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STRATEGY-DRIVEN CONCEPT GENERATION

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The firm which wants to develop an effective concept generation program today faces several key problems: (1) There is no standard concept generation system available from which to craft a specific program for the firm; (2) a confusing and overwhelming set of over 100 ideation techniques has been created and offered for use in generating new concepts; (3) we lack methodologies for measuring the effectiveness of concept generating programs; and (4) the newly developing practice of creating new products strategies has not been related to concept generation in any systematic way.

It is the purpose of this article to reduce some of the dissonance surrounding two of these problems by showing how strategy can be used to choose from among the 100 ideation techniques. This application of strategy is only one of many we will see in the years ahead as firms learn how to operate in a more strategically disciplined fashion.

The system suggested here assumes that a firm wants to develop and implement its own concept generation system. It need not. There are several nationally recognized firms which will provide this service for a fee, some of them being Synectics, Inc., Innotech Inc., and Innovation America Inc.

WHY A STRATEGY-DRIVEN CONCEPT GENERATION PROGRAM?

One may, of course, be prompted to ask just why a concept generation program should be driven by new products strategy at all? Aren't good ideas good ideas, however found? Isn't most strategy limiting and restrictive to concept programs? The answers are no and yes. There is no such thing as a good idea, in the abstract and

for all firms. But strategy does indeed spell out the limitations felt to be appropriate for the firm in question. Strategy is meant to be restrictive -- that's its key value. Strategy calls for direction, but it is impossible to stipulate one or more directions for growth without automatically discounting other directions.

Here are some specific aspects of new products strategies which have influence on concept generation:

1. Strategy often designates a key arena of operation -- based on a particular technology, an application or use, a specific market group or user, or just a particular product category. Gerber's babies, for example, or 3M's adhesive technologies, or Wang's word processing. Concept generation should concentrate in the areas designated.
2. Strategy often states goals and risks -- key inputs to the intensity and character of the search. For example, a firm with a goal of dominating a market needs concepts which are different from those of a firm which wants to maximize Percentage Return on Assets Employed.
3. Strategy often designates a key function within the firm -- e.g. marketing in one firm, R&D in another. This gives locus to concept generation.
4. Strategy often stipulates the degree of innovativeness sought, that is, the degree of market precedence. Concept generation is obviously affected directly.

Strategy, properly chosen and communicated, multiplies the effectiveness of every concept generation dollar. Strategy and concept testing are thought to be the prime reasons why American firms over

the past 15 years have reduced from an average of 58 to 7 the number of concepts which enter the R&D stream to produce one successful new product.

SELECTIVE TYPOLOGY OF NEW PRODUCT STRATEGIES

In order to demonstrate how strategy directs the use of the many ideation techniques crowding our literature it is necessary to have some examples. Accordingly, here are four different new product strategies which are quite representative of business practice today and of the range of choice available.

THE PRODUCT CATEGORY STRATEGY

Here the expertise is product/market knowledge -- the beer business, the shoe business, and so forth. There may be specialized technologies and particular uses and/or users, but the firm's strength is its intangible general knowledge of the "business." This strategy says the firm will stay in that business, and do more of the same. Usually the strategy is not highly innovative, with no high-risk goals. Marketing definitely has charge.

THE SPECIFIC USER STRATEGY

In contrast to the product/market strategy above, this strategy commits to particular customers, or to particular groups of customers. The idea is to make products for them, covering large categories of their actions (not just one, as in the next strategy below) and pulling on any available technology. Gerber's babies are an example, as are pharmaceutical companies for the packaging division of Owens-Illinois. The strategy is

usually conservative, adaptive only, and with limited growth goals. Marketing gets the assignment.

THE SINGLE APPLICATION STRATEGY

Here there is no limitation of product type or customer type, but the application is tightened. Head's commitment to tennis (they have other strategies in other applications) and MCI's focus on business-to-business communication are examples. Although the innovativeness sought is usually still significant, most of those strategies will also permit innovation which is only a significant adaptation. There is little real pioneering, and the functional assignment is customarily to marketing. Goals are situational, though almost always based on significant growth.

THE TECHNOLOGY/APPLICATION STRATEGY

Here a firm has a particular technical strength -- e.g. Kodak and disc technology, Coca-Cola's bottling systems, Corning's glass. Further, the firm has designated at least one application for that technology -- e.g. Kodak's disc applied to amateur photography, Xerox's xerography applied to document reproduction. Together, technology and application can yield a powerful focus, so the strategy usually also calls for a pioneering degree of innovativeness, or at least a very rapid and significant adaptation of others' pioneerings. The functional assignment may be to a technical department, at least early on, and the goal is usually challenging, though longer term.

This set of strategies omits the rare ones based on the distribution

channel, as well as those where the degree of innovativeness is strictly me-too, or pure imitation. None of these omitted strategies calls for vigorous concept generation or use of the ideation techniques.

A GENERIC CONCEPT GENERATION SYSTEM

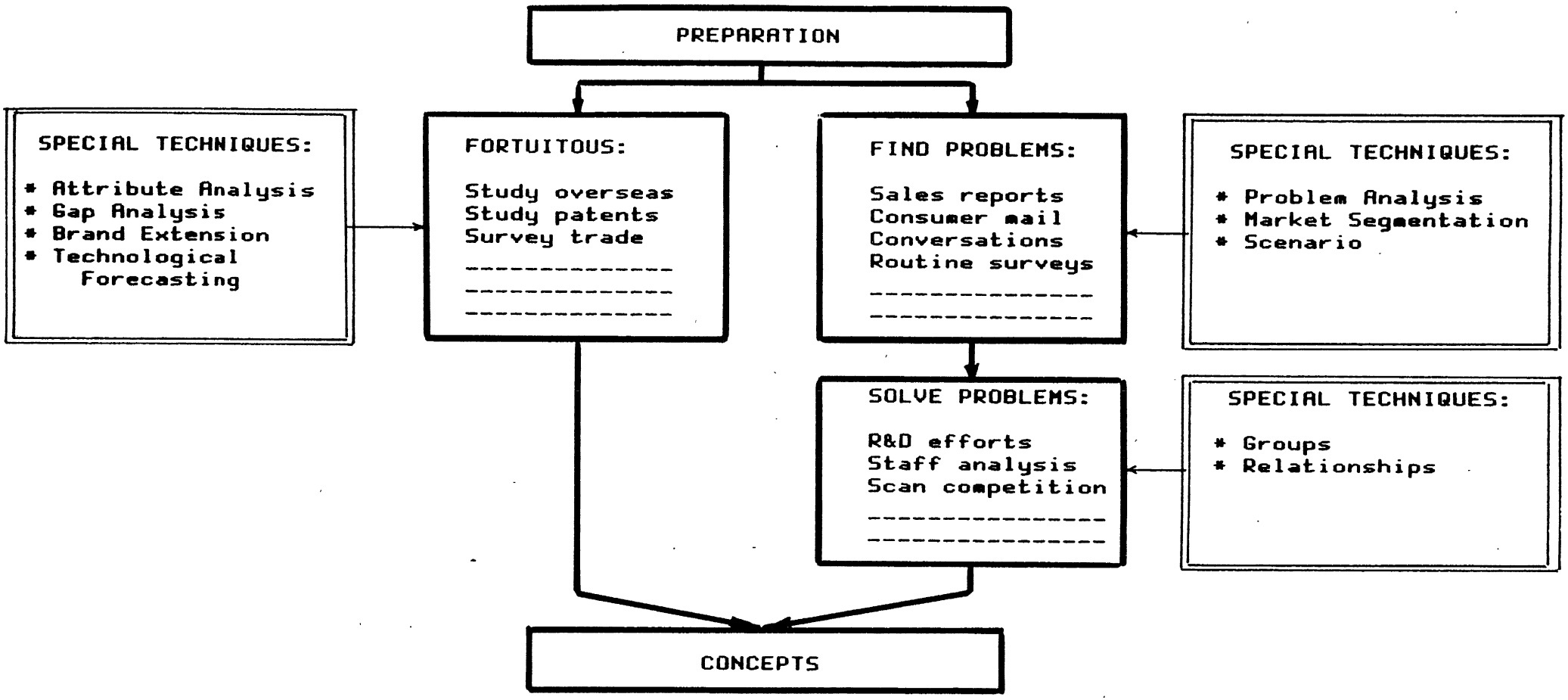
This article does not offer one unique, broadly applicable concept generating system, even though we need one. But we must have some system in order to demonstrate how strategy influences the selection of ideation techniques.

Figure 1 shows the system we will use here, designated by the heavily lined boxes and arrows. It calls for a preliminary period of preparation (staffing, review of literature and past studies, training sessions) followed by two streams of activity. On the right is the major one, comprising a probing search for problems and needs on which new products might conceivably be based. The search for problem is followed iteratively by search for solution. The action stream on the left is more situational. It is not particularly purposive, though it does involve some very traditional and popular actions -- e.g. patent searches, trade advisory councils, overseas scans, and the like.

Feeding into the three major activity boxes are the specialized ideation techniques. For example, problem analysis is the principal technique for finding user problems, brainstorming is frequently used for problem solving, and attribute analysis is a common technique for spotting unexpected ideas. Let's turn now to the complete set of ideation techniques to see how they can be brought into the concept generation operation more systematically than Figure 1

FIGURE 1

Merger of Ideation System and Techniques Typology



shows.

IDEATION TECHNIQUES

There is no way that over 100 techniques can be used systematicaly. Many of those techniques are minor variations on others -- e.g. some people cite over 20 ways to brainstorm. So presented in Figure 2 are those techniques which have a history of usefulness, categorized into a typology that should aid greatly in understanding them.

Figure 2 also gives a descriptive definition for each category and for each technique, plus a demonstration application of the technique to bicycles and bicycling. Additional techniques within each category can be found in the literature on creativity, but they really are not necessary. Several widely available books on new products management give full descriptions of the more common techniques listed by name in Figure 2.

MERGING STRATEGY, SYSTEM, AND IDEATION TYPOLOGY

We can now put the pieces together. Figure 3 shows the four typical strategies given above, plus the particular set of ideation techniques that are useful in each, and where in the system they are useful. Let's take the low risk one (A) first -- the "product category" strategy that might be typified by Stroh's commitment to new beer products, and banks' striving for new commercial loan products.

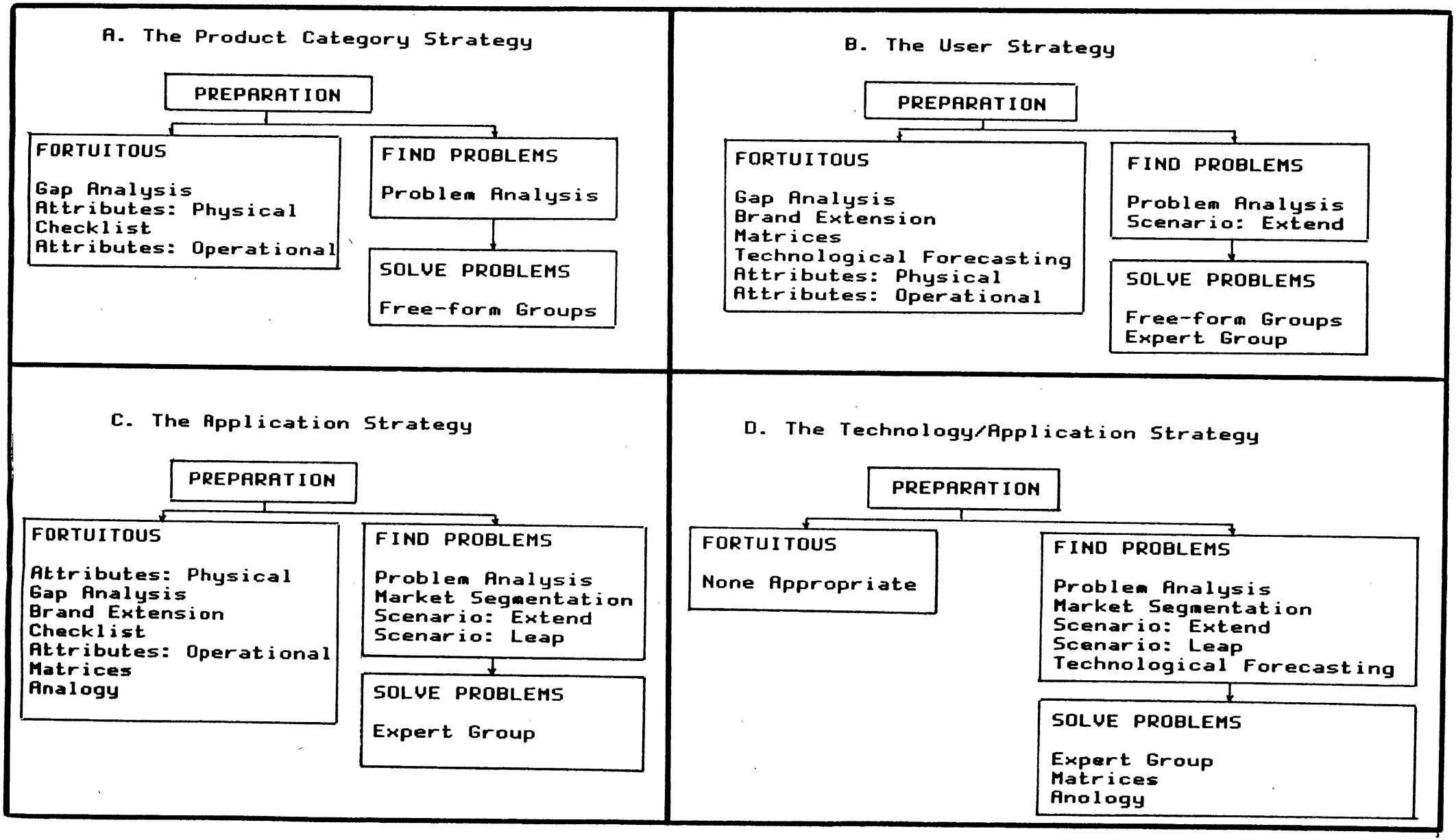
The best technique for finding problems in a setting where the firm has been active for years is problem analysis. It is a specific, powerful technique, almost guaranteed to come up with interes-

FIGURE 2
Typology of Leading Ideation Techniques

IDEATION TECHNIQUES	DESCRIPTION OF TECHNIQUES	APPLICATION TO BICYCLE IDEATION
THOSE BASED ON USERS/USES:		
* PROBLEM ANALYSIS	Using surveys, focus groups, etc to probe user activities, needs, wants. Goal is previously undetected need.	Gathering some 6-8 groups of heavy bike users to discuss what they do and what difficulties they have doing it.
* GAP ANALYSIS	Techniques for mapping user and expert perceptions of product attributes. Seek holes in the maps.	Bikers map bicycles on attributes of speed, weight and heighth. Analysis shows no 16 in. light, fast bike.
* MARKET SEGMENTATION	Analysts construct successive and cummulative segmentation of the market. Use perhaps 5 dimensions.	Use age, purpose of trip, sex, time of day and load. Find older female evening shopper w/ light load needs special bike.
* BRAND EXTENSION	Study market to determine extendability of present brand to other types of products.	Bikers might indicate that the Schwin brand would sell well on tricycles and motorcycles, not sneakers or clothing.
SCENARIO FORECASTING:		
* EXTEND	Descriptions of future situations are made by extending current trends in attitudes and practice.	Bikers now are extending the time they spend on bikes. What opportunities are there for week-long trippers? Longer?
* LEAP	The future is described regardless of current trends. Life in 2010, or the factory of the future.	Someday the car may be banned in large cities. What types of bikes would be particularly useful then?
* TECHNOLOGICAL FORECASTING	A bundle of techniques that basi-extend current technology. E.g. how small can calculators become?	Plastics grow tougher. When will they have attributes that apply to bikes? Or, how light weight can bikes become?
GROUP PROBLEM SOLVING:		
* FREE FORM (BRAINSTORMING)	Groups of qualified (though not expert) people meet to find solutions to a given problem. Rigid control.	People who know bicycles might gather to wrestle with how to park bikes upright, or how to carry spare air.
* EXPERT PANEL	Mix of disciplines address a problem. Physicist, psychologist, biologist, engineer.	What would the ideal long-distance bike look like? How should it be ridden and maintained?
ATTRIBUTE ANALYSIS:		
* PHYSICAL (DIMENSIONS)	Listing every dimension of current product. For each, can it be altered? Force to complete lists.	Cite every bike part, and every aspect of every part. Shape, material, length, hardness, color, etc. "Listen" for ideas.
* OPERATIONAL (FUNCTIONS)	Similar to physical except that one lists uses, functions. How used is called systems analysis.	List all the uses of bikes. Each use may suggest a possible new bike just for that use. E.g., wooing early teenagers.
* CHECK LIST	To facilitate attribute analysis, some people have devised lists of the most fruitful attributes.	Marvin Small's list of 112 possible ways to alter a product suggests disposable, insulated, rotated or reversible bikes.
RELATIONSHIPS:		
* MATRICES	Forcing unrelateds together. Matrix with say foods across top and forms down side yields pancake puddings.	Four-dimensional matrix of bike parts, politics, uses, fears. Get wider pedals for radicals at rallys to escape fast.
* ANALOGY	Seeking some system or operation similar to ours. Study that one for ideas to apply to our product.	Study track. Note runners pace and then spurt. Can we build in pace controls, or provide limited amount of spurt?

FIGURE 3

Four New-Product Strategies
And Ideation Techniques Appropriate To Them



ting new understanding on market user needs and problems. Market segmentation is another useful problem technique, because it uncovers subgroups in the market whose needs are not being addressed at this time. As an aside, we sometimes hear of systems analysis being used here, as well as two-dimensional matrices and scenarios, but these techniques are unlikely in such established categories.

To solve the problems discovered, industry can best use free form groups, particularly brainstorming or less formal focus groups. If focus groups were used for problem finding, searching them for solution is a natural. Incidently, to underline the point that these ideation techniques are only aids to an ongoing system, note that most problem solving is probably done by technical groups such as R&D, not by marketing people.

While the problem process goes on, the fortuitous phase shows several options, particularly gap analysis. In established markets consumers can map product attributes very capably, and so can product managers. Attribute analysis, using dimensions, is common and worthwhile. Checklists are very common, though less useful than they were in less sophisticated times, and some firms use operational attribute analysis (uses) though in established markets there often is little to be learned.

In all, these comprise a set of low-risk techniques consistent for use in a low-risk strategy.

The (B) section of Figure 3 describes the next strategy -- that based on specific market users. Gerber and Owens-Illinois are examples. Here the customer is not new, but the products probably will be. The firm has been addressing currently known needs for some time, so this strategy turns up useful needs only when it goes

outside the current business (e.g. when the strategy led Gerber to market life insurance for babies).

Here we see use of problem analysis among those target users, or among experts who are skilled in the activities of the target. Additionally, the future may bring changes in users' situations, so conservative scenarios are used -- extending seed trends and the activities of seed people.

Problem solving again goes to group techniques, this time partly free form groups of target users, and partly expert panels. Most certainly Gerber developed infant formulas under the guidance of MDs and other scientists. Systems analysis can be used if the particular activity involved is new to the firm.

Fortuitously, there is much more going on here. Though the target user group is well known to the firm, their full range of activities is not. Gap analysis explores those other activities. Brand extension is a good technique because the brand(s) will be a large part of any new product's claim to market share.

Though the situation is riskier than in the first strategy, the techniques are typically conservative, requiring movement only from the known to the nearby unknown.

The (C) portion of Figure 3 shows some sharp differences from the user strategy just above. For example, since we are dealing with a known category of activity (e.g. tennis for the Head Company) we can apply systems analysis effectively. And any scenarios now must utilize the "leap" technique -- jumping out beyond present trends. This is possible because the firm is expert in the target activity.

Solving problems definitely involves experts because we are usually dealing with very difficult problems of the moment or problems expected to appear in the future.

In the fortuitous area we see techniques based importantly upon product attributes, that is, the products currently used in this area of activity. Dimensional attribute analysis, determinant gap analysis, and matrices make the point. Since it is necessary to stretch beyond current products in this category of activity, some use is made of matrix techniques like morphological analysis (using many dimensions, not just two), analogy, and some miscellaneous techniques not in the Figure.

Here the concept generation is clearly higher risk, for a higher risk strategy. It is necessary to force a distinctly different degree of creativity, tough to do in established categories of activity such as tennis or bicycling. Prince rackets and yellow tennis balls may be about all that can be obtained, suggesting that an applications strategy is only useful for rapid growth when the application is new or complex, not like tennis.

Lastly, we can look at (D) the technology/application strategy. This essentially is a "solution running around looking for a problem", or, "have technology, will travel." Thus, finding problems is the central activity, and calls on the most techniques. In Kodak's case, their first round of studies disclosed that many amateur photographers were frustated when taking pictures around dusk. This problem was taken immediately into research with the disc technology, and the problem search temporarily abandoned.

Technological forecasting is a major tool here, as are all types of scenario forecasting.

Solving problems is more apt to be a technological assignment, as it was in Kodak, but expert groups help direct technology, matrix analysis can bring surprises, and analogy is useful, especially when the area of application is outside the firm's experience.

Because the technology is so strong, and the commitment so great, fortuitous methods play little if any role. Concept generation in this strategy is quite purposive and directed. The rationale is usually technical and functional, not frivolous.

SUMMARY AND CONCLUSION

This paper has addressed several of the problems faced by a manager attempting to develop a sound concept generation program. Few established systems are available; there are many more ideation techniques than can be used; and each situation is (or should be) guided by a strong new products strategy. By developing a typology to classify the many techniques and by citing a set of four typical new product strategies, it was possible to spell out suggested concept generation systems which are internally valid; each system incorporates a specific new products strategy and a set of ideation techniques appropriate to it.

The implications are several: (1) some system of concept generation is necessary in each situation, because of the complexity of options; (2) appropriate strategy must be involved somehow; and (3) the long list of ideation techniques need not be inhibiting -- there is an appropriate typology, and the typology categories relate sensibly to the different concept generating systems.

But if concept generation must be responsive to different strategies, and if most firms have several different new product

strategies operating at any one time (some have scores of them), then there must be a multiple set of concept generation systems. Many people run them, in different locations, with different motivations and rewards. No wonder managements today are miniaturizing their new product operations into teams, task forces and the like, each with a bundle of strategy, organization, and system for generating, evaluating, and commercializing new product concepts.