potentially integrated with the cyber retailing techniques in order to support retailers during each of the phases.

- *Product Service Search Phase:* During this phase, consumers are searching for a product with the set of attributes (e.g., price, service, quality) that best meet their needs. In the physical-retailing realm, the consumer will generally visit or phone multiple retail establishments, search catalogues or review advertisements. In the e-commerce realm, this process can be aided considerably by database and search engine technologies. The consumer can implement a database or web search (or employ software agents) to search for products that meet their requirements. For example, consumers can search for airline flights based on any number of criteria such as lowest cost, carrier, or a given level of service (e.g., economy versus business class). This same technology can, and is, being applied to support physical establishments. One of the most obvious approaches would be for a physical retail establishment to establish a presence on the web that facilitates consumer searching prior to a visit to the establishment. They can use cyberspace to drive customers to their physical retail stores. For example, Perfumia, Inc. uses its website to advertise in-store promotions and also advertises its websites in its stores (Kruger 1999). Less obvious approaches include a kiosk in the establishment that allows for a search of products available from the company, including products in-stock, out-of-stock, on layaway, available at nearby affiliate stores,

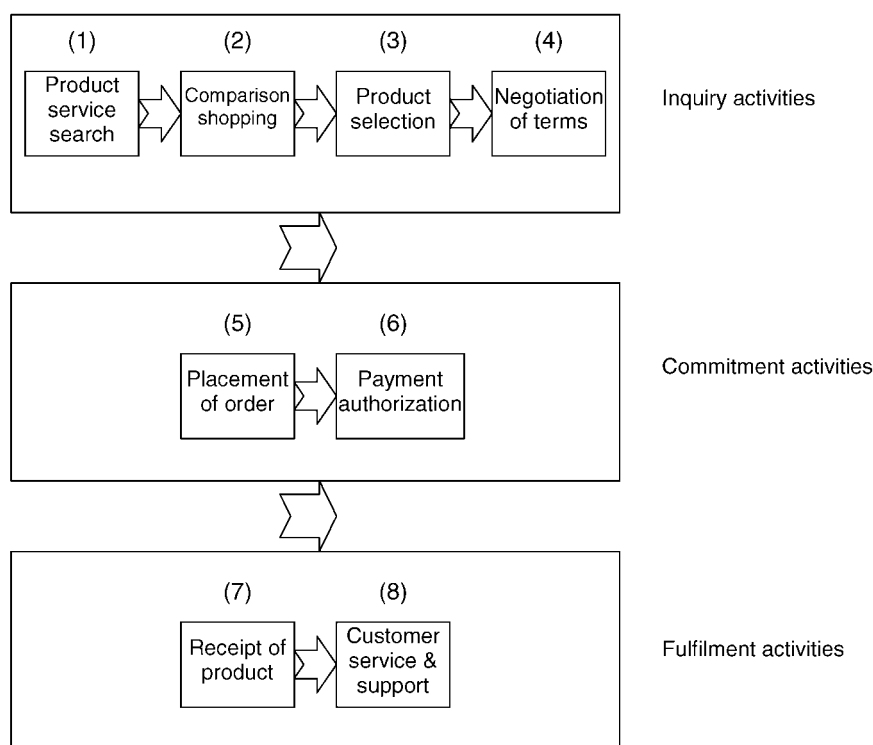


Figure 1. Eight steps of consumer mercantile activities (Adapted from Kalakota and Whinston 1997)

Table 2. Comparison of consumer mercantile activities in two modes of retailing

Activities	Information needs	Traditional retailing	Cyber retailing
(1) Product/ service search	- product/service attributes - product/service sources	- physically inspect products - physically search stores - catalogues - phone inquiries	- electronically review attributes - electronically search stores - online catalogues - email/chat/phone inquiries
(2) Comparison shopping	- alternative products/services - alternative sources	- inspect products - physically search stores - catalogues - phone inquiry	- electronically review attributes - electronically search stores - online catalogues - email/chat/phone inquiries
(3) Product selection	process for comparing product attributes	mentally compare products	mentally compare products
(4) Negotiation of terms	information on terms	- physically review terms on product - discuss with store personnel	- electronically review terms - email/chat/phone discussion with store personnel
(5) Placement of order	transmit order information	carry product to checkout	enter order information online
(6) Authorization of payment	- payment methods - payment instrument information	cash, credit card, check, debit card payment tendered and accepted at checkout; sign instrument	credit card, digital cash tendered electronically, digital signature and certificate
(7) Receipt of product	delivery methods and terms	cash and carry	post delivery or download (information product)
(8) Customer service and support	- technical information - repair information - return information - receipt	- phone or in-store support - onsite repair - return product to store	- phone or online support - mail product to company

and special order items. In this way the consumer has more information, more quickly, to support the search process. This also provides information to the consumer concerning products not available for inspection in the store. Another potential use of in-store e-commerce technology is to provide a map of product locations within the store or to other affiliate stores that might have the product. Additionally, since the customer is already in the establishment, and can physically inspect products that are in stock, the possibility of a sale may increase. The system could be integrated with the existing barcode scanning information systems to allow the customer to independently retrieve additional information on a product. For example, a customer could take a food item off the shelf and scan its barcode at a kiosk to retrieve information about the product's pricing, promotions or speci-

fications. Another potential use for cyber retailing might be in the display of a product that does not yet exist. For example, a customer might take a virtual tour of a house that is not yet built. In a related manner, customers might be able to view or listen to snippets of entertainment products. Cross promotion with related, but noncompetitive products or stores, is also possible.

- *Comparison Shopping Phase:* During this phase, the shopper is comparing the basket of attributes available from each product. For traditional retail establishments, the customer can visit or phone multiple retail establishments, search catalogues, or review advertisements to compare the attributes of multiple products. A decision support system, available on many cyber retail establishments (such as www.dell.com), might be able to help the user make these comparisons. For example, on

the Dell website, the shopper can mix and match product options and compare price and performance (Dell 1999). Such a capability might be useful for an in-store kiosk as well as a traditional retail establishment's web page. Additionally, the shopper can compare product attributes against one another or search products based on a priority attribute such as lowest price or best warranty. If the store does not sell the product of interest, a decision support system might be able to suggest an alternative product that might meet the customer's requirements.

- *Product Selection Phase:* The product selection phase occurs when consumers determine which product(s) best meets their needs. They might also choose from a variety of options for the specific product selected. For example, the product may come in different colours or sizes. Upon selection by a

customer (while either on a PC at home or at a kiosk in the store), the shopper could be presented with a variety of useful information concerning the product. For example, the size, weight, final cost including tax, where the product is located within a store, loan terms, additional product requirements (such as batteries or fuel), and maybe even coupons for printing. If customer service is important, the store can have the products waiting for the customer for immediate pickup and checkout at the front door or loading dock. At the time of product selection, it may also be advantageous to present the customer with additional ideas on related products that the consumer might find useful. For example, if a customer selects a video cassette recorder product, then that customer might be presented with information related to available recording tapes.

- *Negotiation of Terms Phase:* During this phase, a kiosk could present the customer with a variety of terms regarding price, delivery, and loan terms to select from. In special circumstances, the negotiation process could be mediated by software. For example, on certain in-store products, online auctions could be held with the support of one or more kiosks.
- *Placement of Order Phase:* During the order placement process, a shopper and merchant exchange necessary information to order and pay for the product. In most traditional stores, this process involves taking the product to the checkout and paying for it. This immediacy is an advantage of the traditional retail process. Cyber processes might be able to enhance this process by allowing the customer to purchase and receive the product electronically. For example, recently I needed to purchase movie tickets for a popular show. The queues were very long. I was able to avoid the queues at the theatre by employing a kiosk at their location. I inserted my credit card, selected the movie and time of choice, and the

kiosk printed my tickets and delivered them on the spot. This same type of onsite e-commerce is very common at petrol stations. Using a kiosk, a shopper could also place a product on layaway. Other business models that have integrated the Internet for placement of orders include Peapod, Inc. which delivers grocery items from local stores to customers who order online (Matthews 1997). In this way, the customer can get their products almost immediately and local stores can extend their boundaries to customers who may not be willing to travel to the store to purchase their products. Finally, by allowing kiosk ordering, it may be possible to sell the customer additional related products or warranties.

- *Authorization of Payment Phase:* Traditional stores have a significant advantage over cyber retailing in that they can accept cash at the checkout counter. However, an in-store kiosk may be able to help automate this payment authorization process by accepting credit cards and allowing customers to avoid queues at the checkout counter (as previously exemplified by the theatre tickets example).
- *Receipt of Product Phase:* Traditional stores have a decided advantage over cyber stores when it comes to product delivery. In many cases, the customer wants the product immediately. This is possible in physical retail establishment because the customer can walk out with the product. Nonetheless, in the case of information-based products, such as music, tickets, books, stock trades, etc., where the product is not a physical one, cyber retailing techniques may enhance the traditional in-store mercantile process. In addition to the theatre ticket example discussed earlier, Sony is planning a kiosk in music stores to allow the customers to download and create compact disks for any of the Sony titles. This will give customers access to Sony music that is not economical to physically stock in stores. By doing this, Sony

may be able to sell music titles that might otherwise go unnoticed (Hillis 1999).

- *Customer Service and Support Phase:* A traditional store has significant advantages when it comes to returning products. The customer does not need to pack up and mail the product back to the company. Instead, the customer only needs to return it to the store for a credit or their money back. Ironically, however, it is in this after sale support phase where cyber retailing may be able to most strongly enhance traditional retail outlets. If the customer is willing to provide some identifying information, such as name, address, and email, then the store can send information of interest to the shopper. For example, if a frequently purchased item goes on sale, then the store can send an email or flyer to the customer. In this way traditional retailers may be able to increase their customer relationship management services. Additionally, an in-store kiosk may be able to provide detailed support and service information on products in the store. Examples might include product support websites, technical support phone numbers, part numbers and parts ordering.

FURTHER DISCUSSION AND CONCLUSION

Based on the previous discussions on how e-commerce technologies can be used to enhance the mercantile phases in traditional physical retail stores, the following list considers a number of other potential services that might be provided.

- Free email and web services provided with membership login
- 24 × 7 ordering of information for scheduled pickup or delivery
- Status of order information (e.g., photographs, back ordered goods, and layaway items)
- Parts ordering
- Physical sample dispensers for spe-

cial order items (e.g., perfume sample on a card dispensed from kiosk)

- Instant coupons
- Lifestyle suggestions (e.g., recipes)
- Specials of the day
- Store hours, phone numbers, email addresses, etc.
- Frequent shopper points

A handful of the ideas outlined above are already being implemented by retailers, and we believe more of them will become realities (in addition to the previously mentioned examples). A few cases in point: Under a pilot project, SHL Systemhouse is placing kiosks in shopping malls to sell a variety of products including clothes and toys (Schick 1999). Kmart is conducting a test of in-store kiosks to sell products in some of its stores. Kmart offers four guidelines to decide what products to offer in its kiosks; recognized brands, information intensive products that can provide a large amount of descriptive information, hard-to-find items, and replenishment items such as nappies (Heller 1999). NCR is selling kiosks that allow customers to get product prices, product locations in the store, product availability, specifications, and current promotions (McMurchie 1999). Specialized machines or manual methods are also providing some of these same services. For example, specialized machines can print coupons at the check-out counter. Store maps can sometimes be found overhead on an alphabetical sign. These types of services might perhaps be consolidated into a single kiosk.

There are a number of real world issues that must be considered when integrating the cyber and physical retailing realms. Of course, in-store

kiosk implementation and operational costs are always a concern. Furthermore, retailers must also determine if customers will use the terminals in sufficient numbers and often enough to provide a valuable benefit to consumers. Retailers must also address competitive information issues by allowing broader access to product related databases.

We have presented a concept and framework for integrating some of the techniques used by Internet retailers with the traditional retail store. By leveraging e-commerce technologies to enhance the traditional shopping experience, while leveraging their natural competitive advantages, traditional retailers may be able to increase the value of the services they provide their customers and more effectively compete with cyber retailers.

References

- Dell Computer Corporation (2000) 'Dell - Home Page', <http://www.dell.com/us/en/gen/> [accessed 10 January 2000].
- eMarketer (1998) 'Dollar Projections', http://www.emarketer.com/estats/ec_proj_2.html [accessed 3 August 1998].
- Heller, L. (1999) 'Kmart Uses Solutions to Quicken Pace on Info Highway', *Discount Store News* 38(6), 51-4.
- Hillis, S. (1999) 'Digital Music Pacts Bring Retailers into Network Age', *Reuters*, 14 June, p. 1.
- Hong, F. (1999) 'Virtual Shopping Puts Many Retailers in the Red', *Reuters*, New York.
- Kalakota, R. and Whinston, A. (1997) *Electronic Commerce: A Manager's Guide*, Reading, MA: Addison Wesley.
- Kruger, R. (1999) 'Where Retail Meets E-Tail', *Discount Merchandiser* 39(4), 57-9.
- Mathews, R. (1999) 'Virtual Retailing: Beantown's Battle of the Boxes', *Progressive Grocer* 76(4), 37-40.
- McMurchie, L. (1999) 'NCR Seeks Support for Kiosks', *Computer Dealer News* 15(13), 41.
- Messmer, E. (1999) 'Credit Crunch for Electronic-Commerce Wannabes', *Network World* 31 May, 1-3.
- Nashand, K. and Harrison, A. (1999) 'Credit-Card Fraud Plagues E-Commerce', *Computerworld* 10 May, 1-2.
- Nelson, E. (1999) 'Retailing: as Web Retailing Surges, Where's Wal-Mart?', *Wall Street Journal* 17 May, 1-3.
- O'Connell, B. (1999) 'Hands Off on Internet Tax Laws: Government Activity', *ENT* 24 March, 30.
- Rayport, J.F. and Sviokla, J.J. (1995) 'Exploiting the Virtual Value Chain', *Harvard Business Review* 73(6), 75-85.
- Schick, S. (1999) 'The Touchscreen Treatment', *Computer Dealer News* 15(9), 25-6.
- Shaw, M.J. (1999) 'Electronic Commerce: Review of Critical Research Issues', *Information Systems Frontiers* 1(1), 95-106.
- Strader, T.J. and Shaw, M.J. (1997) 'Characteristics of Electronic Markets', *Decision Support Systems* 21(3), 185-98.
- Terhune, A. and Ferrara, C. (1999) 'Retailing FAQs: Comparing Real and Virtual', *Gartner Group Research Note: Select Q&A*, 14 June 1999.