SECTION ONE

PREPARING

By failing to prepare, you are preparing to fail.

—BENJAMIN FRANKLIN (1706–1790), AMERICAN INVENTOR, JOURNALIST, PRINTER, DIPLOMAT, AND STATESMAN

CHAPTER ONE

NEW PRODUCTS—WHAT SEPARATES THE WINNERS FROM THE LOSERS AND WHAT DRIVES SUCCESS

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1.1 Introduction

Product innovation—the development of new and improved products and services—is crucial to the survival and prosperity of the modern corporation. According to a recent American Productivity & Quality Center (APQC) benchmarking study, new products launched in the last three years currently account for 27.3 percent of company sales, on average (Edgett, 2011), and a survey of executive opinion reveals that "enhancing innovation abilities" is now the *number one driver* of corporate growth and prosperity (a decade ago, it was "cost cutting"; Arthur D. Little, 2005). But many new products do not succeed: The same APQC study reports that just over half (53.2 percent) of businesses' new product development projects achieve their financial objectives and only 44.4 percent are launched on time.

The Quest for the Critical Success Factors

The keys to new product success outlined in this chapter are based on numerous research studies of why new products succeed, why they fail, comparisons of winners and losers, and benchmarking

(Continued)

studies of best-performing businesses. Many of these investigations have been reported over the years in the PDMA journal, the *Journal of Product Innovation Management*. Some of the most revealing of these studies have been the large-sample quantitative studies of successful versus unsuccessful new products (for an excellent review, see Cooper, 2011a; Montoya-Weiss and Calantone, 1994). They began with Project SAPPHO in the early 1970s, followed by the NewProd series of studies, the Stanford Innovation Project, and, subsequently, studies in countries outside of North America and Europe (Mishra and Lee, 1996; Song and Parry, 1996). More recently, several large benchmarking studies of best practices have provided other insights into how to succeed at product innovation (American Productivity & Quality Center, 2003, Cooper, Edgett, and Kleinschmidt, 2003). This long tradition of research has enabled us to pinpoint the critical success factors—those factors that separate winners from losers—that are outlined in this chapter.

The central role of product innovation in business strategy coupled with the poor innovation performance results in many firms has resulted in a quest for the factors that drive performance and lead to product innovation success (see "The Quest for the Critical Success Factors"). Understanding why new products succeed and why some businesses are so much better than others at product innovation is central to effective new product management: It provides insights for managing new product projects (for example, are certain practices strongly linked to success?) and clues to new product selection (what are the telltale signs of a winner?). This chapter reports the findings from myriad studies of what makes new products winners and what makes some businesses more successful than others at product development.

Some success drivers distinguish *successful new products* from unsuccessful ones and thus are most relevant for managing individual new-product projects (see "Why New Products Succeed—Eight Critical Success Drivers"). Other success drivers explain why *some businesses* are more successful at product innovation than others and hence are most relevant at the business level (see "Why Businesses Excel—Nine Critical Success Drivers").

Why New Products Succeed—Eight Critical Success Drivers (Cooper, 2011a)

1. A unique superior product—a differentiated product that delivers unique benefits and a compelling value proposition to the customer or user—is the number one driver of new product profitability.
2. Building in the voice of the customer—a market-driven and customer-focused new product process—is critical to success.
3. Doing the homework and front-end loading the project is key to success: Due diligence done before product development gets underway pays off!
4. Getting sharp and early product and project definition—and avoiding scope creep and unstable specs—means higher success rates and faster to market.
5. Spiral development—build, test, obtain feedback, and revise—putting something in front of the customer early and often gets the product right.
6. The world product—a global or *glocal* product (global concept, locally tailored) targeted at international markets—is far more profitable than the product designed for to meet one-country needs.
7. A well-conceived, properly executed launch is central to new product success. And a solid marketing plan is at the heart of the launch.
8. Speed counts! There are many good ways to accelerate development projects, but not at the expense of quality of execution.

1.2 Critical Success Factors at the Project Level

1.2.1 Striving for Unique Superior Products

Delivering products with unique benefits and real value to customers and/or users separates winners from losers more often than any other single factor. Such superior products have five times the success rate, over four

times the market share, and four times the profitability of "me too," copycat, reactive, and ho-hum products with few differentiated characteristics (American Productivity & Quality Center, 2003; Cooper, 2011a; Cooper, Edgett, and Kleinschmidt, 2003; McNally, Cavusgil, and Calantone, 2010). (Note that the *customer* buys the product, whereas the *user* uses the product; the two are not necessarily the same, although often the terms are used interchangeably.)

Superior and differentiated products—ones that deliver unique benefits and superior value to the customer—are the number one driver of success and new product profitability.

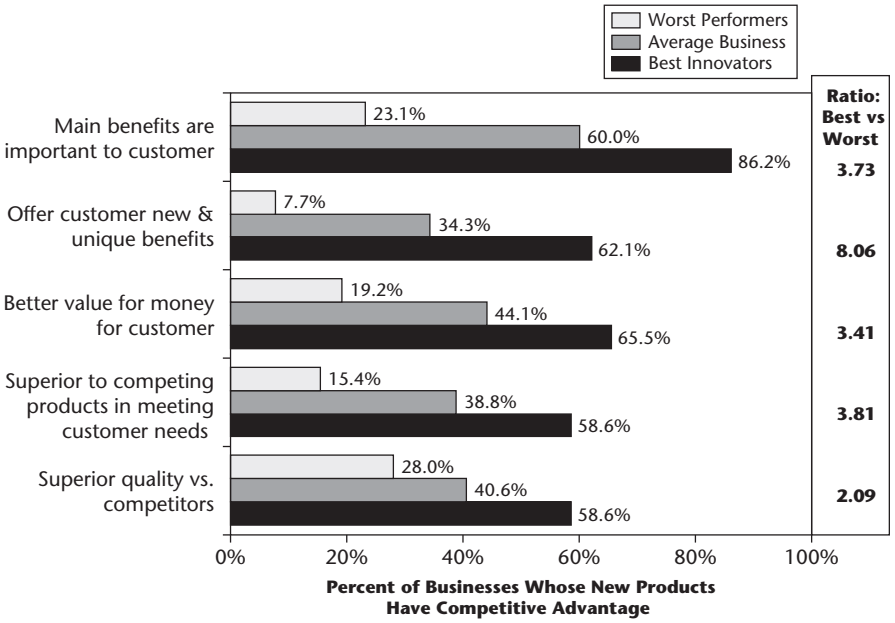
That differentiated, superior products are key to success should come as no surprise to product innovators. Apparently, however, this isn't obvious to everyone: Study after study shows that reactive products and "me too" offerings are the rule rather than the exception in many businesses' new product efforts, and the majority fail to produce large profits.

What do these superior products with unique customer or user benefits have in common? These winning products:

- Feature good value for money for the customer, reduce the customer's total costs (high value in use), and boast excellent price/performance characteristics
- Provide excellent product quality relative to competitors' products and in terms of how the user measures quality
- Are superior to competing products in terms of meeting users' needs, offer unique features not available on competitive products, or solve a problem the customer has with a competitive product
- Offer product benefits or attributes easily perceived as useful by the customer and benefits that are highly visible

Note that there are at least two elements of product advantage: As one study notes, *product meaningfulness* concerns the benefits that users receive from buying and using a new product, whereas *product superiority* captures the extent to which a new product outperforms competing products (Rijsdijk, Langerak, and Jan, 2011). Note also that "product" means not only the evident or physical product but the "extended product"—the entire bundle of benefits associated with the product, including the system supporting the product, product service and support, as well as the product's image.

FIGURE 1.1 A UNIQUE, SUPERIOR PRODUCT IS THE NUMBER ONE DRIVER OF NEW PRODUCT SUCCESS.



Best-performing businesses emphasize these factors in their new product efforts. The APQC benchmarking study cited above shows that the best performers are much stronger in terms of offering important benefits, a superior value proposition, and better value for the customer in their new products (Figure 1.1) (American Productivity & Quality Center, 2003; Cooper, Edgett, and Kleinschmidt, 2003). There, "best performers" were identified as businesses whose product innovation results are superior on a number of performance metrics: new product profitability, meeting sales and profit objectives, time efficiency and on-time performance, and the ability to open up new windows of opportunity.

The management implications are clear:

- First, these ingredients of a superior product (Figure 1.1) provide a useful checklist of items to assess the odds of success of a proposed new product project. They logically become top-priority issues in a project screening checklist or scoring model.

- Second, these ingredients become challenges to the project team to build into their new product design. Note that the definition of "what is unique and superior" must be based on an in-depth understanding of customer or user needs, wants, problems, likes, and dislikes. This leads to success factor 1.2.2, discussed in the next section.

But how does one create or build in product superiority? Note that superiority is derived from design, features, attributes, specifications, and even branding and positioning. The important point here is that *superiority* is defined from the customer's or user's standpoint, not from those of the R&D, technology, or design departments. Sometimes product superiority is the result of new technology or a technological breakthrough. But more than technology and unique features are required to make a product superior. Note that features are those things that cost the developer money. By contrast, benefits are what customers pay money for! Often the two—features and benefits—are not the same. So, in defining *unique benefits*, think of the product as a bundle of benefits for the user and a benefit as something that customers view as having value to them.

1.2.2 Creating Market-Driven Products and Building in the Voice of the Customer (VoC)

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. This tenet is supported by virtually every study of product success factors. Conversely, failure to adopt a strong market orientation in product innovation, unwillingness to undertake the needed market assessments, and leaving the customer out of product development spell disaster. These are the culprits found in almost every study of why new products fail.

A provocative finding of a number of studies is that not only does a strong customer focus improve success rates and profitability, but it also leads to reduced time to market Cooper and Edgett, 2002). Contrary to myth, taking a little extra time to execute quality market analysis and market research does not add extra time; rather, it pays off, not only with higher success rates but also in terms of staying on schedule and achieving better time efficiency.

Sadly, a strong market orientation is missing in the majority of firms' new product projects. Detailed market studies are frequently omitted (in more than 75 percent of projects, according to one investigation).

Further, marketing activities are the lowest-rated activities of the entire new product process, rated far below corresponding technological actions. Moreover, relatively few resources and little money are spent on the marketing actions (except for the launch), accounting for less than 20 percent of the total project.

The management implication is that a market focus should prevail throughout the entire new product project, with best practices such as the following (Griffin and Hauser, 1996):

- *Idea generation:* The best ideas come from customers! Market-oriented idea generation activities, such as focus groups and VoC research (ethnography, site visits) with customers to determine customers' generic needs and/or their problems, lead to superior ideas (Cooper and Dreher, 2010). Robust ideas also come from innovative users and web-based customer inputs to help craft the idea or product.
- *The design of the product*: User and customer inputs have a vital role in the design of the product—when the product's requirements and specifications are being defined. Often, market research, when done at all, is done too late—after the product design has already been decided and simply as an after-the-fact check. Note that market research must be used as an input to the design decisions and serve as a guide to the project team before they charge into the design of the new product. Best performers determine customer and user needs at the outset, starting with a user needs-and-wants study (VoC research) in tandem with a competitive product analysis (competitive benchmarking). Best practices here include in-depth personal interviews with customers and users; customer site visits (done by the entire project team); "camping out" with the customer (extended site visits or ethnography); customer panels; and large- sample quantitative market research. Even in the case of technology-driven new products (where the idea comes from a technology or laboratory source, perhaps a technology breakthrough), the likelihood of success is greatly enhanced if customer and marketplace inputs are built into the project soon after its inception.
- *Before pushing ahead with development:* Best performers test the product concept with the customer by presenting a representation of the product—via models, mock-ups, protocepts, computer-aided design (CAD) drawings, and even virtual prototypes—and gauging the customer's interest, liking, and purchase intent. It's much cheaper to test and learn before development begins than to develop the product first and then begin customer testing.

- *Throughout the entire project:* Customer inputs shouldn't cease at the completion of the predevelopment market studies. Seeking customer inputs and testing concepts or designs with the user is very much an iterative process—*spiral development*, as outlined in Section 1.2.5.. By bringing the customer into the process to view facets of the product via a series of concept tests, rapid prototyping and tests, customer trials, and test markets, the developer verifies all assumptions about the winning design.

1.2.3 Predevelopment Work—the Homework

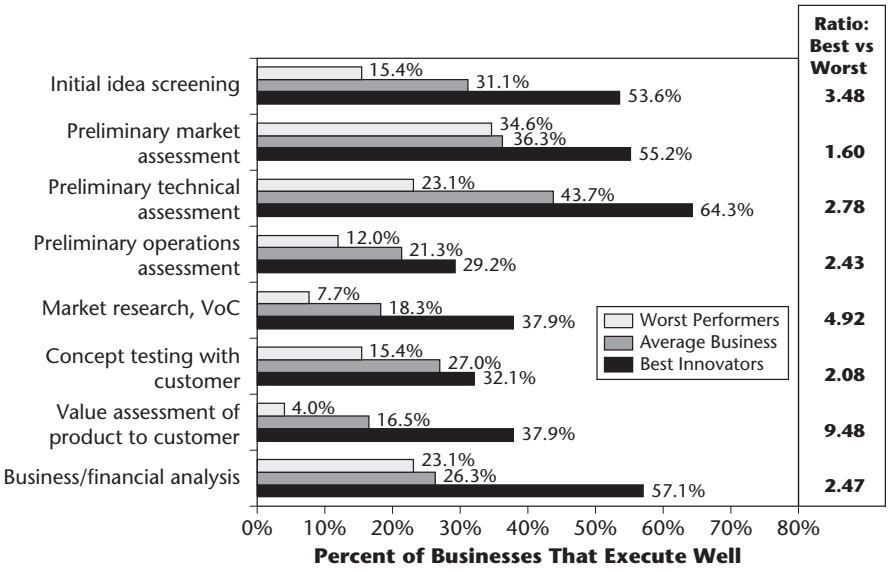
Homework is critical to winning. Countless studies reveal that the steps that precede the actual design and development of the product make the difference between winning and losing (Cooper, 2011a; Edgett, 2011). Successful firms spend about twice as much time and money as unsuccessful firms, as a percent of total project costs on these vital front-end activities:

- Initial screening—the first decision to begin the project (the idea screen)
- Preliminary market assessment—the initial market study
- Preliminary technical assessment—the first and quick technical appraisal of the project
- The detailed market study, market research, and VoC research (described in Section 1.2.2)
- The business and financial analysis just before the decision to go to development (building the business case)

Another issue is the *balance* within the homework phase. Best performers strike an appropriate balance between market/business-oriented tasks and technical tasks, while worst performers tend to push ahead on the technical side and pay lip service to marketing and business issues in the early phases of the project. Figure 1.2 shows how much better best performers execute the homework activities, especially the early-stage marketing/business tasks. Surprisingly, most firms confess to serious weaknesses in the front-end or predevelopment steps of their new product process. Pitifully small amounts of time and money are devoted to these critical steps: only about 7 percent of the total project dollar cost and 16 percent of the effort.

"More homework means longer development times" is a frequently voiced complaint. This is a valid concern, but experience has shown that homework pays for itself in reduced development times as well as improved success rates.

FIGURE 1.2 QUALITY OF EXECUTION IN THE FUZZY FRONT END IMPACTS STRONGLY ON NEW PRODUCT SUCCESS.



- First, all the evidence points to a much higher likelihood of product failure if the homework is omitted. So, the choice is between a slightly longer project and greatly increased odds of failure.
- Second, 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 as they enter the development stage: vague targets and moving goalposts.
- Third, given the inevitable product design evolution that occurs during the life of a project, the majority of these design improvements or changes should not be made as the product is moving out of development and into production. More predevelopment homework anticipates these changes and encourages their occurrence earlier in the process rather than later, when they are more costly.

The message is clear: Don't skimp on the homework! First, cutting out homework drives success rates down; second, eliminating homework to save time today will lead to wasted time tomorrow. It's a "penny wise, pound foolish" way to save time. As Toyota's new products handbook

(Morgan, 2005) recommends: *Front-end load the project.* That is, undertake a higher proportion of the project's work in the early stages and ensure that no significant project move into the development stage without the actions listed in Figure 1.2—early-stage activities that should be built into the idea-to-launch system.

1.2.4 Sharp, Early, Stable, and Fact-Based Project and Product Definition

Two of the worst time wasters in a new-product project are project scope creep and unstable product specs. *Scope creep* means that the definition of the project constantly changes: The project might begin as a single-customer initiative, then be targeted at multiple users, and finally end up being a platform for a new family of products. *Unstable product specs* means that the product definition – product requirements and specifications – keeps changing throughout the development stage; thus, the technical people chase elusive development targets—moving goalposts—and take forever to get to the goal.

Securing *sharp, early, stable, and fact-based project and product definition* during the homework phase is a solution. How well the project and product are defined before the development stage begins is a major success factor, impacting positively on both profitability and reduced time to market. Some companies undertake excellent product and project definition before the door is opened to a full development program. This definition includes:

- Definition of the project's scope (e.g., domestic versus international; line extension versus new product item versus platform development)
- Specification of the target market: exactly who the intended customers or users are
- Description of the product concept and the benefits to be delivered to the user (including the value proposition)
- Delineation of the positioning strategy, including the target price
- A list of the product's features, attributes, requirements, and specifications (prioritized: "must have" and "would like to have")

Securing sharp, early, stable, and fact-based project and product definition during the homework phase is one of the strongest drivers of cycle time reduction and new product success.

Unless the five items in the definition list are clearly defined, written down, and

agreed to by all parties prior to entering the development stage, the odds of failure will skyrocket. Here's why:

- Building in a definition step forces more attention to the front-end or predevelopment activities, a key success driver (Section 1.2.3).
- The definition serves as a communication tool and guide. All party agreement or buy-in means that all functional areas involved in the project have a clear and consistent definition of what the product and project are and are committed to them.
- This definition also provides a clear set of objectives for the development stage of the project and for development team members: The goalposts are defined and clearly visible.

1.2.5 Spiral Development—Build, Test, Feedback, and Revise

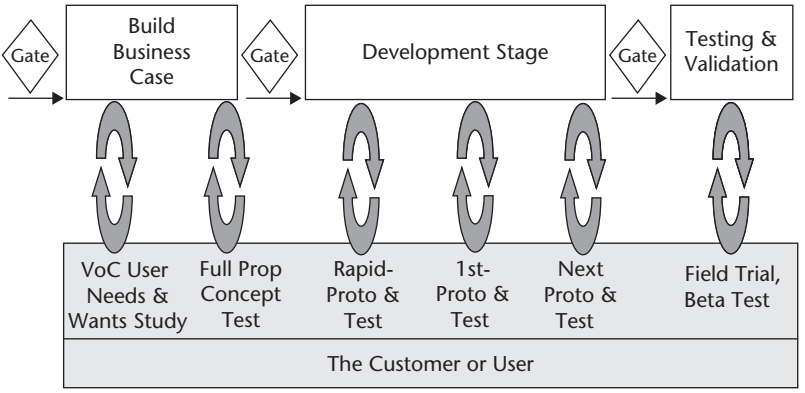
Spiral development is the way fast-paced teams handle the dynamic information process with fluid, changing information. Spiral development helps the project team get the product and product definition right, in spite of the fact that some information is fluid and some may even be unreliable when the team moves into the development stage.

Many businesses use *too rigid and linear a process* for product development. The project team diligently visits customers in the predevelopment or front-end stages and determines customer needs and requirements as best they can. Front-end work or homework is properly done; and the product specs are determined, and the product definition is fixed. So far, so good.

The development stage gets underway but proceeds in *a linear and rigid fashion*. The project team moves the project forward following a "heads-down" rather than a "heads-up" approach. Some 10 or 15 months pass, and at the end of this linear development stage, the product is ready for field trials or customer tests. Then everything goes wrong. When presented with the prototype or beta product for testing, the original intended customers now indicate that "this is not quite what we had in mind" or that "things have changed." Or perhaps a new competitive product has been launched that alters the competitive landscape.

Smart project teams and businesses practice spiral development (based on *agile development*, as used in the information technology industry). They build in a series of *iterative steps* or *loops* whereby successive versions of the product are shown to the customer to seek feedback and verification, as shown in Figure 1.3. These loops are a series of

FIGURE 1.3 SPIRAL DEVELOPMENT—A SERIES OF BUILD-TEST-FEEDBACK-REVISE ITERATIONS—GETS THE PRODUCT RIGHT WITH NO TIME WASTED.



"build-test-feedback-and-revise" iterations (their iterative nature leads to the term *spiral development*):

- Build something, even if it's only a model or representation of the product.
- Test it: get it in front of the customer or user and gauge interest, liking, preferences and purchase intent, likes and dislikes.
- Get feedback: find out the customer's reactions firsthand and, most important, what must be fixed or changed.
- Revise: update the product definition based on this feedback, and get set for the next iteration of build-test-feedback-and-revise, but this time with a product version one step closer to the final product.

> *People don't know what they're looking for until they see it or experience it. So, get something in front of the customer or user fast—and keep repeating these tests all the way through to formal product testing.*

1.2.6 The World Product—a Global Orientation

The world is the business arena today; thus, corporate growth and profitability depend on a globalization strategy married to product innovation. In global markets, product development plays a primary role in achieving a sustainable competitive advantage (Kleinschmidt, de Brentani, and Salomo 2007).

Multinational firms that take a global approach to new product development outperform those that concentrate their research spending in their home market (de Brentani and Kleinschmidt, 2004; de Brentani, Kleinschmidt, and Salomo, 2010; *The Economist*, 2008; Kleinschmidt, de Brentani, & Salomo, 2007). International products designed for and targeted at world and nearest neighbor export markets are the best-performing new products. By contrast, products designed for only the domestic or home market, and later adjusted and sold to nearest neighbor export markets, fare worse. The magnitude of the differences between international new products and domestic products is striking: two or three to one on various performance gauges.

The management implication of these and other studies is that *globalization of markets demands global new products.* To define the new products market as domestic and perhaps including a few other nearby convenient countries severely limits market opportunities. For maximum success in product innovation, the objective must be to design for the world and market to the world. Sadly, this international dimension is often overlooked or, if included, is handled late in the development process or as a side issue.

A global orientation means defining the market as an international one and designing products to meet international requirements, not just domestic ones. The result is either a *global* product (one version for the entire world) or a *glocal* product (one development effort, one product concept or platform, but perhaps *several product variants* to satisfy different international markets). Another option is *two glocal* products—for example, one designed for western or developed countries, but with different versions to suit different countries or regions; and an Asian version to sell to developing countries, but, again, tailored to suit different needs in these countries. A global orientation also means undertaking VoC research, concept testing, and product testing in multiple countries rather than just the home country and launching in multiple countries concurrently or in rapid succession; it also means relying on a global project team with team members in multiple countries (only one new product project team in five is reported to be a global development team; de Brentani, Kleinschmidt, and Salomo, 2010; Kleinschmidt, de Brentani, and Salomo, 2007).

1.2.7 Planning and Resourcing the Launch

Ralph Waldo Emerson once said, "Build a better mousetrap and the world will beat a path to your door." The problem is that Emerson was a poet, not a businessman. Not only must the product be a superior one, but it must

also be launched, marketed, and supported in a proficient manner. A quality launch is strongly linked to new product profitability, and effective after-sales service is central to the successful launch of the new product (Di Benedetto, 1999; Montoya-Weiss and Calantone, 1994; Song and Parry, 1996).

The message is this: Don't assume that good products sell themselves, and don't treat the launch as an afterthought. Even though the launch is the last step in the project, never underestimate its importance. A well-integrated and properly targeted launch does not occur by accident, however; it is the result of a *fine-tuned marketing plan*, properly backed and resourced and proficiently executed. There are five requirements for an effective market launch plan:

1. The development of the market launch plan is an *integral part of the new product process*. It is as central to the new product process as the development of the product itself.
2. The development of the market launch plan *must begin early* in the new product project. It should not be left as an afterthought to be undertaken as the product nears commercialization.
3. A market launch plan is only as good as the *market intelligence* upon which it is based. Market studies designed to yield information crucial to marketing planning should be built into the new product project.
4. The launch must be properly resourced—in terms of both people and dollars. Too often, an otherwise great new product fails to achieve it sales goals simply because of a underresourced launch.
5. These who will execute the launch—the sales force, technical support people, other front-line personnel—should be engaged in the development of the market launch plan and therefore should be members of the project team. This ensures valuable input and insight into the design of the launch effort, availability of resources when needed, and buy-in by those who must execute the launch—elements critical to a successful launch (Hultink and Atuahene-Gima, 2000).

1.2.8 Speed—But Not at the Expense of Quality of Execution

Speed is a competitive weapon. Speed yields competitive advantage—the first on the market; it means less likelihood that the market or competitive situation has changed; and it results in a quicker realization of profits. So, the goal of reducing the development cycle time is admirable. A word of caution here, however: Speed is only an interim objective; the ultimate goal is profitability. While studies reveal that speed and profitability are connected,

the relationship is anything but one to one! Further, there is a dark side to the emphasis on speed: Often the methods used to reduce development time yield precisely the opposite effect, and in many cases are very costly – they are at odds with sound management practices (Cooper and Edgett, 2002; Crawford, 1992). The objective remains successful products, not a series of fast failures! Additionally, overemphasis on speed has led to trivialization of product development in some firms— too many product modifications and line extensions and not enough real new products (Cooper, 2005).

Some sound principles that project teams embrace in order to reduce time to market include:

- Doing the front-end homework and developing early and stable product and project definitions based on facts rather than hearsay and speculation (success drivers discussed in Sections 1.2.3 and 1.2.4); this saves time downstream.
- Building in quality of execution at every stage of the project. The best way to save time is by avoiding having to cycle back and do it a second time.
- Employing effective cross-functional teams: "Rip apart a badly developed project and you will unfailingly find 75 percent of slippage attributable to: 'siloing,' or sending memos up and down vertical organizational "silos" or "stovepipes" for decisions; and sequential problem solving" (Peters, 1988).
- Using *parallel processing*: The relay race, sequential, or series approach to product development is antiquated and inappropriate for today's fast-paced projects.
- Using *spiral development*, as described in Figure 1.3. These build-test-feedback-revise iterations begin with the concept test in Stage 2 (see Figure 1.7) and end with the full field trials (beta tests) in Stage 4.
- Prioritizing and focusing – doing fewer projects but higher-value ones. By concentrating resources on the truly deserving projects, not only will the work be done better, it will be done faster.

1.3 Critical Success Factors at the Business Level

Why are some businesses so much more successful at product innovation than others? Huge differences in product development productivity exist between the best and worst firms, according to a major global study (Arthur D. Little, 2005). The top 25 percent of firms have *12 times as much productivity*

in new product development as the bottom, realizing a huge $39 in new product sales per R&D dollar spent, while the bottom 25 percent of firms achieve only $3.3 in new product sales. In this section, we continue to explore the theme "drivers of success," but *this time focused on the business* rather than the project as the unit of analysis. In short, we consider *what distinguishes the most successful businesses* when it comes to innovation performance (see the box "Why Businesses Excel—Nine Critical Success Drivers" for a summary of the nine critical success drivers at the business level).

Why Businesses Excel—Nine Critical Success Drivers (Cooper, 2011a)

1. Businesses with superlative performance in new-product development have a product innovation and technology strategy to focus the business on the best arenas, and to provide direction for ideation, roadmapping, and resource allocation.
2. Successful businesses focus: They do fewer development projects, better projects, and the right mix of projects. They achieve this by adopting a systematic portfolio management method and by building tough Go/Kill decision points into their new product idea-to-launch system.
3. Leveraging core competencies is vital to success; *step-out* development projects, which take the business into new areas (new markets or new technologies), tend to fail. However, collaborative development and open innovation can mitigate some risks here.
4. Projects aimed at attractive markets do better; thus, certain key elements of market attractiveness—market size, growth, and the competitive situation—are important project selection criteria.
5. The resources must be in place; there is no free lunch in product innovation.
6. The right organizational structure, design, and teams are major drivers of product innovation success.
7. Businesses that excel at product innovation have the right climate and culture that supports and fosters innovative activity.
8. Top management support doesn't guarantee success, but it certainly helps. However, many executives get it wrong.
9. Companies that follow a multistage, disciplined stage-and-gate idea-to-launch system fare much better than an ad hoc approach or no system at all.

1.3.1 A Product Innovation and Technology Strategy for the Business

We live in turbulent times. Technology advances at an ever-increasing pace; customer and market needs are constantly changing; competition moves at lightning speed; and globalization brings new players and opportunities into the game. More than ever, businesses need *a product innovation and technology strategy* to help chart the way (Cooper, 2011b, American Productivity & Quality Center, 2003; Cooper, Edgett, and Kleinschmidt, 2003; Song, X.M., Im, S., van der Bij, H. and Song, L.Z., 2011).

Having a new product strategy for the business is clearly linked to positive performance (American Productivity & Quality Center, 2003; Cooper, Edgett, and Kleinschmidt, 2003). The ingredients of such a strategy with the strongest positive impact on performance include the following (Cooper and Edgett, 2010):

1. *Clearly defined product innovation goals and objectives:* Best practice suggests that a business should clearly define its long-term goals for product innovation—for example, deciding what percentage of the business's sales, profits, or growth will come from new products over the next three or five years.
2. *The role of product innovation in achieving the overall businesses goals:* Strategists recommend that the product innovation goals of the business be linked to the overall business goals so that the role of product innovation in achieving business goals is clearly articulated.
3. *Strategic arenas defined—areas of strategic focus on which to concentrate new product efforts:* Focus is the key to an effective innovation strategy. The goal is to select strategic arenas that are rich with opportunities for innovation—those that will generate the business's future engines of growth (Cooper, 2011b). The great majority of businesses do designate strategic arenas—markets, product areas, industry sectors or technologies—in order to help focus their product development efforts, although evidence suggests that many business are focused on *the wrong arenas*—on traditional and sterile areas that fail to yield the opportunities and development portfolios needed (Cooper, 2005).
4. *Strategic buckets employed:* Studies of portfolio management methods reveal that earmarking buckets of resources—funds or person-days—targeted at different project types or different strategic arenas helps to ensure strategic alignment and the right mix and balance of development projects (Cooper, Edgett, and Kleinschmidt, 2002a). Best performers utilize strategic buckets two and a half times more often than worst performers.

5. *Product roadmap in place:* A product roadmap is an effective way to map out a series of development initiatives over time in an attack plan, often five to seven years into the future. A *roadmap* is simply a management group's view of how to get to where they want to be or achieve their desired objective (Albright and Kappel, 2003; McMillan, 2003), and it provides *placemarks* for specific future development projects. Roadmaps are used by best performers twice as often as by worst performers.
6. *Long-term commitment:* Does the business have a long-term view of its new product efforts? Or is product development largely a short-term effort, with an absence of longer-term projects? Many businesses are deficient here; only 38.1 percent of them have a long-term new product strategy. By contrast, the majority of best performers have such a strategy.

1.3.2 Focus and Sharp Project Selection Decisions—Portfolio Management

Most companies suffer from too many projects, often the wrong projects, and not enough resources to mount an effective or timely effort for each (Cooper, 2011b, Cooper and Edgett, 2002, 2006). This stems from a lack of adequate project evaluation and prioritization, with negative results:

- First, scarce and valuable resources are wasted on poor projects.
- Second, the truly meritorious projects don't receive the resources they need. The result is that the good projects, starved for resources, move at a crawl, or just don't get done.

The desire to weed out bad projects, coupled with the need to focus limited resources on the best projects, means that tough Go or Kill and prioritization decisions must be made. This results in sharper focus, higher success rates, and shorter times to market. Project evaluations, however, are consistently cited as being poorly handled or nonexistent: Decisions involve the wrong people from the wrong functional areas (no functional alignment); no consistent criteria are used to screen or rank projects; or there is simply no will to kill projects at all—projects are allowed to develop a life of their own.

Introduce tough gates with teeth and learn to "drown some puppies." The result is better focus—fewer but better development initiatives.

What some companies have done is to redesign their idea-to-launch systems: They have created a *funneling process*,

which successively weeds out the poor projects; and they have built in decision points in the form of tough *gates*. At gate reviews, senior management rigorously scrutinizes projects, and makes Go or Kill and prioritization decisions. The use of visible Go/Kill criteria at gates improves decision effectiveness. Fortunately, certain project characteristics have been identified that consistently separate winners from losers; these characteristics should be used as criteria for project selection and prioritization. A list of criteria in a *scorecard format*—a scoring model—can be used at gate reviews to rate the project. These criteria include some of the important success drivers cited in this chapter (Cooper and Edgett, 2006; Cooper, Edgett, and Kleinschmidt, 2002a, 2002b):

1. *Strategic:* How well the project aligns with the business's strategy and how strategically important it is
2. *Competitive and product advantage:* Whether the product is differentiated, offers unique benefits, and offers a compelling value proposition to the user
3. *Market attractiveness:* How large and growing the market is its long-term potential, and whether the competitive situation is positive (not intense, few and weak competitors)
4. *Leverage:* Whether the project leverages the business's core competencies, such as marketing, technology and manufacturing
5. *Technical feasibility:* The likelihood of being able to develop and manufacture the product: is this new science and a technically complex project or a technology repackage?
6. *Risk and return:* The financial prospects for the project (e.g., net present value [NPV], internal rate of return [IRR], and payback period) versus the risk

Selecting projects and choosing winning new product initiatives is only part of the task, however. Others are selecting the right *mix and balance* of projects in the development portfolio, seeking strategic alignment in the portfolio, and ensuring that the business's spending on product innovation mirrors its strategic priorities. Many businesses have moved to more formal *portfolio management systems* to help allocate resources effectively and prioritize new product projects (Cooper, Edgett, and Kleinschmidt, 2002a, 2002b). Note that the best-performing businesses have more aggressive development portfolios and undertake a higher proportion of more innovative new product projects, while the worst-performing ones have a very timid new product project portfolio (see the breakdown in Figure 1.4).

FIGURE 1.4 THE BREAKDOWN OF PROJECTS BY PROJECT TYPE SHOWS THE DIFFERENT PORTFOLIOS FOR BEST VERSUS WORST PERFORMERS IN PRODUCT INNOVATION.

	Worst Performers	Average Business	Best Performers
Promotional Developments & Package Changes	12%	10%	6%
Incremental Product Improvements & Changes	40%	33%	28%
Major Product Revisions	19%	22%	25%
New-to-the-Business Products	20%	24%	24%
New-to-the-World Products	7%	10%	16%
	~45%	~55%	~65%

10 Point Steps

Best Performers focus more on innovative and game-changing projects

1.3.3 Leveraging Core Competencies—Synergy and Familiarity

"Attack from a position of strength" may be an old adage, but it certainly applies to the launch of new products. Where synergy with the base business is lacking, new products fare poorly on average.

Synergy or *leverage* is a familiar term, but exactly what does it translate into in the context of new products? Synergy means having a strong fit between the needs of the new product project and the resources, competencies, and experience of the firm in terms of

- R&D or technology resources (for example, ideally the new product should leverage the business's existing technology competencies)
- Marketing, selling (sales force), and distribution (channel) resources
- Brand, image, and marketing communications and promotional assets
- Manufacturing or operations capabilities and resources
- Technical support and customer service resources
- Market research and market intelligence resources
- Management capabilities

These seven synergy or leverage ingredients become obvious checklist items in a scoring model to prioritize new product projects. If the leverage

score is low, then there must be other compelling reasons to proceed with the project. Leverage is not essential, but it certainly improves the odds of winning.

Familiarity is a parallel concept. Some new product projects take the company into unfamiliar territory: a product category new to the firm; new customers and unfamiliar needs served; unfamiliar technology; new sales force, channels, and servicing requirements; or an unfamiliar manufacturing process. And the business often pays the price: Step-out projects have a higher failure rate due to lack of experience, knowledge, skills, and resources.

The encouraging news is that the negative impact here is not as strong as for most success factors. New and unfamiliar territory certainly results in lower success rates and profitability on average, but the success rates are not dramatically lower. The message is this: Sometimes it is necessary to venture into new and unfamiliar markets, technologies, or manufacturing processes and areas where leverage may be limited (e.g., some key skills or resources are missing). Success rates will suffer. However, strategies such as *collaborative development* and *open innovation* help the developer acquire the necessary resources, skills, and knowledge for such step-out projects (Campbell and Cooper, 1999; Chesbrough, 2006; Docherty, 2006). For example, through *open innovation*, the developer obtains resources and knowledge from sources external to the company: ideas for new products; intellectual property and outsourced development work; marketing and launch resources; and even licensed products ready to launch.

1.3.4 Targeting Attractive Markets

Market attractiveness is an important strategic variable and plays a role in notable strategy models, such as Porter's "five forces" model and the two-dimensional GE-McKinsey map or business portfolio grid. In the case of new products, market attractiveness is also important: New products targeted at more attractive markets are more successful (Cooper, 2011a; Montoya-Weiss and Calantone, 1994; Song and Parry, 1996); thus, market attractiveness should be considered in project selection and scoring models.

There are two dimensions to market attractiveness:

1. *Market potential:* positive market environments, namely, large and growing markets—where a strong customer need exists for such products, where the purchase is an important one for the customer, and where profit margins earned by others are high
2. *Competitive situation:* negative markets characterized by intense competition; competition on the basis of price; high quality, and strong competitive products; and competitors whose sales force, channel system, and support service are strongly rated

The message is this: Both elements of market attractiveness—market potential and competitive situation—impact new product fortunes, and both should be considered as criteria in any scoring model for project selection and prioritization.

1.3.5 The Necessary Resources

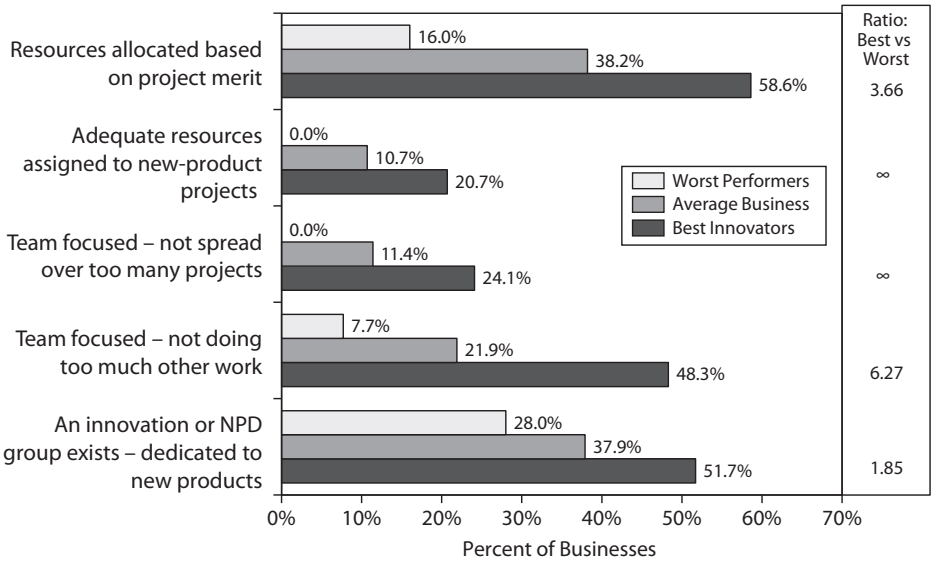
Too many projects suffer from a lack of time and financial commitment. The results are predictable: much higher failure rates (American Productivity & Quality Center, 2003; Cooper, Edgett, and Kleinschmidt, 2003). As the competitive situation has toughened, companies have responded with restructuring and doing more with less. And so, resources are limited or cut back (Cooper and Edgett, 2003). Another reason for failure is trying to do too many projects with the limited resources available—the inability to say "no" to would-be development projects or to kill bad ones. The *resource crunch* takes its toll and is the root cause for much of what ails product development: a lack of VoC and market input; inadequate front-end homework; ineffective launches; and overemphasis on simple, fast projects.

Best-practice companies commit the necessary resources to new products much more often than do most firms (American Productivity & Quality Center, 2003; Cooper, Edgett, and Kleinschmidt, 2003). While new product resources are in short supply across the board—with less than 30 percent of businesses indicating that they have sufficient resources in four key functional areas—the best performers appear to be much better resourced than most firms . Equally important, as shown in Figure 1.5, these resources are focused and dedicated, with project team members not working on too many projects or doing other tasks. Indeed, about half of the best performers have a *ring-fenced product innovation group* that does nothing but work on new products (this is a *dedicated* cross-functional group—technology, marketing, and even sales and operations—whose full-time job is to work on new product projects). Finally, resources must be available early in the project in order to undertake the essential front-end homework and early-stage market research outlined above.

1.3.6 The Way Project Teams Are Organized

Product innovation is very much a team effort. Do a postmortem on any bungled new product project, and invariably you'll find each functional area doing its own piece of the project, with very little communication between players and functions (a fiefdom mentality) and no real

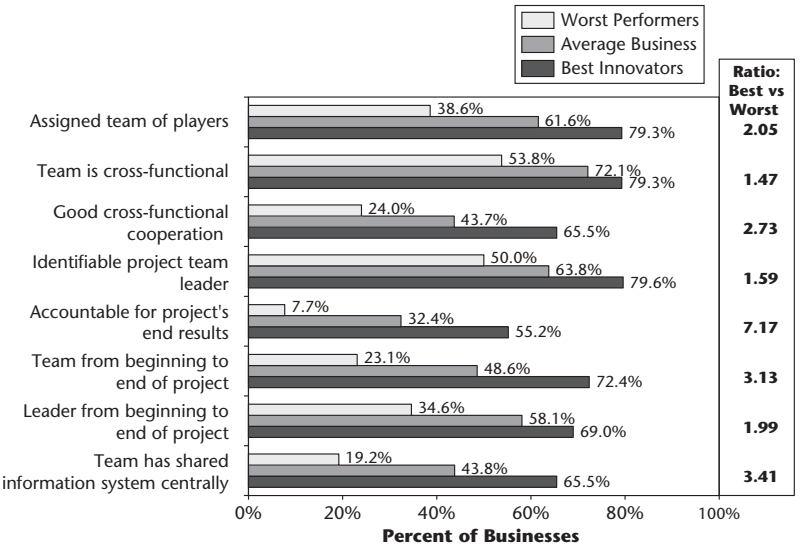
FIGURE 1.5 PROJECT TEAM FOCUS AND DEDICATED RESOURCES HAVE A STRONG IMPACT ON PERFORMANCE.



commitment of players to the project. Many studies concur that the way the project team is organized and functions strongly influences project outcomes (Cooper, 2011a; Cooper, 2011b; Nakata and Im, 2010). Best performers organize their new product project teams as follows (Figure 1.6; American Productivity & Quality Center, 2003; Cooper, Edgett, and Kleinschmidt, 2003; Edgett, 2011):

- There is a clearly assigned project team for each significant new product project—people who are part of the project and do work for it (only 61.5 percent of businesses have clearly assigned teams, with the best-performing businesses outdoing the worst by 2:1). And most important, the project team is cross-functional, with team members from technology, sales, marketing, operations, and so on—a practice now embraced by the great majority of businesses. Here, team members are not just representatives of their function, but rather *true members of the project team*, shedding their functional loyalties and working together to a common goal.

FIGURE 1.6 THE WAY DEVELOPMENT PROJECT TEAMS ARE ORGANIZED STRONGLY IMPACTS ON PRODUCT INNOVATION PERFORMANCE.



- The project team remains on the project from beginning to end, not just for a short period or a single phase. Almost half of businesses use this team approach, and it is particularly evident among the best performers.
- There is a clearly identified project leader—a person who is in charge and responsible for driving the project. And the project leader is responsible for the project from idea to launch; he or she carries the project right through the process, and not just one or a few stages. Worst-performing businesses are weak here.
- A central shared-information system for project team members is in place—a system that permits sharing of project information and allows several team members to work concurrently on the same document, even across functions, locations, and countries.
- Project teams are accountable for their project's end result—for example, ensuring that projects meet profit/revenue targets and time targets. Team accountability is a pivotal best practice, separating the best from the worst performers by 7:1!

Product development must be run as a multidisciplinary, cross-functional effort. While the ingredients of good organizational design should be familiar, surprisingly many businesses have yet to get the message.

1.3.7 The Right Environment—Climate and Culture

A second organizational success ingredient is a positive climate for innovation. Such a climate has many facets and includes an environment where (Cooper, 2011b; American Productivity & Quality Center, 2003; Cooper, Edgett, and Kleinschmidt, 2003; Edgett, 2011)

- Intrepreneurs (internal entrepreneurs) and risk-taking behavior are supported and encouraged
- Senior management is not afraid to invest in the occasional risky project
- New product successes are rewarded and recognized (and failures are not punished)
- Team efforts are recognized rather than individuals
- Senior managers refrain from micromanaging projects and second-guessing the project team members
- Project review meetings are open (the entire project team participates)

Most businesses are quite weak on almost all of the elements of a positive climate described in the preceding list, with typically less than one-third of businesses employing these practices (but best performers do!) (American Productivity & Quality Center, 2003; Cooper, Edgett, and Kleinschmidt, 2003; Edgett, 2011). Some other practices that also drive performance, but are rarely seen except in a handful of very innovative firms, include making resources and time available for creative people to work on their own projects (e.g., via free *scouting time*, *Friday projects*, or bootstrapping funds); allowing the occasional unofficial project to proceed under the radar; setting up *skunk works* projects—teams operating outside the official company bureaucracy; and having an idea submission scheme in place (whereby employees are encouraged to submit new product ideas and are rewarded or recognized for good new product ideas).

A positive climate and culture that supports product innovation is one of the strongest discriminators between best and worst performers.

1.3.8 Top Management Support

Top management support is a necessary ingredient for successful product innovation. Top management's main role is to *set the stage* for product innovation, to be a behind-the-scenes facilitator and much less an actor

front and center (Cooper, 2011b; American Productivity & Quality Center, 2003; Cooper, Edgett, and Kleinschmidt, 2003; Edgett, 2011).

In best-performing businesses, senior management makes a long-term commitment to product innovation as a source of growth. It develops a vision, objectives, and a strategy for product innovation. And it makes available the necessary resources for product development and ensures that they aren't diverted to more immediate needs in times of shortage. In addition, management commits to a disciplined idea-to-launch system to drive products to market.

Most important, senior management is engaged in the new product process, reviewing projects, making timely and firm Go/Kill decisions, and if Go, making resource commitments to project teams. And management empowers project teams and supports committed champions by acting as mentors, facilitators, "godfathers," or sponsors of project leaders and teams.

1.3.9 A Multistage, Disciplined Idea-to-Launch System

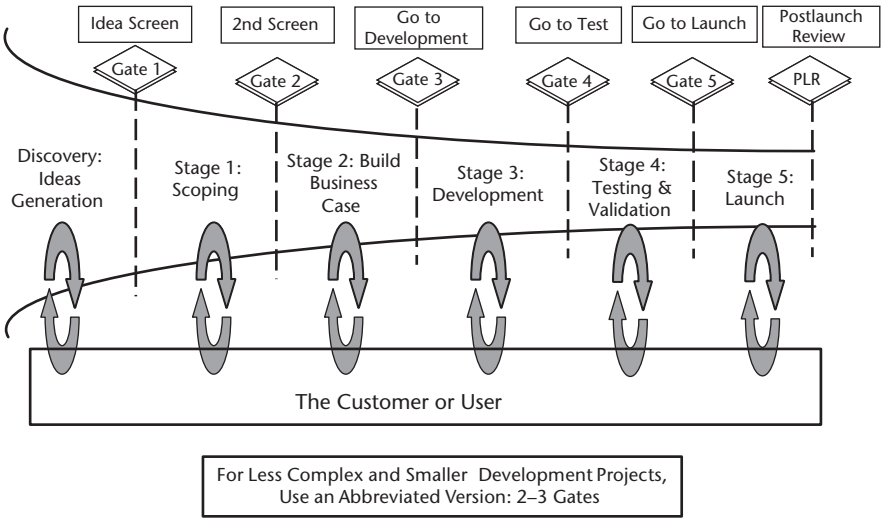
A systematic idea-to-launch methodology – such as a Stage-Gate® system[1]— is the solution that many companies have adopted in order to overcome the deficiencies that plague their new product efforts (Cooper, 2011a; Edgett, 2011; Griffin, 1997; Lynn, Skov, and Abel, 1999; Menke, 1997). Stage-Gate systems are simply roadmaps or play books for driving new products from idea to launch successfully and efficiently. The 2010 APQC benchmarking study reveals that 88 percent of U.S. businesses employ such a process, and it identified the stage-and-gate process as one of the strongest best practices, employed by almost every best-performing business (Cooper and Edgett, 2012). And the payoffs of such processes have been frequently reported: improved teamwork; less recycling and rework; improved success rates; earlier detection of failures; a better launch; and even shorter cycle times (reduced by about 30 percent).

Leading companies have adopted a Stage-Gate system, a method developed by the author, to accelerate new product projects from idea to launch.

The goal of a robust idea-to-launch system is to combine the best practices outlined in this chapter into a single methodology or model so that these success drivers or practices happen by design, not by accident.

[1]Stage-Gate® is a registered trademark of Stage-Gate International Inc. in the United States; see www.stage-gate.com.

FIGURE 1.7 THIS FIVE-STAGE IDEA-TO-LAUNCH STAGE-GATE SYSTEM IS FOR MAJOR PRODUCT DEVELOPMENT PROJECTS.



Used with permission from Cooper (2011a), Chapter 4.

A typical idea-to-launch system is shown in Figure 1.7 for *major projects*, which breaks the innovation process into five stages (Cooper, 2011a). Each stage consists of a set of concurrent, cross-functional, proven, and prescribed activities to be undertaken by the cross-functional team. Best practices, such as solid front-end homework, sharp fact-based product definition, spiral development, and VoC are built into the various stages by design. Required deliverables are defined for the end of each stage—expectations are thus clear.

Here are the stages:

Discovery: the ideation stage, which involves prework designed to discover and uncover opportunities and generate ideas. Multiple sources of ideas should be accessed, although some sources and methods are more popular or more effective than others (Cooper and Edgett, 2008).

Stage 1. Scoping: a quick investigation and sculpting of the project. This first and inexpensive homework stage has the objective of determining the project's technical and marketplace merits. Stage 1 involves desk research or detective work—little or no primary

research is done here. Prescribed activities include preliminary market, technical, and business assessments (see Figure 1.2).

Stage 2. Build the Business Case: the detailed homework and up-front investigation work. This second homework stage includes actions such as a detailed market analysis, user needs and wants studies to build in VoC, competitive benchmarking, concept testing, detailed technical assessment, source of supply assessment, and a detailed financial and business analysis. The result is a *business case*—a defined product, a business justification, and a detailed plan of action for the next stages.

Stage 3. Development: the actual design and development of the new product. Stage 3 witnesses the implementation of the development plan and the physical development of the product. Lab tests, in-house tests, or alpha tests ensure that the product meets the requirements under controlled conditions. The deliverable at the end of Stage 3 is an in-house-tested (alpha-tested) prototype of the product, partially tested with the customer.

Stage 4. Testing and Validation: the verification and validation of the proposed new product, its marketing and production. This stage tests and validates the entire viability of the project: the product itself via customer tests, beta tests, or field trials; the operations process via trial or limited production runs or operations trials; customer acceptance by way of a test market, simulated test market, or trial sell; and the financial justification required prior to full launch.

Stage 5. Launch: full commercialization of the product—the beginning of full operations and commercial launch and selling. The postlaunch plan—monitoring and fixing—is implemented, along with early elements of the life cycle plan (new variants and releases; continuous improvements).

Some 12–18 months after launch, the Post Launch Review occurs. The performance of the project versus expectations is assessed (team accountability is a key review issue), along with reasons why and lessons learned; the project team is disbanded and recognized; and the project is terminated.

Preceding each stage in Figure 1.7 is a gate. These gates are the *quality control checkpoints* in the system: Are we doing the right project, and are we doing the project right? At each gate, the project team meets with senior management, the *gatekeepers*, to seek approval and resources for

their project. The gates thus open the door for the project to proceed to the next stage and also commit the necessary resources—people and funds—to the project and team to move forward.

Each Go/Kill gate specifies deliverables (what the project team must deliver to that gate review); criteria for Go (e.g., a scorecard outlined above in Section 1.3.2) upon which the Go/Kill and prioritization decisions are based; and outputs (an action plan for the next stage and resources approved).

Since Stage-Gate was first introduced, it has undergone many changes and improvements, and some firms have even deployed their *third-generation version* of the system. New practices built into Stage-Gate include (Cooper, 2008)

- Adapting the process for *open innovation*—for the inclusion of ideas, intellectual property, R&D work, and even fully developed products from outside the firm (Crawford, 1992; Docherty, 2006; Grölund, Rönneberg, and Frishammar, 2010)
- Making the process scalable—for example, Lite and XPress versions of Stage-Gate for lower-risk and smaller projects; and even different versions of Stage-Gate to handle different types of development projects, such as Stage-Gate-TD for technology platform developments (Cooper, 2011a)
- Creating a leaner idea-to-launch system—removing all waste and factoring in continuous improvement—by utilizing principles borrowed from lean manufacturing
- Making the Stage-Gate system part of the total *Product Life Cycle Management System*—from idea to product exit many years later (Cooper, 2011a)
- Building in tough gates—gates with teeth—to focus scarce development resources on the highest-value-to-the-corporation projects, culling out the weaker projects (Cooper, 2009)
- Making the system more adaptive and agile—for example, by using spiral development, and accelerating the process via concurrent activities (overlapping activities) and even overlapping stages—moving forward with partial information (Cooper, 2008)
- Automating the idea-to-launch system via new software products that handle everything from idea management to the development process and even resource management.[2]

[2]Some software products have been evaluated; see www.stage-gate.com.

1.4 Summary

Generating a continuous stream of new product successes is an elusive goal. But the quest goes on, because the goal is so important to business success. This chapter has provided an overview of some of the key drivers of new product performance, and hence insights into how to win in developing and launching new products.

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