

# Product Quality in Transition

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In the 1980s, many Western companies discovered Total Quality Management. They implemented quality programs, formed teams, thought about customer-supplier relationships, trained staff in Quality Function Deployment and Ishikawa techniques, and appointed quality vice presidents and quality planning departments. For companies such as Motorola and Ford Motor Company, these efforts have paid off. Others have still to reap the benefits.

But where in all this deep organizational introspection is that old, traditional value of product quality? What does it mean in the 1990s? Who is responsible for ensuring it? And is there a risk that, just as optimized aerodynamic analysis always comes up with the same car shape, the disciplined, logical tools of quality planning will lead to identical, „me-too“ products? In this article we examine the meaning of product quality from the point of view of the toughest critic of all – the final customer.

## Customers' Perceptions of Quality

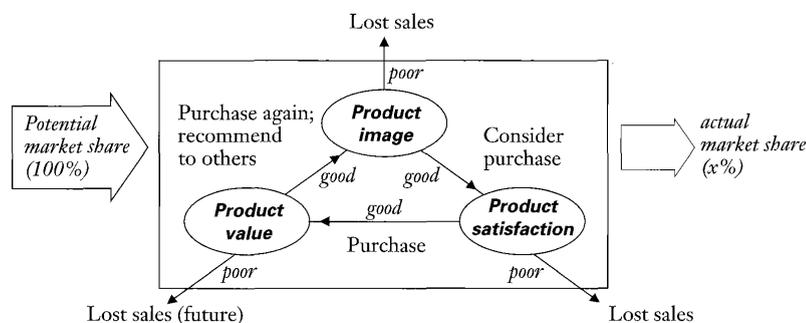
Customers' perceptions of product quality are as diverse as the customers themselves. One useful way of grouping these perceptions is by their role in the buying-and-ownership process. We have identified three basic dimensions of product quality in this process: image, value, and satisfaction (Exhibit 1).

- *Product image* drives purchase consideration. For example, a customer will consider dining at McDonald's or The Ritz, or buying a Mercedes or a Cadillac, on the basis of product image.
- *Product value* drives the purchase decision. Relative to both desired image and price, what value does the product offer? Do the added features of a Matsushita CD player outweigh the brand-image benefits of the comparably priced Sony model? Only if the value assessment is good will the customer buy.
- *Product satisfaction* drives both brand loyalty (as measured by the customer's willingness to buy again) and future image. Having bought the product, the customer lives with it and experiences a measure of satisfaction. If the experience lives up to or exceeds the customer's expectations, he or she will be satisfied. A satisfied customer may buy the same brand again and recommend it to others (which will boost future image). A dissatisfied customer probably will not do these things.

A good illustration is Toyota's experience in one of the world's most demanding automobile markets, Western Germany. The Toyota Corolla is still a relatively unknown model in the German market and, as such, does not have a strong image. However, perceived value is high and owner satisfaction ratings are excellent. As a result, Toyota brand loyalty in Germany has increased dramatically, from 55 percent of customers saying they would buy again to over 70 percent in a period of six years (Exhibit 2). The implications for future image and market share are not difficult to predict. In contrast, one of Corolla's major domestic competitors has experienced the opposite trends: Its image ratings are higher than actual satisfaction, and many potential buyers reject it because of its high price. As a result, its brand loyalty has declined sharply.

## Exhibit 1

### Three Dimensions of Product Quality



Each of these three dimensions – image, value, and satisfaction – must be carefully planned and managed through its constituent attributes.

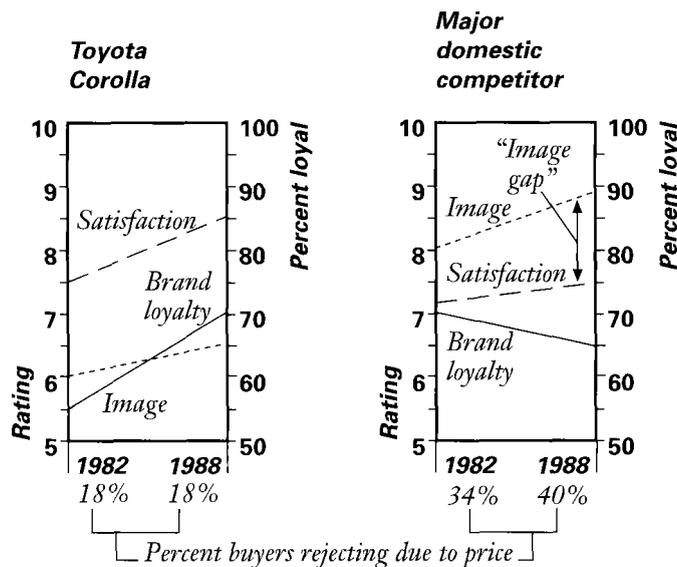
**Image Attributes.** Image attributes that customers associate with products and corporations range from the highly objective and functional to the deeply subjective. Examples include:

- Prestige or snob-value (Rolex)
- Solidity/tradition (IBM)
- Innovativeness (Sony)
- Safety (Volvo)
- Technological sophistication (Canon)
- Family values (McDonald’s)
- Youthfulness (Benetton)
- Stylishness (Gucci)

**Exhibit 2**

**Product Quality Dimensions:**

**Toyota Corolla Example**



Source: Market Research Data, Germany

Managing the image of a product or brand is as important as managing its physical characteristics. Volvo, for example, has managed the „safety“ image so consistently for more than 20 years that it has been able to maintain much longer product life cycles than many of its competitors – without significant volume loss.

**Value Attributes.** Value is simply the relationship of product content (including image attributes) to the purchase price. Some companies go to the extent of assigning a financial value to each product feature and comparing this to the variable cost of the feature, as a basis for feature planning (Exhibit 3). Those features with relatively low perceived value and relatively low cost are „normal“ product expectations and must be offered as standard. In contrast, features with low perceived value and relatively high cost are a waste of money. Features with high perceived value and low cost are very attractive not only to purchasers but to providers. Auto makers earn high profit margins with these as „options.“ For example, a new-car buyer might pay \$250 for optional metallic paint that costs

the manufacturer only \$10.

The most challenging feature category is the high-value/ high-cost area. Often it is hard to decide whether to offer these features as standard or optional, or, indeed, whether to offer them at all. U.S. auto makers debated for many years before they introduced features such as four-valve engines, antilock brakes, and air bags.

Feature planning for maximum value perception is further complicated by continually increasing customer expectations. Features that are „nice to have“ today rapidly become tomorrow’s normal product expectations.

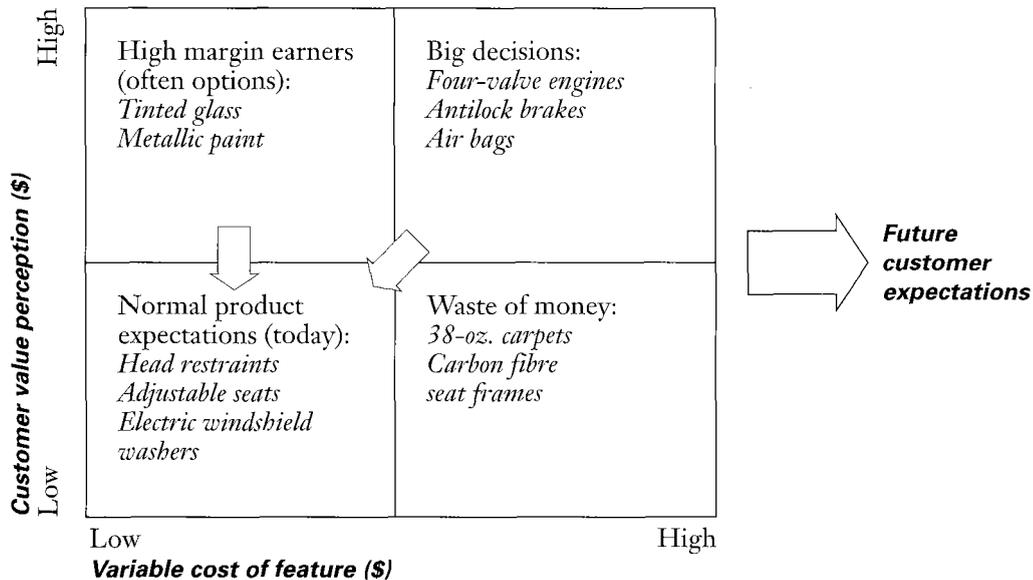
Value is an important purchase factor in any price segment, even the highest. For example, when Porsche dramatically increased prices in the United States to offset the strengthening deutsche mark, volume dropped a cumulative 86 percent between 1987 and 1990.

**Satisfaction Attributes.** Satisfaction is the measure of how well a product lives up to its purchasers’ expectations. Satisfaction includes all the traditional „product quality“ attributes, such as product performance, freedom from initial defects, in-service reliability, durability, and ease of operation. It also includes service-related attributes, such as speed of delivery, courteousness of sales person, efficiency of after-sales service, and extent of warranty. Third, it includes the intangible feelings associated with aesthetics and image attributes. Examples include:

- Feeling of privilege when driving a new Mercedes
- Feeling youthful in a new Benetton outfit
- Feeling of social responsibility when using recycled paper products

**Exhibit 3**

**Product Value/Feature Cost Relationships**



**How Much Product Quality?**

Having established the dimensions and attributes of product quality, a key question is how much of each to provide. Although the claim is often made that quality reduces cost, adding a new feature costs real money, at least in the short term. Choices must be made.

Elsewhere in this issue of *Prism*, Harvey Shycon discusses a methodology for calibrating the optimal service (or quality) level for a particular product. Here, we suggest assessing this question for each dimension.

For example, in the satisfaction dimension, it is imperative to satisfy minimum customer expectations („musts“) while at the same time satisfying as many customer „wants“ as possible. Both „musts“ and „wants“ will increase with time because of competitive activity. The real challenge is to exceed today’s customer expectations through innovation – i.e., by providing something the customer values highly, but has never been offered before.

In the area of female contraceptives, for example, a single attribute of customer satisfaction – delivery – has played a decisive role in the market. Intrauterine devices, one of the earliest product types, were difficult to „deliver“ (i.e., place in position) and unreliable. Because the contraceptive pill provided much simpler delivery and greater reliability (so long as the user remembered to take the pill), it rapidly gained market share. But human fallibility remained an issue. The latest controlled-release contraceptive implants solve the delivery problem for five years. For most women, they greatly exceed expectations. We anticipate major growth in this product – until another product innovation replaces it.

This single attribute of product quality – delivery – can be improved to gain competitive advantage in a number of other areas:

- In agricultural chemicals, more emphasis will be placed on delivering an insecticide or herbicide to its target. Products will increasingly combine the delivery vehicle or application approach with the active ingredient. In addition, farmers may contract for services that include product and delivery rather than just the product itself.
- In the automobile industry, today’s process of shopping, purchasing, and taking delivery of a new car is confusing, time-consuming, and often frustrating. It clearly offers many opportunities for improving customer satisfaction.
- In consumer products, customers want recyclable or biodegradable packaging and containers. Suppliers who meet these customer expectations add another dimension to their overall product quality.
- In commodity products, such as bulk chemicals, polymer resins, fertilizers, and petroleum fractions, timely delivery in an environmentally sound, hazard-free manner enables manufacturers’ customers to reduce inventories and conduct operations more safely. Thus, they can meet or exceed their needs and also their own customers’ service requirements.

Many companies could identify opportunities to enhance competitive advantage simply through a structured analysis of how much quality they presently offer. The key is to ask the following questions for each attribute of each dimension: Are „musts“ being met, are sufficient „wants“ being provided, and are there opportunities for innovation?

### **Planning for Product Quality**

Planning for product quality is a relatively straightforward process:

- Define the target customer segment clearly enough that product quality attributes can be established and trade-off decisions made.
- Listen to the voice of the customer and translate it into basic must/want requirements. (The „customer“ must also include those government or social groups that could influence the product.)
- Expand the voice of the customer to identify implicit wants not stated or not yet available. These will form the basis for innovation efforts, to avoid product „me-too-ism.“
- Translate voice-of-the-customer requirements into feasible and cost-effective engineering specifications for both the product and its manufacturing process.
- Resolve problems early and deliver the product to the customer as fast as possible.
- Exceed the customer’s expectations – for both product and service.
- If achievable, offer a „lifetime satisfaction“ guarantee.

This process works best when led by an experienced and authoritative product manager, as typified by Honda’s concept of a „large-project leader“ with wide-ranging responsibility and powers to ensure that product quality targets are clearly defined and met.

Many management tools are now available to assist in the product quality planning process. For example, customer-based segmentation techniques focus on customer lifestyle and usage patterns, rather than traditional product-based segmentations, such as large, medium, and small. We have recently implemented such a segmentation scheme at a major European automobile manufacturer.

Analytical techniques can be used to correlate customer perceptions with physical characteristics of products. For many years we have helped food industry clients correlate customer perceptions such as „sweet,“ „sour,“ and „sharp“ with physical characteristics of their products (see the article by Christine Jantz and David Kendall elsewhere in this issue of *Prism*). This correlation has made possible real-time process control to ensure that customer satisfaction is maintained.

The Quality Function Deployment (QFD) tool is now a proven technique for translating customer requirements into product and process design specifications. Its applications extend beyond engineered products. For example, we have successfully used it to design a new financial services product. In addition, engineering reliability and safety analysis tools establish that products (and processes) delivered to customers will meet or exceed their expected lifetime without failure and without harm to customers or the environment.

Perhaps the most difficult area in which to ensure quality is innovation management. The voice of the customer cannot express a desire for attributes the customer has not yet dreamed of. For example, customer research clinics on automobile styling often result in much higher ratings for today's models than for designs proposed for five years in the future. We have found three basic areas for improvement in innovation management: technology portfolio planning, risk management, and creating an innovation climate.

**Technology Portfolio Planning.** Our research suggests that it is most effective to structure the bulk of the technology portfolio (80 to 90 percent) to reflect known customer priorities (actual or implied). The rest of the portfolio can be devoted to a number of small „pots bubbling“ that may result in breakthroughs.

**Risk Management.** Companies often do not implement important technologies in products because they can't manage the demand uncertainty. A good example is the four-valve engine. Western auto makers lagged their Japanese counterparts by two to three years in introduction, not because they did not have the technical capability (they did), but typically because their marketing departments couldn't guarantee them the volumes they needed to make the investment a profitable business decision. The uncertainty of volume forecasts prevents technology implementation. More carefully conceived strategic questions must be asked that convert uncertainty into calculated risk. For example, for the four-valve engine, questions might include: „Does this technology provide an improvement in engine efficiency?“ (Yes, about 10 percent.) and „When will the last Japanese competitor convert fully to four-valve?“ (By 1995, with 90 percent confidence.)

**Creating an Innovation Climate.** Some companies, such as Apple, Honda, 3M, Motorola, and Sony, pride themselves on their innovative capabilities. Innovation is part of their corporate vision. Their organizations typically provide structures to support innovation, such as a high degree of individual freedom, minimal organization hierarchy and formality, strong emphasis on teamwork, and reward systems that encourage rather than prevent new-idea generation.

## Conclusions

Product quality is much broader than conformance to specifications. It includes dimensions such as image, value, and satisfaction – each of which comprises many detailed attributes, such as delivery, service, and guarantee. For each individual attribute of product quality, there are very different leverages available. Some – such as safety, legislative compliance, and freedom from defects – are „musts“: If you don't provide them, you can't sell the product. Provision of „wants,“ on the other hand, drives product value. Innovation is what gets customers excited and gives competitive advantage.

Product quality is in transition. Today's „wants“ will become tomorrow's „musts.“ Today's innovations will become tomorrow's wants. Customer expectations will be continuously driven upward by competition. Many management tools are available to improve the planning of product quality. The critical issue is to successfully plan and manage innovation.

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