INFORMATION TECHNOLOGY IN MARKETING

John D. C. Little
Sloan School of Management
M.I.T.

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ABSTRACT

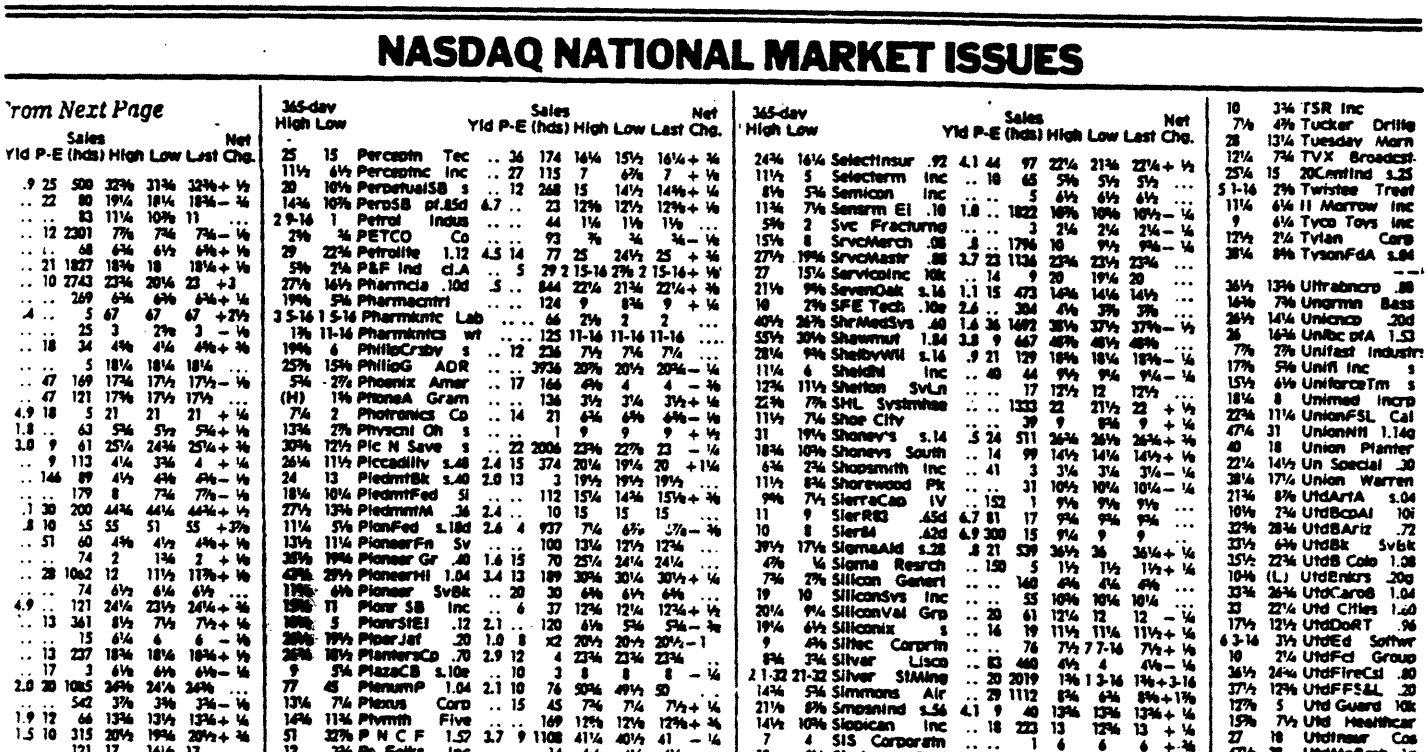
Information technology affects marketing in many ways. Some of these save labor and provide better service. Others create entirely new products and new organizational forms. Still others enhance marketing operations in ways that can change their character. An example of the latter is now taking place behind the scenes in the consumer packaged goods industry, where a new generation of data is producing a discontinuity in the information available to marketers. In this case the combination of data and technology is bringing increased marketing effectiveness, organizational change, and shifts in power within channels of distribution. More generally, information technology blurs traditional strategic and functional boundaries by enabling an organization to deliver a large number of differentiated products to a large number of differentiated markets. For this to be successful, marketing must be closely interwoven with operations, R&D, and sales.

PART I:

INFORMATION TECHNOLOGY IS EVERYWHERE

Information technology pervades marketing. When you answer the telephone, a computer may be calling with a sales message. If you buy shares of Intel, Microsoft, or other company listed with NASDAQ, you trade on an electronic market. NASDAQ has no physical location where traders meet. Instead, a network of securities dealers set bid and ask prices through connections to a common computer.

When I call Sears Roebuck to place a catalog order, the Sears operator asks me my phone number. Then she tells me my name and address. Obviously she is sitting in front of a video terminal. Later, when I go to the store to pick up my order, I find another terminal. It too wants my phone number and tells me my name. Then it gives me a slip of paper indicating the storage bin that holds my order. The whole system works smoothly and efficiently, providing quick service with low hassle and, important to Sears, little clerical labor.



NASDAQ NATIONAL MARKET ISSUES

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Sales						Net
Yld	P-E	(hds)	High	Low	Last	Chg.
.9	25	500	32⅜	31⅜	32⅜	+ ⅛
..	22	80	19¼	18¼	18⅜	– ⅛
..	..	83	11¼	10⅜	11	...
..	12	2301	7⅞	7¼	7¼	– ⅛
..	..	68	6¾	6½	6⅝	+ ⅛
..	21	1827	18⅜	18	18¼	+ ⅛
..	10	2743	23¾	20¼	23	+3
..	..	269	6¾	6⅜	6¾	+ ⅛
.4	..	5	67	67	67	+2½
..	..	25	3	2⅞	3	– ⅛
..	18	34	4⅜	4¼	4⅜	+ ⅛
..	..	5	18¼	18¼	18¼	...
..	47	169	17¾	17½	17½	– ⅛
..	47	121	17⅜	17½	17½	...
4.9	18	5	21	21	21	+ ⅛
1.8	..	63	5⅜	5½	5⅜	+ ⅛
3.0	9	61	25¼	24¾	25¼	+ ⅛
..	9	113	4¼	3⅜	4	+ ⅛
..	146	89	4½	4⅜	4⅜	– ⅛
..	..	179	8	7¾	7⅞	– ⅛
.1	30	200	44¾	44¼	44¾	+ ½
.8	10	55	55	51	55	+3⅜
..	51	60	4⅜	4½	4⅜	+ ⅛
..	..	74	2	1⅜	2	+ ⅛
..	28	10a2	12	11½	11⅜	+ ⅛
..	..	74	6½	6¼	6½	...
4.9	..	121	24¼	23½	24¼	+ ⅜
..	13	361	8½	7½	7½	+ ⅛
..	..	15	6¼	6	6	– ⅛
..	13	237	18¾	18⅛	18¾	+ ⅛
..	17	3	6½	6⅜	6⅜	– ⅛
2.0	20	1085	24⅜	24¼	24⅜	...
..	..	542	3⅞	3⅜	3⅜	– ⅛
1.9	12	66	13⅜	13½	13⅜	+ ⅛
1.5	10	315	20½	19¾	20½	+ ⅜
..	.	121	17	16½	17	. .

365-day High	Low		Sales	Yld	P-E	(hds)	High	Low	Last	Net Chg.
25	15	Percepin Tec	..	..	36	174	16¼	15½	16¼	+ ⅛
11½	6½	Percepinc Inc	..	..	27	115	7	6⅞	7	+ ⅛
20	10½	PerpetualSB s	..	..	12	268	15	14½	14⅝	+ ⅛
14¾	10⅝	PerpSB pf.85d	6.7	..	..	23	12⅝	12½	12⅝	+ ⅛
2 9-16	1	Petrol Indus	..	..	..	44	1⅛	1⅛	1⅛	...
2⅝	¾	PETCO Co	..	..	..	93	⅞	¾	¾	– ⅛
29	22¾	Petrolite 1.12	4.5	14	..	77	25	24½	25	+ ⅜
5⅜	2⅛	P&F Ind cl.A	..	..	5	29	2 15-16	2⅞	2 15-16	+ ⅛
27½	16½	Pharmcia .10d	.5	..	..	844	22¼	21¾	22¼	+ ⅜
19⅝	5⅜	Pharmacntrl	..	..	..	124	9	8¾	9	+ ⅛
3 5-16	1 5-16	Pharmkmtc Lab	..	..	..	66	2⅛	2	2	...
1⅜	11-16	Pharmkmtcs wt	..	..	..	125	11-16	11-16	11-16	...
19⅜	6	PhilipCrsby s	..	..	12	236	7½	7¼	7¼	...
25⅞	15⅜	PhilipG ADR	..	..	..	3936	20⅜	20½	20⅝	– ⅛
5¾	2⅞	Phoenix Amer	..	..	17	166	4⅜	4	4	– ⅜
(H)	1⅜	PhoneA Gram	..	..	..	136	3½	3¼	3½	+ ⅛
7¼	2	Photronics Co	..	..	14	21	6¼	6⅛	6⅛	– ⅛
13¾	2⅞	Physcnl Oh s	..	..	..	1	9	9	9	+ ½
30⅝	12½	Pic N Save s	..	..	22	2006	23⅜	22⅞	23	– ⅛
26¼	11½	Piccadilly s.48	2.4	15	374	20¼	19¼	20	+ 1¼	
24	13	PiedmtBk s.40	2.0	13	3	19½	19½	19½	...	
18¼	10¼	PiedmtFed SI	..	..	112	15¼	14⅜	15⅛	+ ⅜	
27½	13¾	PiedmntM .36	2.4	..	10	15	15	15	...	
11¼	5⅛	PionFed s.18d	2.6	4	937	7¼	6⅞	7	– ⅜	
13½	11¼	PioneerFn Sv	..	..	100	13¼	12½	12¾	...	
38½	19⅜	Pioneer Gr .40	1.6	15	70	25¼	24¼	24¼	...	
43⅜	28½	PioneerHi 1.04	3.4	13	189	30⅜	30¼	30½	+ ¼	
19⅜	6⅜	Pioneer SvBk	..	..	20	30	6⅜	6½	6⅜	...
15⅜	11	Pionr SB Inc	..	..	6	37	12¾	12¼	12¾	+ ½
18⅜	5	PionrStEl .12	2.1	..	..	120	6⅛	5⅞	5⅞	– ⅛
20⅜	19½	PiperJaf .20	1.0	8	..	x2	20½	20½	20½	– 1
26⅜	18½	PlantersCo .70	2.9	12	4	23¾	23¾	23¾	...	
9	5¼	PlazaCB s.10e	..	..	10	3	8	8	8	– ¼
77	45	PlenumP 1.04	2.1	10	76	50⅝	49½	50	...	
13¼	7¼	Plexus Corp	..	..	15	45	7¾	7¼	7½	+ ¼
14⅜	11¾	Plymth Five	..	..	..	169	12⅝	12½	12⅝	+ ⅜
51	32⅞	P N C F 1.52	3.7	9	1108	41¼	40½	41	– ¼	
12	3¾	Po Folks Inc	..	..	..	14	4¼	4¼	4½	...

365-day High	Low		Sales	Yld	P-E	(hds)	High	Low	Last	Net Chg.
24¾	16¼	Selectinsur .92	4.1	44		97	22¼	21¾	22¼	+ ½
11½	5	Selecterm Inc	..	..	18	65	5⅝	5½	5½	...
8⅛	5¾	Semicon Inc	..	..	..	5	6½	6½	6½	...
11¾	7⅛	Sensrm El .10	1.8	..	1822	10⅝	10⅝	10½	– ⅛	
5⅜	2	Svc Fracturng	..	..	..	3	2¼	2¼	2¼	– ⅛
15⅛	8	SrvcMerch .08	.8	..	1796	10	9½	9⅝	– ⅛	
27½	19⅝	SrvcMastr .88	3.7	23	1136	23⅝	23½	23⅝	...	
27	15¼	Servicolnc 10k	..	14		9	20	19¼	20	...
21½	9⅜	SevenOak s.16	1.1	15		473	14⅜	14¼	14½	...
10	2⅜	SFE Tech .10e	2.6	..		304	4⅛	3⅝	3⅝	...
40½	26⅞	ShrMedSys .60	1.6	36		1692	38⅛	37½	37⅝	– ½
55½	30⅛	Shawmut 1.84	3.8	9		667	48⅝	48¼	48⅝	...
28¼	9⅜	ShelbyWil s.16	.9	21		129	18⅝	18¼	18⅜	– ⅛
11¼	6	Shieldtl Inc	..	..	40	44	9½	9¼	9¼	– ⅛
12⅜	11½	Shelton SvLn	..	..	..	17	12½	12	12½	...
22⅜	7⅞	SHL Systmhse	..	..	1333	22		21½	22	+ ½
11½	7¼	Shoe City	..	..	39	9	8⅝	9	+ ⅛	
31	19¼	Shonev's s.14	.5	24	511	26⅜	26½	26⅜	+ ⅜	
18⅜	10⅝	Shonevs South	..	14		99	14½	14¼	14½	+ ⅛
6⅜	2⅜	Shopsmith Inc	..	41		3	3⅛	3⅛	3⅛	– ⅛
11½	8¾	Shorewood Pk	..	..	31	10½	10⅜	10¼	– ⅛	
9⅜	7¼	SierraCap IV	..	152		1	9⅛	9⅛	9⅛	...
11	9	SierR83 .45d	6.7	81		17	9⅝	9⅝	9⅝	...
10	8	Sier84 .42d	6.9	300		15	9¼	9	9	...
39½	17⅛	SigmaAld s.28	.8	21		539	36½	36	36¼	+ ⅛
4⅞	¼	Sigma Resrch	..	150		5	1½	1½	1½	+ ⅛
7⅜	2⅞	Silicon Genert	..	..		160	4¼	4¼	4⅜	...
19	10	SiliconSys Inc	..	..		55	10⅜	10¼	10¼	...
20¼	9¼	SiliconVal Grp	..	20		61	12¼	12	12	– ⅛
19¼	6½	Siliconix s	..	16		19	11½	11¼	11½	+ ⅛
9	4⅜	Siltec Corprtn	..	..		76	7½	7 7-16	7½	+ ⅛
8¾	3¾	Silver Lisco	..	83		440	4¼	4	4⅛	– ⅛
2 1-32	21-32	Silver StMing	..	20		2019	1⅜	1 3-16	1⅜	+ 3-16
14⅜	5⅜	Simmons Air	..	29		1112	8¾	6¾	8⅜	+ 1⅜
21⅛	8⅜	Smsnind s.56	4.1	9		40	13⅜	13⅜	13⅜	+ ⅛
14½	10⅜	Sippican Inc	..	18		223	13	12⅝	13	+ ⅛
7	4	SIS Corporatn	..	..		1	6	6	6	+ ⅜
1⁵	8⅛	Sizzler Rest	..	16		448	16⅜	16⅛	16⅜	+ ⅛

10	3¼	TSR Inc								
7⅛	4⅞	Tucker Drilla								
28	13¼	Tuesday Morn								
12¼	7¾	TVX Broadcst								
25¼	15	20Centind s.25								
5 1-16	2⅜	Twistee Treat								
11¼	6¼	U Marrow Inc								
9	6½	Tyco Toys Inc								
12½	2¼	Tylan Corp								
38¼	8⅜	TysonFdA s.84								
36½	13⅜	Ultrabncrp .88								
16⅛	7⅜	Unamrm Bass								
26½	14¼	Unicnco .20d								
26	16⅜	UnBc pfA 1.53								
7⅞	2⅜	Unifast Industr								
17⅜	5⅜	Unifi Inc s								
15½	6⅛	UniforceTm s								
18¼	8	Unimed Incrp								
22⅜	11¼	UnionFSL Cal								
47¼	31	UnionNH 1.14g								
40	18	Union Planter								
22¼	14½	Un Special .30								
38⅛	17¼	Union Warren								
21¾	8⅞	UtdAirA s.04								
10⅛	2¾	UtdBcpAl 10i								
32⅜	28¾	UtdBAriz .72								
23½	6⅜	UtdBk Svbk								
35½	22¾	UtdB Colo 1.08								
10⅜	(L)	UtdBnkrs .20g								
33¾	26⅜	UtdCaroB 1.04								
33	22¼	Utd Cities 1.60								
17½	12½	UtdDoRT .96								
6 3-16	3½	UtdEd Softwr								
10	2¼	UtdFcl Group								
36½	24¾	UtdFireCsl .80								
27½	12⅜	UtdFFS&L .20								
12⅞	5	Utd Guard 10k								
15⅜	7½	Utd Healthcar								
27	18	Utdtreasr Cos								
47½	38	UtdMoBcsh 1g								
36	22⅜	UtdSvrsB .72								

FIGURE 1. NASDAQ is an electronic market in which traders meet only by computer.

Telemarketing is more evidence of information technology at work. This is a big business, about which you may have mixed feelings, if you are the recipient of many sales phone calls. But the technique reduces selling costs by screening prospects and saving travel. Unquestionably, it is a major success.

The phrase, direct marketing, applies to any activity in which individual prospects are pinpointed by name. Examples include mailed catalogs, other direct mail selling, and telemarketing. As you are well aware if you have a mailbox, direct marketing by catalog has exploded. Major catalog retailers like L.L. Bean and Land's End are totally dependent on information technology. Here are the essential ingredients:

- large, up-to-date, computerized mailing lists;
- toll-free 800 numbers;
- credit cards;
- rapid credit checks to computerized databases.

Then deliveries can be authorized and made quickly. Fast service has been a critical success factor in the rapid growth of direct marketing. It is easier and faster for me to buy computer equipment in New Hampshire or California by 800 number than to find time to shop at a computer store in Boston.

A friend of mine left a senior position in a consumer packaged goods company to become vice president of marketing in a large U.S. bank. The CEO hired him to lead the bank's charge into new financial services under deregulation. His focus was retail banking - i.e., services for individual customers. I saw him about a year later. He said, "I can design the new products. I can test them in the field and prove they are good and that people will pay for them. But the bank can't deliver them. It does not have the required computer systems and it cannot put them together in a reasonable length of time." Success in banking and other financial services has become critically dependent on good information technology.

In the 1960's, two management scientists working for an oil company discovered a fascinating marketing phenomena that applies to gas stations. Most people thought that, if you kept putting more Arco stations in the same city, they would soon start to cannibalize business from each another with rapidly diminishing returns for Arco. Hartung and Fisher (1965) discovered that, on the contrary, as you add stations in the same market, the gallons sold per station increase. The reasons are several. For example: (1) Each station is an outdoor advertisement for all stations of its brand; (2) People would rather have a credit card for a brand with many stations, rather than a few; (3) Local advertising is far more efficient if the company has many stations.

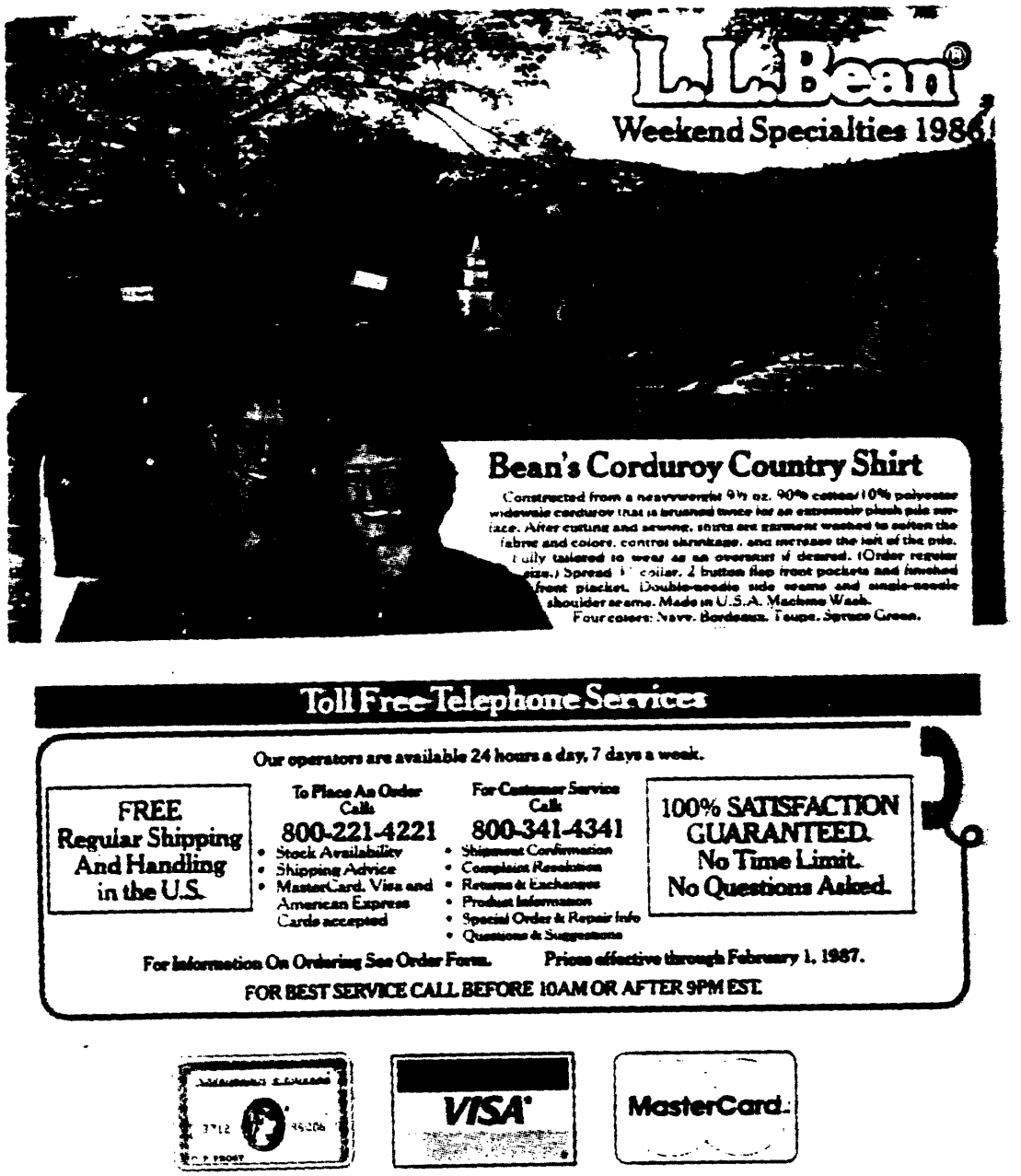


FIGURE 2. Catalog sales have exploded because of the convenient, fast service made possible by 800 numbers, credit cards and computerized credit authorization.

The same is true of most franchised outlets: Sales per outlet increase with the number of outlets in a city.

Now think about automatic teller machines.

In Massachusetts a few years ago, a holding company, BayBank, pulled together under a single umbrella many banks previously confined to individual counties by Massachusetts law. BayBank established a common name and logo across the state. It was not the first bank to have ATM's but it was the first to have them everywhere. Now it owns retail banking in Massachusetts and is awash in consumer deposits, the envy of the big Boston commercial banks. Information technology strikes again. And in this case it follows well-known laws of marketing.

FIGURE 3. Automatic teller machines not only enhance service and save labor but are robot soldiers in the battle for market share in retail banking.

More electronic markets. The Boston Computer Exchange runs an ad with a telephone number and a post office box. No physical address is given.

Video technology is big in marketing. Sales brochures on videotape are common - many schools send tapes to prospective students, for example. Buick will give you a diskette that your can run on a PC at home or in the showroom to view animated pictures of automobiles and examine models and options.

On the other hand, electronic home shopping has moved more slowly than expected. Several experimental systems have folded. The vision of people sitting at home and flipping through video catalogs has not yet materialized in a substantial way. Videotext services such as Prodigy, Delphi, and the Source, however, offer computer shopping and usage may grow as the number of home computers equipped with modems increases. However, it may take another generation of higher resolution computer screens, greater communications bandwidth, and lower cost graphics to make home shopping widespread. For example, the way to do grocery shopping at home may be to push a video image of a shopping cart down store aisles on a screen, picking items off the shelves with a mouse along the way.

The sales force is an expensive and important part of an organization where any leverage in effectiveness can have large payoffs. Here information technology is providing new efficiencies in lead tracking, field reporting, and, perhaps most important, new services such as the analysis of customer problems on lap-top computers. Moriarty and Swartz (1989) report examples.

An oft-cited case of the impact of information technology on marketing is the airline reservation system. American and United gained significant competitive advantages by putting their systems in the hands of travel agents. But, without as much publicity, something else is going on behind the scenes that uses information technology in combination with other activities, social and analytic, to place extra passengers on the planes. This is the overbooking system. Overbooking sounds bad, but perhaps it shouldn't. There is a hidden marketing triumph here. Here's why:

The airlines subsist on the business passenger. Business passengers need the service and pick up the tab. However, as queuing theory shows, if flights are working smoothly for the business passengers, there will be empty seats. Therefore, why not sell the extra seats at a discount to people who are willing to stand-by for last minute boarding? This is a good idea, but, when the airlines try to do this, various not-too-scrupulous individuals call up and make reservation under false names. Then they show up at the airport as stand-bys and, surprise, there are no-shows and plenty of seats available.

The airlines' answer is overbooking. This also helps with the no-shows arising from road traffic delays, late business meetings, and the like. But overbooking raises other problems. If you want a fight, try to eject a passenger with a confirmed reservation from an airplane. Needed is one more good idea and that is: buying people off the plane. Free market supply and demand are put to work. Every plane contains at least a few people who aren't in a big hurry. So offer them something that is valuable to them but not quite so valuable to the airline. What is that something? It's airplane tickets. This creates a win-win situation. What makes it all possible is: (1) the data provided by the reservation system, (2) some fine management science forecasting and seat inventory models, and (3) the basic strategic idea that you would be willing to do some marginal cost pricing. The whole system is a remarkably successful, if complex, informational and social operation that significantly increases capacity utilization.

A specialized workstation, called DesignCenter, developed by a Weyerhauser subsidiary, Innovis, targets the do-it-yourself market. Home improvement stores install a kiosk containing DesignCenter in their display area. A customer, usually with modest help from a sales clerk, can easily design a home deck by him/herself using the interactive system. The look and feel is somewhat analagous to a video game. The deck is visually displayed and easily manipulated to meet the customer's wishes about size, shape, type of wood, etc. After the design is finished, a push of a button brings a complete bill of materials with dimensions, costs, and other specifications for all parts. The customer can walk away with a drawing of the finished product and a hard copy of the bill of materials. Using the DesignCenter, do-it-yourselfers created $ 150 million in projects during the first eight months of operation. Much of this represents a market expansion of projects that home-owners would not otherwise have built.

DesignCenter typifies an important new class of applications of information technology in which the customer solves his or her own problem, thereby creating an increase in primary demand for the product. In presenting the workstation to retailers, Weyerhauser, emphasizes the involvement of store sales people in assisting the customer, thereby, strengthening relations between manufacturer and retailer as well as ensuring that the customer can obtain any necessary information not contained in the computer program.

So a first point is that information technology is pervasive in marketing. We use it at every turn to gain a little or a lot of competitive advantage, improve our services, save money, and generally do a better job. Successful applications create new benefits at one or more stages along the chain of added value in the product or service. A hierarchy of improvements is:

1. Labor displacement. This is a traditional computer role. Among the examples above, the Sears catalog order system clearly falls in the category. So does the automatic teller machine. One can also include videotape presentations.

2. Service enhancement. Surprisingly, just about every example of labor displacement includes service enhancement, which, in fact, may be more important. Automatic tellers are open 24 hours a day and appear in more places than branch banks. Machines lack the personal touch often associated with good service, but they bring timeliness, convenience, and the up-side of being impersonal: you can discover in privacy that your account is overdrawn. Some of the cited examples, for instance, catalog retailing, have blossomed because of service enhancements and then have maintained competitiveness through labor efficiencies.

3. Improved market intelligence. An important source of value from information technology lies in understanding and pinpointing your markets better. Direct marketing benefits from computerized lists of names spun off from other activities. Screening of lists by pre-specified criteria is often possible; for example, you can restrict a mailing to people who have bought more than $100 worth of goods by mail in the last six months. Analysis of customer records reveals individual tastes and preferences so that people can be sent information only on goods that might interest them. One of the biggest new adventures is taking place with an explosion of marketing data in consumer package goods. This will be probed in depth below.

4. Creation of new entities. Some organizations and services could not have existed before an enabling information technology came into being. The electronic markets, like NASDAQ, are examples. DesignCenter is completely dependent on modern computer technology. Certain financial services also fall in the category. In principle they seem simple, but in practice they are remarkably difficult to implement and require sophisticated hardware, software and communications.

PART II:

CONSUMER PACKAGED GOODS: *A Discontinuity in Marketing Information*

A striking example of the information age at work is taking place in the consumer packaged goods industry. Packaged goods consist primarily of the grocery business (i.e., food)

along with health and beauty aids (e.g., shampoo and aspirin). The largest quantities of packaged products go through supermarkets, which therefore become the primary focus of the manufacturers' marketing attention. Supermarkets sell 280 billion dollars of goods per year - 20% of all retail sales.

The main information technology activity in packaged goods today is behind the scenes. A rush is going on to use new information to understand better which marketing actions work and which do not, so as to improve marketing efficiency and effectiveness. The changes are taking place so rapidly as to warrant calling them a discontinuity in marketing practice. There are lessons here for other information-intensive industries.

Some of the forces at work are: large quantities of new data, dropping hardware costs, improved software, new marketing science models, and expert systems. As we shall see, these have led to the founding of new companies, organizational change within manufacturers, and power shifts in the distribution channels.

Early History of Information Use

To go back sixty years into the 1930's, Arthur C. Nielsen invented a scorecard for package goods companies - market share. He did this by collecting data on retail grocery sales in a national sample of stores. Teams of people called auditors were sent into the stores every two months. They counted inventory and went over invoices for hundreds of products in each store. The auditors took the amounts on the invoices, adjusted them for the change in inventory and thereby determined bimonthly sales through the store. An acre of starched-collar clerks in Chicago added all this up with hand-crank calculators. Another roomful drew bar chart reports and the Nielsen Food Index was born. Marketing stars at Proctor and Gamble and General Foods rose and set based on Nielsen market shares.

By the 1960's, new sources of data had appeared and a typical consumer packaged goods company ran its business with up to four kinds of numbers: its own factory shipments, Nielsen shares, warehouse withdrawal data provided by Selling Areas Marketing, Inc. (SAMI), and consumer purchase histories collected by national diary panels. As may be seen in Figure 4, these data sources represent different places to look at the distribution pipeline. Each source tells a story about a different actor in the system. Everything was in hard copy, but, it should be noted, the IBM 370 had arrived and management information system (MIS) departments were learning how to master the large systems that handled ordering, billing, and other high volume jobs.

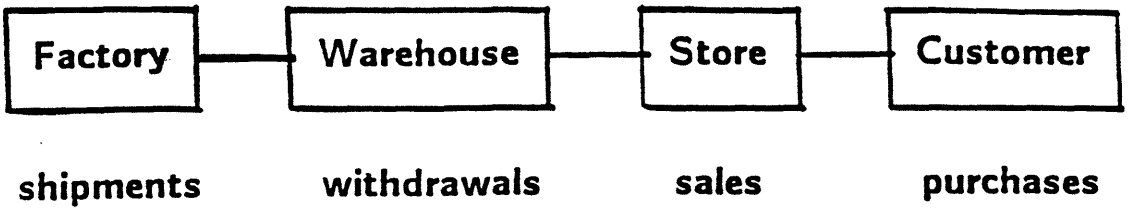


FIGURE 4. In the 1960's data was available for measuring sales at each stage of the product pipeline but reporting was all in hard copy.

Decision Support Systems

In the 1970's came the initial flowering of decision support systems (DSS's). The original technological impetus was time-sharing. Then database management systems came in, along with fourth generation languages. Most of the fourth generation languages that found favor in financial analysis were not suitable for marketing because they could not handle large databases. However, the few that could became widely used and marketing data slowly inched its way on-line.

The really significant accomplishment of information technology in this era was putting companies in control of their own shipments data. In the early 70's I recall a sales crisis with one of Nabisco's flagship brands. As a result, the director of marketing wanted to make comparisons of the most recent six months sales with the corresponding period a year ago in the midwest region. His chief lieutenant for doing this, the head of marketing research, was told by MIS that he would have to have, besides a budget - which was no problem - special priority and, even then, it would take 4 to 6 weeks to do the programming and make the runs.

A colleague and I were visiting the company at the time. Contemplating the development of on-line systems, we asked the marketing research director whether he would be willing to pay $100 to have the answer in ten minutes. He pulled out his wallet and said he would pay for it himself. The great irony of the story, however, occurred two months later when he received his report. He glanced at it for a few moments and the numbers looked peculiar. Then he realized he had forgotten that a teamsters' strike in Chicago had disrupted sales during a month of the previous year. The print-out was meaningless. He immediately knew how to fix it, but that took another week.

Conventional Decision Support Systems provide

MARKET STATUS REPORTING

- o sales
- o share
- o price
- o promotion
- o advertising

New systems should also provide

MARKET RESPONSE REPORTING

- o price elasticity
- o promotional effectiveness
- o advertising impact on sales

Fig. 5. Improved data and analytic methods permit the measurement of market response and hold the promise of reporting it on a regular basis.

Market Response Reporting

By the early 1980's the days of the MIS bottleneck were gone in most large companies as modern DSS databases and on-line systems for marketing information went into place. Indeed, starting in the late 70's people began to raise their sights and differentiate between market status reporting and market response reporting. Figure 5 makes the distinction. Prior to this time most marketing decision support systems had supplied what may be called status information: what are company and competitive sales volumes? shares? prices? etc. This is key information for running the business, but of equal and often greater importance are answers to market response questions: What is effect of price changes on sales? How profitable are promotions? What is the impact of advertising? With the data going into the on-line systems of the early 80's, companies began to scratch at these questions and learn enough to whet their appetites.

All this was good, but it was mostly doing what people had been doing laboriously in batch systems prior to DSS. It was quicker, better, and in greater quantity but not a

discontinuity.

The Universal Product Code

Optical scanning of bar codes on grocery packages started in 1974 with the goal of saving labor by speeding up checkouts. Implementation of the Universal Product Code (UPC) represented a remarkable achievement of cooperation among manufacturers and retailers. However, growth of installations was slow, and, as late as 1980, less than 15% of national grocery sales were being scanned. Although there was much talk about using scanning information for "soft savings", i.e., marketing purposes, nothing much happened because there were too few scanning stores. But in 1979 a pair of entrepreneurs in Chicago decided not to wait any longer. They simply bought and installed scanners themselves. The company, Information Resources, Inc. (IRI), developed what it calls BehaviorScan and may generically be called laboratory markets.

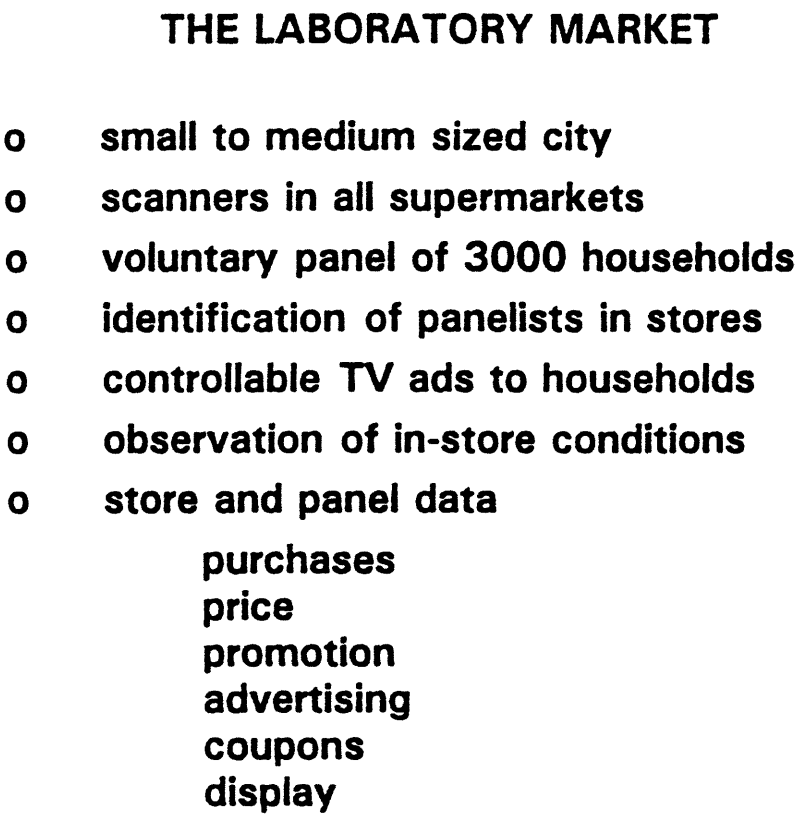


FIGURE 6. Laboratory markets are ideal for testing new products, TV advertising, and other marketing activities.

Figure 6 describes the idea. IRI initially put scanners in all the supermarkets in two small cities, Pittsfield, Massachusetts and Marion, Indiana. This gave them sales and price data

as a direct spinoff from the scanners. In addition, they started recording all the newspaper ads and all the special displays in the stores. In each market they recruited a panel of 3,000 to 4,000 households whose members identify themselves at checkouts so that their purchase records could be set aside in the store computer and accumulated. The two markets were chosen for high cable television usage and the panelists on the cable had specially modified television sets so that different groups of people could be sent different commercials in test and control fashion. Thus was introduced a powerful testing laboratory for new products, television advertising and other marketing activities. The whole system was extremely successful and grew rapidly until now there are about 8 such markets.

In instrumenting the markets IRI made a look-ahead move. It extracted the data directly from the stores electronically, polling the stores at night by telephone from Chicago. Although more expensive than sending tapes by UPS, it is obviously faster and is also more reliable. (UPS doesn't lose the tape, but the stores may lose data if it sits around too long.) As happens so often in information technology, there are unexpected fringe benefits from the electronic delivery.

Here is an example of one such benefit. In late 1985 it became apparent that a drought in Brazil would very likely ruin the coffee crop and send world coffee prices skyward. A major food company contacted IRI and said, "How fast can you give us coffee prices and sales movement at retail?" The answer was nine days after the close of the store week for the IRI laboratory markets. This compared to an average age of 4 to 8 weeks for top line reports from more conventional syndicated sources. The data arrived by diskette to run under flexible DSS software on a personal computer.

The drought did indeed devastate the coffee crop, and, starting in late December, a coffee task force of senior managers in the food company met weekly to review the latest data on what the consumers and retailers were doing in the market. Out of these meetings came the company's pricing policy.

Figure 7 shows some of the data, which is fascinating. It shows how your household was buying coffee that January. The top curve is the price. It is steady on the left, suddenly runs up in January, and then tapers down during 1986. The lower curve shows total coffee sales. We see some seasonality on the left - people switch to iced tea and soft drinks in summer. But notice the spike. When the price started to rise, people stocked up on coffee, but stopped well before the price peak. Very smart. It also appears that, during 1986 with coffee prices considerably higher than the previous year, overall coffee purchases were down. Such data permits easy calculation of price elasticity for the product category.

Note that this whole managerial scenario is a far cry from the frustrated marketing research director described earlier who had to wait a month to obtain an analysis of last year's

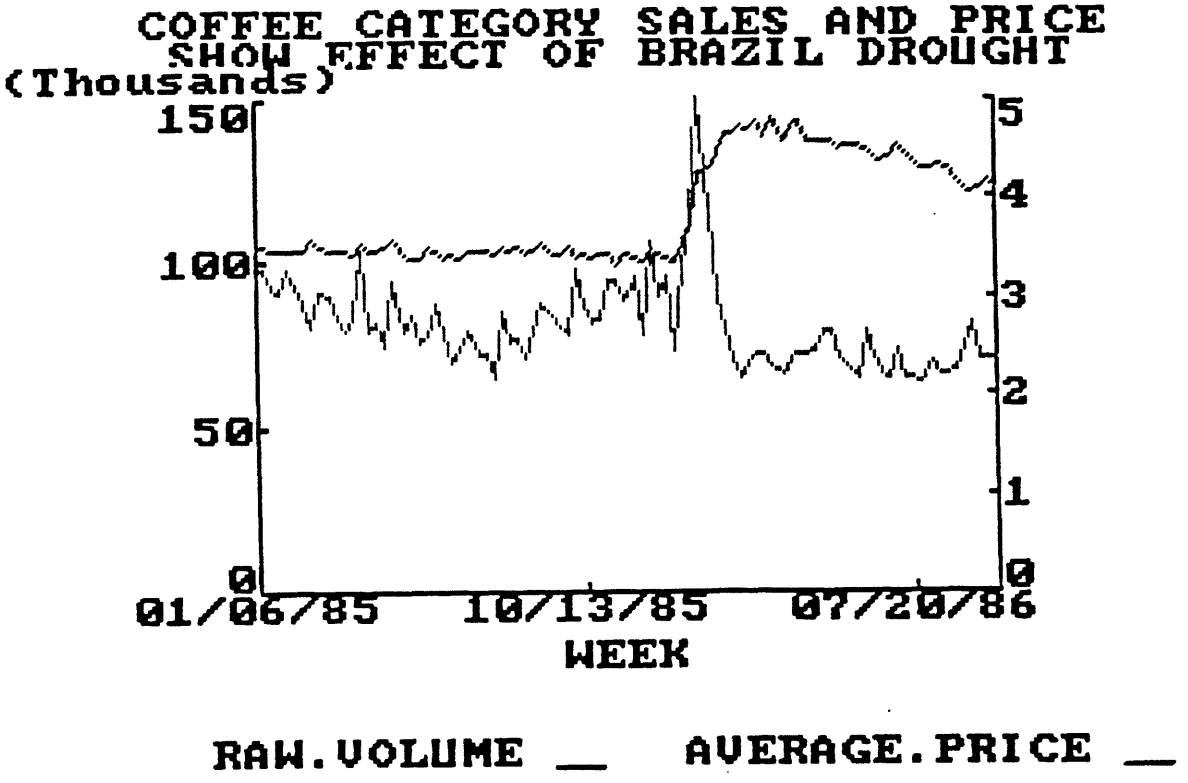


Fig. 7. Weekly data, quickly reported, has high value in fast-breaking marketing situations. A drought in Brazil caused a run-up of coffee prices and a rush to stock-up by households. Then, under high prices, sales fell below pre-drought levels.

data. The incident illustrates how advances in information technology speed up and improve the quality of marketing decision making. But it is just the start of the discontinuity that is taking place.

The Data Explosion

A new generation of tracking and status reporting services has been created. Scanner stores now represent most of the sales volume through supermarkets and it is therefore possible to design a valid national sample of 2000-3000 scanner stores and develop a data service based on them. The two major players are Information Resources and Nielsen Marketing Research. Their services provide coverage of individual major markets as well as the total U.S. Both companies include, besides basic sales and price data, specially collected information on store displays, newspaper advertising in the market, and coupon drops, all classified and broken out in a great variety of ways.

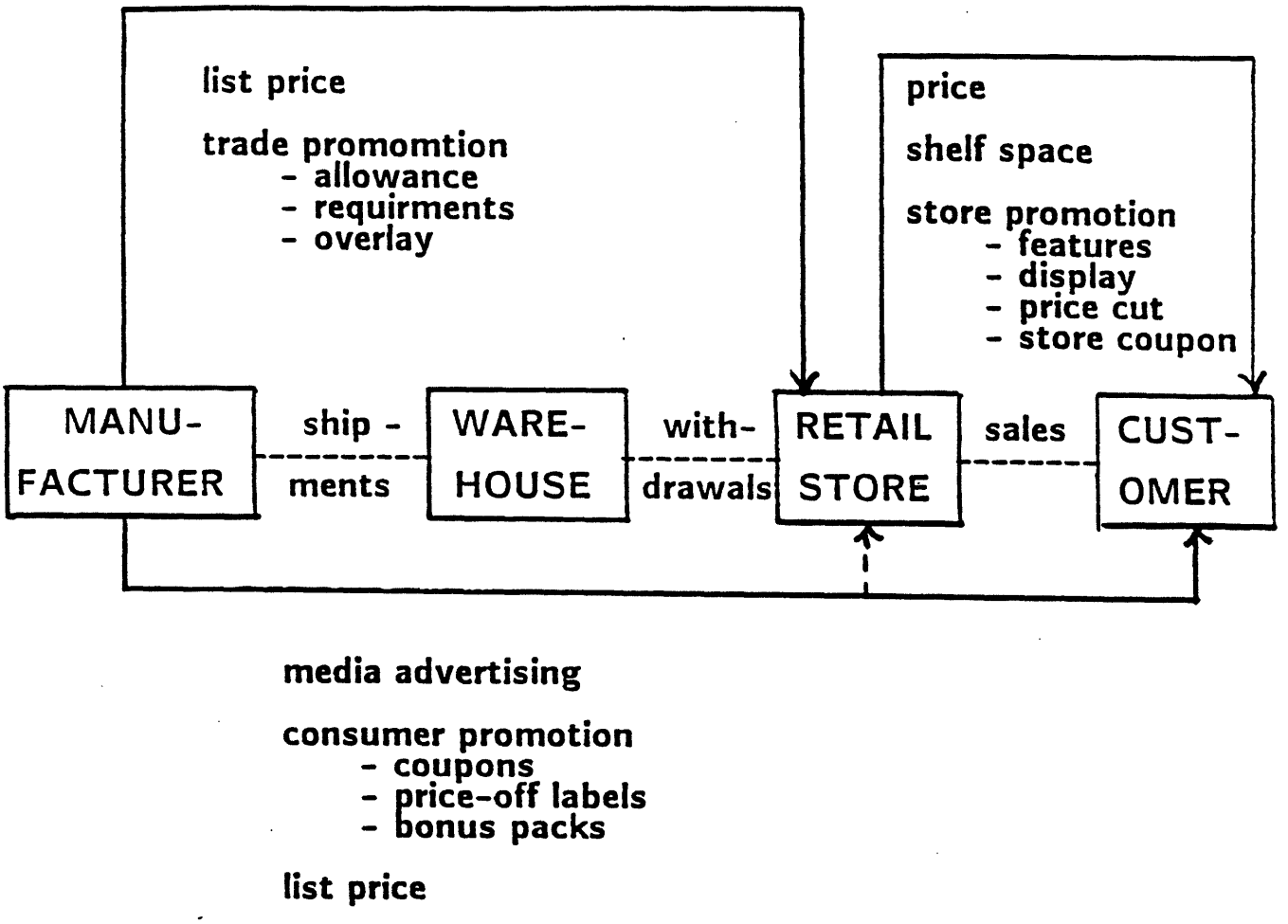


Fig. 8. Each actor along the distribution pipeline influences others through its set of marketing activities. Each activity is a target for a measurement of marketing effectiveness using the new data sources.

The distribution pipeline in Figure 8 illustrates the potential value of the new data for learning market response. Each actor in the system influences sales to the others by means of the marketing variable shown. Scanner data opens the possibility of measuring vertually all the response relationships along the pipeline.

All this sounds wonderful. But there is a hitch. The amount of data is overwhelming. Consider the new detail now available: weeks instead of 4-weeks or bimonths (this increases data by a factor of 4 to 8), UPC's instead of aggregate brands (a factor of 3 to 5), top 40 markets instead of broad geographic regions (a factor of 4 to 5), new tracking measures (a factor of 2 to 3), and chain breakouts (a factor of 1 to 3).

Multiplying out these factors reveals that roughly 100 to 1000 times as much data are at hand than previously. Furthermore, any analysis that requires going to individual stores or to panel households brings in new, equally large databases. Let's take 100 as a conservative multiplicative factor for the data that many companies are now bringing in-house for everyday use.

This kind of change is not easy to comprehend. In terms of a report, it means that, if a report took an hour to look through before, the corresponding document with all the possible new breakouts would take 100 hours to look through. In other words, the new detail won't be looked at.

Solutions Will Come in Stages

What should be done about this data explosion? Certainly there is value and competitive advantage to be found amid the detail, but how do we get at it? There is no single answer; solutions will come in stages:

Stage 1: ***Get access.***

This is well underway. Manufacturers have set up systems that permit them to get their arms around the new databases. Since they must continue to run their businesses at the same time, they have given high priority to recreating aggregate numbers similar to those they have used before so as to make a smooth transition into new modes of operation.

Stage 2: ***Automate the anlysis.***

Whatever people were doing to examine data previously is almost certainly inadequate now, at least as far as obtaining the new value. The old way consisted of an individual analyst, often an assistant product manager or management scientist, putting the data into a spread sheet or a statistical package and manipulating it to look for relationships and try to solve particular problems.

Although individual analysis continues, of course, no company is willing to hire 100 times its present staff in order to pour over the new data and find out what is in it. Some other

solution must be found. Part of the answer lies in automation. Although the required software will have to be developed, market response analysis often follows identifiable rules and can be approached through expert systems techniques.

By analyzing market response, I mean going over historical events to determine the effectiveness of marketing activities. Trade promotions, coupons, price changes, store merchandising, etc. are all fair game for evaluation. There are thousands of such events when you break them out by brand, geographical area and time period. Much work is already underway to automate this type of analysis and obtain its benefits. Here are examples:

Promotion evaluation. Package goods manufacturers run trade promotions. These are temporary wholesale discounts and usually include a contract with the retailers for merchandising activity, for example, putting the product on special display at the end of an aisle for a week. Or the retailer may agree to advertise the product in the local newspapers. Ordinarily the store temporarily reduces the shelf price. The net result is often a big bump in retail sales. You can see an example in Figure 9, which shows sales peaks for several successive promotions.

Now, how do you know whether a promotion was profitable for the manufacturer? Well, you would like to know what sales would have been without the promotion. The usual way to determine this is, essentially, to draw a line through the data points for which there were no promotions. Such a line is called a baseline. But, as it turns out, drawing a baseline offers many pitfalls. Abraham and Lodish (1987) have developed a set of procedures and a computer program for drawing a baseline and determining the difference between the baseline and actual sales. This gives the incremental sales for the promotion, from which its profit can be calculated.

The baseline program makes extensive use of expert systems ideas. That is, it mimics the hands-on processes of the authors, a pair of skilled marketing scientists, and employs their heuristics for handling the many issues that come up in working with the data. To give the flavor of this, we quote from the authors' flow diagram. They use such phrases as "contaminated points are removed from the data," "non-normal points are diagnosed," and "corrective actions." Such words are more in the realm of human judgment than mathematical technique. The work is a good example of combining statistical methods and expert system ideas in an automated analysis. The methodology has since been hardwired into efficient code for high volume commercial processing.

Coupon evaluation. Manufacturers in 1988 distributed about 220 billion cents-off coupons. Approximately 3.2% were redeemed at average face value of about 42 cents. The cost of this, plus distribution and handling, produced a total bill of $ 4.7 billion. In the past people have had only the number of redemptions (cashed-in coupons) with which to evaluate coupons. This was inadequate because no one knew how many of the customers redeeming coupons would

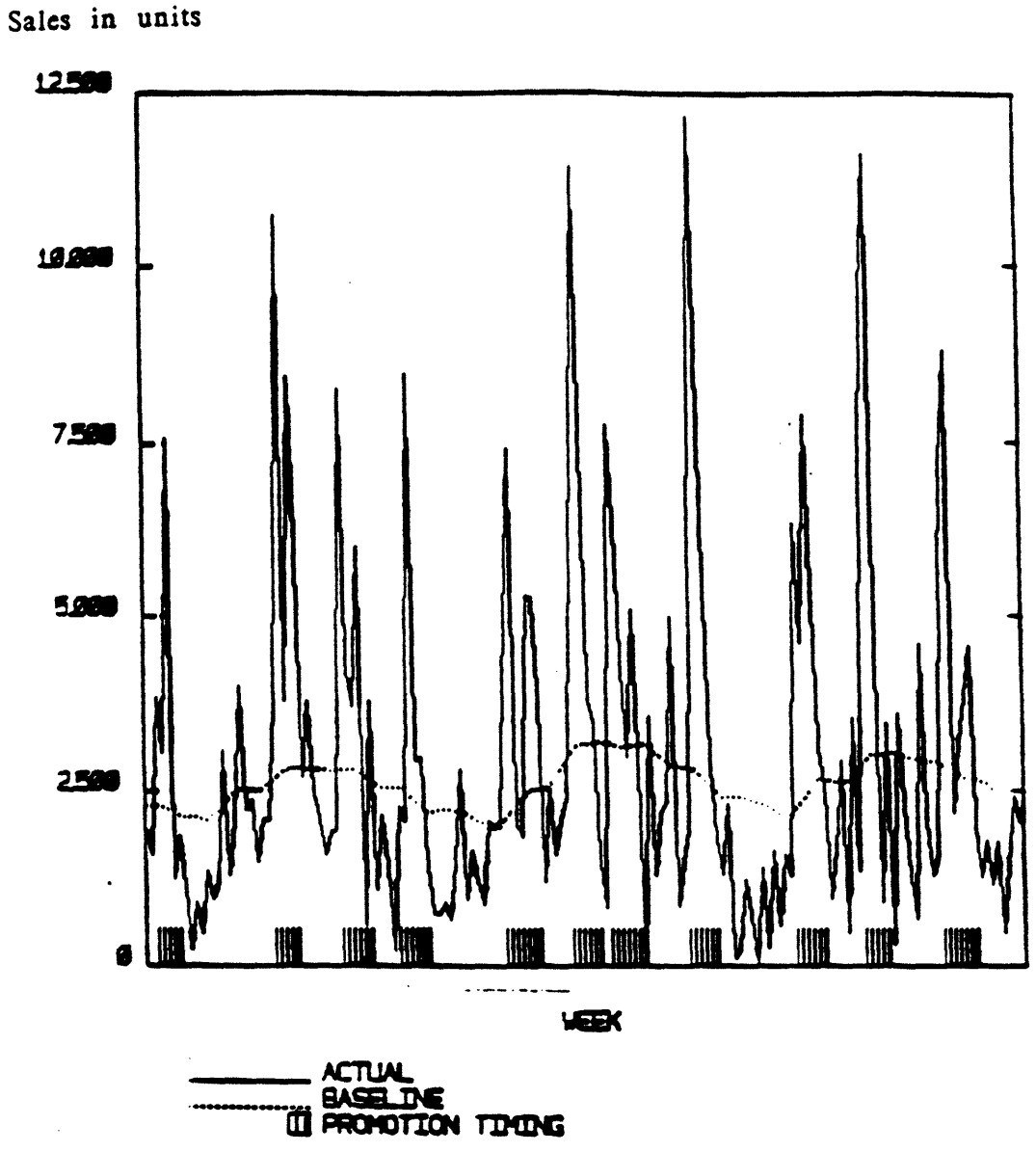


FIGURE 9. Weekly shipments to retailers show sharp peaks corresponding to manufacturers promotions. The evaluation program constructs a baseline to represent what sales would have been without the promotion.

have bought the product anyway. The money at stake suggests a large payoff from a valid measurement of coupon profitability.

Today this can be routinely done using panel data - the purchase histories being collected from 60,000 households in 25 markets. These, and copious computer time, permit the building

of a model that will predict the brand purchase probability for each household in the panel. The model is calibrated over some time period, say, a year, before a coupon drop. Then the model projects ahead to forecast what the households would have purchased in the absence of the coupon. An example is shown in Figure 10. The difference between forecast and actual sales appears as the shaded area. This measures the extra sales attributable to the coupon and becomes the basis for a report card of coupon effectiveness for each coupon dropped.

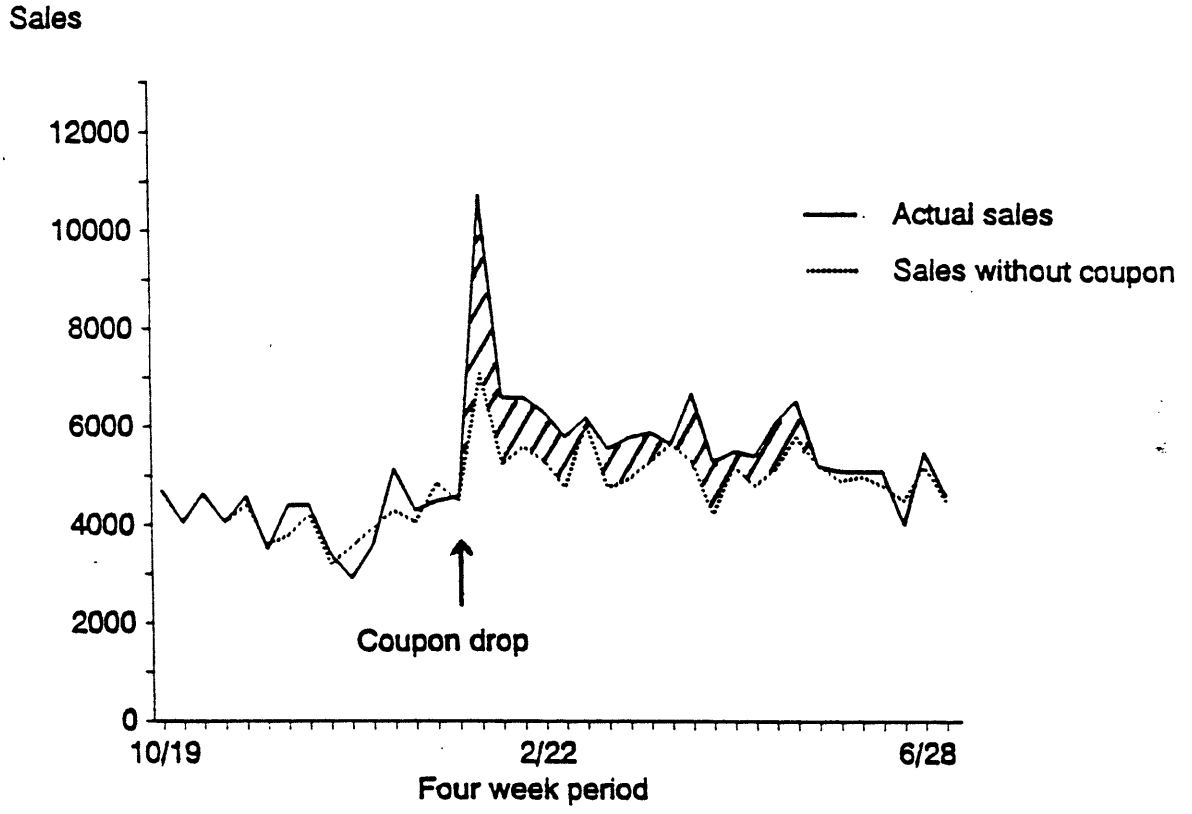


FIGURE 10. The difference between actual sales and predicted sales in the absence of the coupon measures the effect of a coupon and appears as the shaded area. Predicted sales are calculated from a product choice model based on 60,000 households.

The model underlying the evaluation comes from university research. The basic technique is the multinomial logit as adapted by Guadagni and Little (1983) for scanner panel data. In commercial practice, the process is partially automated. Full automation is needed and will require building futher intelligence into the program because real markets of real customers are full of unexpected (though understandable) events.

Derived databases. Promotion and coupon evaluations themselves accumulate into valuable new databases. Some of these are big, not in the sense of megabytes, but in terms of

people absorbing what they mean. Over a thousand coupons have been evaluated and hundreds of new ones are analyzed each year. Promotion response differs by event by market and by brand, adding up to tens of thousands of numbers.

These are market response databases and contain much valuable information. By analyzing them we can develop norms about what to expect and detailed understanding about why certain marketing actions worked and others did not. For example, by looking across many different coupons, we can determine whether high face-values are more profitable than low ones, full-page ads better than half-page, etc. There is competitive advantage for the companies who understand these results first. It seems likely that, except for day to day tracking purposes, internal analysts in companies will spend more time on market response databases than on the raw scanner data itself.

Stage 3: *Find the news.*

Suppose a half dozen new computer tapes have just come in with the latest four weeks of scanner data for our product category. What important has happened? Who has gained share? Where did it come from - what regions, what brands? Who has lost share? Perhaps there is a rumor that a major competitor was promoting heavily in Los Angeles. How heavy was it really? How much did it affect us?

These are typical highlights people want to know early. In many companies, top line reports of latest results are distributed on a regular basis. They contain fairly detailed tables, breakouts and graphs, but, almost always, they start with a cover memo that reports major happenings. The memo is traditionally written by the analyst who prepares the report. Significant changes in the market are noted - perhaps a substantial increase in category volume, a share loss for a key product in an important geographical area, etc. The tables and charts provide detail for the reader who wants to follow up.

A computer should write the cover memo.

In a project at MIT a few years ago, some students built a prototype that did this (Stoyiannidis, 1987; Little, 1988). Since then, the ideas have been picked up and further developed into a commercial product, CoverStory, by Information Resources (Schmitz, Armstrong, and Little, 1990). An example of the output appears in Figure 11.

Because the process is automated, you can easily generate the memo for any brand or category or segment of a category, depending on managerial interests. You can even look at the market through the eyes of your competitors by running their brands. Or you can run the report

for a district sales manager, where instead of pulling out highlights by market you do it by key retail account.

This application also provides an important lesson for DSS architecture in the 1990's. Many companies have built DSS's that are basically retrieval systems. A file server holding the data is accessed over a local area network by a workstation that is essentially a PC. Design has focused on smooth user interfaces at the front end and standardized database management at the back. This is an ideal architecture for the marketing DSS's of the 1970's, when most applications involved people retrieving a few numbers to look at personally and analyze by hand.

But automated analyses and expert systems working against large databases require real processing power not available on a PC. They need what might be called MIPS in the middle between PC and database. Computer architecture for this is not difficult to devise but probably will not happen unless marketing management identifies the need.

Knowledge delivery

Automated analysis is necessary for dealing with the data flood but it is not enough. There is, I believe, too much response information. The issue is not what the computer can hold, but rather how much a person can organize and assimilate just by looking at it. Needed are structures to turn the information into knowledge and techniques to deliver it. The former will come from people. For the latter, technology will help.

Knowledge delivery will evolve through phases, typically: "What happened?" then, "Why did it happen?" and, finally, "What do we do about it?"

Today people are focusing mostly on "What happened?" and the beginnings of "Why did it happen?" Prospects for rapid progress are good because many people inside and outside of packaged goods companies are working with scanner data to solve day-to-day marketing problems. As successful applications emerge, they can be generalized and packaged for automatic on-line delivery. Expert systems technology is not the bottleneck but rather the development of marketing knowledge. Likely near-term applications are, for marketing, the diagnosis of brand performance and, for sales, the development of fact-based selling points for salespeople's presentations to key accounts.

The application of expert systems to scanner data is an active topic for a number of academic researchers. McCann and Gallagher (1988) have an ambitious program in progress. Bayer and Harter (1989) report a PC-based system.

To: Director of Marketing
From: CoverStory
Date: 11/08/88
Subject: Ellios Brand Summary for four weeks ending June 26, 1988

Ellios' national share was 4.0% of the Total Frozen Pizza category for the four weeks ending 6/26/88. This is a decrease of .6 share points from a year earlier but up .7 points from last period. This share reflects volume sales of 1.2 million consumer units. The .6 point share loss may be partly attributed to 3.5 pts of ACV decrease in distribution vs yr ago.

Competitor Summary

Among Ellios' major competitors, the principal gainers are:

- Jenos: up 5.6 share points from last year to 13.1 (but down 1.3 since last period)
- Totinos +1.1 to 10.0 (but down 1.8 since last period)

and loser:

- Bernatellos -1.0 to .8

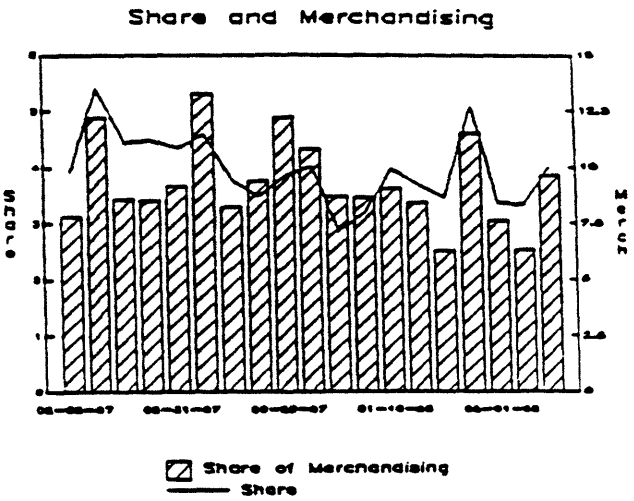
Ellios' share is 4.0 - down .6 points from the same period last year.

Jenos's share increase may be partly attributed to 6.0 pts of ACV increase in distribution versus a year ago.

Components of Ellios Volume

Within the Ellios line, share decreases have been sustained by:

- Ellios Frn Brd off .3 share points from last year to .1
- Ellios Trad -.3 to .5



The brand components with relatively small changes since last year are:

- Ellios Snk / Slc unchanged from year ago but +.8 points since last period to 3.4

Ellios Frn Brd's share decrease may be partly attributed to 6.6 pts of ACV decrease in distribution vs yr ago.

Geographic Highlights

Ellios showed significant gains relative to a year ago in:

- Philadelphia, PA: up 2.6 share points from last year to 52.6. This may be partly attributed to 6.5 pts of ACV increase in distribution vs yr ago and 13.4 points increase in displays since last year.

but posted share losses in:

- Boston, MA -6.1 to 21.4. This may be partly attributed to 20.5 ACV points

FIGURE 11. Using expert systems techniques, a computer can go through a large database, identify important news, and report it in a natural language memorandum.

Looking ahead, I see a general problem and, out of it, a goal. Market response analysis is done today by internal staff groups, essentially internal consultants, and by external consultants. At the culmination of a study, they make a presentation to management. In the course of an hour's presentation the consultant summarizes the results of an effort that took, perhaps 3 to 6 man-months. If the consultant is lucky the audience will become really interested and the meeting will run over its allotted time by a half hour or so. But no matter how well things work, a standard presentation provides a very narrow bottleneck through which to transmit information. Under these circumstances, there is great pressure to produce tight, top-line summaries and to uncover immediately actionable implications. This is all to the good, but much information is lost and never becomes available to product management because it doesn't happen to fit into the current need at the time the information was created.

A goal, therefore, is to find structures that will organize the market response information that will soon be generated and to develop methods for delivering relevant portions of that information to the decision maker at the time that he or she is thinking about the problem. I call this Stage 4 of the answer to the information glut.

As an example, consider a product management team planning its promotional program for the coming year. A brand has some set of current circumstances. It has a share and a rank in its product category. The category itself is characterized by an overall sales rate, a percentage of households using such products, a certain history of competitive activity, etc. The brand may have specific current concerns, such as falling share, or low distribution, or a new competitor. One would like a support system that could systematically bring to bear the distilled experience of hundreds of past marketing activities on the brand's problem at hand.

This seems doable. Many companies have long had how-to-do-it handbooks on promotions, coupons, media, etc. These handbooks contain rules of thumb for what to do in various brand and market circumstances. Although the rules need extension and updating with the new knowledge being generated, they represent a worthwhile starting knowledge base. Based on such information, Van Arsdell and Weise (1986) developed a prototype promotion advising system. It asks you questions about your product and then recommends actions. Although the system would require an order of magnitude more effort to become a practical tool, it suggests that, with the output of automated market response analysis that is to come, we should be able to build a generation of electronic marketing advisors that would really be helpful.

Impact of Information Technology on the Packaged Goods Industry

So far I have focussed on behind-the-scenes data and its evolving utilization. Now let us stand back and assess the overall impact this is having on the packaged goods industry,

including its effect on organization and industry structure. Figure 12 provides an overview.

First of all, in the marketing function generally, we are seeing increased efficiency and effectiveness. This is what we have been discussing.

INFORMATION TECHNOLOGY IMPACT ON PACKAGED GOODS INDUSTRY

- o In the marketing function
  - increased efficiency and effectiveness
  - shift to regional marketing
- o In the manufacturer's organization
  - sales and marketing move closer
- o In the grocery industry as a whole
  - shift more power to the retailer

Fig. 12. New knowledge about marketing effectiveness is bringing changes at both the company and industry levels.

Next, a major opportunity lies in using the new data to gain regional marketing advantage. Historically, the evolution of the grocery industry saw the emergence of giant companies like General Foods, Nabisco, and Proctor and Gamble in the first half of this century. Such companies invented national brands by producing uniform, high quality goods, backed by national advertising budgets and reinforced with economies of scale in manufacturing, distribution and marketing. Although national brands usually ended up being somewhat stronger in one part of the country than another and some local tailoring of the marketing was done, this was largely left to the sales force. The major elements of the marketing program: price, promotion, advertising, packaging were set at the home office.

Now with information costs dropping drastically, companies have data on a market by market basis for the top 40 or 50 markets, and, potentially, can act on the information. But you cannot reproduce the central staff in 50 regions. That's not the answer. You can, however, create small, sales and marketing teams in principal sales regions and give them strong DSS

support. Several manufacturers are now implementing such an organizational change. The step represents a major rethinking of the product management system that has been operating in the packaged goods industry for the last 50 years.

However, this is not likely to be the end of the changes. The new information signals a shift in power toward the retailers. Initially, retailers have not been as well situated as the manufacturers to gain value from the UPC data. They suffer from lack of scale. A large food manufacturer deals with a few hundred or a thousand items. These are clustered into brands, each of which might represent sales in the range of 10 to 100 million dollars. Therefore, a manufacturer deals with large entities and can afford to spend considerable money collecting and analyzing data for them. Consider, however, a retailer. A large supermarket may carry 20,000 items, whose sales might range from a few hundred to a few thousand dollars a year. Even when you multiply these figures by the number of stores in a chain, a retailer cannot afford to lavish as much attention on an individual item as a manufacturer. However, the cost of processing information is plummeting and already the retailers are beginning to find actionable content in their data, especially by analyzing it at the category level, which is the most meaningful unit for them. Analysis of the data by retailers will certainly increase. One implication of this is that strong brands will get stronger whereas weak ones will be in trouble. This is not a matter of market power but rather increased efficiency in the marketplace. It also sounds like something that is, on net, a good outcome.

What we can conclude? A huge new database has arrived in consumer package goods and, lagging a little, the ability to extract useful information from it. The totality of the data has not been absorbed yet but soon will be. The data permit measurements and understanding that reveal inefficiencies in the system and opportunities for improvement. As a result, companies will stop doing a lot of things that don't work well and do some better things. By and large the market will become more efficient. We are seeing changes in roles and in organization.

PART III:

WILL INFORMATION TECHNOLOGY MAKE MARKETING OBSOLETE?

Paradoxically, while marketing is almost universally regarded as essential to modern organizations, marketing departments have come under increasing fire.

Charges of inadequacy and inefficiency are common. The U.S. automobile industry receives regular abuse, being accused of failing to provide the cars people want. Critics assert that the supermarket shelves are filled with products that differ from one another only in hype. Trade promotions in the packaged goods industry have created striking distribution inefficiencies by pushing products through distribution channels in big lumps - the promotional discounts offered by manufacturers cause retailers to "forward buy", that is, stock up at the low price to meet future needs. The large, lumpy orders not only require manufacturing plants to run in a stop-and-go manner but lead the retailers to build new warehouses just to accommodate the

promotional merchandise. A potentially smooth production and distribution process has been made inefficiently erratic.

One hears other criticisms: "Marketing is too important to be left to the marketers." A case in point is the "house of quality" methodology in manufacturing (Hauser and Clausing, 1989). In this planning and communication process, the "voice of the customer" permeates engineering design, parts specification, manufacturing process planning, through to production itself. Although the voice of the customer and the house of quality epitomize the fundamentals of marketing, the methodology originated in manufacturing at a Japanese shipyard and is sponsored within most U.S. companies by engineering, not marketing.

One may reasonably ask: Will information technology alleviate or accentuate these difficulties? What is the role of marketing as business becomes increasingly information centered?

Before answering, we examine some of the forces that the information age is placing on the firm and thence marketing. As Glazer (1989) and Braddock (1989) point out, information technology blurs the classic strategies of cost leadership (seeking market share through low cost) and differentiation (targeting special market segments). Traditionally, low cost is achieved by standardization and economies of scale. Then broad markets can be approached competitively. Differentiation, on the other hand, focuses narrowly on meeting the needs of a specific customer group. But information technology offers the possibility of achieving both. This is because it facilitates not only rapid and flexible design but also targeted delivery of products and services.

Therefore, it is increasingly feasible to pursue a market niche strategy in many niches at once. As databases grow and provide increased knowledge of customers, we can determine better their wishes and how to communicate with them. With the help of information technology we shall often be able to handle large groups of customers with remarkable individuality.

The opportunities for product flexibility have been widely recognized by the financial service industry with its proliferation of cash management accounts, different mutual funds, money market accounts with checking privileges, CD's, credit cards, debit cards, etc. Citicorp, for example, sees itself as being in the information business. Braddock (1989) stresses the close connection between providing information-intensive services to customers (automatic tellers, automated voice interrogation of account data, varied kinds of accounts) and using the resulting databases to understand customers' wishes and cater to them.

The ability of information technology to permit large scale operations and yet provide individual attention is only just beginning to be tapped. As part of its information-oriented strategy, Citicorp plans to build a scanner database of grocery purchase histories for 20 million households. This is customer information on a grand scale. That many households is 100 times the number currently monitored by market research companies. The goal, of course, is different: it is operational - to provide new services to the household, such as "frequent buyer" programs that reward brand loyalty or store loyalty with a kind of electronic green stamps, or to deliver coupons to individual households based on their historical buying patterns.

Such an undertaking is but one example of a rapidly growing field of direct marketing to customers, sometimes known as "database marketing." As Roscitt (1988) observes, there are

dozens of commercial databases providing remarkable detail about various characteristics of the American consumer, from demographics, to product ownership and purchase habits. Many of these are broken out by small geographic areas, such as zip codes or neighborhoods, and even by household. Often the data can be combined with a firm's own customer transaction histories to understand better what products might be of interest. The process will lead to far more efficient and effective marketing programs than possible by indiscriminate mailings or broadcast media.

Yet, such direct marketing, with its dependence on large systems of data collection, processing and analysis, looks more like operations than marketing and calls into question the traditional marketing function.

To be competitive, companies will organize to get close to their customers. An example that we saw earlier was packaged goods manufacturers moving to regional organization of marketing and sales teams. Such teams know the local conditions, receive up-to-date tracking data via workstations, and, increasingly, can perform automated analyses, such as generating potential selling points for use with key accounts. Certain kinds activities have long been local, for example, community-oriented public relations, but increasingly one sees television commercials for national products that show the local city in the background. This all fits with the concept of flat organizations and fast response to the customer, but it weakens the traditional national marketing planning function at headquarters.

As one looks through the marketing-mix in modern information-intensive customer relationships, one finds a blurring of lines once thought rather separate (Glazer, 1989). For example, when we buy from a catalog using an 800 number and a credit card, and have the product sent directly to our home, the benefits of the product itself are almost swamped by the benefits we receive in the form of information and information processing. The fact that the catalog came to us in the first place, the presentation of the product within the catalog, the telecommunications by 800 number, the financial credit transaction, the prompt delivery by UPS or Federal Express (traceable at any point in time), all of these information-intensive operations are key service attributes that we see as benefits and help lead us to make the purchase in this manner rather than at a store. One can call the catalog, a communications medium, UPS, a distribution channel, and the credit card, part of the price transaction, but we would be artificially disassembling the essential unity of the system.

Returning to our question: Will information technology make marketing obsolete? If we think of marketing in conventional, compartmentalized, planning-back-at-headquarters terms, separate from operations, sales and R&D, the answer is likely to be yes. But, the answer is no, if we think of marketing as distributed throughout the organization, bringing in the voice of the customer through appropriately collected information and helping to define and communicate a bundle of benefits in an integrated way with R&D, operations and sales. Then information and information technology will play a transformational role in strengthening marketing throughout the organization.

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