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Emerging Approaches to Retail Outlet Management

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Current research in retail outlet management suggests that managers should focus their attention on a few key concepts when deciding strategic and tactical issues. Empirical studies show that in a variety of product areas, particularly in convenience goods, the share of retail outlets held by a company is related to that company's market share in a nonlinear, S-shaped fashion. When deciding where to build an outlet, the sales potential of any particular site depends on two separate components: sales from people who live nearby and sales from people who do not live in the area. This article reviews emerging quantitative approaches for treating the strategic and tactical problems of retail outlet management. Ed.

In many industries convenience goods and products are offered to consumers through company-controlled retail outlets. Examples of these products include packaged products, gasoline, bank services, and fast foods, where the respective outlets are supermarket chains, service stations, branch banks, and franchised restaurants. Common to each of these product-outlet pairs are key problems involving the creation and evaluation of outlet building and development programs.

The problems are becoming increasingly critical in the area of convenience goods, where the introduction of service-enhancing technologies is almost bewildering. For example, we have recently seen the wide-scale diffusion of automatic teller machines and statewide branch banking in the banking industry, the reduction in number and increase in size of gasoline service stations, and an endless proliferation of fast-food franchises.

In the past much of the quantitative work in the field has focused on tactical problems, particularly on site evaluation.[1] Strategic issues have largely been handled in an informal way. Recently, some researchers have recognized that site potential is related to the product or company "image,"[2] but they do not indicate how image can be changed to increase site potential.

Much progress has been made recently, however. This article reviews some emerging approaches to retail outlet management, focusing on a set of strategic and tactical issues. It is not an exhaustive review of the literature in this field but rather a discussion of key concepts that have been successfully used in several product areas. The results are simple, powerful, and readily applicable.

The strategic planning questions we consider are:

- How many outlets should be built in the next Y years?
- In what cities (markets) should they be built?
- When?

The tactical decisions we explore concern the selection of specific sites, that is:

- What is the potential of a specific site?
- What is the impact of changes in the environment on site potential, e.g., construction of a motel on gas station sales?
- What is the impact of an outlet on a neighboring outlet?

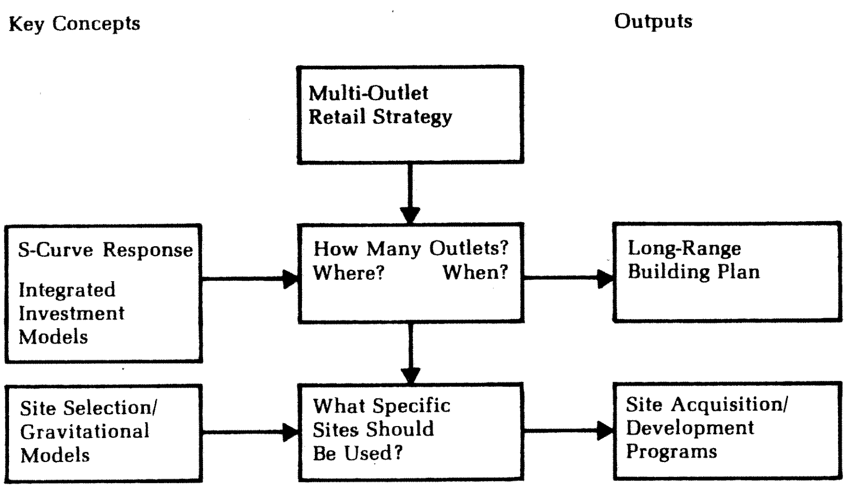
Figure 1 outlines our approach.

The reader should note that the concepts developed here are most applicable when the consumers are buying convenience goods and/or services. As Stanley and Sewall[3] point out, size and image factors may explain a significant portion of retail trade involving shopping goods. Therefore, the S-shaped response and draw concepts to be discussed shortly would require substantial modification before being applicable to shopping goods situations.

Strategic Decisions

Suppose the total industry unit sales of a product in a market are denoted by S and the total number of outlets through which the product is offered is denoted by N. Also, suppose that a particular company sells s units and has n outlets. Then we can define the company's market share as s/S and its

Figure 1 **Structuring Some Key Problems in Retail Outlet Management**



outlet share as n/N. We assume here that the N outlets are roughly similar; if substantial differences among outlets do exist, some adjustments may be required in practice. Such adjustments are reviewed later in the article. Given these definitions, one might intuitively reason that after a building plan is implemented, market share will equal outlet share for small to medium levels of outlet share. The authors have observed many managers who behave in accordance with this relationship.

But empirical studies have shown the relationship between outlet share and market share to be nonlinear and generally S-shaped.[4] Small outlet shares produce disproportionately smaller market shares. As outlet share grows, market share grows at a faster rate, until it exceeds outlet share. As outlet share continues to increase, the rate of market share growth decreases. Empirically, few cases of very high outlet shares have been observed, but the lower part of the curve (below an outlet share of 50 percent) is well documented. Since we can argue on theoretical grounds that when outlet share equals one, market share must equal one, the upper part of the curve can be hypothesized with a great deal of confidence. Figure 2 graphically illustrates the S-shaped curve, with the hypothesized portion shown by the dotted curve.

From a theoretical point of view a number of hypotheses concerning consumer and/or corporate behavior have been offered in order to justify the S-shaped relationship.[5] A simple explanation is still the subject of debate. Nonetheless, this empirically verified relationship is an important finding for decision makers, regardless of its lack of theoretical backing.

One Curve or Many Curves?

Differences among outlets *do* occur in practice. The two major types of differences are in terms of size and recency of construction. In such cases a family of S-shaped curves defined in terms of the size or recency of construction parameters is used instead of the single S-shaped curve.[6] Recent work in the retail banking area sheds further light and support on this observation.[7]

The implications of the S-shaped relationship are important. From the point of view of maximizing incremental market share, a firm should only build in markets where it already has an established position. A major oil company explicitly recognized this relationship in its entry strategy into a new state during the late sixties. The company decided not to enter unless outlet share could be immediately built up to a reasonable (5 to 6 percent) level, i.e., where marginal market share returns for additional gas stations were reasonable. Several local distributors were acquired, immediately resulting in a 5 percent outlet share on which was based the subsequent building program. Starting an outlet share from scratch was seen as an unprofitable strategy. Thus, the S-curve supports an expansion strategy of quickly establishing share in each new market before proceeding to the next. Simultaneous expansion into a large number of new markets promises limited success unless financial and managerial constraints are nonexistent.

But even an understanding of this market share-outlet share relationship does not simplify the preparation of plans on how many outlets to build, and in which markets

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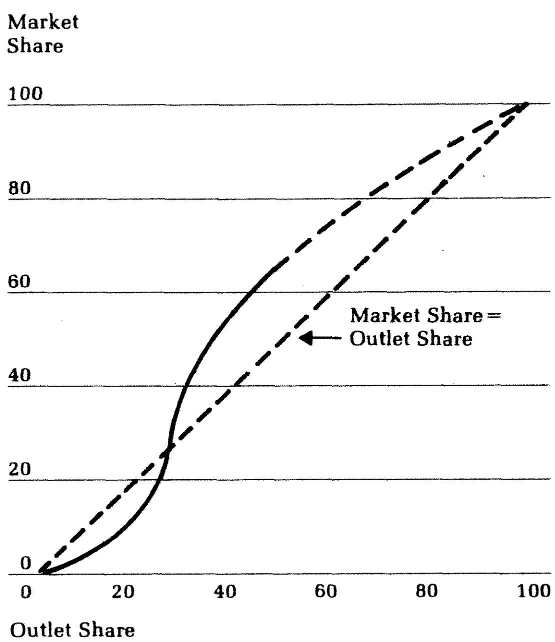
Figure 2 **Typical Outlet Share/Market Share Relationship**



to build them. A procedure has been developed and implemented to support managers in making these decisions. Using the procedure improves the quality of decisions even if they are not always "optimal" in the narrow mathematical sense. In fact, these near-optimal answers are usually accurate enough for practical planning situations.

Using the S-Curve as Part of a Planning System

Suppose that a firm has empirically developed an S-curve for its markets and now wants to know how many outlets to build in each of a large number of markets during a multi-year (e.g., five) planning period. Generally the first year results become budget items — building funds are allocated in accordance with the plan of "year 1." The following year results are used to prepare profit plan projections and to help allocate outlet-site procurement funds (in anticipation of building programs).

Observe the nature of the managerial decision process: all planned outlets may not always be built due to changing local building codes, construction difficulties, lack of sites, etc. If an extra "choice" site becomes available in a desirable area, an outlet may be constructed on it immediately, even if no money was originally allocated for its construction. In terms of the output of the planning model, the difference between five and six outlets in a market is negligible, especially in the types of businesses we are discussing — supermarkets, banks, gasoline stations, and fast foods. Therefore, in these situations management wants to know whether five outlets or twenty outlets should be built in a given area.

So far the discussion has focused on market share. Obviously, company revenues and profits in a market are dependent on a variety of factors in addition to market share and the share of outlet required to generate that market share. Although studies such as PIMS[8] have related brand share to profitability, they have not focused specifically on retail outlet oriented industries. Thus, generalizations on the relationship of market share to profitability are still not possible, at least not for the types of businesses considered in this article. Nevertheless, in specific situations it is not hard to estimate the profitability of a desired share of market.

First, we consider the outlet share required to produce a desired market share. This required outlet share is obtained directly from the S-shaped relationship. The number of *new* outlets required to achieve this outlet share depends not only on the current total number of product outlets N and company outlets n, but on the forecasted level of competitive outlet construction as well. This difficult problem of competitive forecasting is best handled by comparing historical building trends with management judgment. This approach of using two independent forecasting methods isolates those market areas requiring additional research so that a more precise estimate can be obtained. Once the number of new outlets to be constructed has been established, the associated cost can be computed using estimates of real estate prices.

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Given the current and projected total industry sales in the market, the target market share estimate yields market unit sales volume and projected volume growth. Estimates of gross margins are then applied to these sales projections to obtain gross revenue estimates. Then, by adjusting gross revenue by building costs, investment tax credits, etc. and using standard Net Present Value (NPV) concepts, one develops a NPV estimate associated with any desired target market share.

A basic question must be answered at this point. It concerns the validity (and perhaps even the availability) of much of the data entering the NPV computation. Obviously many of the estimates are subject to error and some are hard to develop. In practical implementation, however, the authors have found that estimates can be obtained either objectively via data analysis or subjectively through discussions with managers. These estimates are adequate for planning purposes when supported by substantial (usually computerized) sensitivity analysis.

Up to this point our goal has been to organize all available data in a rational format in order to arrive at good but not necessarily optimal decisions. But managers are currently making these decisions using informal methods. We believe that a formal model-based procedure delineating all assumptions and providing for the systematic examination of the impact of each assumption on the final outcome must, at least, clarify the planning process. In addition, it is likely to improve substantially the quality of decisions made. Thus, a secondary benefit of the procedure is that it encourages the retail decision maker to think in a logical and consistent manner when developing corporate plans and strategies.

If every outlet valued in terms of NPV were worth less than the one built before it, the best building plan would consist of first building the outlet with the highest current incremental NPV, then the one with the next highest, and so on. But as the S-curve relationship indicates, there are often *increasing* returns to scale in a building plan which should be taken into account. The planning procedure we have developed does take this region of increasing returns into consideration. The following example explains how this is done.

Example. We first calculate the NPV associated with any building plan. Suppose that company XYZ has two markets to consider, market A and market B, and has calculated the NPV associated with each building plan in each market. Figure 3 displays the results.

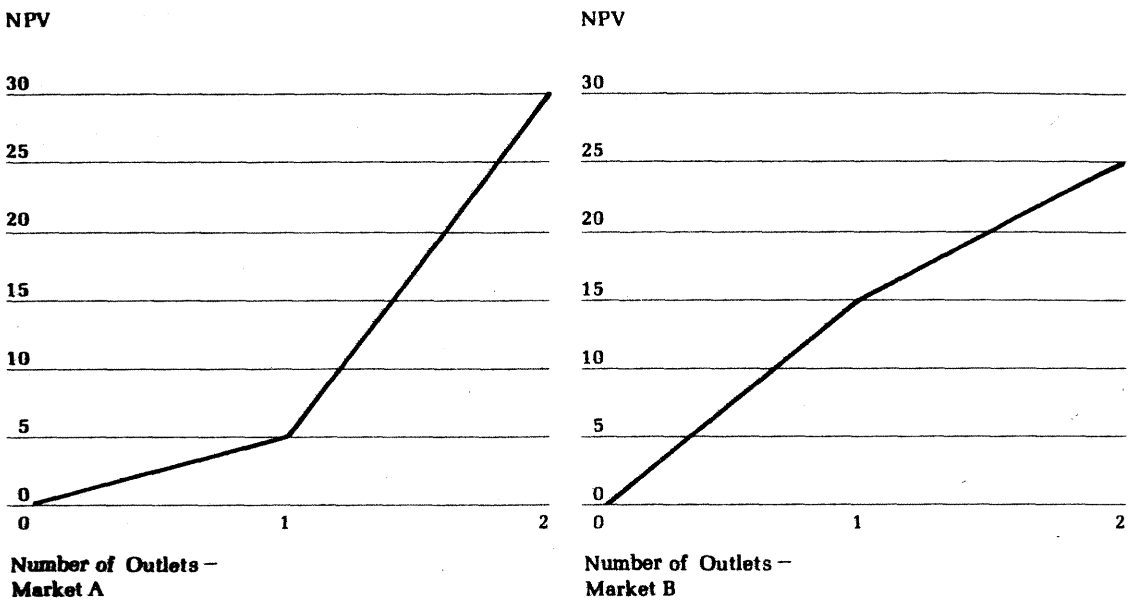
Suppose XYZ only wants to build one outlet; clearly that outlet should be built in market B. If two outlets are to be built, they should *both* be built in market A. If three are to be built, two should be built in A, one in B, etc. These results are summarized in Table 1.

Note that if scale effects were ignored and an *incremental* analysis used instead, the second of two outlets would be built in market B, since it would yield an incremental NPV of 10 compared to a NPV of 5 for a first outlet constructed in market A. A total net present value of 25 would result instead of the best case NPV of 30.

We have just shown how this procedure considers not only the value of single outlets, but also the value of *groups* of outlets in assessing profitability. The actual mechanics of the procedure, especially as applied to building plans over time, are somewhat technical and are treated elsewhere.[9] The important point to remember is that in practice the procedure has proven efficient and easy to use, producing results that are optimal or close to optimal. For example, the procedure was applied to a 170-market, five-year planning problem considering 3,000 outlets. The allocation procedure took less than a minute on an IBM 360-75; including input-output and NPV calculations, the entire procedure ran in less than five minutes. This efficiency is important for allowing update runs and sensitivity analyses at low cost.

This system has also been used as an aid in outlet construction planning at a major U.S.

Figure 3 **Allocation Example**



corporation since 1969. The procedure was used to:

1. Generate allocation plans, given a set of assumptions and inputs;
2. Test the allocation against changes in those assumptions;
3. Aid in determining the overall building allocation.

Point 2 is critical in every application. Suppose that the model's allocation does not change with projected variations in land costs but is very sensitive to variations in profit margin projections. Analysts should, therefore, spend a great deal of time firming up their margin projections and devote less attention, if any, to the land cost estimates.

In regard to point 3, outlets should be viewed as investments since firms have alternative uses for their building capital. As in any capital budgeting problem, the firm should build those outlets returning a positive net present value when discounted at the firm's cutoff or internal rate of return. No overall building constraint is needed, however; the procedure terminates when the incremental NPV for the last outlet planned becomes zero or negative. Hence, the discount factor affects both the overall building level as well as the total allocation of outlets.

Summary. The model does not replace or transcend the manager; however, it does provide more meaningful inputs and thus more useful outputs. The managers are involved at each step in shaping the final results and, by being able to control the process, they grow to trust it. They also learn a great deal about the particular decision situation and how it interacts with the firm's problems. They become more secure in their own judgments as well.

We have discussed the key idea that development of efficient building plans requires explicit recognition of the S-curve relationship, i.e., the impact of new construction upon the entire structure of the market. Incorporating this relationship into the planning process leads to significant improvements in retail outlet building policies.

Table 1 Example—Allocation Procedure Results

Total Building Constraints	A	B	Total NPV
1	0	1	15
2	2	0	30
3	2	1	45
4	2	2	55

Site Selection and Site Potential

A second key problem faced by the multi-outlet business is deciding where the outlet should be placed once the commitment to locate in a market area or city has been made. Approaches vary, as will be seen. Applebaum[10] reports that 10 percent of a sample of 170 large retail chains performed *no* systematic analysis for location of retail outlets. That same study showed that research expenditures varied widely; the average research expenditure per new location was about 1 percent of the site investment cost.

When Eastern Shopping Centers appraises a site, the location is ". . . subjected to a searching analysis covering current populations . . . population trends, current and per capita income of the area, competing centers of retailers, . . . road patterns, . . ." etc. In contrast, a drug chain appraises a site ". . . just by taking a ride around a particular area, talking to some of the people living there and getting a feel for the site's expansion capabilities."[11]

A variety of different methods have been suggested to assist in the evaluation and measurement of site potential. Some of these have been published and are briefly reviewed later in this article. Many other approaches are commercially available, but their details are usually closely guarded and unavailable for critical review and publication. The large number of commercial and academically published models suggests that researchers (and managers) feel a need for rational and formal use of information in this area. However, most of the models appear to be *ad hoc* in nature. They consider neither the synergistic influences of other outlets (the company's or a competitor's) nor any well-developed theory of consumer motivation or behavior. We will examine these models from two viewpoints and then advance some suggestions for future research in the area. The viewpoints are:

— Model structure, and

— Model predictive validity.

Site Selection Model Structure

Kotler views the site evaluation problem in two parts: site research and site selection.[12] The site research method, which isolates potential site candidates, is usually performed by real estate agents either inside or outside a company.

Site selection methods can roughly be grouped into three categories: checklist, analogue, and gravitational (or behavioral) procedures. Checklist methods use an intuitive set of judgments and weightings to evaluate site potential. Again, Kotler discusses some of these examples.[13]

Analogue methods (intuitive gravitational methods) develop zones around a proposed site and estimate sales that are likely to be drawn from each zone. These "draw" estimates are based on the drawing power of similar stores in the company's chain, hence the term "analogue" method. Analogue methods are most closely associated with Applebaum's research.[14]

A common structure underlies many of the best gravitational models[15] that are modified or customized for the particular business or purchase situation. This structure can be summarized as:

$$\text{Site Potential} = \text{Local Sales Component} + \text{Transient Sales Component.} \quad (1)$$

Relationship (1) says that sales potential at a particular site has two separate components: sales to people who live nearby and sales to people who are driving through (i.e., who do not live in the area). The nature and importance of these two components vary considerably from product class to product class, but the basic structure serves as a starting point for model development.

First, we focus on local potential, f_i, with a brief review of the approach proposed by Reinitz.[16] This approach was used originally for gasoline stations, but since the method is quite comprehensive, it can be applied to fast foods as well. The procedure is as follows:

1. Choose a local area radius, usually one mile. (Model results are generally not sensitive to the size of this radius as long as it is not too small.) Obtain the car population, gasoline usage, and other descriptive information of the area.

2. Obtain a census of existing outlets, and rate them according to a number of predetermined attributes. Let

   r_{ij} = rating of outlet i in the trading area, along attribute j. For example, j may be ease of accessibility.

3. Obtain importance weights of these attributes from consumers.

   Let w_j = average importance weight of attribute j.

   One key attribute to include is brand image or market presence so as to link this model with the S-curve model in the previous section.

4. Now estimate local potential, f_i, as

$$f_i = \frac{\sum_j w_j r_{ij}}{\sum_i \sum_j w_j r_{ij}} \times \text{area gasoline potential} \times \text{fraction of sales bought locally} \qquad (2)$$

where index j covers all outlets in the trading area.

Functional forms other than (2) have been used as well, but none show improvements in predictive power.

Huff tries to quantify "similar conditions" by relating the draw of a store to its size, and customer commute time to a store relative to the commute time to competing stores.[17] Stanley and Sewall replace the "size" variable in Huff's procedure with an image variable obtained through multidimensional scaling.[18] Hlavac and Little use an approach for automotive dealerships which is a combination of the Huff and Stanley-Sewall procedures.[19] It considers the distance customers travel, as well as the attractiveness (image) of the automobiles offered for sale.

The transient component of sales is of great importance in such product classes as gasoline and fast foods. A great deal of brand-to-brand substitution is possible and the purchase trip is often a secondary part of another journey.

Reinitz's model again is the most complete here. He uses essentially the same model structure as is used for local potential, replacing "area gasoline potential" with traffic count data, and the "local trading area" with a measure of road segments emanating from the gasoline station.

Predictive Validity

Efforts to gauge the predictive validity of site potential models have been clouded by several factors. Some of the most important of these are discussed below.

1. Model validation has usually been done by checking how well the model fits data collected from outlets used in model development or, at best, by using a small hold-out sample. Since many of the models have been implemented by management, one concludes that these tests have produced acceptable results. For example, Reinitz's model was subjected to extensive testing of this type. Had the model's predictions been used, most of the unprofitable outlets and

only a few of the profitable ones would have been eliminated.

The more rigorous type of testing — predicting the sales of unconstructed outlets and comparing predictions with actual sales — has been rarely conducted in practice. The reason is that sales potential is a long-range concept. Outlets may approach their potential in only six months, or reach it over a period of several years.

In recent work by Kinberg and Rao,[20] data for checking and savings accounts for branch banks were analyzed to identify when a "steady state level" of business was reached. It was found that the time required to reach the steady state level varied from two years to over seven years, depending on such area characteristics as population turnover rate. Due to such large time lags, substantial changes in traffic patterns and neighborhood characteristics occur which invalidate many original model assumptions and thus, the forecasts of sales potential. Evaluation of a model's predictive power can be a long-range task, requiring the kind of effort and dedication to validation that many commercial organizations are unwilling to undertake.

The only predictive study the authors are aware of (because they participated in it) was conducted for Reinitz's model. The model predictions were unbiased but had a very large error variance. Nonetheless, this variance was still smaller than the error variance associated with forecasts made by real estate officers. This suggests that while the model approach is better than informal forecasts developed by "knowledgeable people," there is still much room for improvement.

2. All of the models predict sales *potential*. Actual sales achieved by a site depend critically on the management of the outlet. Once an outlet earns a reputation for poor service, it is almost impossible for it to reach a target sales level that approaches the predicted "potential." Conversely, sites with good management consistently exceed their potential. Since there is no method for estimating the *ex ante* quality of an individual manager, there is a large uncontrollable source of error intrinsic to every forecast. For example, in the studies to validate the predictive capability of Reinitz's model, much of the forecast error could be explained by variations in outlet management. Therefore, site selection models will remain incomplete and ultimately inaccurate, unless they explicitly incorporate management quality into their model specifications.

Suggested Research

One of the major shortcomings of site models is that they are "site-by-site" evaluations; they do not consider the impact of one site on the others. The S-curve relating market share to outlet share provides at least a starting point for analyzing such interactions. Also, the S-curve provides a way to incorporate "brand strengths" directly into site potential.

More importantly, a behavioral approach to the modeling of site potential is required. Some interesting preliminary work reported by Ackoff[21] relates the probability of a consumer stopping at a particular outlet to the perceived time it will take to obtain service, and relates perceived time to actual time in a nonlinear fashion. This cognitive distance approach has been explored initially by MacKay and Olshavsky[22] but needs further analysis.

Implications and Conclusions

Inefficient expansion and site selection strategies benefit no one. The retailer sees lower than optimal returns on investment, and the average consumer does not have the same variety of alternatives available (or at least has to drive further to obtain them). The marketplace is a powerful mechanism. We have reviewed procedures derived from a scientific and empirical understanding of that marketplace. The application of these procedures reduces unnecessary distribution costs and leads to a more systematic process of retail outlet planning.

These models do not, of course, replace management judgment. Rather, they support that judgment by providing systematic and quantitative input as one element in the decision process.

Our aim here has been selective rather than exhaustive. We point out that quantitative approaches to problems of retail outlet management are emerging which are of use in problems of strategic and tactical planning. Underlying these approaches are a few key ideas:

1. Outlet share is generally related to share of market in a nonlinear fashion. This relationship has an important impact on the development of strategic building plans as well as on the evaluation of retail site operations.
2. Structuring the problem of evaluating site potential as potential = local component + transient component has been quite successful and should be exploited.

There is a great need for new research in this field. However, there is a much greater need for integration and implementation of existing methodology. Many new tools and concepts are now available. The challenge to the multi-outlet retailer is to effectively use them.

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