

A MARKETING PERSPECTIVE ON CUSTOMER
ACCESS INFORMATION TECHNOLOGY

Robert J. Kauffman
Assistant Professor of Information Systems
Leonard N. Stern School of Business
New York University

Laura Lally
Special Assistant Professor of Business Computer Information Systems
Hofstra University

February 1992

Submitted to Northeast Decision Science Conference, October 1991.

Working Paper Series
STERN #IS-92-7

**A MARKETING PERSPECTIVE ON
CUSTOMER ACCESS INFORMATION TECHNOLOGY**

February 1, 1992

Robert J. Kauffman
Assistant Professor of Information Systems
Leonard N. Stern School of Business
New York University

Laura Lally
Special Assistant Professor of
Business Computer Information Systems
Hofstra University

Submitted to Northeast Decision Science Conference, October 1991.

We wish to thank Joseph Pendleton III, senior vice president of electronic banking at Meridian Bancorp of Pennsylvania, for providing access to managers' time and information about the bank's electronic banking operations. We also appreciated the advice of Gary Reinert, Lisa C. Gresh, Orest Borys, and Michelle Landau at Meridian, who helped us to understand how the perspective discussed in this paper can be applied to electronic banking deployment. Avijit Ghosh, Tomas Isakowitz, Hank Lucas and Ted Stohr provided helpful advice and Geraldine Henze offered useful editorial suggestions on an earlier version of this work.

1. INTRODUCTION

Information technology (IT) can link organizations with their customers in a competitive environment. Through the use of devices such as point-of-sale terminals, order entry terminals and automatic teller machines (ATMs), customers have a direct channel to perform transactions without human intermediaries. By offering this access to customers, organizations hope to maintain competitive parity or to gain a competitive edge.

The IT cost of these systems is typically high requiring investments in customer terminals, telecommunications hardware and software, and back-office hardware and software to process the transactions. Additionally, implementing these systems may require substantial changes in the organization's information architecture and the fundamental processes by which it conducts its business, further increasing their cost.

Deployment of systems that are not subsequently used by a critical mass of the organization's customers can result in large losses. For example, Chemical Bank had to write off tens of millions of dollars because of the failure of its home banking system, Pronto (GUEN88). Yet, success stories such as the American Airline SABRE system (PETR85) and McKesson Drug (CLEM88) indicate that direct links to customers can result in large increases in revenue and market share.

When considering an investment in such technologies, therefore, managers need guidance in crafting systems that will be used by customers and benefit the organization. This paper will address this need by proposing a conceptual model for the deployment of computer and communication-based technologies that provide a direct link between

organizations and their customers -- customer access information technology (CAIT).

This model is based on marketing science concepts and adapted to CAIT. Propositions drawn from this model will emphasize the key relationships that managers must consider when crafting a CAIT deployment strategy.

2. CUSTOMER ACCESS INFORMATION TECHNOLOGY (CAIT): BENEFIT EVALUATION

The strategic IT literature offers frameworks and guidelines for identifying systems with the potential for generating competitive advantages. Yet, the literature notes a lack of measures for evaluating the benefits of these systems and controlling the risk involved in making such expensive investments (CASH85, CLEM90, JOHN88, KAUF89).

2.1. CAIT: Benefits Recognized by the Strategic IT Literature

There are a number of potential benefits for the organization that deploys CAIT. *First*, direct customer access can lower transaction costs by increasing transmission speeds, reducing costly paperwork and eliminating human intermediaries (BAKO87, CASH85, HAMM88, IVES84, JOHN88, KEEN86, MCFA84). *Second*, direct access offers a means of product differentiation for the organization by providing additional services to the customer, such as an ability to check account status without human intermediaries, a wider range of times and locations for performing transactions, a wider variety of payment options, and reduced inventory carrying costs due to the efficiency with which new goods can be ordered. CAIT features such as optical scanning devices and icon-driven interfaces make the terminals easier for the customer to use, further

enhancing product differentiation. Offering a superior product or service can lead to increases in revenue (HAMM88, IVES84, JOHN88, KEEN86).

Third, direct access systems can also lock in the organization's existing customer base by increasing switching costs (BAKO91, HAMM88, IVES84, JOHN88, KEEN86, MCFA84). McFarlan suggested that when an organization's customers have "adopted a series of increasingly complex and useful procedures that insinuate themselves into the customer's routine ... the customer will have to spend too much time and money to change suppliers" (MCFA84, p. 99). And, *finally*, direct access systems allow the organization to expand its customer base by establishing points of electronic presence in new areas (HAMM88, JOHN88, KEEN86).

2.2. CAIT Benefit Evaluation Problems

Although transaction fees to customers provide one easily measured benefit, whether to pass costs on to customers as fees is a controversial issue (CASH85, JOHN88, KEEN86). Other benefits of CAIT, similar to those that accrue from other kinds of IT, may be more difficult to measure (KAUF89).

These difficulties arise because CAIT benefits do not fit traditional economic or accounting frameworks. For example, microeconomic models for profit maximization focus management attention upon selecting the optimal levels of input, with the assumption that inputs and outputs are physical and the functional relationship between them is well defined (VARI84). CAIT deployment, however, is based on the establishment of a technological infrastructure that may support a wide range of customer transactions. Therefore, output levels (and even output dimensions) cannot be

readily determined and there may be no clear relationship between input and output. Additionally, focusing on the technology alone does not reflect the wide range of decisions faced by the CAIT deployment manager in choosing the "inputs" that make a CAIT productive.

Accounting methods for evaluating investments, such as net present value and discounted cash flow, are based on the assumption that the dimensions of the investment's benefits can be clearly identified and expressed as a stream of cash flows, over a specific period of time. These methods further assume that an appropriate discount rate can be selected to represent the riskiness of the project. As a result, the business value of CAIT may be difficult to estimate in this way.

CAIT typically requires large up-front investments in telecommunication infrastructures to which the customer access terminals can be linked. After the infrastructure is in place and operational, the time required for a critical mass of the organization's customers to adopt and use the CAIT varies widely. McKesson Drug's customer order-entry system was adopted by a sufficient number of the customers to show major cost benefits one year after its formal rollout (CLEM88). In contrast, ATMs have taken years to capture a substantial portion of customer transactions (CLEM90, KOUZ87), and home banking systems have thus far failed to achieve this critical mass at all (GUEN88). This time-lagged nature of benefits is a problem common to IT (DOSS90, KAUF89). Although attainment of a critical mass of users is key to the success of a CAIT, estimating when this critical mass is likely to be reached and benefits realized remains an uncertain process.

In addition to timing problems, measures of an organization's success in locking in existing customers and capturing new ones initially may be expressed in terms of the number of customer transactions at the CAIT or measures of market share, these may not directly translate into financial gains. Intermediate production benefits have been recognized as a common occurrence for IT investments (BAKO87, BANK88, BERG88, KAUF89, KAUF91). CAIT managers need measures that will help them: 1) measure these intermediate benefits, since they can help to provide an earlier indication of a system's success or failure, 2) trace the impacts of these intermediate benefits to measures of business value.

Finally, the benefits of CAIT may be short-lived due to responses by competitors. Competitors may have access to similar technology and can provide systems of their own (MIRO88, MORI88). For example, McKesson Drug's Economost was considered to be a major success story, with adoption of the system by 99% of McKesson's users and a 424% increase in sales. McKesson's success, however, led to the deployment of similar systems by competitors such as Bergen-Brunswig, and a consolidation of the wholesale drug distribution industry. The result is that, "it is not obvious that any player has obtained 'competitive advantage'" (CLEM88, p. 44). Such CAITs may become a "strategic necessity," a service that customers require an organization to provide, and an additional cost of doing business for the organization (CLEM88, CLEM90). In planning a CAIT, therefore, managers must analyze carefully the existing competitive environment and the potential for competitors to respond. Their responses will likely impact the CAIT's ability to perform in accordance with the objectives for which it was deployed.

2.3. Frameworks and Guidelines from the Literature

Several conceptual frameworks have been suggested in the literature to guide managers contemplating an investment in CAIT. Reich and Benbasat (REIC90) propose a model that identifies the factors which influence the development, adoption, and resulting competitive advantage of "customer-oriented strategic systems." Vepsalainen and Apte (VEPA87) draw on transaction cost theory to identify the type of customer transaction best suited for automated delivery channels in the financial service sector. They propose that transactions which are fixed in nature, not requiring customization, and quickly completed (rather than those that require continuous attention), are best suited for automation.

Thompson and Mead (THOM88) identify alternative power relationships between buyers and sellers, and provide guidelines for using customer access information technology to increase the power of deploying organizations over their customers.

These frameworks can provide insights for the manager contemplating the development of a CAIT in terms of:

- * whether CAIT is suitable for a particular type of customer access;
- * what CAIT features would enhance its ability to provide strategic benefits; and,
- * whether the organizational and industrial factors conducive to successful development and adoption are present.

What these frameworks do not provide is a way of measuring the degree to which business value has been realized, once the CAIT has been developed, and the impact that environmental factors may have had on business value.

CAIT managers, therefore, need a conceptual model that:

- (1) enumerates the factors applicable to deploying a developed CAIT;
- (2) organizes the factors into meaningful groups; and,
- (3) predicts the impacts of these factors on measures of business value.

3. A CONCEPTUAL MODEL OF CAIT DEPLOYMENT FROM MARKETING SCIENCE

This paper suggests a CAIT deployment model drawn from retail deployment theory in marketing science. Propositions will be drawn from this model indicating the likely impact of key factors on the ability of CAIT deployment sites to meet their business value objectives. From this conceptual model, and the specifics of a given CAIT deployment performance evaluation problem, managers can generate hypotheses regarding the impact of particular key factors on the success of a CAIT deployment strategy.

3.1. A Retail Deployment Perspective

Retailers often see themselves as fighting for survival in a competitive environment. Competition in retailing is great due to relatively low entry costs, especially compared to manufacturing. High profits tend to be short-lived due to new market entrants, and individual retailers are less likely to command a large percent of the total market than are manufacturers (RACH75). Retail firms must work to keep their existing customers, not letting them be captured by competing firms. Additionally, since high profit margins are unlikely to be maintained in the long term, retail firms must continually expand into new markets and capture new customers to survive (MASO81).

Deployment strategy addresses the questions "What do I offer?" and "Where do I place it?" In retailing "What do I offer?" is considered to be controllable by the retail manager and focuses on the features of the product/service retail outlet (CHUR79, GHOS87, MCCA68, RACH75). These features have been described as:

- (1) "the four P's," product, price, place, and promotion (MCCA68);
- (2) the "marketing mix," consisting of goods and services, communications with customers, and physical distribution (RACH75); and,
- (3) the "value platform," including merchandise assortment, atmosphere, service, convenience and price (GHOS87).

In each case these variables focus on the nature and attractiveness of the product/service, the means by which the customer is encouraged to use the product/service, and the characteristics of the immediate site that make it accessible to the customer. Locational convenience, low prices, a large assortment of merchandise, good customer service, and high merchandise quality are considered important attributes by customers in many types of retail outlets (TIGE83). Features such as merchandise quality, services offered and the atmosphere of the outlet combine into a holistic shopping experience, and a higher quality shopping experience is typically associated with higher prices (GHOS87, HIRS78).

"Where do I place it?" deals with the environment into which the product/service outlet is placed. Environmental features are considered uncontrollable (CHUR79, GHOS87, MCCA68, NEL58, RACH75). Choosing from among differing environments, the firm's "location strategy" (GHOS87) is considered to be "probably the single most important factor in retail profitability" (CSM86, p. 58).

The most crucial uncontrollable environmental factor is the customer: "the retail firm can do little to make the consumer conform to its wishes and desires" (RACH75, p. 70). Since retailers cannot manipulate customer characteristics, retail firms must identify groups of people with features that make them likely customers and locate their outlets to reach these customers. Studies have shown that environmental features such as population density and demographics such as age, income and education level can have a significant impact on sales, if the characteristics of potential customers match the value platform of the retail outlet (FERB58, HOYT69, INGE84, LIU70).

Other environmental features are viewed as constraints on the ability of a firm to interact with its desired customers (RACH75). The major constraint on the success of a retail outlet in capturing customers is usually nearby competition in the environment (CHUR79, MCCA68, RACH75). The greater the number of alternatives to the outlet, the less the likelihood that a customer will patronize that outlet (CHUR79, GHOS87, MCCA68, RACH75).

The success of a CAIT, like the success of retail outlets, depends upon generating customer transactions; thus, CAIT deployment managers and retail managers are faced with similar categories of questions. When determining "What?" CAIT managers must choose features from a number of alternatives promoted by vendors as being likely to increase customer transactions. They must also determine if these features are worth their cost. Similar to the retail outlet, the immediate site for the CAIT terminal must be chosen so that it is convenient to the customer. Customer support services may be necessary to assure adoption, and the question of whether to charge customers a fee for

use arises.

CAIT sites are typically deployed across a number of different geographical areas with varying customer demographics and degrees of competition. When determining "Where?" CAIT deployment managers must consider who the customers of the CAIT will be and which characteristics of customers are likely to impact their conducting transactions with the CAIT. One investigation of strategic systems oriented toward an organization's customers indicated that adoption penetration by a significant portion of the customer base was achieved by all successful systems studied (REIC90).

The presence of a competitor's CAIT in the immediate environment will also affect the likelihood of customers conducting transactions with a particular CAIT.

We recommend the use of a conceptual model from retailing, to assist CAIT managers in gaining insight that will help them formulate better deployment strategies. The model identifies the features which are key in deployment, organizes them into meaningful groups as managerially controllable and non-controllable variables and suggests their likely impact on transactions and resulting success measures.

3.2. A Retail Product/Service Model

Using terminology suggested by Ghosh (GHOS87), the controllable features of the product/service will be referred to as "value platform variables," and the non-controllable environmental features will be called "location strategy variables." In the marketing literature, these factors are inputs to the sales function which generates revenue and market share (KOTL88). In Figure 1, the *retail outlet deployment model*, value platform and location strategy variables are inputs to the sales function for each outlet. The

outputs of the sales function are the resulting revenue and market share impacts.

INSERT FIGURE 1 ABOUT HERE

The value platform variables consist of the merchandise assortment (the number and quality of the products and services offered at the outlet), the atmosphere, the services, and the convenience of the outlet. From a sales function standpoint, these features are viewed as controllable inputs. Increasing the value of any of these variables is expected to increase sales transactions at the outlet. But increasing any of these variables also increases costs, and higher costs that are passed along to customers in the form of higher prices are generally believed to have a negative impact on sales transactions (GHOS87, MASO81, RACH75). For this reason, the value platform feature price is viewed as an input with a negative impact on the sales function. The relationship between price per item and revenues is determined by the elasticity of demand for the product or service. Therefore, although increasing prices is likely to decrease sales transactions, the impact of increasing prices on revenues may be positive or negative.

Thus, retail managers face several key questions:

- * Do investments that enhance the value of platform variables indeed increase transactions, resulting in increases in revenues and market share?
- * Are the increases in revenue and market share sufficient to justify the additional costs?
- * What will be the impact on revenue and market share in passing these costs on to customers in the form of higher prices?

The location strategy variables describe key non-controllable features of the

environments into which the retail outlets are deployed. A greater number of potential customers is believed to have a positive impact on the eventual level of customer transactions and the resulting revenue and market share. Economic, legal, and social conditions, such as the passage or repeal of restrictive legislation or the advent of a recession, must be predicted and evaluated as they arise.

3.3. The CAIT Deployment Model

Adapting this model to CAIT involves treating each deployment site as a retail outlet and applying the value platform and location strategy concepts to the "What?" and "Where?" questions faced in CAIT deployment. Additionally, the issue of business value measures unique to CAIT arises. CAIT business value measures of increased revenue, decreased costs and increased market share all depend on the generation of transactions at the CAIT site. So, this model will focus on both the intermediate level benefit of transaction generation and on the process by which this benefit is converted into revenue, cost and market share impacts.

The CAIT deployment model draws on the *business value linkage (BVL)* concept. BVL was developed as a means to aid managers in identifying the economic impacts IT can have on a firm. BVL indicates the inputs employed in the local production process, identifies intermediate processes inside or outside the firm influenced by IT, and the set of outputs modified by, or attributable to, the IT investment (BANK91, KAUF91).

The BVL for CAIT includes physical and capital inputs, the intermediate output of transactions, and production processes functions by which transactions are converted into the direct impacts of operating costs and revenues and the indirect impacts of

increased market share from locking in existing customers and capturing new ones.

The CAIT deployment model addresses the two ways by which CAIT-based transactions can generate revenue: through sales of the underlying product or service or by the generation of transaction fees. Transactions generate reduced costs through the function of labor displacement or streamlined operations. Transactions generate market share because they represent the locking in of existing customers or the capture of new ones.

The Value Platform. The value platform for a CAIT consists of the services delivered by the CAIT and the features of its immediate deployment site. Applying the merchandise assortment concept to CAIT yields two variables for consideration: the number of services provided by the CAIT and the technical quality of these services. A manager deploying a CAIT must choose among optional features offering different degrees of service and among alternative technological infrastructures, which can affect the speed and reliability with which the services are performed.

Customer service, providing assistance to customers with their shopping, is analogous to providing user support in a CAIT environment.

Convenience to the customer can be dichotomized into accessibility, which describes the geographic convenience of a CAIT, and availability which addresses the time frame during which CAIT services are can be used. Accessibility and availability are treated separately here because they represent two distinct features of CAIT that may be determined and manipulated separately.

The retail outlet deployment model suggests that an increase in any of these value

platform features will have a positive impact on transactions. Increasing transactions will have an immediate positive impact on market share of customer transactions. An increase in CAIT-based transactions provides the potential for labor displacement and more streamlined operations, but this may not be realized and must be weighed against the cost of providing the CAIT. Like the retail model, the impact of transactions on revenue depends upon the price to customers of the product or service sold and the demand for the product or service.

The retail outlet deployment model suggests that an increase in price to the customer for using the CAIT will have a negative impact on transactions, as in retail outlet deployment. Market share of customer transactions will decrease. Cost reductions from CAIT transactions will be less likely to be realized. The impact on revenues may be positive or negative, depending on the demand for the product or service.

Location Strategy. Location strategy variables for CAIT address the features of the environments into which they are deployed. A base of potential users is key to the success of a CAIT deployment site. CAITs must be deployed into environments in which there are sufficient customers who will accept the value platform offered and thus generate transactions that result in business value to the deploying firm. An increase in customers, therefore will result in an increase in transactions. An increase in customer transactions will also have a positive impact on market share. An increase in customers implies an increase in transactions at a given price, therefore the impact on revenues will be positive. Likewise, an increase in customers increases transactions without costly improvements in the value platform, providing greater potential for a decrease in costs.

Competition, the presence of CAITs from other organizations in an environment, provide alternatives for potential customers. Therefore, competition is viewed as a having a negative impact on transactions. Fewer transactions will take place at the given price, decreasing revenue. Decreasing customer transactions will immediately lead to decreases in market share. Reduced cost benefits are less likely to be realized.

Economic, legal and social conditions may include restrictions on interstate commerce, restrictions on the types of institutions that may perform financial transactions, or the degree of computer literacy among the user population. The impact of each of these must be considered separately.

See Figure 2 for an illustration of the CAIT deployment model.

INSERT FIGURE 2 ABOUT HERE

From this model propositions can be drawn concerning key variables and their likely impact on success:

- Proposition #1:** *Enhancing a CAIT's value platform by increasing:*
- a) *the number and technical quality of the service it provides,*
 - b) *the degree of user support it provides,*
 - c) *its availability, or*
 - d) *its accessibility*

will have a positive impact on transactions; as a result of the increase in transactions, the market share of customer transactions will increase; operating cost reductions will depend on the ability of CAIT transactions to displace labor and to streamline operations versus the cost of improving the value platform; revenue impacts will depend upon demand for CAIT transactions and the price.

- Proposition #2:** *Increasing the price to the customer for using a CAIT will have a negative impact on the transactions; as a result, the market share of customer transactions will decrease; operating cost reduction impacts are less likely to materialize.*
- Proposition #3:** *A greater number of potential users in a CAIT site's deployment environment will have a positive impact on transactions; operating cost reductions will be more likely to result because transactions will have increased without an increase in costly value platform features; and revenues will increase as more transactions will occur at a given price.*
- Proposition #4:** *A greater number of competitors in a CAIT site's deployment environment will have a negative impact on transactions; market share will decrease; operating cost reductions will be less likely because transactions may not reach the critical mass necessary; revenues will decrease because there are more competitors per user.*

From these propositions, hypotheses regarding specific CAIT deployments can be derived and later tested.

4. APPLICATIONS AND LIMITATIONS OF THE CAIT DEPLOYMENT MODEL

The CAIT deployment model draws upon the actions and decisions that must be made by managers of a similar deployment process for which there is a strong theory base. It provides a set of variables that management must consider in CAIT deployment.

4.1. Two Illustrations

Two examples illustrate the usefulness of these concepts.

McKesson Drug's Economost. The CAIT model provides insight into the strategic impacts resulting from McKesson Drug's Economost order entry system for pharmacists. The original deployment scenario faced by McKesson was a relatively fixed customer base of pharmacies and no comparable automated system available from competitors. McKesson's original Economost system provided simple order entry and resulted in

significant revenue and market share gains. McKesson's competitors soon responded with systems of their own. Fighting for a fixed customer base with increasing competition led McKesson to expand its value platform. Economost's value platform was enhanced by offering additional services to customers such as the generation of price tags, management reports and the use of sales personnel as consultants. McKesson and its customers now feel that it is the enhanced personal consulting service that distinguishes its order entry system from the competition (CLEM88).

Home Banking in Japan. The CAIT model can also provide insight into the relatively greater success of home financial service systems in Japan than in the U.S. Home banking in the U.S. has not experienced widespread user adoption. The value platform typically offered in these systems requires a delivery platform of a personal computer or a special terminal. The customer base for this value platform, therefore, is limited to personal computer users. Given the present value platform offered, the short term market for home banking appears limited.

In Japan, Yamaichi Securities took a different value platform approach to providing home financial services. Yamaichi identified its target customers as upper middle class housewives who typically control family finances. Yamaichi designed a value platform around the Nintendo home game system, which was already in 40% of Japanese households. As a result, Yamaichi increased its market share of customers by 8% (ROCH91).

4.2. Practical Considerations and Limitations

The variables in the CAIT model are likely to have measurable empirical

referents, allowing the model to be implemented without great difficulty. The model distinguishes between factors that are controllable by management in the short run and those that are not. Finally, the model permits the use of evaluative methods from management science and economics to be applied to determine key decision variables in each CAIT deployment scenario.

The limitations of the CAIT model revolve around its ex-post, evaluative perspective. The insight the CAIT model provides is in determining which value platform and environmental features impact use and resulting business value. To provide this evaluation, some deployment must have already taken place because it is from the results of the initial deployment that the impacts will be measured.

This limitation can be overcome in some cases. The CAIT model can be applied to a pilot deployment, to determine if full scale deployment should take place. Managers of similar CAITs can draw insights from an initial analysis of a success or failure. The constructs of value platform and location strategy can provide ex-ante insight by allowing the manager to consider whether important determinants of CAIT success exist in a particular scenario. However, for a new CAIT, the model will provide limited ex-ante insight.

REFERENCES

- BAKO87 Bakos, J. Y., "Dependent Variables for the Study of Firm and Industry-Level Impacts of Information Technology," in *Proceedings of the Eighth International Conference on Information Systems*, San Diego, California, pp. 10-23 (December 1987).
- BAKO91 Bakos, J. Y., "Interorganizational Information Systems in Vertical Markets," *Proceedings of the Twenty-Fourth Annual Hawaii International Conference on Systems Sciences*, IEEE, Poipu Beach, Hawaii (January 1991).
- BANK88 Banker, R. D., and R. J. Kauffman, "Strategic Contributions of Information Technology: An Empirical Study of ATM Networks," *Proceedings of the Ninth International Conference on Information Systems*, Minneapolis, Minnesota (December 1988).
- BANK91 Banker, R. D., and Kauffman, R. J. "Quantifying the Business Value of Information Technology: An Illustration of the 'Business Value Linkage' Framework," Working paper, Center for Research on Information Systems, Stern School of Business, New York University (March 1991).
- BERG88 Berger, P., "Selecting Enterprise-Level Measurements of IT Value," in P. Berger, J. Kobielus, and D. Sutherland, Eds., *Measuring Business Value of Information Technologies*, ICIT Press, Washington, D.C. (1988).
- CASH85 Cash, J. I., and B. Konsynski, "IS Redraws Competitive Boundaries," *Harvard Business Review*, pp. 134-142 (May-June 1985).
- CHUR79 Churchill, G. A., *Marketing Research*, The Dryden Press, Hillsdale, Illinois, 1979.
- CLEM88 Clemons, E., and M. Row, "McKesson Drug Company: A Case Study of Economost -- A Strategic Information System," *Journal of Management Information Systems*, Vol. 5, No.1., pp. 36-50 (Spring/Summer, 1988).
- CLEM90 Clemons, E., "Making the Information Technology Investment Decisions: A Principled Approach," in *Proceedings of the Twenty-Third Hawaii International Conference on Systems Sciences*, IEEE, Poipu Beach, Hawaii (January 1990).
- CSM86 *Convenience Store Merchandiser*, "It's Your Move: Retail Site Selection," Vol. 13, No. 1, pp. 57-62 (January 1986).

- CHUR79 Churchill, G. A., *Marketing Research*, Dryden Press, Hinsdale, Illinois, 1979.
- DOSS90 Dos Santos, B., "Justifying Investments in New Information Technologies," Working paper, Krannert School of Business, Purdue University (December 1989).
- FERB58 Ferber, R., "Variation in Retail Sales between Cities," *Journal of Marketing*, Vol. 22, pp. 295-303 (April 1958).
- GHOS87 Ghosh, A., and S.L. McLafferty, *Location Strategies for Retail and Service Firms*, Lexington Books, Lexington, MA, 1987.
- GUEN88 Guenther, R., "Chemical Banking, AT&T to Scrap Home Banking Service," *Wall Street Journal*, p. 21. (December 5, 1988).
- HAMM88 Hammer, M., and Mangurian, G., "The Changing Value of Communications Technology," *Sloan Management Review*, pp. 65-71 (Winter 1988).
- HIRS78 Hirschman E., "A Descriptive Theory of Retail Market Structures," *Journal of Retailing*, Vol. 54, No. 4, pp. 29-48 (October 1978).
- HOYT69 Hoyt, H., *The Location of Additional Retail Stores in the United States in the Last One-Third of the Twentieth Century: A Research Monograph*, National Retail Merchants Association, New York, 1969.
- INGE84 Inge, C.A., "Structural Determinants of Retail Potential," *Journal of Retailing*, Vol. 60, No. 1, pp. 37-64 (January 1984).
- IVES84 Ives, B., and G. P. Learmouth, "The Information System as a Competitive Weapon," *Communications of the ACM*, Vol. 27, No. 12, pp. 1193-1201 (December 1984).
- JOHN88 Johnston, H. R., and M. R. Vitale, "Creating Competitive Advantage with Interorganizational Information Systems," *MIS Quarterly*, Vol. 12, No. 2, pp. 153-165 (June 1988).
- KAUF89 Kauffman, R. J., and P. Weill, "An Evaluative Framework For Research on the Performance Effects of Information Technology Investment," in *Proceedings of the Tenth International Conference on Information Systems*, Minneapolis, Minnesota pp. 377-388 (December 1988).

- KAUF91 Kauffman, R. J., and C. Kriebel, "Identifying Business Value Linkages for Production Processes Involving Information Technology," *Advances in Working Capital Management: Volume 2*, Y. Kim and V. Srinivasan, eds., JAI Press, New Haven, CT, 1991.
- KEEN86 Keen, P., *Competing in Time*, Harper and Row, Cambridge, MA, 1986.
- KOTL88 Kotler, P., *Marketing Management: Analysis, Planning Implementation and Control*, Prentice Hall, Englewood Cliffs New Jersey, 1988.
- KOUZ87 Kouzelis, A., "On the Determinants of ATM Performance," *European Journal of Operations Research*, Vol. 30, No. 2, pp 89-94 (June 1987).
- LIU70 Liu, B.C., "Determinants of Retail Sales in Large Metropolitan Areas: 1954 and 1963," *Journal of the American Statistical Association*, Vol. 65, pp. 1460-1473 (June 1970).
- MASO81 Mason, J. B., and M. L. Mayer, *Modern Retailing*, Business Publications, Inc., Plano, Texas, 1981.
- MCCA68 McCarthy, J. *Basic Marketing, A Managerial Approach, 3rd Edition*, Irwin, Homewood, Illinois, 1968.
- MCFA84 McFarlan, F. W., "Information Technology Changes the Way You Compete," *Harvard Business Review*, pp. 98-103 (May-June 1984).
- MIRO88 Miron, M., J. Cecil, K. Bradicich, and G. Hall, "The Myths and Realities of Competitive Advantage," *Datamation* (October 1, 1988).
- MORI89 Morison, R., and K. C. Mead, "A Hard Look at Strategic Systems," *Indications*, Vol. 6, No. 1 (January/February 1989).
- NELS58 Nelson, R., *The Selection of Retail Locations*, F. W. Dodge, New York, 1958.
- PETR85 Petre, P., "How to Keep Customers Happy Captives," *Fortune*, pp 42-46 (September 2, 1985).

- RACH75 Rachman, D., *Retail Strategy and Structure*, Prentice-Hall, Englewood Cliffs, New Jersey, 1975.
- REIC90 Reich, B. H., and I. Benbasat, "An Empirical Investigation of the Factors Influencing the Success of Customer-Oriented Strategic Systems," *Information Systems Research*, Vol. 1, No. 3 (September 1990).
- ROCH91 Roche, Edward M., *Telecommunications and Business Strategy*, The Dryden Press, Orlando, Florida, 1991.
- TIGE83 Tigert, D. J., "Pushing the Hot Buttons for a Successful Retailing Strategy," in W. R. Darden, and R. F. Lusch, *Patronage Behavior and Retail Management*, North-Holland, New York, 1983.
- THOM88 Thompson, J. M., and K. C. Mead, "Boost Your Market Power With Information Technology, *Indications*, Vol. 5, No. 2, (March/ April, 1988).
- VARI84 Varian, H., *Microeconomic Analysis*, W. W. Norton and Co., New York, NY, 1984.
- VEPS87 Vepsalainen, A, and U. Apte, "The Impact of Information Technology on Financial Services Delivery," working paper, #87-12-01, Department of Decision Sciences, The Wharton School, University of Pennsylvania, Philadelphia, Pennsylvania, 1987.
- VONS88 Von Simson, C., "FedEx: America's Warehouse," *InformationWEEK* (May 16, 1988).

FIGURE 1. THE RETAIL OUTLET DEPLOYMENT MODEL

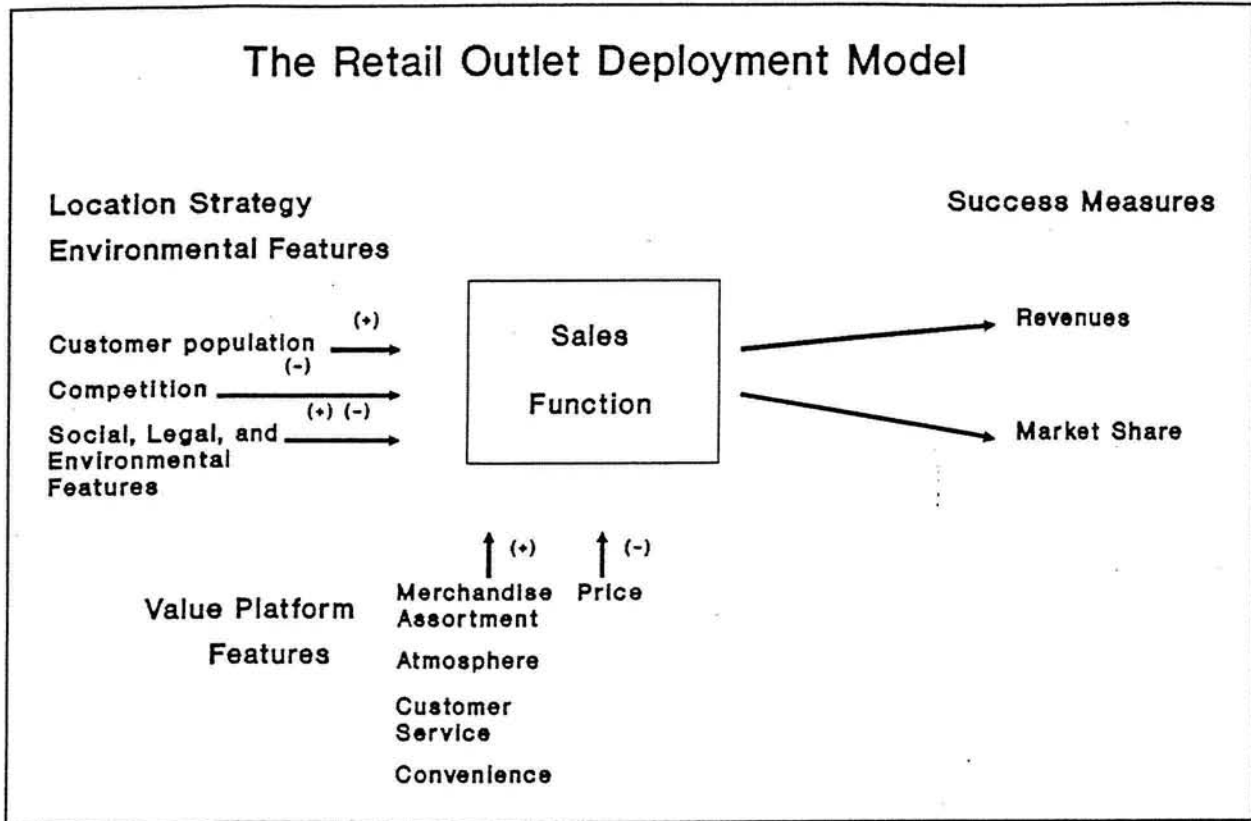


FIGURE 2. THE CAIT DEPLOYMENT MODEL

