

Stage Gate Systems for New Product Success

Here's a new game plan to boost your odds on the innovation battlefield.

Product innovation has become the decisive corporate battlefield, vital to success, prosperity, and even corporate survival. Witness the companies doing well today; chances are, they are succeeding because of sound new product decisions made in the last decade or two. Losing the battle spells disaster. Companies simply disappeared because they failed to innovate, failed to keep their product portfolio current and competitive, and were surpassed by more innovative competitors.

Here, we first look at past victories and defeats on that battlefield and draw nine key lessons for new product success. They are based on rigorous research, including our own *NewProd* studies which address the question, "What separates winners from losers?" (See "The *NewProd* Studies," on page 28.)

Those nine lessons lead us to a game plan—a process template for driving new products to market quickly and efficiently—which a number of leading firms in North America and Europe have used successfully.

PRODUCT SUPERIORITY MATTERS

Lesson 1: The number one success factor is a unique superior product—a differentiated product that delivers unique benefits and superior value to the customer.

Superior products delivering real and unique benefits to users succeed

far better than "me too" products with few positive elements of differentiation. Exhibit 1 shows the relationships. When we compared the top 20% of products in terms of product superiority to the bottom 20% (the least differentiated), the superior products had five times the success rate, in terms of the manufacturer's success criteria. Here, we define success and failure from a financial, or profitability, standpoint: the degree to which the new product's profits exceeded or fell short of the firm's hurdle rate for this type of investment.

Superior products with unique benefits outscored the others on every other measure of performance as well, by considerable margins, as

EXECUTIVE BRIEFING

New products are critical to the growth, prosperity, and survival of the modern corporation. Nine key lessons for new product success improve the chances of winning and reduce the time-to-market. The prescriptions are drawn from the *NewProd* studies of more than 1,000 new product launches, successful or otherwise, in hundreds of firms. The stage gate system, a new tool for managing the product innovation process, builds on those nine lessons. Stage gate models have been successfully implemented in many leading U.S. and foreign companies in the last half-dozen years.

assessed by knowledgeable managers and project teams. They captured much higher market share, by more than 40 share points. They enjoy higher profitability; managements rate them 8.4 out of 10 on profitability, compared to only 2.6 for “me too” products. Superior products were much more likely to meet company sales and profit objectives.

Such results, no surprise to leading product innovators, apparently are not obvious to everyone. We’ve found that “tired products” and “me too” offerings are the rule rather than the exception in many firms’ new product efforts—and 82% of such efforts fail!

What did superior products with real customer benefits have in common? They offer unique features not available on competitive products. They meet customer needs better than competitive products. They have higher relative product quality, and solve problems customers had with competitive products. They reduce the customer’s total costs, providing high value-in-use. And they are innovative, the first of their kind on the market.

CUSTOMER FOCUS IS ESSENTIAL

Lesson 2: A strong market orientation—a market-driven and customer-focused new product process—is critical to success.

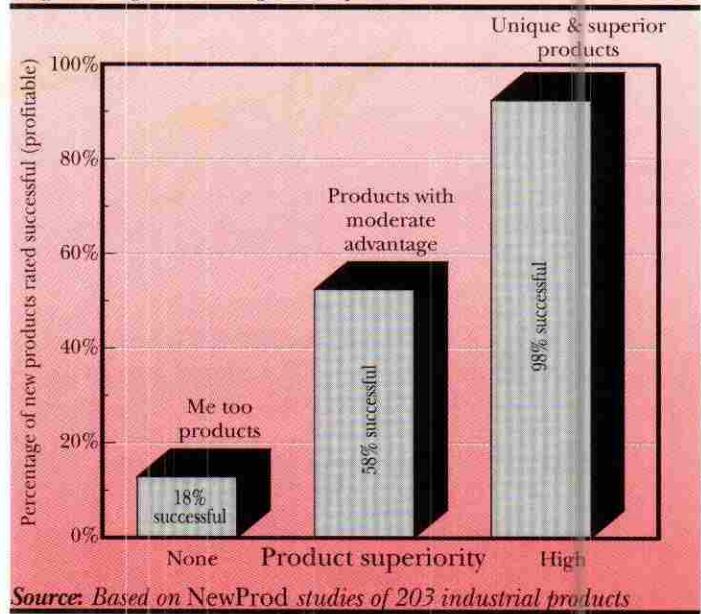
A thorough understanding of customers’ needs and wants, the competitive situation, and the nature of the market is an essential component of new product success. Virtually every study of product success factors supports that finding. Need recognition, understanding user needs, market need satisfaction, constant customer contact, strong market knowledge, undertaking market research, quality of marketing execution, and more spending on up-front marketing activities are recurring themes throughout the many studies that have probed what makes a new product a winner.

Conversely, failing to adopt a strong market orientation in product innovation, an unwillingness to undertake essential market assessments, and leaving the customer out of product development spells disaster. Insufficient resources, poor market research, inadequate market analysis, weak market studies, and lackluster test marketing and product launches are common weaknesses found in virtually every study of why new products fail.

In our *NewProd* studies, we have focused on what actually happened during the new product project, examining 13 key activities in particular, from initial screening through product launch. Exhibit 2 shows the mean “quality of execution” self-assessment ratings that project managers assigned to these 13 actions, for product successes vs. failures. We also looked at how much money and effort went to each activity.

EXHIBIT 1

Impact of product superiority on success



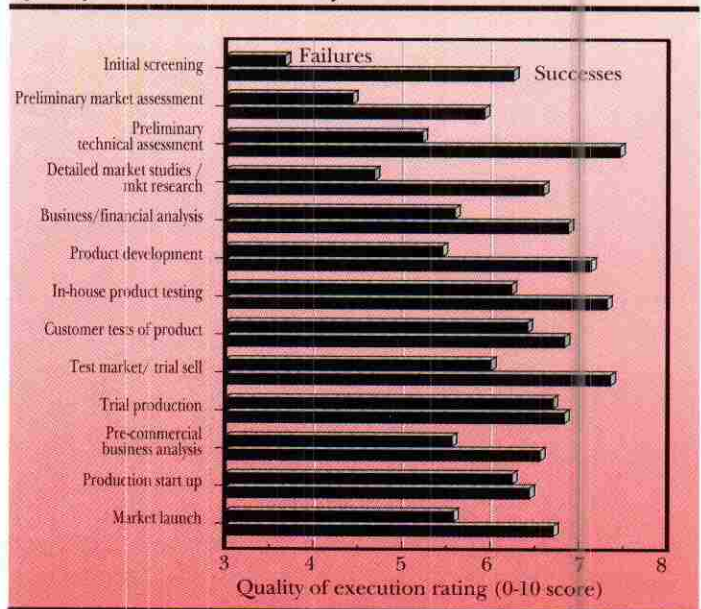
Source: Based on NewProd studies of 203 industrial products

Particularly notable is how much marketing actions discriminated between winners and losers.

- For the five marketing actions listed in Exhibit 2, quality of execution was rated higher for the successful products than for the failures. This was especially true for four marketing activities: the

EXHIBIT 2

Quality of execution - 13 key activities



preliminary market assessment, the detailed market study, test market or trial sell, and the launch itself.

- Companies devoted three times as many person-days and twice as much money to preliminary market assessments for successful projects, compared to failures.
- Companies spent twice as much on market research, in both dollars and person-days, in successful projects than in failures.

Sadly, a strong market orientation is missing in the majority of firms' new product projects. For example, we found that 75% of new product projects' studies omitted a detailed market study. Marketing activities were rated the poorest of all steps of the entire new product process. Typically they scored much lower than technical issues on our zero-to-ten "quality of execution" index in Exhibit 2.

Moreover, companies spend relatively few resources and little money on marketing actions: only 16% of the effort and 32% of dollar expenditures in the typical project. (About 81% of that money goes to the launch.)

DO THE HOMEWORK **L**esson 3: More predevelopment work must be done before product development gets under way.

Homework is critical to winning. *NewProd* and other studies reveal that the steps preceding the actual design and development of the product—screening, market studies, technical feasibility assessment, and building the business case—are key factors separating winners from losers.

In Exhibit 2, the greatest differences between winners and losers occur in the top half of the diagram with the up-front or homework activities that precede development. The quality of execution of the predevelopment steps—initial screening, preliminary market and technical studies, market research, and business analysis—is closely tied to the product's financial performance. And successful projects have more than 1.75 times as many person-days spent on predevelopment steps as do failures.

Japanese innovators, for example, devote substantial effort to the planning stage of the new product process. As described by researchers, "Japanese developers make a clear distinction between the 'planning' and the 'implementation' phases of a new technology initiative.... The objective of planning is complete understanding of the problem and the related technology before a 'go' decision is made. It is reported to be an

unrushed process which might look agonizingly drawn out to Western eyes."¹

Also, Booz Allen & Hamilton's 1982 study, *New Product Management for the 1980s*, found that Japanese firms and successful U.S. companies apply considerably more time to the homework stages before entering development than does the average U.S. firm.

Threadbare Excuse. Surprisingly, most companies acknowledge serious weaknesses in the predevelopment steps of their new product activities. The *NewProd* evidence on resources spent shows pitifully small amounts of time and money devoted to these critical steps: only 7% of the dollars and 16% of the effort.

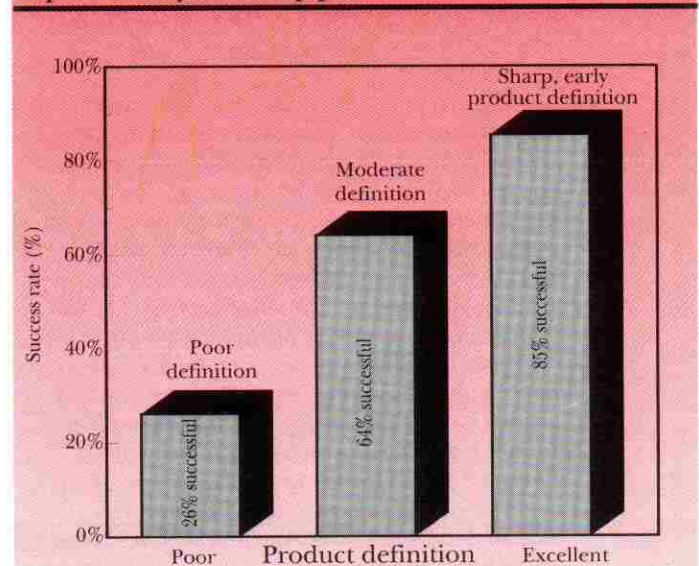
"More homework means longer development times," is a frequent complaint. It is a valid concern, but experience has shown that homework pays for itself in reduced development times as well as improved success rates, primarily for three reasons:

1. Product failure is much more likely if the homework is omitted. So the choice is between a slightly longer project or greatly increased odds of failure.

2. Better project definition, the result of sound homework, actually speeds up the development process. One of the major causes of time slippage is poorly defined projects entering the development phase as vague targets and moving goalposts. This is often the result of weak predevelopment activities.

EXHIBIT 3

Impact of early and sharp product definition on success



Source: Based on *NewProd* studies of 203 industrial products

3. Given the inevitable product design evolution that occurs during the life of a project, the time to make the majority of design improvements or changes is not as the product is moving out of development and into production. More homework up front anticipates changes and encourages them to occur earlier in the process, rather than later, when they are more costly.

DEFINE THE PROJECT EARLY

Lesson 4: Sharp and early product definition is one of the key differences between winning and losing at new products.

How well the project is defined before entering the development phase is a key success factor. Managers should consider including what Professor Merle Crawford has called the "protocol step," in which all parties involved in the project agree on specific product requirements before beginning development.²

The *NewProd* studies find that successful products had much sharper definition before development and were more than three times as likely to be successful. They achieved higher market share, by 38 points on average, they were rated 7.6 out of 10 in terms of profitability (compared to 3.1 for poorly defined products), and they tended to meet company sales and profit objectives much more often than lesser efforts (see Exhibit 3). Getting the product definition right was also the number one factor in success identified in a 1991 internal study by Hewlett-Packard.

Definition Criteria. Some companies devise an excellent product and project definition before the door is opened to a full development program.

Their definitions:

- Specify target markets, the intended users.
- Describe the product concept and the benefits to be delivered.
- Delineate the positioning strategy.
- Prioritize product features, attributes, requirements, and specifications by "must have" and "would like to have" criteria.

Unambiguous project definitions before development focus more attention on predevelopment activities and objectives. Definitions guide each functional area involved in the project, engendering their commitment to it.

PROMOTE CROSS-FUNCTIONAL EFFORT

Lesson 5: The right organizational structure is a key factor in success.

Product innovation is not a one-department show, but a multidisciplinary, cross-functional effort. The evidence is compelling. Our most recent *NewProd* studies in the chemical industry show projects were more

likely to be successful when they were handled by cross-functional teams dedicated to the projects, accountable for them from idea to launch, and led by strong leader-champions having top management support. Studies of U.S. high-technology firms, and Japanese new product programs, find similar cross-functional patterns unfettered by traditional functional barriers.

How does one design a process that integrates many activities and multifunctional inputs? And how does one ensure quality of execution? One answer is to develop a systematic approach to product innovation, a game plan that cuts across departmental boundaries and forces the active participation of people from different functions, such as the stage gate approach we will explain later in this article.

Organizational design is just as important. The traditional functional organization structure does not suit many of the needs of product innovation. Indeed, functional and functional matrix approaches led to the least new product success, according to one extensive study on new products.³

Companies must move to team approaches that cut across functional lines. Three approaches that appear to work well are the *balanced matrix*, the *project matrix* and the *project team* methods, which emphasize the autonomy of the team, and the responsibility and independent authority of the project leader.

In the balanced matrix, a project manager oversees the project and shares responsibility and authority with functional managers. There is joint approval and direction.

The project matrix approach assigns a project manager who takes primary responsibility and authority for the venture. Functional managers assign personnel as needed to provide technical expertise to the project.

In the project team, the project manager heads a core group of people drawn from several functional areas. Functional managers do not have formal involvement.

These approaches contrast with functional designs, in which functional managers retain responsibility and authority for their segments of the projects, and the project leader role is minimal or doesn't exist.

Lesson 6: New product success is predictable, and the profile of a winner can be used to make sharper project selection decisions.

SCREEN WITH A WINNER

Most companies suffer from a lack of effective project evaluation and priorities. As a result, they waste scarce resources on the wrong projects and starve the truly meritorious ones. Solving that allocation problem requires that management make

tough go/kill and priority decisions.

In too many firms, however, project evaluations are either weak, deficient, or nonexistent. Our *NewProd* studies find that initial screening was one of the most poorly handled activities of the entire new product process. In 88% of the projects studied, project management judged the screening decision point to be deficient: the decision involved only one decision maker, or there were no criteria used to screen projects. And 37% of projects did not undergo a business or financial analysis before the development phase; 65% did not include a pro forma business analysis.

In many cases, managers confessed that ventures simply aren't killed once they're into development: "Projects get a life of their own," as one put it, and become like "express trains, slowing down at the stations, but never with the intention of stopping until they reach their final destination, market launch."

Often the problem of poor project evaluation boils down to a lack of criteria against which to judge projects. Fortunately, new product success is fairly predictable; certain project characteristics consistently separate winners from losers, and should be used as evaluation criteria for other projects.

For instance, three important factors which consistently differentiate successful from unsuccessful projects in our *NewProd* investigations include *product superiority*, *synergy*, and *market attractiveness*. Those three factors, and the list of items that comprise them, should be an integral

part of firms' screening and project evaluation decisions. (For example, a computer-based new product screening and diagnostic model, the *NewProd Model*, has been constructed from the *NewProd* results and is available from the authors.)

Lesson 7: *New product success is controllable. More emphasis is needed on completeness, consistency, and quality of execution.*

CONTROL THE PROCESS

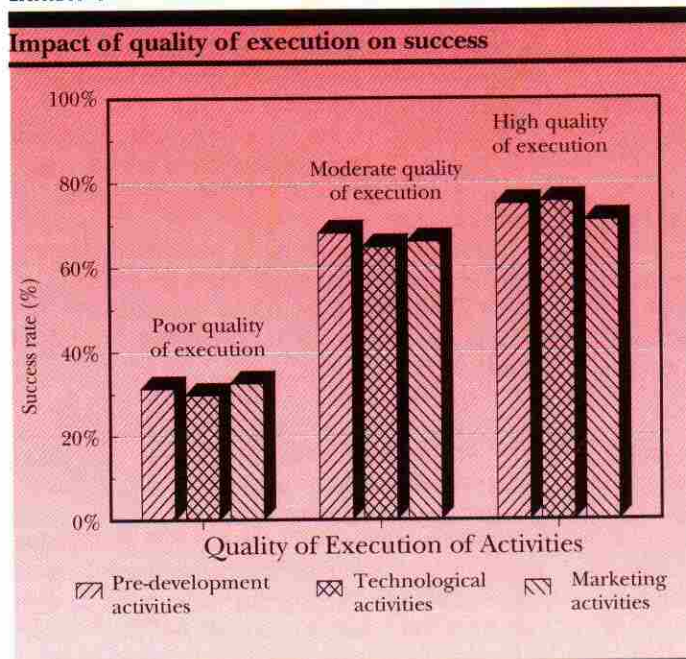
Quality of execution of the project is *the* key to success. Note the major impact of factors that capture quality of execution of technological, marketing, and predevelopment activities in the *NewProd* studies, illustrated in Exhibit 4. Here we look at "quality of execution" across groups of activities, comparing the top 20% of projects to the bottom 20%. Projects with well-executed marketing actions were 2.2 times as successful as those receiving weak marketing. Those with well-executed technological activities were 2.6 times as successful. Projects with predevelopment activities executed in a quality fashion were 2.4 times as successful.

Sins of Omission. Certain key activities such as those shown in Exhibit 2, cited earlier are strong correlates of success. But as the *NewProd* studies reveal, managers frequently omit many of those activities altogether. For example, 76% of projects featured no market research or detailed market study; 37% had no precommercialization business and financial analysis; 33% had no customer tests or trials; and 77% did not include a test market or trial sell.

Quality of execution ratings were also low. No activity came close to receiving a "10 out of 10" rating. Rather, the mean quality of execution score across all activities was a mediocre 6.42 out of 10, with initial screening, preliminary market assessments, and detailed market studies scoring particularly low.

The men and women controlling new product projects must strive for significant improvements in the way the innovation process unfolds. The solution that some firms have adopted is to treat product innovation as a process with quality-of-execution checkpoints. They design quality into their game plan by making mandatory certain

EXHIBIT 4



key activities and actions that are often omitted, yet are central to success.

OBSERVE SPEED LIMITS | *Lesson 8: Speed is everything! But not at the expense of quality of execution.*

Speed is the new competitive weapon. Speed yields competitive advantage—the first on the market. It means launching products with less likelihood that the market or competitive situation has changed. It results in quicker realization of profit.

But while the goal of reducing the development cycle time is admirable, it is only an interim objective, a means to an end. Many of the practices naively employed in order to reduce time-to-market ultimately cost the company money; they achieve the interim objective but fail to reach the ultimate objective, profitability.

An example is moving a product to market quickly by shortening the customer test phase, only to incur product reliability problems after launch, lost customer confidence, and substantial warranty and servicing costs. Be careful in your quest for cycle time reduction. Too often the methods used to reduce development time yield precisely the opposite effect. In many cases they are very costly and are at odds with sound management practice.

Reducing Cycle Time. Here are five sensible ways to reduce cycle time—ways that are totally consistent with sound management practice and are derived from our lessons for success. They not only will increase the odds of winning, but also will reduce the time-to-market.

- Do it right the first time. Build in quality of execution at every stage of the project. The best way to save time is by avoiding having to do it again. (See Lesson 7.)
- Do the up-front homework and provide clear project definition, based on fact rather than hearsay and speculation. That saves time downstream, requiring less recycling back to get the facts or redefine the product requirements. (See Lesson 3.)
- Organize around an empowered multifunctional team. “Rip apart a badly developed project and you will unfailingly find 75% of slippage attributable to (1) ‘silos,’ or sending memos up and down vertical organizational ‘silos’ or ‘stovepipes’ for decisions, and (2) sequential problem solving,” writes consultant Tom Peters in his book, *Thriving on Chaos*. Sadly, the typical project resembles a relay race, with each function or department carrying the baton for its stretch, then

handing off to the next runner or department. (See Lesson 5.)

- Parallel process. The rugby game is a better model, with activities proceeding concurrently rather than sequentially.⁴ More gets done per unit time as each part of the team—marketing, R&D, manufacturing, and engineering—work together simultaneously. Because parallel play is a lot more complex than a series approach, the new product process demands a disciplined game plan. (See Lesson 9.)

- Prioritize and focus. The best way to slow projects down is to spread limited resources and people too thinly across too many projects. Concentrating on the truly meritorious projects will improve the quality and speed of the work. That means tough choices, however, and perhaps killing some promising projects. One must apply the right criteria for making go/kill decisions. (See Lesson 6.)

Lesson 9: Companies that follow a multistage, disciplined new product game plan fare much better.

MULTITASKING THE PROCESS

A game plan or formal new product process—a “stage gate system”—is the solution to which many firms have turned to overcome deficiencies plaguing their new product programs. Strong evidence supports the approach. Booz Allen & Hamilton found that companies with such game plans are more successful; those with the longest experience at it were even more successful.

In one of our studies, we examined what happened at 21 divisions in leading firms that implemented stage gate plans. The results were dramatic.

- Improved teamwork: Managers reported significant improvements in cross-functional teamwork. The fact that formal new product processes stress multifunctional activities and stages and use multifunctional criteria at each gate or decision point promotes teamwork.
- Less recycling and less rework: The amount of time spent going back and doing it again was greatly reduced. Stage gates have a number of quality checks built in to ensure that all actions are executed in a quality fashion.
- Improved success rates: Managers reported that a higher proportion of new products succeeded and that resulting profitability was better. Stage gates require sharper project evaluation and focus, and highlight the activities that result in success.

- Earlier failure detection: Potential disasters were spotted earlier, and either killed outright or modified. Stage gates with tough go/kill criteria help sharpen project evaluations.
- Better launches: Marketing planning and other marketing activities are an integral part of stage gate new product processes, resulting in more involvement in new products by marketing people.
- Shorter cycle times: This result was both surprising and reassuring. Better teamwork, more cross-functional involvement, sharper and earlier market and product definition and less recycling all served to shorten the idea-to-launch time.

THE STAGE GATE GAME PLAN

Many leading firms have developed a systematic stage gate process for moving a new product project through the various steps from idea to launch. Most important, they have built into their road map the key lessons for new product success in order to improve the effectiveness and timeliness of their programs.

Stage gate systems break the innovation process into a predetermined set of stages, each consisting of prescribed, multifunctional, and parallel activities. Exhibit 5 illustrates the process flow. The entrance to each stage is a decision gate, a checkpoint for a go or kill decision. Many other names have been used to describe similar formats, among them "product delivery process," "new product process," "gating system," and "product launch system."

The stage gate concept is based on the experiences, suggestions, and observations of a large number of managers and firms, and on our own and others' research in the field. What happened in over 60 case histories laid the foundation for it. Since the stage gate system first appeared in print, it has been implemented in whole or in part by dozens of firms in North America, including Exxon Chemicals, Procter & Gamble, Du Pont, Polaroid, US West, B.F. Goodrich, Corning Glass, Labatts, Westinghouse, the Royal Bank of Canada, and Rohm & Haas—all of which have provided an excellent laboratory setting to further refine and improve the concept. In Europe, firms such as ICI, Waven division of Shell, Courtauld, and Lego provide similarly successful examples, as have many other firms worldwide.

The stage gate system breaks the new product project into discrete and identifiable stages, typically four, five, or six in number. Each is designed to gather information needed to move the project to the next decision point.

Each stage is multifunctional. There is no

"R&D stage" or "marketing stage"; each consists of parallel activities by people from different functional areas within the firm. Commitment at each stage costs more than the preceding one.

A go/kill decision gate precedes each stage. Gates are the scrums or huddles on the rugby field, the points during the game when the team converges and where all new information is brought together. Gates serve as checkpoints for quality control and for choosing the next play.

Gates are predefined, specifying sets of "must meet" project requirements and "should meet" desirable characteristics. And they designate an output—what comes next. Senior managers from different functions, who "own" the resources the project requires, usually man the gates.

Process Overview. As shown in Exhibit 5, Gate 1 screens ideas which originate in basic research, come out of seed or unfunded projects, and are generated from a variety of customer-based and creativity techniques. Initial screening is the first decision to commit resources to the project, signaling a tentative commitment to it. Gate 1 criteria tend to be qualitative and few in number: strategic alignment; technical feasibility; competitive advantage; and opportunity attractiveness.

Stage 1—Preliminary investigation: This first and inexpensive stage determines the project's technical and marketplace merits. Stage 1 is a quick review of the project, often completed in 10 to 20 person-days' work effort. Its activities include a *preliminary market assessment* (a "quickie" study to determine market size, market potential, and possible market acceptance) and a *preliminary technical assessment* (an in-house appraisal of the proposed product's development and manufacturing feasibility).

The project then moves to Gate 2, a second and somewhat more rigorous screen. If the decision is go at this point, the project becomes more expensive, so Gate 2 criteria tend to be more rigorous than in Gate 1. In addition to again invoking the "must meet" criteria of Gate 1, the project must satisfy "should meet" yardsticks applied at Gate 2. Those standards often take the form of a scoring model for synergies, market attractiveness and competitive situation, elements of product advantage, and profit potential.

Stage 2—Detailed investigation: This is where management develops the business case that defines the product and verifies the attractiveness of the project before heavy spending in the next stage, development. It is the critical homework stage, the one research shows is so often weakly handled. Typical Stage 2 activities include:

Stage Gate Systems for New Product Success

- A user needs-and-wants study to determine the customer's desires and define the ideal new product.
- Competitive analysis.
- Concept testing, where a representation of the proposed new product is presented to potential customers to gauge likely acceptance.
- Technical appraisal, which focuses on the feasibility of the project from an economic and technological viewpoint.
- Manufacturing (or operations) appraisal, in which issues of manufacturability, costs to manufacture, and investment required are investigated.
- Legal, patent, and regulatory assessment, in order to remove risks and to map out legally required action.
- Detailed financial analysis, the justification which typically involves a discounted cash flow forecast complete with sensitivity analysis of "what if" risks.

Gate 3, the decision following the work in Stage 2, is the final gate before the development stage. It is the last point at which the project can be killed before incurring heavy spending. Gate 3 also yields a "sign off" on the product definition. Criteria for a pass should be tough and include a rigorous repeat of the Gate 2 "must" and "should" criteria as well as a critical financial and risk-return review.

Stage 3—Development: The "deliverable" at the end of Stage 3 is a lab-tested prototype of the product. Stage 3 emphasizes technical work, while marketing and manufacturing activities also proceed in parallel. For example, market

analysis and customer feedback continue, with constant customer opinion sought as the product takes shape during development. It's an iterative process. Meanwhile, detailed market test plans, market launch programs, and production and operations plans take shape. At the same time, the innovation team updates its financial and legal analyses.

At the post-development review of Gate 4, planners recheck the continued attractiveness of the project. Has work proceeded in a quality fashion? Does the developed product conform to the original definition specified at Gate 3?

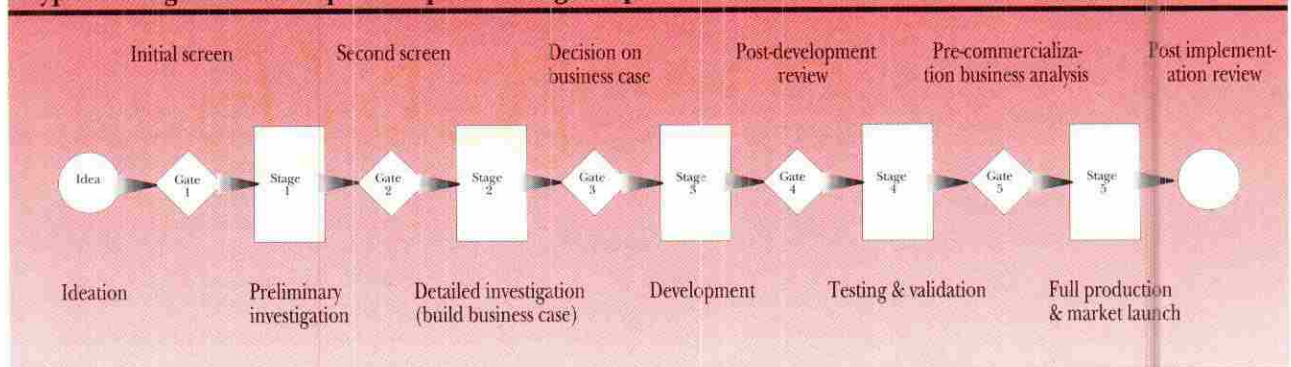
Stage 4—Testing and validation: This stage tests and validates the entire project—the product itself, the production process, customer acceptance, and the economics. Stage 4 requires a number of activities.

- In-house product tests check product quality and performance under controlled or lab conditions.
- User or field trials verify that the product functions under actual use conditions, and generates customer purchase intent.
- Trial, limited, or pilot production debugs the production process and determines more precise production costs and throughputs.
- Pretest market, test market, or trial sell gauges customer reaction, measures the effectiveness of the launch plan, and determines expected market share and revenue.
- Revised financial analysis checks on the continued economic viability of the project, based on new and more accurate revenue and cost data.

The precommercialization business analysis of

EXHIBIT 5

A typical "Stage-Gate" new product process or game plan



Gate 5, the final gate, opens the door to full commercialization: a market launch and full production or operations start-up. It is the final point at which the project can still be killed. Criteria to pass Gate 5 focus largely on the quality of efforts to date, on the appropriateness of the production and launch plans, and on the financial viability of the product.

Stage 5—Full production and market launch:

This final stage involves putting the marketing launch plan and the production or operations plan in motion. Given a well-thought-out plan of action backed by appropriate resources and barring unforeseen events, it should be clear sailing for the new product. Another new product success!

Post-Implementation Review. Following commercialization, often 6 to 18 months, the company terminates the new product project and disbands the team. The product has become a “regular” in the line. At this point, management reviews the project’s performance to assess its strengths and weaknesses. A major question is what the company can learn from the project and do better the

next time. The project team and leader remain responsible for the success of the project through this post-launch period, right up to the point of the post-implementation review.

Let’s deal with some potential misconceptions. The stage gate game plan is designed to facilitate development and speed products to market. Here are some of the things the system is not:

WHAT THE STAGE GATE SYSTEM IS NOT

1. Stage gate is not a functional, phased-review system.

The game plan of the '90s is not the traditional “phased-review” process of the '60s. Phased review, endorsed by NASA and others, broke the innovation process into stages, each reporting to a function or a department. Implemented with the best of intentions, the process nonetheless managed to nearly double development times. It scheduled activities in sequence rather than in parallel, as one team or function passed the project on to the next department. And, as with any relay race, there are the inevitable fumbles and dropped batons. With no one group committed to the project from beginning to end, there was no accountability.

2. Stage gate is not a rigid system.

The game plan or new product process outlined in Exhibit 5 is fairly typical. Most companies tailor the model to their own circumstances and build flexibility into it.


For example, not all projects pass through every stage or gate of the model. In some firms, management defines two or three categories of projects, based on project scope, investment, and risk level. These range from sales developments or product modifications (relatively simple, short time frame and low risk projects) to major projects involving heavy expenditures and high risks. Management chooses appropriate routes for each type of project, with lower-risk projects typically leapfrogging some stages and gates.

In any one project, stages, gates, and activities can be omitted or bypassed. Similarly, activities can be moved from one stage to another—moving an activity ahead one stage in the event of long lead times, for instance. The point is that the game plan is a guide or road map, and that deviations or detours are made consciously and deliberately, with full awareness of the facts, consequences, and risks. Decisions to skip over, delete, or shift activities or gates are not ad hoc, arbitrary, and made for the wrong reasons. They are decided thoughtfully, with the agreement of the gatekeepers at the preceding gate.

The NewProd Studies

Over the last 20 years, the NewProd research investigations have probed the causes of new product failure and what distinguishes new product successes from failures. The database now includes more than 1,000 new product projects—products which went to market and whose commercial outcomes are known—from more than 300 firms in North America and Europe.

Each project has measured a myriad of characteristics, including factors thought to be important to success as well as various performance gauges. While some of the studies have been private, in-company research, most of the results are public and have been published in numerous articles. The cases studied have been largely industrial goods in moderate-to-high technology industries, the most recent study being of the chemical industry in four countries.


The majority of the NewProd results referred to in the current article are based on a study of 203 industrial new product projects. Detailed results have been published in a 1990 American Marketing Association monograph by the authors: *New Products: The Key Factors in Success.* 

3. Stage gate is not a bureaucratic system.

Properly implemented, the stage gate system fosters all the attributes of a timely, successful development effort: a clearly visible road map with defined deliverables and objectives; a cross-functional team approach with empowerment; and defined decision points with criteria spelled out. Sadly, some managers consider any system an opportunity to impose more paperwork, more meetings, and more red tape.

'READING FROM THE SAME PAGE'

Many investigations, including our *NewProd* studies, have provided clues and insights into product innovation. We have translated them into the skeleton of a carefully crafted new product process—a game plan which provides a disciplined focus on quality of execution, up-front homework, strong market orientation, and backing by appropriate resources.

Stage gate is the blueprint for successful innovation, visible, relatively simple, and easy to understand and communicate. As one manager exclaimed, "At least we're all reading from the same page of the same book." 

Footnotes

1. See research as cited in Everett M. Rogers, "The R&D/Marketing Interface in the Technological Innovation Process," in Massoud M. Saghafi and Ashok K. Gupta, eds., *Managing the R&D/Marketing Interface for Process Success: The Telecommunications Focus, Vol. 1, Advances in Telecommunications Management* (Greenwich, Conn., JAI Press Inc.)

2. C.M. Crawford, "Protocol: New Tool for Product Innovation," *Journal of Product Innovation Management*, 2, 1984, pp. 85-91.

3. E.W. Larson and David H. Gobeli, "Organizing for Product Development Projects," *Journal of Product Innovation Management*, 5, 1988, pp. 180-190.

4. Bro Uttal, "Speeding New Ideas to Market," *Fortune*, March 1987, pp. 62-66.

About the Authors

Robert G. Cooper is a leading researcher and consultant in the field of new products, and has published more than 50 articles and books on the subject. He is the Lawson Mardon Chaired Professor of Industrial Marketing and Technology Management at the Michael De Groote School of Business, McMaster University, Hamilton, Ont.

Bob is also Professor of Marketing and Chair of the Marketing, International Business and Policy Areas at the university, and Director of Research of the Canadian Industrial Innovation Centre, Waterloo, Ont. A former Associate Dean of McGill University's Faculty of Management, Montreal, he holds bachelor's and master's degrees in chemical engineering, and an MBA and a PhD in business administration.

Parts of this article are condensed from his latest book, *Winning at New Products: Accelerating the Process from Idea to Launch*, which Addison-Wesley will publish in 1993.

Elko J. Kleinschmidt is Associate Professor of Marketing and International Business at the Michael De Groote School of Business, McMaster University, Hamilton, Ont. He is an active researcher and consultant in both North America and Europe in the fields of international marketing and product innovation, with an emphasis on international comparative studies of new product practices.

Elko has published extensively on those topics in the *Journal of Product Innovation Management* and other journals. His most recent research includes a study into formal new product processes, an analysis of new product success factors; and a study of how innovativeness affects performance.

He holds a bachelor's degree in mechanical engineering, and an MBA and PhD in business administration.