cost of replacement includes financial, emotional, and social costs of giving up old possessions. Knowledgeable consumers are usually quicker to assess new product benefits. Consumers with a favorable attitude toward risk place less emphasis on possible sacrifices.

Based on the relationship between consumer perceptions of benefits and those of sacrifices, the author proposes a two-by-two matrix of strategic situations.

First is the *high-benefits–high-sacrifice* product (e.g., Gillette Sensor). Second is the *high-benefits–low-sacrifice* product (the AT&T Universal card that promised unparalleled service quality with no annual fee for a lifetime). Third is the *low-benefits–low-sacrifice* product (Packard-Bell's inexpensive PCs loaded with popular software). And fourth is the *high-sacrifice–low-benefits* product (the electric car, except for environmentally sensitive consumers).

For each of these products, the author offers some favoring conditions. For example, the extremely easy-to-sell second category product is offered only when, for example, a close-follower might be expected to enter with a higher-value item soon, there is built-in stability in the market that requires intense stimulation to make customers change, or the buyer is a government unit. The third situation (the Packard Bell item) fits where there is little product differentiation in the market, where customers see few intrinsic cues, or they are very price-sensitive. The fourth situation (low in benefits but high in sacrifice) calls for action to change one or the other, such as further product redesign or a special introduction price.

All four of these strategies can be used in any one market, by segmenting it. Strategists are urged to study how consumers use products in the subject category, how current products are replaced, and whether consumers are forward-looking (e.g., in technology-intensive industries).

Concurrent Project Management: A Tool for Technology Transfer, R&D-to-Market, Terrance M. Skelton and Hans J. Thamhain, *Project Management Journal* (December 1993), pp. 41–48

The pressures on managers to bring new products to market faster, without compromising quality and cost, led the current authors to ask some of these managers about their problems and what conditions they feel are necessary to the task. This mail/personal interview study of 183 projects (via interviews with 235 engineering professionals) led to two sets of findings.

First, the participants cited twelve key requirements for effective technology transfer, given here in order of their importance as seen by the managers.

- *Early assessment of feasibility of work in process.* Every function involved in a development should regularly assess feasibilities and should quickly communicate difficulties. This is commonly not done.
- *Senior management support and leadership.* Commitments by senior functional managements will reduce problems of shifting priorities, influence working climates, and enhance cross-functional communication.
- *Project leadership.* This includes providing clarity of project mission, techniques that enhance cross-functional openness, and management styles that foster personal motivation and project enthusiasm.
- *Early involvement in product planning.* This essentially means to have the cross-functional team in operation from the beginning, even before idea generation.
- *Market and customer inputs.* Continuous customer-watching will enhance the flow of good suggestions from customers, both through marketing and as feedback to R&D/engineering.
- *Cross-functional interface personnel defined.* Not everyone can serve in cross-functional situations, and even those who can will need training in operating methods that permit what they want to do. For example, they need interface maps and regular meetings.
- *Working closely with purchasing, suppliers, and subcontractors.* Outsiders must be in the loop, especially when their inputs are components and subsystems that need to be integrated into the new product.
- *Advanced design information.* In situations where the team is not appointed at the start, provisions should be made for design personnel to share their progress with people waiting down the line.
- *Downstream process information.* As with the previous point, those building process capability should not proceed without keeping others informed.

- *Minimum changes.* Changes are often essential, but they "have dysfunctional impact if they are perceived as unnecessary, based on convenience, or have the effect of a surprise."
- *Unified project team.* This means that team members feel like a team, have a sense of belonging, work with a clear structure, and try to create a unified team image around the firm.
- *Better product and market definition.* This is the part of the mission statement that clarifies the market being addressed and the specific output needed from the project.

A subset of managers was asked about how organizational factors correlate with success. Here they cited three major areas:

- *Cross-functional cooperation*, especially the involvement of marketing with R&D and engineering, and information sharing between engineering departments.
- Having a *professional project*, stimulating and challenging, and with high visibility and top management support.
- The giving of *recognition* to project accomplishments, as they occur.

Rooting Out the Causes of Inefficient Product Creation, Michael S. Rosenberg and Bruce McK. Thompson, *Prism* (Second Quarter 1993), pp. 97–111

This article from an A.D. Little publication yields conclusions from a review of the firm's consulting assignments with various firms. They began their analysis with the common conviction that business is under pressure to reduce time-to-market, increase customer satisfaction, reduce manufacturing costs, and increase the efficiency of the technical development process.

They first sought the causes of each of these problems, individually. As the causes were often common and overlapping among the four major problem areas, they worked them into one common set—some of which are organizational, some process, some human resource, and some physical resources. The article shows which of the total set of twenty-four root causes relate to each of the four major problem areas, generally, but they recommend that any firm's managers should seek to find the ones they have and then work to improve them accordingly.

First we will see the twenty-four factors and then the process to apply them in a firm's situation.

1. Organizational causes

- Misaligned "unwritten rules of the game."
- Complex/ineffective management structure, such as with too many review committees or tendency to send tough decisions upwards.
- Awkward engineering organization.
- Unclear roles and responsibilities.
- Ineffective program management.
- Misdirected evaluation and reward system.
- Poor cross-functional communications.

2. Process causes

- Ineffective milestone structure/discipline. Waiting means process stretching, but going ahead often leads to rework. Customer may be omitted.
- Excessive hand-offs, poorly coordinated.
- Incomplete specification process, early and during development.
- Poor project screening mechanism, to reduce the number of active projects and thus engineering work-span.
- Ineffective process of understanding customer wants and needs—the market requirements, product definitions, attributes vs costs—especially latent needs.
- Unclear product strategy formulation process. Markets, products, timing.
- Poor trade-off analysis, or managerial leadership to pull it off. Quality-function-deployment.
- Lack of early manufacturing involvement that is truly cross-functional.

3. Human resource causes

- Lack of urgency, teams are too relaxed.
- Poor team-building skills, without which teams flounder.
- "Not invented here" syndrome, especially toward upstream sources.