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Invited article

Succeeding in the Big Middle through technology

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Abstract

Big Middle retailers serve the mass market composed of mainstream consumers and face competition from both other Big Middle retailers and specialized (niche) retailers that want a share of the Big Middle consumer market. How can Big Middle retailers leverage technology to strengthen their competitive position? The authors explore this question by offering a framework for characterizing the Big Middle and a consumer-based taxonomy for classifying technology strategies in the retailing arena. In particular, the authors emphasize the following key points: (1) most technological advancements in retailing in the twenty-first century will relate to information technology; (2) many technologies have the potential to both cut the cost of retailer operations and enhance service to customers; (3) the adoption of these technologies requires significant upfront investments; (4) successful retailers in the Big Middle are in the best position to adopt these technologies because of their deep pockets and because they can pass on part of the costs to their vendors; (5) Big Middle retailers must take a longer term view with respect to returns on their technology investments; and (6) Big Middle retailers should consider consumers' reactions to these technologies and be cautious about "overengineering." In this regard, this editorial points to several directions for further research in the realm of technology investments by retailers.

Keywords: Big Middle retailers; Technology; Investments

The "Big Middle" refers to the mainstream market with its large number of consumers. Because of the attractiveness of this mass market, retailers in the Big Middle are vulnerable to encroachment on their turf by other Big Middle players; they also are likely to be challenged by niche retailers that want a piece of the big market. These challenges and the proliferation of technologies that pertain to the retailing arena raise an important issue: How can Big Middle retailers leverage technology to strengthen their market positions? We address this issue with the intent of stimulating further managerial thought and scholarly research on the topic. We begin by proposing a framework for characterizing the Big Middle and a taxonomy for classifying retail technologies.

Framework for characterizing the Big Middle

We categorize retail stores along two dimensions, as we show in Fig. 1. The first dimension (x-axis) is price, which can be thought of as the overall price index (aggregated across products) of the store. The second dimension (y-axis) reflects service, which we use as a catch-all phrase to represent the variety of nonprice store attributes (e.g., location, product assortment, and sales assistance), supplementary services (Lovelock 1994), and convenience aspects (Berry, Seiders, and Grewal 2002) that contribute to customers' overall experience with retailers.

In an ideal scenario, consumers want the best of both worlds: the maximum level of service at minimum prices, as is indicated by the ideal point "n" in Fig. 1. Assume that three retail outlets (i, j, and k) are positioned as shown in Fig. 1. According to the ideal point model, a consumer will prefer the store whose perceived distance from the ideal point is the lowest. That is, the consumer will choose store i if $D(in) < D(jn)$, $D(kn)$, where D represents the perceived distance from the ideal point.

Using the weighted block distance method, we represent the distances as follows:

$$D(in) = D(ii') + D(i'n) = \beta_m(ii') + i'n, \quad (1)$$

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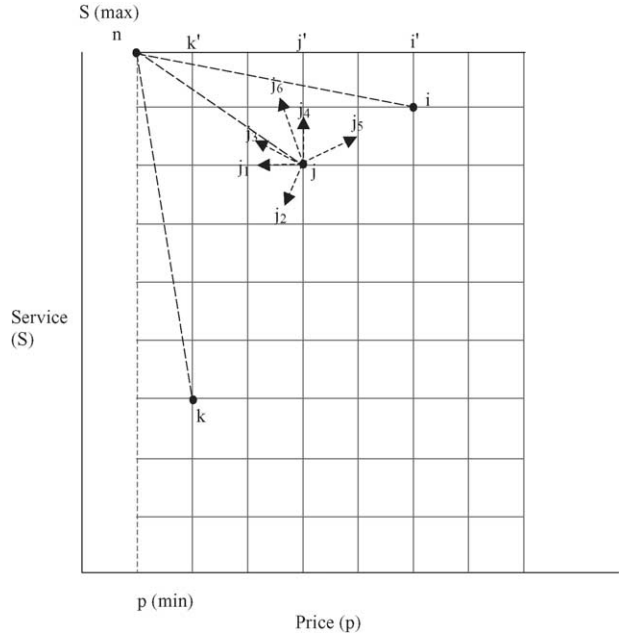

Fig. 1. The Big Middle and technology strategies.

$$D(jn) = D(jj') + D(j'n) = \beta_m(jj') + j'n, \quad (2)$$

$$D(kn) = D(kk') + D(k'n) = \beta_m(kk') + k'n. \quad (3)$$

Parameter β_m is the service sensitivity of consumer m, relative to price sensitivity, which we set at 1, without loss of generality. Note that β_m can vary across consumers and determines which store a consumer will choose, as we illustrate in Table 1 for three different consumers.

Thus, the market shares of stores i, j, and k depend on the distribution of β_m across consumers in the market.

Levy, Grewal, Peterson and Connoly (2005) define the Big Middle as the marketspace with the largest number of potential customers. Thus, in our framework, the existence of a Big Middle implies that the distribution of β_m be clustered around the middle. For example, if there are 100 consumers on the market, 10 with $\beta_m = 3$, 10 with $\beta_m = 0.3$, and 80 with $\beta_m = 1$, stores i and k receive 10 percent market share each. Store j caters to the Big Middle and gets 80 percent market share, if it operates alone. However, the large size of the market likely would attract many other stores, so that j would be one of a multitude of competing retailers in the same Big Middle marketspace. Thus, the Big Middle marketspace typically can be characterized by the following:

Table 1
Store choice decisions

m	Consumer type (β_m)	$D(in)$	$D(jn)$	$D(kn)$	Store choice
1	3 (service sensitive)	8[a]	9	19	i
2	1 (moderate)	6	5	7	j
3	0.3 (price sensitive)	5.3	3.6	2.8	k

[a] $D(in) = \beta_m(ii') + i'n = 3(1) + 5 = 8$.

- Many potential customers to target;
- A target market of customers who desire moderate to high levels of service but also are value driven;
- Many potential competitors, both within and across retail formats;
- Relatively large revenues because of the large market size;
- Strong channel power for retailers relative to other parties in the supply chain because of the retailers' large size.

As we explain subsequently, some of these characteristics give retailers in the Big Middle an advantage in terms of embracing technology to strengthen their competitive positions.

The foregoing discussion calls for further research to enhance our understanding of the potential success of Big Middle retailers. For example, how homogeneous is the Big Middle in terms of the service sensitivity of consumers, that is, the distribution of β_m values? Does the nature of the distribution vary across different types of retailing (e.g., groceries vs. clothes)? In the preceding illustration, we assume a fairly compact and symmetric distribution in which the bulk of the market has a moderate degree of service sensitivity ($\beta_m = 1$). Whereas such a market is especially conducive for dominance by Big Middle retailers, what types of market structures are likely to emerge if the distribution of β_m is skewed to the left or right or if the distribution is uniform?

Consumer-based taxonomy for classifying retail technologies

Consider store j operating in the Big Middle (Fig. 1). Through investments in technology, store j can increase the attractiveness of its offerings along one or both dimensions—lower prices for consumers and/or a higher level of service. Technologies that facilitate a leftward shift along the price axis are *cost-saving technologies*, or those technologies that reduce operating costs for retailers who in turn can pass on the savings to consumers in the form of lower prices. Cost-saving technologies include those that reduce inventory (e.g., cross-docking) and labor (e.g., self-service checkouts) costs. Technologies that help a store shift its position upward along the service axis are *service-enhancing technologies*, which might include devices to speed the authorization of credit card transactions or help consumers find item prices. However, the two types of technologies may not always work in unison to move a store's position closer to a consumer's ideal. For example, a service-enhancing technology might result in higher prices, and a cost-saving technology could lead to a lower service level. Specifically, the deployment of technology can cause consumers to perceive that store j is moving in one of six directions, as we show with the six vectors in Fig. 1 and describe in Table 2.

We believe that financially strong retailers in the Big Middle are in the best position to exploit technology to improve their competitive positions for several reasons. First, most technologies, such as those listed in Table 2, require upfront

Table 2
A consumer-based taxonomy of retail technologies

Number	Vector	Technology type	Example
1	jj_1	Cost-saving technology that does not affect service level	Cross-docking intended to reduce inventory costs
2	jj_2	Cost-saving technology that reduces service level	Automatic self-checkout lanes
3	jj_3	Cost-saving technology that enhances service level	Information technology (e.g., CPFR, RFID)
4	jj_4	Service-enhancing technology that does not affect costs to consumers	Biometric technology such as thumbprint identification instead of signature
5	jj_5	Service-enhancing technology that may increase costs to consumers	Navigation or payment system attached to grocery cart
6	jj_6	Service-enhancing technology that can result in potential cost savings for customers	E-commerce

investments. That is, they are characterized by high fixed costs but relatively low variable costs. Because of the high investment costs, Big Middle players with deep pockets can invest in such technologies, but the high investment erects an entry barrier that smaller retailers may find difficult to penetrate. Second, because of their large potential market, Big Middle retailers can afford to tolerate a longer time horizon for returns on their investments. Third, because of their size, retailers in the Big Middle have the channel power to pass on some or all of the technology investment costs to their upstream partners in the supply chain. For example, retailers such as Wal-Mart force their vendors to attach radio frequency identification (RFID) labels to pallets for easy identification in the warehouse.

The preceding discussion intuitively suggests that Big Middle retailers that invest in technologies (especially those that fall in categories 3 and 6 in Table 2) are likely to become stronger and more entrenched. However, this intuition, and the boundary conditions in which it is likely to be sound, must be examined through systematic scholarly research, because not all consumers are likely to be equally enthusiastic about embracing and using new technologies. Extensive qualitative research (e.g., Mick & Fournier 1998) and empirical work (e.g., Parasuraman 2000) suggest that technologies can trigger both positive and negative feelings and that the dominance of these two types of feelings varies across consumers. Therefore, though customer perceptions of value can be enhanced through information technology (IT) in general (e.g., Feeny 2001), as well as through specific technologies such as e-commerce (e.g., Piccoli, Kathryn, Watson, & Parasuraman 2004), the existence of distinct customer segments that have different reactions to technology-based products and services (e.g., Parasuraman & Colby 2001) raises several worthwhile questions regarding technology's role in retailing, as we discuss in the next section.

Nevertheless, a vast majority of modern retail customers in the Big Middle appear to want both low prices and good service. Therefore, Big Middle retailers that adopt technologies that move their stores along vector "*jn*" in Fig. 1, closer to consumers' ideal point, should be able to consolidate their positions. The retailers' technology strategy should be to select and implement a portfolio of technologies that will enable them to maintain and grow their market share in the Big Middle without hurting their long-term profitability.

Cost-saving and service-enhancing technologies

Cost-saving technologies that function behind the scenes and involve little or no interaction with consumers (e.g., electronic data interchange [EDI] and RFID for efficient, effective inventory management) are especially suitable for adoption by Big Middle retailers because they provide a greater opportunity ultimately to lower prices. In addition, these technologies present virtually no downside (e.g., customers reacting negatively) other than the substantial upfront investment, which, as we argued previously, most Big Middle retailers can afford.

The case of service-enhancing technologies is somewhat more complex because, as we have discussed, in cases in which customers must interact with technologies, various issues come into play, such as customers' fears about and mental readiness to embrace those technologies.

Although there are a variety of cost-saving and service-enhancing technologies, we next discuss and identify research opportunities pertaining to four specific technologies that we believe are already changing, and likely will continue to change, the nature of retailing: (1) e-tailing; (2) IT and collaborative planning, forecasting, and replenishment (CPFR); (3) RFID; and (4) computerized shopping carts.

E-tailing and retailing

The greatest technological evolution in traditional retailing in the past decade has been the adoption of e-commerce by retailers in the Big Middle. Established bricks-and-mortar retailers initially were reluctant to embrace e-commerce because it appeared to undermine the very core of their reason for being. However, as more consumers started shopping online, the benefits of e-tailing to traditional retailers became more obvious and then inescapable. As an infrastructure of computing and communication technology, e-commerce provides 24-hour access at a low cost to almost any kind of product and purchase information that consumers might desire and thereby complements rather than replaces traditional retailing infrastructures. Now, virtually all Big Middle retailers have a Web presence.

Nevertheless, several key questions have yet to be answered. How well have brick-and-mortar retailers integrated e-commerce into their traditional retailing operations? Is

e-commerce just a stepchild that they tolerate? Or is it viewed as a critical component on par with conventional retailing? Should retailers provide the same assortments and maintain the same prices in their physical and electronic markets? How are consumers using retailers' Web sites—merely to obtain information or to make purchases as well? Given that consumers probably will demand quick, high-touch service when service failures occur in e-space (Parasuraman, Zeithaml, & Malhotra 2005), what systems or processes, if any, do retailers have in place to provide an effective service recovery?

Finally, because of its provision of a host of services to consumers, such as convenience, safety, selection, information, and personalization, e-tailing generally is viewed as a service-enhancing technology. However, e-tailing also might reduce transaction costs by lowering labor and storage costs and thus can be viewed as a cost-saving technology (vector jj_6 in Fig. 1, category 6 in Table 2). The cost implication of e-tailing for Big Middle retailers, and the question of whether e-tailing can serve as both a service-enhancing and a cost-saving technology, therefore, should be evaluated by both managers and researchers.

IT and retailing: the evolution of collaborative planning, forecasting, and replenishment

The universal product code (UPC) created a consistent way to identify products. Advances in IT have enabled the effective collection and dissemination of UPC-based data through the supply chain network, with the objective of both reducing the cost of supply operations (i.e., facilitating more efficient supply chain management) and potentially enhancing end-user satisfaction (i.e., facilitating more effective customer relationship management).

The UPC-based data revolution commenced with the sharing of information among relevant players, or EDI. Then came advancements in analytical tools to mine the vast data for efficient inventory management. The most recent wave focuses on sharing the data with other manufacturers and suppliers through an integrated system for planning, forecasting, and replenishment—a practice known as CPFR—that cuts costs using data management software and IT.

Although CPFR is primarily a cost-saving technology, its implementation has the potential to increase customer service through the provision of appropriate assortments that consumers desire and quick responses, as well as the avoidance of out-of-stock situations. Thus, CPFR belongs to category 3 in Table 2, which corresponds to technology vector jj_3 in Fig. 1.

However, CPFR only recently has been adopted, and the jury is still out on its effectiveness and how pervasive its adoption will be. Although initial trials conducted by retailers in the United States and Europe appear promising, some key questions remain. For example, assuming that CPFR is here to stay, how rapidly and in what manner is it likely to diffuse among Big Middle retailers and niche players? What effect, if any, will the dynamics of CPFR adoption have on the nature of competition in the Big Middle marketspace and on the relative power of channel members in the supply chain?

From UPC to EPC through RFID

Radio frequency identification technology has been in use for approximately a decade in toll plazas, security systems, and ranches (to count animals). Now, the technology is making its way into the retail world to help reduce theft, better locate items, match supplies to demand, and speed distribution. Similar to a barcode with a UPC number, an RFID label has an electronic product code (EPC) number. However, unlike bar codes, which must be passed in front of a scanner, RFID tags can be read remotely by a device up to 60 feet away, and therefore, reduce the time and labor needed to take inventory and facilitate faster stock replenishment when inventory levels are low. For example, according to one Sainsbury (U.K.) manager, RFID tags have reduced his company's receiving function time from two and half hours to 15 minutes. In addition, RFID tags have larger memory capacities and can carry much more data than can bar codes.

The application of RFID to retailing can be quite extensive. Applied to crates and pallets, RFID labels enable users to locate and track inventory at an aggregate level, but the technology also can be used to track individual items from their distribution to their sale. A clothing retailer in Italy attaches RFID labels to all its items so that consumers do not even need to check out at the counter if they have an RFID card from which their payments can be electronically debited. Thus, RFID technology has the potential to be both cost saving and service-enhancing (vector jj_3 in Fig. 1, category 3 in Table 2).

It appears that the Big Middle retailers will adopt RFID in some form. However, because of the cost and lack of universal acceptance of this technology, an issue worth exploring is the extent to which this technology can replace bar codes. Installing an RFID label costs 30–50 cents compared with just a few cents for installing a bar code. Suppliers have complained about the higher cost of RFID tags and expressed concern about being able to recoup their investments in this technology. Also worth exploring are consumer reactions to this technology, especially in terms of any potential loss of privacy that consumers may perceive on the basis of their belief that anyone with the appropriate electronic equipment could track their purchases remotely.

Computerized shopping carts

In an ideal shopping world, a customer would be able to start and end a store visit with just his or her shopping cart—if it were a computerized shopping cart with the potential to offer information about products, answer queries, and even complete transactions without the customer having to wait in line. Some versions of an advanced, customer-friendly shopping cart were introduced in the market early but without much success because of their technological problems

and costs and the customers' lack of response. With RFID and wireless technology and computer miniaturization, in the future, more information might be accessed and more operations performed at the shopping cart interface. However, more research is needed to understand consumers' reactions to these carts, especially in terms of their perceived costs and benefits. The cost effectiveness of the carts from the retailer's perspective and the contexts in which they are likely to be most beneficial are also potentially fruitful avenues for research.

The computerized shopping cart offers more services to the customer at the point of purchase but also is likely to increase the cost of operations for the retailer (thus falling in category 5 in Table 2 and vector jj_5 in Fig. 1). A pertinent question that should be addressed is whether retailers can charge a fee for the electronic cart's use or if the cart should be made available as a perk to special segments of customers (e.g., top-tier store-loyalty cardholders).

Conclusion

Mainstream consumers (i.e., those in the Big Middle) are becoming increasingly discerning and demanding. They seek value for their money but also expect high-quality products and reasonable levels of customer service. Although successful retailers in the Big Middle are in a position to offer good value because of their purchasing and operating economies of scale, their size often makes it cost prohibitive for them to offer a level of personalized service comparable to that of niche players that operate in smaller markets. Big Middle retailers, therefore, need to leverage technology creatively to compensate for their lower level of personalized service while lowering their operating costs.

Our analysis of technology portfolios suggests that a variety of IT-based systems and processes (e.g., e-tailing, technology-enhanced inventory management, RFID, and computerized shopping carts) are available to retailers. Many of these technologies can both reduce operating costs for retailers and improve service to customers. However, most require a fairly significant upfront investment. Big Middle retailers are in a good position to leverage these technologies because of their deep pockets and because they may be able to pass on some of the costs to their vendors.

As Big Middle retailers consider their adoption of these technologies, many important questions remain unanswered and deserve scholarly attention. How do consumers trade off the convenience of self-service technologies with the need for personal service or potential fears about using those technologies? To what extent and in which segments is personalized service, in and of itself, valued by consumers, even if it is likely to result in higher prices? Are some types of retailing in the Big Middle more amenable to and appropriate for the intensive introduction of technologies? Are Big Middle retailers that invest heavily in high-tech services vulnerable to losing ground to high-touch niche players? Does this vulnerability vary for different types of retailing? Would it be beneficial for high-tech Big Middle retailers to setup their own high-touch niche stores (perhaps under a different brand name) to preempt competition from niche players? If so, in what conditions? Research-based insights that shed light on questions such as these can add significantly to extant knowledge about technology's role in retailing.

References

Berry, Leonard L., Seiders, Kathleen, & Grewal, Dhruv. (2002). Understanding service convenience. *Journal of Marketing*, *66*(July), 1–17.

Feeny, David. (2001). Making business sense of the e-opportunity. *MIT Sloan Management Review*, *42*(2), 41–51.

Levy, Michael, Grewal, Dhruv, Peterson, Robert, & Connolly, Bob. (2005). The concept of the 'Big Middle'. *Journal of Retailing*, *81*(2), 83–88.

Lovelock, Christopher H. (1994). *Product plus: How product + service = competitive advantage*. New York: McGraw-Hill.

Mick, David Glenn, & Fournier, Susan. (1998). Paradoxes of technology: Consumer cognizance, emotions, and coping strategies. *Journal of Consumer Research*, *25*(September), 123–147.

Parasuraman, A. (2000). Technology Readiness Index (TRI): A multiple-item scale to measure readiness to embrace new technologies. *Journal of Service Research*, *2*(May), 307–320.

Parasuraman, A., & Colby, Charles L. (2001). *Techno-ready marketing: How and why your customers adopt technology*. New York: The Free Press.

Parasuraman, A., Zeithaml, Valarie A., & Malhotra, Arvind. (2005). E-S-QUAL: A multiple-item scale for assessing electronic service quality. *Journal of Service Research*, *7*(February), 213–233.

Piccoli, Gabriele, Kathryn, Brohman M., Watson, Richard T., & Parasuraman, A. (2004). Net-based customer service systems: Evolution and revolution in web site functionalities. *Decision Sciences*, *35*(Summer), 423–455.