Debra L. Zahay
is an assistant professor of
marketing and e-commerce at
North Carolina State
University and in the autumn of
2003 will become the
CADMEF Professor of
Interactive Marketing at
Northern Illinois University.

Robert B. Handfield
is the Bank of America
University Distinguished
Professor of Supply Chain
Management at North Carolina
State University and director of
the university's Supply Chain
Resource Consortium.

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Using the value chain concept to improve interactive marketing

Debra L. Zahay and Robert B. Handfield

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Abstract

If interactive marketing is the ability to identify customers, locate them and provide the products and services they require, true interactive marketing is a complex operation that involves managing information and processes across the entire value chain.¹ This paper defines interactive marketing processes broadly to include CRM (customer relationship management), SCM (supply chain management) and NPD (new product development). A combination of case study methodology and quantitative analysis is used to understand and explain how these interactive marketing processes work and how they can help the firm create value. This work provides a fundamental model with examples to help managers in implementing these core processes to facilitate value creation in a marketing context, using research and examples from the USA.

Background

The primary premise of the value chain concept is that firms are in business to provide value to their customers and profits to themselves. As suggested by Michael Porter, value is provided through a firm's internal value chain — the set of activities that lead to the production of a product or service (see Figure 1).² The value chain consists of both supply-side (logistics, operations, etc) and demand-side (sales and service) activities.³

Figure 1: Value activities, core value processes and the value chain
Source: Porter, M. E. (1985) *Competitive Advantage*, Free Press, New York

Debra L. Zahay
Campus Box 7229
College of Management
North Carolina State University
Raleigh
North Carolina
27695-7229, USA
Tel: +1 919 515 4767
E-mail: Debra_Zahay@ncsu.edu

Value chain linked to interactive marketing

Information is processed through the value chain, and at each step firms have a chance to add another piece to the value package, the product/service bundle, created for the customer. Customers then pay the firm for the product commensurate with the perceived value that has been created.

The value chain helps marketers to understand that all the firm's value creation processes are linked to the concept of interactive marketing. Interactive marketing involves understanding the customer in order to provide the customer with appropriate products, services and communications, and must rely in part on the internal firm's information processing. If a company such as Herman Miller, a global provider of office furniture and services, uses information processing technology to shorten its production lead time, these operations-based activities on the supply side of the value chain are related to the demand side of the value chain. Changes in production capability influence the customer's evaluation of service. There has been an increasing awareness of the 'virtual' value chain and the understanding that technology can facilitate value creation across the firm as well as with its suppliers and partners. However, there has been less emphasis on the impact of all of the firm's activities on the customer and how information processing throughout the value chain can help understand the customer better and improve interactive marketing processes.^{4,5}

CRM, SCM technologies and NPD can all play a vital role as core processes that help coordinate information along the value chain. Value is the reason customers buy, either for the low prices produced by a firm's operational efficiency or for some differentiating product feature or service process. The creation of value requires coordinating these complex, inter-functional processes, as shown in Figure 2. The discussion in this paper moves from right to left on the value chain shown in Figure 1 to discuss value creation in a technology context and refer to these core

Figure 2: Core value processes

processes as appropriate. The generic value chain used is considered most appropriate for manufacturing firms, although the same principles can be applied in service industries.

The research described in this paper took place over the course of several years and represents three different research efforts. The authors interviewed high-level executives at the firms described in the paper in conjunction with the research of the Supply Chain Research Consortium at North Carolina State University. Web strategies of firms over time were analysed in the course of teaching electronic marketing courses at NC State. Finally, the authors analysed results of 209 quantitative telephone surveys with managers on their customer information management capabilities, strategy selection and customisation and personalisation capabilities and performance.⁶

**Service can
differentiate, create
value**

Service: Federal Express delivers value at the moment of truth

Service businesses are an important contributor of the overall world economy. In the USA, services account for three-quarters of GDP and 80 per cent of all jobs, and produce a balance of trade surplus of nearly \$100bn. Essentially, all products have a service component. This statement is especially true since technology itself cannot provide a long-term competitive advantage. Technology can be imitated and duplicated and patents expire. The ability to distinguish oneself along the service dimension is important. Interestingly, the time that firms take to respond to customer e-mails is increasing rather than decreasing, as many firms are sacrificing service in the economic downturn at the exact time they should be increasing their service orientation. Firms should not ignore service, a key differentiator that can provide value to the customer.

As indicated in the Herman Miller example above, changes in production and logistics on the supply side of the value chain impact service on the supply side and the ability to market interactively to customers. Nowhere has the service concept had greater impact than in logistics management. For example, Federal Express at one time held a lock on the overnight delivery market, and was able to charge high fees to ensure that the package arrived to its destined location 'on time, every time'. However, rivals such as UPS, Airborne Express, the US Post Office and even the Deutsche Post Office have gained significant market share, largely through their ability to offer delivery services at a lower cost, and in other cases offering two-day deliveries at a substantial discount.

FedEx realised this weakness in its service strategy, and began to differentiate its services with its ability to offer real-time package tracking (as opposed to delayed tracking by its competitors). Through these improvements, FedEx has been able to regain some of its lost market share. FedEx may at some point become a systems integrator, bring different components and parts of a final system together at a central distribution centre, in order to deliver to one of Cisco's final customers in a truly seamless manner.

Positioning the site

Marketing and sales: Wal-Mart versus Target Aligning technology with strategy

By creating partnerships with its customers and employing technology, FedEx is differentiating itself from its competitors. Positioning and segmentation decisions are basic to the operation of any business and should not be ignored in the more interactive online environment. Whether by conscious design or not, most firms choose to be either low cost or differentiated.⁷ Some firms never make a clear choice and are 'stuck in the middle', failing to reap any of the benefits of these strategies. Some firms choose a 'both' strategy and reap the benefits of each.

Low-cost providers and differentiators do not have the same type of value chain. Low-cost providers typically focus on cost-saving technologies such as inventory control systems and the far left side of the value chain (inbound logistics, production), whereas differentiators focus on the far right side of the value chain (marketing/sales and service) and invest in technologies more directly seen by the customer, such as call centre technologies, or Internet-driven ordering systems.

Firms should examine their communications and interactions with their customers in this positioning context. A firm's website and other interactive capabilities should be examined to see if they are consistent with basic positioning (low cost versus differentiation) strategies. These positioning strategies in turn have value chain implications.

For example, Wal-Mart historically has pursued a low-cost strategy and has focused on the left-hand side of the value chain, with inventory control and SCM systems to ensure that it delivers 'everyday low prices'. The Wal-Mart site is simple, so that its basic market segment, which was perhaps not initially used to ordering over the Internet, may easily navigate the site (www.walmart.com). In spite of a rocky start and many relaunches, the site does a high volume. While initially providing a mixed message, the site has improved in terms of supporting the low-cost image.

From the differentiation point of view, look at Target's site (www.target.com). Target pursues a 'both' strategy (expect more, pay less), with differentiation being its major emphasis. Target creates a store atmosphere that is less cluttered than Wal-Mart and relies on its ability to deliver fashionable items in the housewares and women's fashion areas to attract its target customers. Target's customers are typically more affluent and spend more per visit than the typical Wal-Mart customers. Target has already emphasised technologies on the far right of the value chain as shown in Figure 1 with its in-store gift registry systems, and the use of the Internet to facilitate that system and other online ordering is consistent with its overall strategy.

Managing underlying customer information

The authors' research on customer information system (CIS) capabilities in business-to-business services firms and their relationship to profitability found that improved customer information management helps with certain aspects of performance.⁸

This study involved telephone surveys with 209 business executives in the insurance and software industries, with a 48 per cent response rate on

a firm basis (209 of 433 firms). The final measure of customer information management capability, the CIS, measured information management capabilities, focusing around the ability to generate, store, move and use customer information in the business unit. The mean CIS score for the sample was 3.41 (maximum possible 5), indicating room for improvement, particularly in the most sophisticated aspects such as the ability to share customer information across the organisation.

In this research, self-reports of growth in net income and sales were not in fact directly related to CIS capabilities. This relationship is shown in Figure 3. However, as Figure 4 shows, CIS capabilities (the ability to gather quality data, store them, move them and share them in the organisation) were related to 'customer performance' measures such as lifetime customer value, retention and share of wallet. This result supports the activities of firms in developing databases and CRM systems. However, the effect of strategy selection, particularly differentiation, is almost three times that of CIS development on the customer performance variable as measured by regression weights.

Some firms are developing extensive customer databases and investing in CRM technologies to leverage this information. While there are benefits to be gained from managing information captured about customers, there are also strong benefits from strategy selection. In addition, anecdotal results indicate that the firms which have been most successful at developing these applications have been those which have been able to leverage the people as well as the technology issues involved. Boise Cascade Office Products (BCOP), a worldwide distributor of

**Customer
information
management linked
to performance**

Figure 3: Customer information management capability is not associated with business performance (growth in sales and net income)
Base: 209 insurers and software firms

Figure 4: Customer information management capability is associated with marketing

Base: 206 insurers and software firms

Note: Customer performance = retention, share of wallet, lifetime customer value, return on investment

business and computer office supplies and systems, recently won a Gartner CRM Excellence Award for its CRM efforts. News accounts as well as qualitative research conducted by the authors at BCOP indicate that the company is quite different in a number of interpersonal aspects from other firms studied which are less successful in implementing CRM. BCOP has created an entire culture of CRM, changing the vocabulary of the company and placing individuals on the CRM effort as their full-time job during certain key implementation phases.

Distribution functions critical to interactive marketing

Outbound distribution: Nortel

CRM systems cannot function without certain vital elements of the value chain, distribution and SRM (supplier relationship management). Distribution is important in interactive marketing because if the product is not delivered in a timely fashion to the right location then marketers are not leveraging the information that they have collected about their customers and processed along the value chain. Witness the importance of poor distribution management in contributing to the failure of many a dot.com company, such as Webvan. Amazon.com and others continue to struggle with distribution problems, whereas some of the most successful firms on the Web, such as Lands' End, are former direct mail experts which already had distribution systems in place.

Other firms have developed creative solutions to their distribution problems. NT (Nortel Telecommunications)⁹ offers data and telephony communications products, data networking products and related services for business networks, including e-business infrastructure, tools and

applications. NT's strategy is to keep in-house only the most proprietary components (the 'crown jewels') while forming strategic alliances with its partners to increase operating flexibility and efficiency, cut product costs and gain cost advantages.

The two driving forces behind the NT order fulfilment and distribution strategy that helped deliver this impressive performance are virtual, customer-focused supply chain teams, also referred to as customer order houses, and a worldwide network of physical logistics operations centres (LOCs, also called 'systems houses'). As shown in Figure 5, an order house is a virtual team organised around a customer or group of customers (called clusters), operating on the customer's behalf. The team includes representatives from key processes across the end-to-end supply chain, including technical operations, order management, regional supply and demand, supply management and logistics. LOCs are physical warehouses that house inventory for specific customers or customer clusters. The LOCs are located close to their respective customer base.

Unique supply chains

In effect, NT has created a tailored supply chain for each customer, and provides that customer with 'one-stop shopping'. The dedicated order house teams manage key customer supply chain requirements — from receipt of order through shipment and installation at the customer site. These teams will ensure that products are available, that the most frequently ordered products are stocked in the LOCs and that the products are delivered to that customer in days, not weeks. The order house will

Figure 5: Nortel Networks new supply chain

order inventory from systems houses (now managed by contract manufacturers such as Solectron, Jabil, SCI and Celestica) and suppliers, and put it in the appropriate LOC. Value chain improvements have netted improvements in another core process, NPD processes, as well as improvements in relationships with customers and suppliers. These improvements have also helped NT weather the recent economic downturn.

Mass customisation benefits

Production: Challenges of customisation

NT's distribution improvements rely on technology trends such as large-scale databases and the widespread adoption of Web browsers, not to mention the network of the Internet itself. In fact, interactive marketing (the ability to address the customer specifically, remember what the customer said and then provide a response that takes into account what was said) also relies these elements of database and Internet technology. All these technologies make it possible to collect and manage data on customers, communicate with them and design products for them in a way that marketers only dreamed of in the past.

In fact, firms such as Xerox, Adobe and Red Hat Software are utilising the Internet and other information technology to facilitate the transfer of data not only about the customer and the customer's needs and wants, but about all aspects of the NPD process. Dell Computers is another important example of the use of mass-customisation technology in product design and delivery.

Rogers and Peppers provide a model for analysing industries which suggests that there are some differences between firms but that ultimately all firms should engage in personalisation and customisation. (In this paper personalisation is a unique communication and customisation is a unique product.) Instead of a general communications model directed at everyone (attention, interest, desire, action — AIDA) Rogers and Peppers suggest a one-to-one model (identify, differentiate, interact, customise/personalise — IDIC).¹⁰ Just because firms can be personalised and customised, should they do this? As technology enables more mass customisation,¹¹ will that method of production become the norm rather than the exception?

In fact, mass customisation is a promise of the Web which to date has failed to materialise as providing true value to customers, as a recent online news article noted.¹² Although personalisation may improve short-term response rates to marketing promotions, there is no study in which the long-term relationship between personalisation and profitability is highlighted. Neither are the performance effects of customisation documented, even in the authors' research. In preliminary research from the same study of 209 business executives in software and insurance described above, personalisation and customisation in and of themselves were *not* found to be correlated either with the performance of the customer (retention, share of wallet, lifetime customer value), or with business unit growth (Figure 6). These marketing communications and production-oriented decisions appear to create value only as part of a particular firm strategy and not just for their own sake.

Figure 6: Customisation and personalisation do not necessarily bring performance benefits
Base: 209 insurers and software firms

However, the recent success of Brooks Brothers in using technologies to create customised suits for a fraction of the cost of custom tailoring indicates that we may only have just begun to see the benefits of customisation in the marketing area.¹³ Technology from TC² allows Brooks Brothers to create a three-dimensional digital scan of a person's body. A custom suit that normally would be completed in six to eight weeks can be made using this technology within 15 business days for only \$100 more than an off-the-rack version. This technology allows for true customisation and not just mass customisation.

Operations: General Motors

While B2B firms are clearly blazing a new trail, the real successes that will emerge are those firms which create integrative mechanisms internally, between their different functional areas, and externally, with their customer and distributor networks, to create and deliver products via the Web. While the majority of research work has been dedicated to B2C sites such as Amazon and Dell, selling large products such as automobiles requires that firms rethink the core processes required to do so. Behind the GM BuyPower Web page lies a complex network of supply chain processes and relationships that is often unseen by the end customer. Figure 7 shows that truly to manage supply chain operations requires both *internal* integration as well as *external* integration.

In interviews with top executives at General Motors and through other research with the company, the authors have seen that GM has made a commitment to the highly interactive medium of the Web, and in the last five years has undergone a radical change in its global management structure. While many firms have initiated Web-based strategies, GM has

Manufacturers use Web

Figure 7: Simplified illustration of GM's order-to-delivery process

also created a three-pronged strategy to support its intention of doing business entirely via the Web. This strategy involves using the Web to drive, buy and build innovative new vehicles in ways never imagined previously. Given the reliance of automotive firms on suppliers (over 70 per cent of the cost of a vehicle is purchased components), GM's solid global supply chain structure is already in place to ensure that this new three-pronged strategy is realised.

Most notably, on the customer end GM is initiating BuyPower, the firm's online shopping service and main customer website. Cutting its order-to-delivery lead times to ten days or less will enable customers to order customised products directly from the Web, Dell-style (see production section above). Finally, GM is integrating new and innovative technologies into its future products, including such innovations as On-Star, which features in-car Web surfing, voice activation and global positioning systems.

Supply chain re-engineering

Purchasing: Solectron

The inbound purchasing activities of the value chain can be illustrated by the evolution of Solectron as a contract manufacturer; this represents a cutting-edge strategy that has driven the firm continuously to re-engineer their supply chain processes, with a focus on purchasing excellence. The entrepreneurial nature of the firm has led to an ever-increasing expansion into turnkey solutions, as original equipment manufacturers (OEMs) continued to simplify their supply chains and outsource 'grey areas' not considered to be core competencies. These changes have occurred largely in response to the changing nature of the computer industry.

A future role for this integrated system is for Solectron to have access to warehouse demand information. Customers will have access to recommended parts, technologies, prices, availability and future price reductions on any particular type of component offered by suppliers.

Customers currently have no access to this supply chain information. Other benefits of this system include negotiating leverage, global visibility and alignment with preferred suppliers.

Conclusion

The authors suggest that managers looking to improve interactive marketing activities at their organisations take a holistic, integrative approach to their firms as suggested by the value chain concept. The following specific suggestions are made to both managers and academics in this area.

First, to participate fully in interactive marketing, to provide personalised and customised products, firms must integrate processes across the value chain. Integrating these processes requires inter-functional coordination among all areas of the firm and an orientation towards customers, suppliers and competitors. In fact, a theme of this discussion of the value chain and its impact on interactive marketing is that marketing and production must be more integrated than in the past.

The decision to be customised from a marketing viewpoint requires enormous coordination with production. As shown in Figure 1, the decision to improve customer service can have implications that reach back into the purchasing function of the organisation. Academic researchers need to appreciate these inter-functional coordination issues and incorporate them into their research agendas.

Secondly, technology itself is a tool to support these core value processes (CRM, NPD, SCM), not a means to an end. Although managing customer information well is associated with customer performance gains, the effects of these gains are smaller than those of 'sticking to one's knitting', ie selecting a good strategy at the beginning of the process. Managers must understand the role of strategy and technology, and this area of the interplay between the two is also an important one for academic research.

Thirdly, firms must continually examine their technological decisions to determine if strategy and technology are aligned across all functional areas, from sales, service and marketing to purchasing, operations and distribution. For example, in the marketing area, while customisation and personalisation activities are not necessarily associated with performance, they can support the development of more information about the customer. In turn, customer information management improvements can impact retention rate, lifetime customer value and share of wallet.

Fourthly, for the first time in the USA and worldwide, we have some of the technologies necessary to make this integration between production and marketing, between value creation and value delivery, possible. A critical consideration for managers will be finding the people to understand, implement and support these processes. We need cross-functional thinkers who understand both technology and the underlying business function to operate in such a complex environment. In the academic world, this managerial challenge provides important opportunities for research into the interpersonal and organisational factors underlying technology integration.

**Coordinate
functions,
technology, strategy**

Appendix: Glossary

Customer information system (CIS): Scale developed for research reported in this paper which measures how well a firm manages customer information based on the quality of the information acquired and other capabilities relating to the ability of the firm to learn.

Customer relationship management (CRM): Process of identifying customers and placing them into segments to service and market to them differently according to various criteria such as customer needs and spending patterns.

Customisation: Creating a unique product or unique Web content for a specific customer.

Order house: A virtual team organised around a customer or group of customers (called clusters) operating on the customer's behalf. The team includes customer representatives familiar with technical operations, order management, regional supply and demand, supply management and logistics. These individuals are responsible for order fulfilment and dealing directly with their major customers' requirements and issues.

Logistics operations centres (LOCs): Physical warehouses that house inventory for specific customers or customer clusters.

New product development (NPD): Process of identifying, developing and commercialising new products within a firm.

Personalisation: Creating a unique communication for a specific customer.

Positioning: Using uniqueness to create impression in mind of customer about the value of product offerings, ie low cost versus differentiation along product or service lines.

Supply chain management (SCM): The integration of supply chain activities through improved supply chain relationships, to achieve a sustainable competitive advantage.

Segmentation: Groups of customers to whom a firm targets its products. Can be broad (mass market) or focused (smaller segments with similar characteristics or one to one).

Value chain: The set of activities which lead to the production of a product that ultimately creates something of value for which a customer is willing to pay — service, sales and marketing, distribution, purchasing and operations.

References

1. Deighton, J. (1996) 'The future of interactive marketing', *Harvard Business Review*, November–December, pp. 151–160.
2. Porter, M. E. (1980) *Competitive Strategy*, Free Press, New York; Porter, M. E. (1985) *Competitive Advantage*, Free Press, New York; Porter, M. E. (2001) 'Strategy and the Internet', *Harvard Business Review*, March–April, pp. 62–78; Rayport, J. F. and Sviokla, J. J. (1995) 'Exploiting the virtual value chain', *Harvard Business Review*, pp. 75–85.
3. Roberts, M. L. (2003) *Internet Marketing: Integrating Online and Offline Strategies*, McGraw-Hill, New York.
4. Porter and Rayport and Sviokla, ref. 2 above
5. Roberts, ref. 3 above.
6. Zahay, D. and Griffin, A. (2002) 'Are customer information systems worth it?: Results from B2B services,' Marketing Science Institute working paper, Report No. 02-113.
7. Deighton, ref. 1 above.
8. Zahay and Griffin, ref. 6 above.
9. www.nortelnetworks.com/corporate/newsreleases, accessed 13 December 2001.
10. Peppers, D. and Rogers, M. (1997) *Enterprise One to One: Tools for Competing in the Interactive Age*, Currency Doubleday, New York; Rogers, M., Peppers, D. and Dorf, B. (1999) *The One to One Fieldbook*, Bantam Doubleday Dell, New York.
11. Pine, B. J. (1997) *Mass Customisation*, Harvard Business School Press, Boston, MA.
12. 'Customised e-commerce tries again', www.msnbc.com/news/737957/asp, accessed 16 April 2002.
13. money.cnn.com/2002/01/02/news/v_brooks_brothers/, accessed 5 September 2002.