Perceptual maps: one aid to product planning

Perceptual maps identify many characteristics of products already on the market. They are a prime basis for gathering other information important to product planning and design. A planning specialist outlines how the maps are made and used.

Information is the basis of all design. Someone must say what a product should do, what a car should look like, what market segment a refrigerator should be put into.

One difficulty is that such information can come from scores of sources of many kinds—consumers, government statistics, even a corporation's board of directors. Unfortunately, raw data is usually more confusing than useful.

One of the most difficult problems in business is for everyone involved in making product decisions to have a base of concise information so that they can agree on what must be done.

Among the many tools product planners use to organize information are perceptual maps. Such maps condense a great deal of information into a graphic display that can serve as the focus for discussion.

Perceptual maps usually use two or more prime characteristics or "determinants" of a product, such as price and size, to relate a group of competitors in a market. Such maps can be used to present the results of early, information-gathering "audits" before planners—including marketing and design personnel—go on to learn the "whys" of the results to develop a sensible, marketable product design.

Complementary activities
Marketing and design, of course, are complementary activities. Marketing takes care of a product's distribution and promotion, design takes care of the product's performance and appearance.

The evolution of design and marketing as discrete activities can be traced to the turn of the century. As mass production took hold, the "design" of the product was the work of engineering. By the 1920s, sales became a complement to manufacturing; most companies had both, but sales simply sold what engineering made.

By the 1960s, as more products could be made than consumed, product styling began to dominate the design of many types of products. For example, GM started styling its cars, and today, sales lead from Ford.

By the 1950s, marketing (a more "scientific" way to control how products were distributed and promoted) began to replace sales. In many companies (especially those making consumables) it started calling the shots on the product's design. But in most companies, whether design (engineering or styling) dominated or marketing dominated, a reason between the two was poor.

That's one of two main reasons product planning evolved in the 1960s. Within a company, the role of a planning staff is to assure coordination between design and marketing. To do this, planners must collect and organize sufficient information from both design and marketing groups to assure that both operate at peak effectiveness.

Product planning evolved for another, external reason, too: to keep the consuming public happy enough with a company's products to keep on buying them. Planners, then, do more than see that something is designed and marketed only to sell lots of it, an idea often offensive to designers and artists. Planners also seek the objective of design and marketing as increasing consumer satisfaction.

The primary objective
To assure that consumer satisfaction is company's primary objective, product planners:
• Outline what "control information"—that used to form a product—design must generate (see sidebar) and what information design must not waste time or. Planners do this by describing the product (ranges) to be designed.
• from the product such as weight and size—are combined with subjective evaluations taken from consumers.

This flow model is a cybernetic loop Evaluation information becomes feedback that control uses to make corrections and refinements to the design information generated for use in succeeding cycles. The arrows in the drawing (Figure 1) are information being transmitted, the cells are where information is transformed.

Design, the generation of control information, includes two activities engineering (which produces information to control product performance) and styling (which produces information to control product appearance). But design is only one of many activities in the model. Marketing, a complementary activity is equally important. The model helps to relate the two.

Information as a design base
There are as many definitions of design as there are definers. Here is another: Design is the generation of "control information." To define control information requires some theoretical foreplay, which includes a model of human operations.

The underpinning idea of this model is the assertion that every product is composed of information, materials, and energy. The form given the materials is the result of information applied, and these materials are formed by an expenditure of energy.

For example, an automobile's materials are some dirt and oil which, after applying information and energy are applied, have been refined into steel, aluminum, glass, paint, plastics, and rubber. Applying more information and energy to these materials produces a car which reaches its peak of integration at the end of the assembly line.

The purpose for focusing on information is that the model maps how information is transmitted and transformed in business operations. The model has five components:
• Control is where design generates information that is used to form the product.
• Operation is where design information, sent down from control, is combined with materials to form the product.
• Product (materialized information) is the intended result of operation.
• Consumers (for whom the product is intended) produce a subjective evaluation of the product, they like it or they don't.
• Evaluation is where objective evaluations—measurements taken directly

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structure and present the information evaluation. Planners collect what is available and recommend the collection that’s missing.

Product planners do not design the product; this is done by engineering. They don’t market the product; this is done by specialists in advertising, cataloging, or distribution, for instance. Neither do planners set corporate strategy; top management does, and planners work to meet its directives.

**Early audits**

Integrate design and marketing, and be sure that delivering consumer satisfaction is a company’s primary objective. Planners use many techniques, adding five types of audits. Two used to produce control information are value analysis and technology assessment. Value analysis is a spin-off of engineering, where in-depth examination of a product and its competitors is made to determine how the nature and condition of the product can be improved. The goal is not cost reduction but to improve quality while providing economic material, assembly, and manufacturing.

Technology assessment is used to evaluate the state of present technology to project how trends will affect the product. The goal is to allocate technical resources properly.

Consumer research and market analysis are two audits used to collect market information.

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The model can be divided into two parts (Figure 2). One part includes control, operation, and product. This is the static phase where the product is materialized from design information to “reality.”

The second part, which includes control, consumer, and evaluation, is dynamic. This is where the product is materialized into information.

At the core is the critical relationship between product and consumer. Marketing’s task is to arrange every aspect of this interaction, including packaging, advertising, cataloging, pricing, distribution channels, and display. Design and marketing are complementary activities. Design takes care of the product’s performance and appearance; marketing takes care of the product’s distribution and promotion.

—J.D.
Information and product planning

Consumer research examines trends and demands for product features, styling and human factors. There are many approaches for producing useful, projectable information, such as focus groups and diaries.

Market analysis studies the channels of distribution to determine their inherent constraints and opportunities. It includes evaluation of promotional practices and requirements.

Finally, there is the environmental assessment audit, where factors such as legal restrictions, economic changes, consumerism, and energy costs are taken into account.

Depending on the particular project, the proportion of effort spent on each kind of audit varies. The work is customized, in other words.

The result is a vast amount of data drawn from primary and secondary sources. That's where perceptual maps come in.

A real map

A real example of a company's initial planning for new refrigerator designs can illustrate the use of perceptual maps. In 1976, Rockwell International, the Pittsburgh manufacturing conglomerate, acquired Admiral, a manufacturer of major appliances. Shortly after the acquisition, Admiral produced a plan that called for a multi-million-dollar retooling program. Because of the enormity of this investment, our firm, Delta Planning Group, in Chicago, was asked to "verify" the plan. One result of our study was the perceptual map accompanying this article (Figure 3).

Competitors were positioned on the map according to:
- Average price paid per refrigerator
- Average unit size sold
- Share of market by brand name
- Amount of product moved on sale

As with most perceptual maps, the vertical axis is price. The horizontal axis is refrigerator size, in cubic feet. The average price, as shown by the location of the horizontal axis, is around $430. The average size, as shown by the location of the vertical axis, is about 18.25 cu ft capacity.

The map is objective, because it uses two directly measurable product attributes. (In other studies of major appliances such as washing machines, dishwashers, micro cookers, etc., the horizontal determinant has been reliability, a subjective attribute.)

Admiral and its competitors are positioned according to information de-
derived from various sources, such as Trendex. Examination of this map shows General Electric, with its 18% share of market, in an enviable position. GE presumably enjoys a high regard by consumers to sell so many refrigerators at a higher than average price.

GE also builds Hotpoint refrigerators, which have a 6% share. They are positioned to compete on price. And GE makes units for JC Penney. With 2% of the market, Penney doesn't give GE strong representation in chain store distribution. To maintain this small volume, Penney sells GE refrigerators (under the Penney brand) at cost.

Sears, with a 22% market share, is well positioned near the center of distribution of consumers. What may pull Sears' price below GE's is that over 40% of Sears' sales are made at on-sale prices. (The cross hatched areas show brands with more than 40% of sales on-sale.)

Whirlpool, which builds Sears refrigerators, has 9% of the market. It markets primarily through appliance dealers.

Frigidaire, once owned by General Motors, has 12%. It seems well positioned between GE and Sears. But this may be a bad place to compete, and one reason why GM recently sold the brand to White-Consolidated.

White-Consolidated, with a total of 9%, is an accumulation of many acquired refrigerator brands including Whirlpool, Crosley, Gibson, and Kelvinator. These are clustered to the left of center.

Amana, with a 5% share, enjoys a lofty, high price position with its big refrigerators. It is difficult to understand how Amana perpetuates this high quality image. The company's products do look a bit higher in quality, but not 20% to 50% better than others. One thing Amana does is give a five year warranty, which is paid for by the higher price, like an insurance policy.

Admiral, with 4% of the market, is selling bigger-than-average boxes at lower prices. This means taking less markup or else producing lower quality. This tenuous position is probably due to Admiral's distribution, which is mostly through lower end appliance or furniture outlets.

Admiral also builds Wards' refrigerators. Wards, with 7%, is also in a difficult position, along with Admiral, selling on credit to mostly less affluent, big-family customers. Admiral and Wards products thus have an image of lower quality to some observers, which may be undeserved.

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Rotation
Inspection of this map shows an abnormal stretching from lower left to upper right. Most maps show competitors more evenly distributed with heavy clustering at the center; this follows the normal distribution of consumers.

Inspecting the map for vectors provides additional information. If vectors are drawn to chart the slope at price per cubic foot (Figure 4), it can be seen that J.C. Penney and Wards are positioned on a vector at about $20 per cu ft; GE, Frigidaire, and Sears are positioned at about $25 per cu ft. Amana, at about $30, is alone at this high quality position.

No brand is below $20 per cu ft, probably because this is as cheap as a product of this type can be manufactured. Although Amana is slightly above $30 per cu ft, no others are; probably because no product of this type could command a higher price.

Further consideration indicates that if the map were redrawn using the price-per-cubic-foot vectors as a vertical scale (rather than price alone) the map would rotate into a much more normal configuration (Figure 5). Amana, Wards, and J.C. Penney, initially at the extremes, now fall into a pattern more like those on most perceptual maps, and the redrawn map is easier to understand.

This new map is a snapshot of the market as of a year earlier than when it was done; it is historic. This information is useful, but to assist planning the positions of the brands must be projected as they would be at some specified future date. Various positions for Admiral and Wards can be considered with all they imply for investment, design, distribution, promotion, or even profit.

Mapping strategy
If management's strategy is to increase share of market there are two possibilities. One is to determine if a company's consumer segment is going to increase. If so, the company can stay where it is (at position 1 in Figure 6) and develop its strength.

If this consumer segment isn't increasing, then it is necessary to move toward the center (position 2) where more consumers are; this means taking business away from competitors. Such an operation will mean giving better value (equivalent quality and features at a lower price). In Admiral's case, we found that this may require Admiral to forego profits temporarily.

If management strategy is to increase profits, one way is to increase prices

Figure 5—Vectors as vertical scale 'rotate' map for easier understanding
which means moving up (to position 3, toward Amana). This seems possible since this position is unoccupied. It may be that fewer consumers are there; this would have to be checked. An alternative is to stay where they are (position 1) and cut costs but not quality.

From the positioning strategy chosen, product planning can project, in detail, the product's performance and appearance design, as well as marketing's distribution and promotion programs. From this, projects can be assigned to appropriate groups, both internal and consultative. The designers get the information they need to start drawing, and the marketers can begin plotting.

To visualize the capacity of mapping to illuminate change, if data from past years is mapped, then coupled to a map of the present, and then to a projected future map, plots in space show products changing in position or size, and show them coming and going. A hypothetical trio of maps is drawn to illustrate this feature (Figure 7).

**Only the beginning**

Product planning is still an evolving discipline. In practice, it ranges from a highly formalized approach adopted by companies like GE, Texas Instruments, and IBM to an informal, unstructured approach used by many businesses in the U.S., Japan, and Europe.

Regardless of the approach used, rapid access to appropriate information, its analysis, and its dissemination among decision makers are being recognized as the most critical activities of the product planning function. Perceptual maps are only one part of the process. Once they show the positions products hold in a market, the hard work begins: finding out the reasons consumers put the products in those positions.

The techniques described in this article provide only a glimpse of how information-gathering activities are being carried out in a few firms. In the years to come, we are likely to see much broader use of these techniques and rapid advancements in the level of sophistication of information collection, as well as information analysis and display.

The author, Jay Doblin, is an associate in Delta Planning Group, a Chicago consulting firm that specializes in product planning and new business development. The firm's other key associates, who assisted in the preparation of this article, areinder Agrawal, Richard D. Austin, and Richard S. Latham—out of whose product planning firm the present organization evolved. All four have professional background in planning and design, and are trying to bring both together in a common practice.