MAXIMIZING PRODUCTIVITY IN PRODUCT INNOVATION

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If it's time to take a hard look at the methods and systems you rely on to conceive, develop and launch new products, then these seven principles are a good place to start.

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OVERVIEW:

Recent evidence suggests that productivity in new product development (NPD) is declining; that is, we are seeing less output (measured in terms of impact on the business) for the same relative spending level.

This article outlines seven practices or principles which, according to studies of NPD practices and performance, will increase NPD productivity after they are embraced.

These principles include familiar concepts such as building in the voice of the customer, front-end loading projects, and taking a more holistic approach to product innovation. However, while they are familiar, it is surprising how many firms have yet to embrace them. Other, less familiar, principles include: relying on spiral rather than linear development; building in metrics, team accountability and continuous improvement; and portfolio management techniques to yield higher value projects.

Finally, a number of best performers are redesigning their idea-to-launch processes, moving to the next-generation Stage-Gate® system; they employ methods borrowed from lean manufacturing to remove waste from their development processes, and they also make their processes scalable, flexible, adaptable, and more open to the external environment.

KEY CONCEPTS: *NPD productivity, lean product development, Stage-Gate®, portfolio management.* The concept of productivity is simple: it is output over input, or, "the most bang for the buck." More specifically, in the field of new product development (NPD), productivity is defined as output (measured as new product sales or profits) divided by input (measured as R&D or NPD costs and time). For example:

$$NPD\ Productivity = \frac{Sales\ (or\ Profits)\ from\ NPD}{R\&D\ Spending}$$

Because the concept of NPD productivity is relatively new, there are few hard numbers on results achieved in industry. Indeed, a best-practices American Productivity and Quality Center (APQC) study reveals that almost no companies measure or report their NPD or R&D productivity as a business metric (7).

There is strong evidence that NPD productivity is heading in the wrong direction, however. In the United States, the most recent Product Development & Management Association (PDMA) best-practices study reveals that sales from new products are off in a period when R&D spending has remained constant: New product sales fell from 32.6 percent of total company sales in the mid-1990s to 28.0 percent by 2004 (2). At the same time, R&D spending in the U.S. remains unchanged: for example, 2.76 percent of GNP in 1985 versus 2.70 percent in 2004. That is a 14 percent drop in output per spending in less than a decade—quite a dramatic downward shift in NPD productivity.

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This significant decrease in just a handful of years is cause for concern *(3)*. What's going on? There's no evidence that people are doing a worse job today—deficient design and development work, poor market studies, or bad launches. Indeed, a comparison of the quality-of-execution of key activities between 1985 and today—from initial screening through to market launch—reveals no change in quality-of-execution ratings *(4)*. On the other hand, product developers have not improved quality-of-execution at a time when most pundits believe they should have, so that is a second cause for concern.

The one factor that does show a dramatic change, however, and that explains the decrease in profitability, impact and productivity, is *the balance in the portfolio* of projects undertaken today versus in 1990. Simply stated, businesses today are preoccupied with minor modifications, product tweaks, and minor responses to salespeople's requests, while true product development has taken a back seat *(3)*.

Major Gaps in NPD Productivities

One recent Arthur D. Little study provides insights into productivity by industry (5). The study looked at output—measured by five-year sales from new products as a percentage of company sales—and input, measured by R&D spending, also as a percentage of company sales (see Figure 1).

> **There are huge differences in productivity between the best and worst performers.**

One startling conclusion is how much productivity varies by industry, from a high of 14:1 in consumer goods to a low of about 2:1 in the pharmaceutical industry. A second revelation is how *low* the productivity numbers are; note that output was measured by sales *over five years*.

When one compares the productivity of the most productive companies versus the least productive, the results are even more provocative (Figure 1). There are huge differences in productivity between the best and worst performers—on average, almost a 1,200 percent difference! And in some industries, such as pharmaceutical, the differences are even greater. For example, the top 25 percent pharmaceutical firms are 31 times more productive in NPD than the bottom 25 percent.

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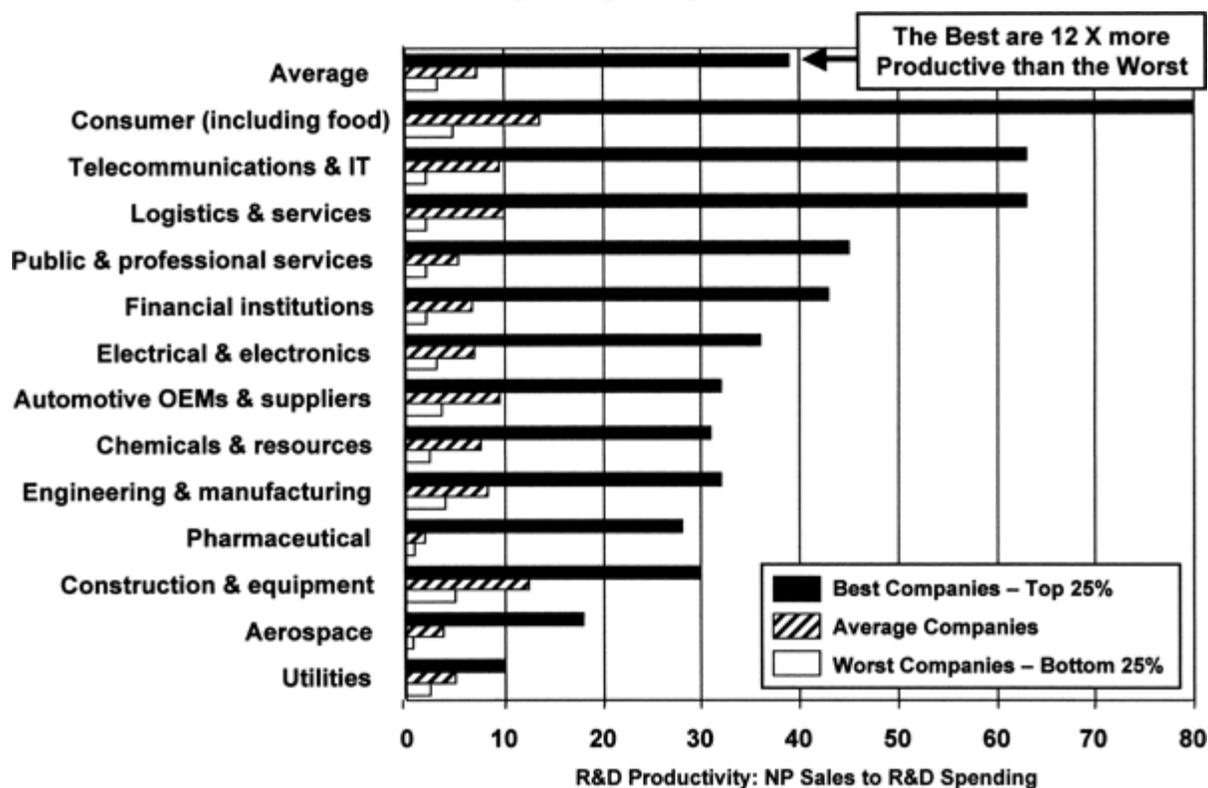# MAXIMIZING PRODUCTIVITY IN PRODUCT INNOVATION

Figure 1 .— NPD productivity varies greatly among companies, with huge differences between the best and worst Companies in each industry. Source: A. D. Little Innovation Excellence Study (5). Source: A.D. Little Innovation Excellence Study (5).

These huge productivity differences between top and poor performers lead to the obvious question: why? What is it that these high-productivity businesses do so differently? And can your business learn from them? Data from a number of best practices studies helps us gain insights into what the secrets to high productivity are—what the best performing companies do so differently (see "Sources of the Data," below).

The Seven Principles

These principles of lean, rapid and profitable NPD, with the goal of improving productivity, have been developed from a long line of research investigations, culminating in the most recent APQC study (*1,6*). Each of the seven principles is very much fact-based; that is, research investigations reveal that businesses or project teams that employ each principle *achieve superior performance results.*

For example, in the sections to follow, you will see bar chart results from the APQC study. What these bar chart results show is that best-performing businesses do employ each of these seven principles to a far greater extent than the rest of the businesses, and that poor performers in particular tend to ignore these principles. Note that the research results have been widely published in refereed journals, including *RTM,* lending credibility and authenticity to what is presented; this is not simply a treatise based on a handful of anecdotes, case studies or home-grown research.

The message is clear—if you want your business to be among the best performers in NPD, do what the high-productivity businesses do: adopt and embrace these seven principles of lean, rapid and profitable NPD, which lead to improved performance and higher NPD productivity (7).

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1.   Customer Focused

Developing and delivering new products that are differentiated, solve major customer problems, and offer a compelling *value proposition* to the customer or user is the number one key to NPD success and profitability (see Figure 2). Indeed, one of the reasons why NPD productivity is down is because of the lack of breakthrough new products with a "wow" factor in most companies' development portfolios.

When one compares the practices of the high productivity businesses (the top 20 percent) with the average and poor productivity businesses in Figure 2, we see that:

* The great majority of high-productivity businesses develop and launch new products that offer new and unique benefits to their customers or users (only 7.7 percent of low-productivity businesses do this).
* New products developed by high-productivity businesses offer the customer or user better value for the money.
* And their new products meet customers' and users' needs better than competing products, by about four-to-one when compared to new products from low-productivity companies.

Conceiving such unique, superior products is no easy feat. On occasion, it is the result of a genuine technological breakthrough or a disruptive technology. But most often, coming up with a differentiated, superior product begins with a thorough understanding of the customers' and users' unmet and often unarticulated needs through in-the-field voice-of-customer (VoC) work. Note that, from Figure 2:

* More than two-thirds of high-productivity businesses work closely with their customers and users to identify their needs and problems (only 15 percent of low-productivity companies do this).
* High-productivity businesses tend to rely on market research to define the product requirements much more than do low-productivity businesses (although here even the best performers are weak).
* And by a four-to-one ratio, the best performers use concept testing with customers or users to gauge expected product acceptance before development begins (again this is a weak area, even for the high-productivity companies).

In short, the customer or user must be an integral part of the entire development process—from scoping, through product definition, development and right on to validation and beyond.

Sources of the Data

A number of studies of new product performance and of what drives this performance have been conducted by the authors and co-workers over the last 20 years *(6,10)*. The seven principles outlined in this article are based on the collective results of these many studies; that is, they are those factors that consistently separate top performers from the rest over the years and appear to have the strongest impact on performance (7). The general approach in each study is to gauge the NPD performance of a large sample of businesses on multiple metrics. Next, a number of practices are also investigated within each business—what is done and how well it is executed. These practices range from strategy development and portfolio management methods to which market studies are undertaken and how project teams are organized.

Finally, these many practices are correlated with the various performance metrics to determine the most important drivers or determinants of performance.

In addition, most of these principles have been well-researched in studies that probed large samples of individual new product projects and project teams. The results were clear in these studies as well: those project teams that employed each principle or practice were more successful.

These studies have shed much light into what makes new products a success and why some businesses are so much more effective at NPD than others.

The specific data shown in the bar charts are from the most recent study, namely the APQC (American Productiv-ty & Quality Center) best practices study (7). NPD productivity was measured for 105 firms on a number of metrics including percentage of sales by new products, new product success rates, percentage of projects meetings sales and profit targets, time to market and slip rate, and profitability relative to spending.

—**R.G.C. and S.J.E.**

Here again, high-productivity businesses excel, with five times as many high-productivity firms building the customer into their development processes.

Note that VoC does not mean "voice of the salesperson" or "voice of the product manager." They are not the customer or user and do not necessarily speak for them, nor do they necessarily understand true customer needs. Further, responding to short-term requests from the sales force results in a series of small, incremental and reactive new products. Some of these small developments are necessary in order to keep the product line fresh and to respond to key customers' requests, but a steady diet of such projects leads to a dearth of genuinely new products, no game-changers and ultimately very mediocre performance (3).

Six different methods of undertaking VoC work were identified among best performing businesses in the APQC and other studies *(1,6)*. These are:

1. *Customer visits with in-depth interviews.*—The entire project team does face-to-face visitation and in-depth interviews with customers or users. In the case of business-to-business (B2B) markets, the visit team is usually three people—marketing, technical and sales— and the customer is often represented by a

> ## High-productivity businesses excel in doing the right up-front homework.

group as well. The interviews are set up by the sales force, and are based on a carefully crafted interview guide that probes for unmet needs, unarticulated problems, and functions and benefits sought—probing well beyond what is normal in just a casual conversation.

2. "Camping out" or ethnography.—This method is essentially cultural anthropology, and involves camping out with users in their homes, offices or factories. Here the visit team is non-intrusive and spends most of their time *observing customers* use, abuse and misuse products as they go about their daily routine. An insightful research team gains a much better understanding of the customers' challenges and problems, and is thus in an excellent position to design the next great new product.
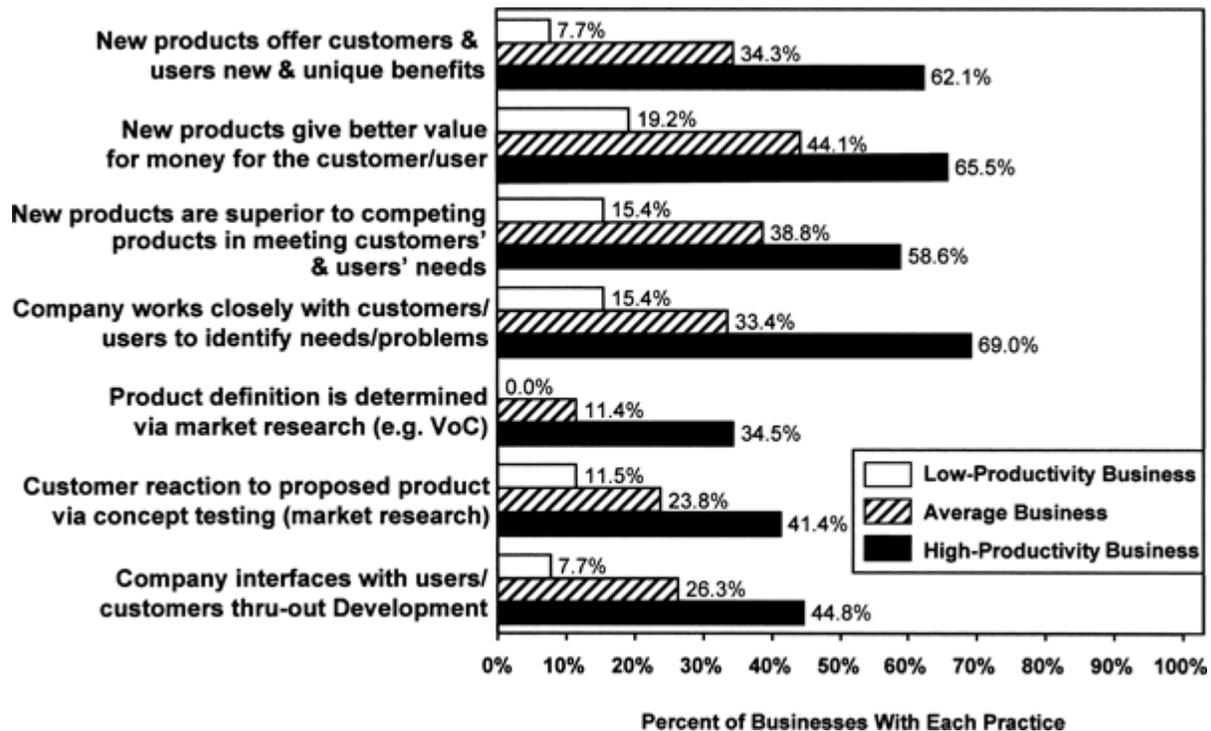

Figure 2 .—A strong market focus with voice-of-customer work is key to achieving product advantage. Note how much stronger the high-productivity firms are here. Source: APQC best practices study (1).

This method sees many applications in consumer goods, but we also saw it effectively used to generate significant new products in B2B settings.

3. *Lead user analysis.*—Your innovative customer has your next new product! In this method, the goal is to identify particularly innovative customers or users—those who are ahead of the wave *(8)*. Working with them—for example, via a customer group meeting at an off-site event—you are bound to come up with innovative product designs and solutions.

4.*Focus group problem detection sessions.*—Customers and users are invited to a moderated round-table discussion or focus group session, not to evaluate new concepts, but rather to articulate their problems and challenges. Understanding *customer points of pain* is often the starting point for developing a breakthrough solution. In some cases, the host company also has a group of design engineers watching the customer focus groups on closed-circuit TV; once a problem has been identified, the engineers quickly brainstorm and propose solutions, which are promptly tested on the focus group. After some iterations back and forth between the focus and brain-storming groups, an innovative solution often emerges. The methodology works with either B2B or consumer products.

5. *Brainstorming group events with customers.*—Customers are invited to a company "innovation day." As part of the day, attendees break out into teams with company people—marketing, sales and technical—intermingled. One team exercise is often a reverse or inverse brainstorming session, where the purpose is to rip apart the current products. Other breakout sessions include brainstorming or group creativity methods to yield possible solutions. This method is most appropriate for B2B products.

6. *Crowd sourcing using online or IT-based approaches.*—The advent of communities of users combined with the widespread availability of high-speed Internet has enabled some companies to tap into the creativity abilities of their customer base. They seek input, ideas and, in some cases, partially completed product designs. Whether you are a T-shirt maker in Chicago, a furniture manufacturer (such as Muji in Japan), or a household products company (e.g., P&G with its Connect & Develop system), opening your doors to external inputs and your customers' wishes

> ## Smart product teams move quickly by practicing spiral development.

via company hosted webpage and the Internet is an increasingly popular route in this trend toward *open innovation (9)*.

2. Front-End Loaded

Due diligence in the early days of a new product project pays off—just ask a venture capitalist! A good dose of the right up-front homework pays for itself in terms of saving time and also higher success rates. Consistently and across the board, high-productivity businesses excel here (see Figure 3).

- About twice as many high-productivity businesses undertake a preliminary market assessment early in the life of a development project when compared to low-productivity firms.
- A much higher proportion of best performers conduct technical assessments, to assess technical risk and probable technical solutions, and source-of-supply (manufacturability) assessments early in the project.
- Although they are weak areas, market research (VoC), concept testing, and determining the value of the product to the customer are activities practiced by high-productivity businesses much more than by poor performers.
- Finally, conducting a detailed financial and business analysis before development begins is a decidedly weak area in low-productivity business, and much stronger among high-productivity companies.

The activities in Figure 3 are a good beginning list of what constitutes front-end work on a typical major project. They should be built into one's idea-to-launch system, and include:
- Preliminary market assessment: a quick assessment of the market to determine market size and potential, customer interest, initial insights into customer needs, requirements and value, and the competitive situation.

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- Technical assessment: a pre-development assessment of the technical challenge, identifying the probable technical solution (on paper), the development route, technical challenges, risks and potential "showstoppers," the IP situation, and outside technology required (including the need for technology alliances). This is the best-executed activity in the front end, with almost half of businesses rated well here.
- Source-of-supply assessment: an initial appraisal of source of product supply, including operating requirements, probable materials and equipment needs, and possible outsourcing needs, suppliers and partners or alliances. This is judged to be a very weak area, with only about one business in five doing a solid job here. Too often, project teams do not involve the manufacturing or operations people early enough in the project, when key decisions—such as product design decisions—are taken that later impact strongly on the operations people.
- Market research: a more in-depth market investigation, involving the project team doing VoC research, highlighted above. Market size and segmentation analysis may be conducted here as well.

This is also a very weak area, with only 18 percent of businesses judged to do this well, but again, best performers seem to do better here, and by an almost five-to-one ratio versus poor performers.

- Concept testing: This is a different type of customer input, where the proposed product, perhaps as a model, concept or virtual prototype, is presented to customers, and feedback is sought. Interest, liking and purchase intent are established. This is good and necessary research, but no substitute for the VoC work outlined above as input.
- Value-to-the-customer assessment: a value-in-use analysis, whereby the product's value is quantified. This activity usually involves looking at the economic impact on customers' operations versus how they solve their problem now (for example, versus competitive solutions and then considering competitive prices and their products' cost in use). This is perhaps the weakest of the front-end activities with only one-in-six businesses doing this well. Again, best performers handle this value assessment much better—by an eight-to-one ratio—but still this is a task needing improvement in many businesses.
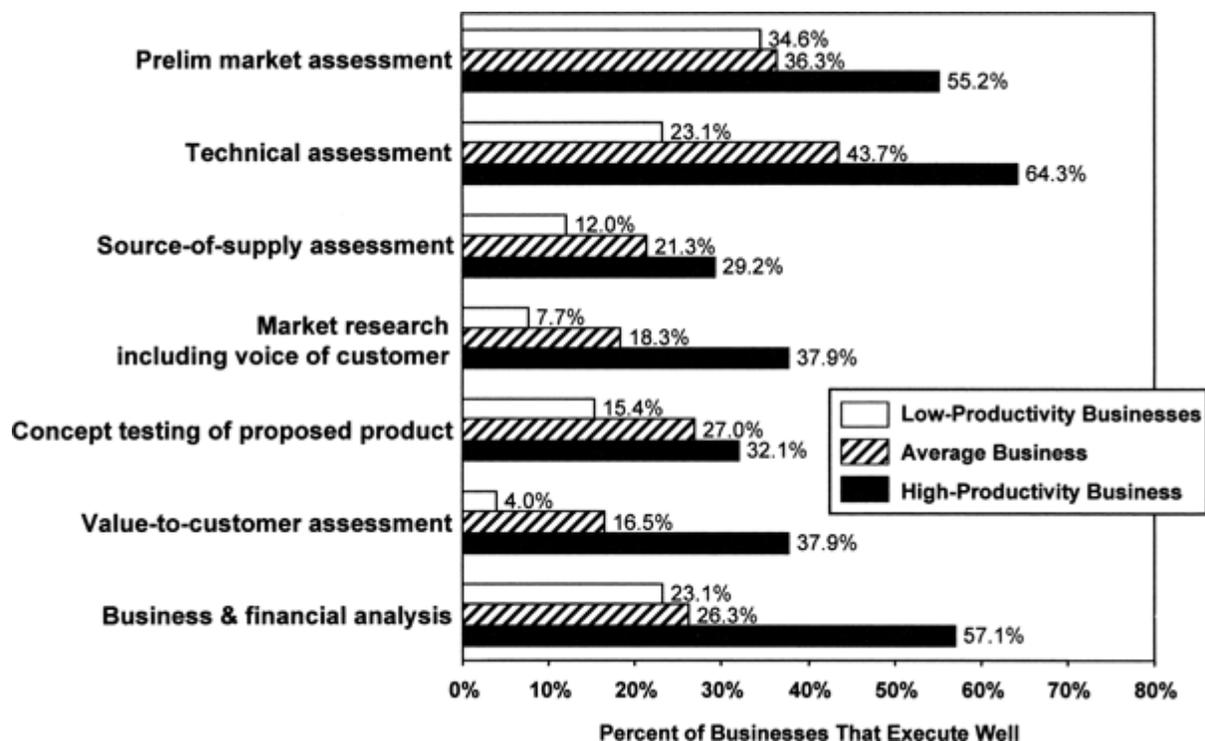

Figure 3 .—High-productivity businesses do the front-end work much more than poor performers. But weaknesses exist—front-end load your projects! Source: APQC best practices study (1).

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- Product definition: the entire project team integrating the acquired information into a product definition. This definition specifies the project scope, target market, product concept, benefits and value proposition, target price and positioning, and features, requirements and high-level specs.
- Business and financial analysis: integrating the data obtained in the homework stage into a business case, which features a full financial and business analysis. For major projects, this is usually a spreadsheet with net present value (NPV), internal rate of return (IRR) and the payback period calculated, along with sensitivity analysis.

Smart managements demand and get the right front-end homework done on projects—the right market, technical and business assessments. This homework is not excessive, but is designed to yield just enough of the vital information to make a Go-to-Development decision, and to define the product and project sufficiently to proceed. The right homework is also instrumental in yielding a winning product and project definition.

3. Spiral Development

In traditional linear development, the project team charges into the Development stage with a product definition based on information that might have been right at the time, and which they believed was accurate. Such a definition may even have been developed from solid VoC or customer visitation work done in the project's pre-Development stages. Months then go by as the project team labors to design and develop the product consistent with the agreed definition.

However, things invariably go wrong. The customer did not know what she wanted; or he changed his mind as the product evolved; or the project team did not listen very well; or the market shifted; or a competitive product was introduced. Thus, when it comes time for field trials or beta tests, everything has changed, and the product is not what the customer or market wanted at all. So launch is delayed and it's back to the drawing board! Indeed, unstable product specs and project scope creep are two of the main causes of long times to market, significant project delays, and even product failure (10).

By contrast, smart development teams practice *spiral development,* shown in Figure 4.

> **Most businesses have too many development projects underway, and often the wrong ones.**

They develop a first version of the product, perhaps a *virtual prototype.* And they test it with the customer, seeking immediate and early feedback, which they then use to produce the next and more complete version, a working model or *protocept.* These fast-paced teams remove unnecessary work and move quickly to a finalized product by building a series of these iterative steps or "loops"—"build-test-feedback-and-revise"—into their project. These iterative loops begin early and become an integral part of the entire development process from early-stage scoping through the Development stage and into testing. When sketched on a flow diagram, these loops appear like spirals in Figure 4, hence the name "spiral development."

4. Holistic Approach Driven by Effective Cross-Functional Teams

Product innovation is very much a business function— not an R&D activity—and team-based endeavor. And the core team, an effective cross-functional project team, is the primary key to cycle time reduction and to getting to market on time. Almost three-quarters of businesses now use cross-functional teams for their major development projects.

Many firms miss the fine points in fostering a team culture, however. Let the high-productivity businesses model the way (see Figure 5). In best-performing businesses, effective cross-functional teams consist of key players drawn from different parts of the organization, and players are assigned so that it is clear who is on the team and who is not. Further, each team member has an equal stake in and commitment to the project, and remains on the field from end to end, not just for one phase of the project. The team is led by a carefully-selected leader or captain, driving his or her project down the field to the goal line in entrepreneurial fashion, and also remaining leader from beginning to end. And senior management provides strong

support and commitment to the team and its members. Team accountability—results measured against success criteria—is also key to effective team performance.

Note that, in Figure 5, high-productivity businesses consistently embrace these team practices, much more so than poor-performing companies. Thus, how the team is organized, its composition, the roles and authority of key players, and the choice and role of the team leader or captain make all the difference between efficient time-driven projects and those that languish forever.

5. Metrics, Accountability and Continuous Improvement

You cannot manage what you do not measure. Many businesses are guilty of not measuring their new product results—only 30 percent of businesses measure the performance or outcomes of new product projects once launched (7). As a result, it's not clear whether a specific project was a success—met its profit targets or met its launch targets. Further, the post-launch review is one of the worst-rated activities in the entire

innovation process, and is executed proficiently by only 22.1 percent of businesses. Without metrics in place, project teams cannot be held accountable for results, while learning and continuous improvement are next to impossible.

Best-performing businesses put metrics in place. *Success criteria* are established for each project, and how well the project performs against these success criteria is measured. The project leader and team declare their projections on key performance metrics as part of their business case at the Go-to-Development gate. Example projections might be:

- NPV ($000) (or some other profit metric such as EVA).
- Year 1 sales ($000 or units).
- Launch date (or time-to-market).

These are important numbers, and are a major input into the Go/Kill decision. On the basis of these and other data, senior management makes the decision to move the project into development, and these projections now become success criteria.
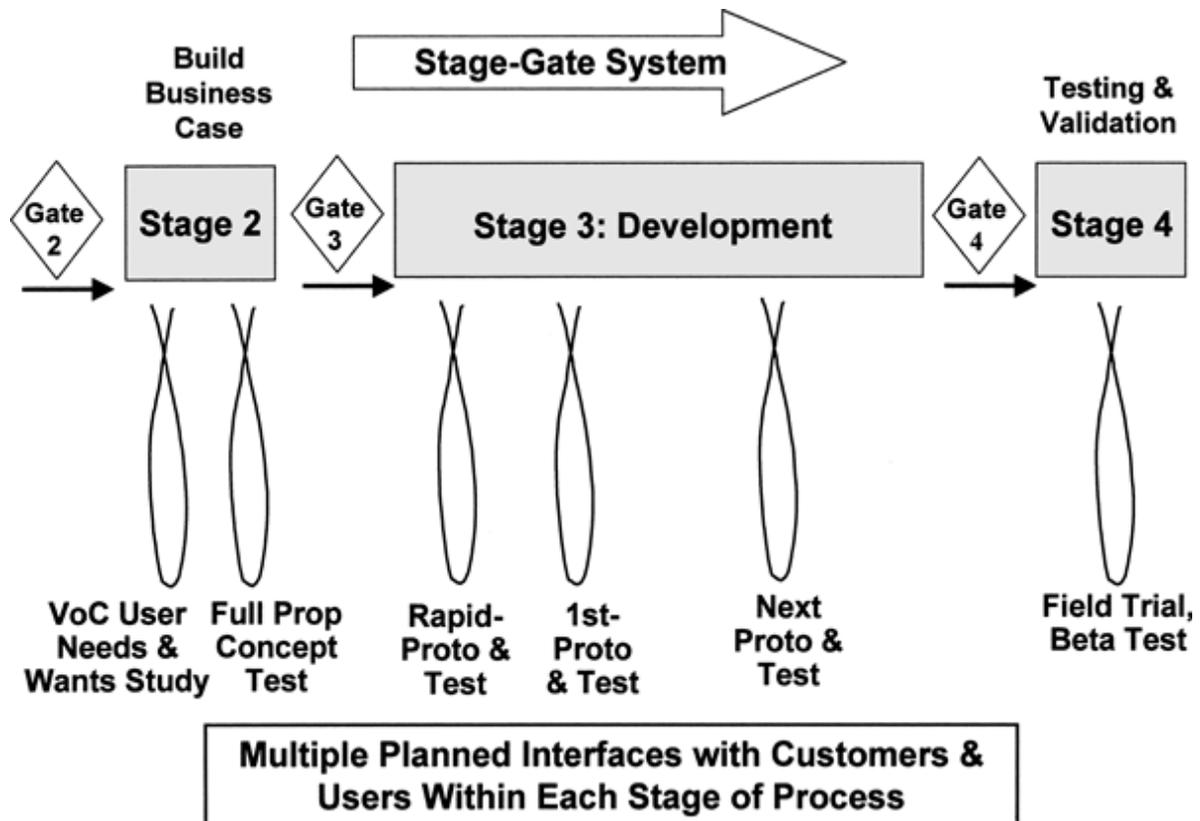

Figure 4 .—Top performers build spiral development into their Stage-Gate® system—a series of "build-test-feedback-revise " iterations.

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The project team is then held accountable for delivering promised results against these success criteria. For example, Go/Kill decisions at successive gates are based in large part on whether or not the project and team continue to meet the stated success criteria. The post-launch review is the *fvasl point of accountability* for the project team. Actual results achieved are determined: the first year's sales realized; the actual date of launch; and the actual NPV based on latest expected results. These numbers are then compared to the projections—the *original success criteria.* When variances are spotted, problem solving sessions that focus on root causes are held, and corrective actions designed to stop future recurrence are identified. Thus, *learning and continuous improvement* become integral and routine facets of the development process— "every project executed better than the one before."

The most popular metrics to gauge the *performance of individual new product projects* are sales and profit measures: revenue achieved versus forecasted revenue is used the most (70.5 percent of businesses that measure project performance use this metric), followed by profitability (NPV or operating profits).

Customer satisfaction is also employed (64.8 percent of businesses) and includes a variety of tools, such as results from satisfaction surveys, warrantee claims, returns and complaints tracking. Additionally, over 80 percent of businesses rely on project metrics that capture time—either time to market or on-time performance.

6. Focus and Effective Portfolio Management

Most businesses have too many development projects underway, and often the wrong ones. That is, they fail to focus, spreading their resources too thinly across too many initiatives, and their project choices result in the wrong mix and balance of development projects in the portfolio (see Figure 6). Most companies do a poor job of ranking and prioritizing development projects; there are too many projects underway for the limited resources available, and portfolios contain too many low-value projects. Not surprisingly, there is no formal portfolio management system in place. The result is that projects take too long, key resources go to too many low-value projects, and NPD productivity suffers.
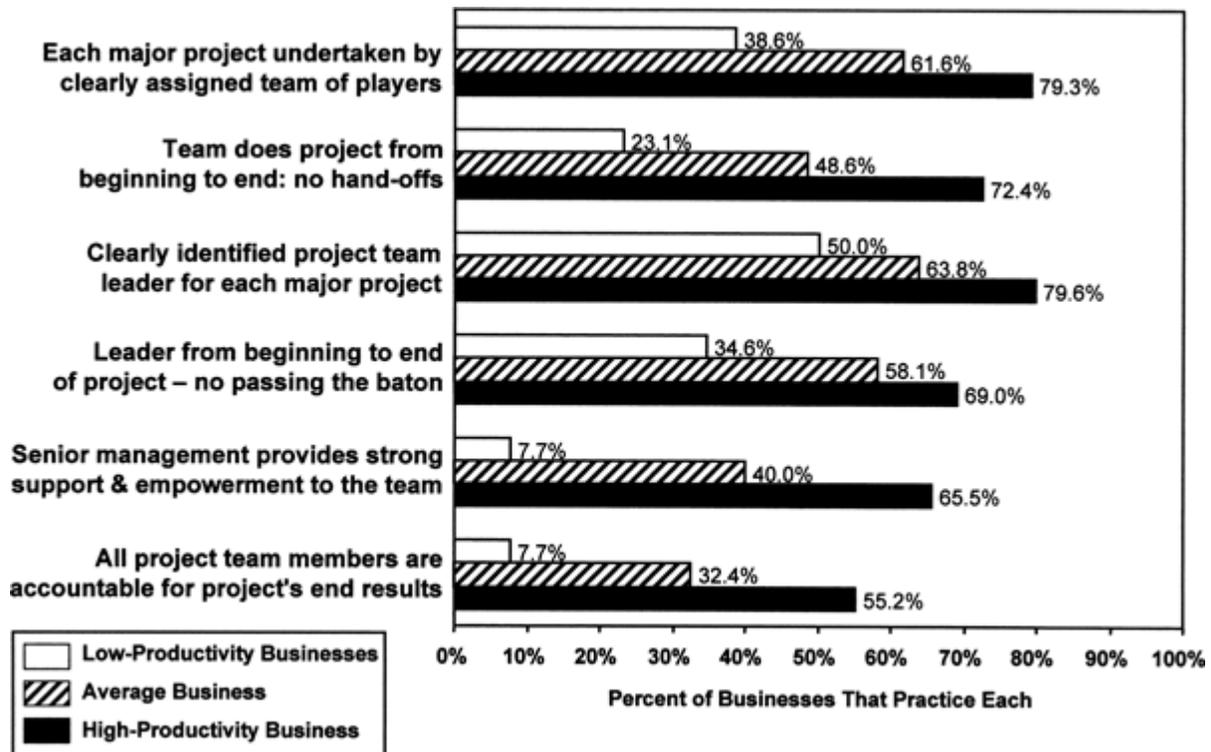

Figure 5 .—The best performers organize their NPD project teams for maximum productivity. Source: APQC best practices study (1).

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Making the right Go/Kill decisions and effectively allocating development resources is fundamental to productivity improvement in NPD. Recognize that every development project is an investment, and like stock market investments, these development investments must be carefully scrutinized and focused through an effective portfolio management system. This is achieved through a funneling approach: start with many solid new product concepts, and successively remove the weak ones via a series of gates.

While a formal portfolio management system is still rare in even the best of firms, the tendencies in Figure 6 are evident: best-performers have such a system by a seven-to-one ratio when compared to poor-performing businesses. Note also that high-productivity businesses—the ones with the best NPD performance overall—achieve a much better balance between numbers of projects and resources available; that is, they do not overload their development pipeline. Further, they have a much better balance between small, short-term projects and major, longer-term ones; and finally, they are more judicious about the specific projects they select, and end up with a portfolio of much

higher value-to-the-corporation projects. These portfolio management efforts combine to yield a significant improvement in productivity.

Some of the tools that best performers include in their formal portfolio system and which they use to make better development portfolio decisions include *(11)*:

- Strategic buckets: setting up "buckets of resources" to ensure the right mix and balance of projects (by project type, and across market segments and technologies).
- Product and technology roadmaps: to map out the major development initiatives (major projects, technologies, platforms) required over the next five-to-seven years.
- Scorecards: rigorous qualitative methods employed by gatekeepers at gate meetings to help select and prioritize the best development projects.
- The Productivity Index: a financial tool with a difference, which attempts to maximize the economic value of the portfolio, subject to personnel or financial resource constraints.
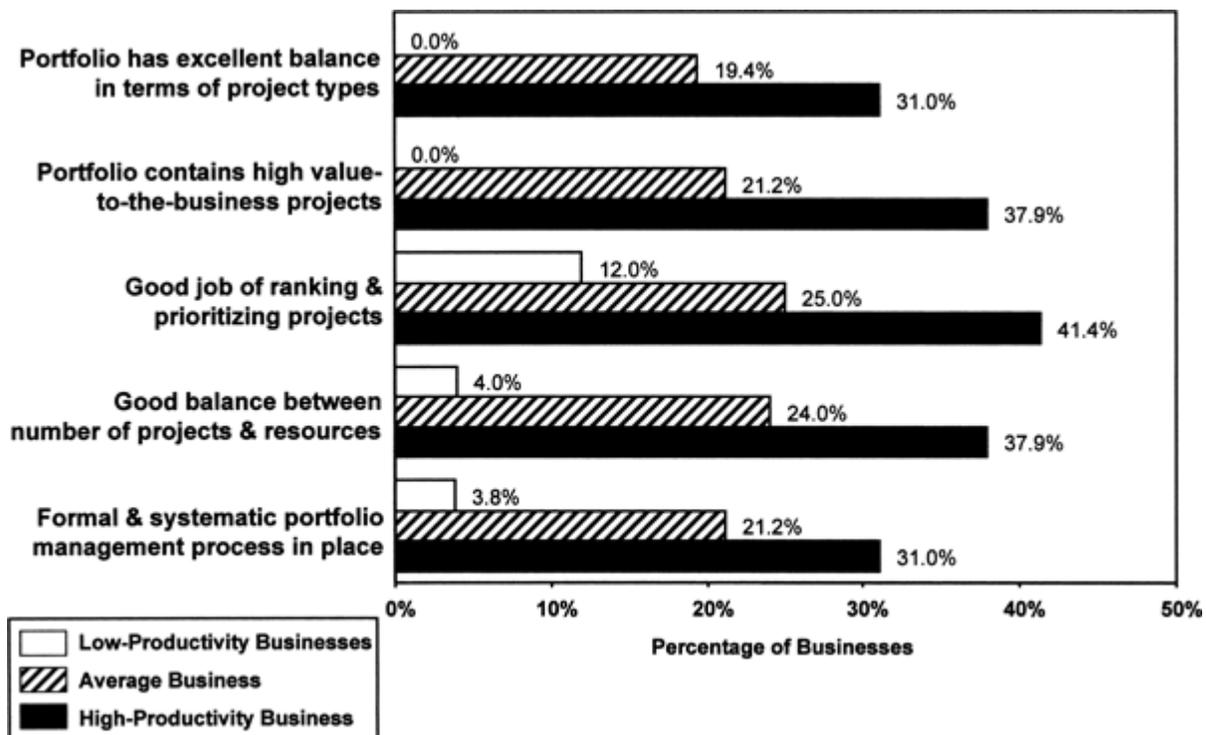

Figure 6 .—Most NPD portfolios reveal major deficiencies: too many projects, wrong balance, low-value projects. High-productivity firms fare better. Source: APQC best practices study (1).

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7. NexGen Stage-Gate® Process

Many businesses' idea-to-launch processes contain much bureaucracy, time wasters and make-work activities. By contrast, smart companies have made their NPD or NexGen Stage-Gate process *lean,* removing waste and inefficiency at every opportunity. They have borrowed *value stream analysis* from lean manufacturing, and have applied it to their new product process. (In value stream analysis, one analyzes the development process from idea to launch and systematically removes all non-value-added activities in order to streamline and accelerate development projects to market).

Stage-Gate has also morphed into a much more *flexible and adaptable* innovation process, one that adapts to changing conditions and fluid, unstable information. The notion of *simultaneous execution* is also built in, whereby key activities and even entire stages overlap, not waiting for perfect information before moving forward. The cost of delay must be weighed against the cost of being wrong.

NexGen Stage-Gate has become a *scalable process,* to suit very different types and risk-levels of projects—

from very risky and complex platform developments to lower-risk extensions and modifications, and even to handle simple requests from the sales force. Each of these projects has risk, consumes resources and thus must be managed, but the nature of your Stage-Gate process will vary greatly depending on the project type. One size of Stage-Gate does not fit all types of projects.

Stage-Gate has also been modified to accomodate *open innovation.* Best performers have reinvented their NPD process to accomodate the flow of ideas, IP, technology and even totally developed products into the company from external sources, and also the flow outward. Companies such as P&G, Kimberly Clark and Air Products have moved to open innovation, and they have modified their Stage-Gate process—built in the necessary flexibility, capability and systems—in order to enable this network of partners, alliances and outsourced-vendors from idea generation right through to launch *{9,12).* For example, P&G has released its SIMPL 3.0 version of its Stage-Gate system, which is designed to handle externally-derived ideas, IP, technologies, and even fully developed products.
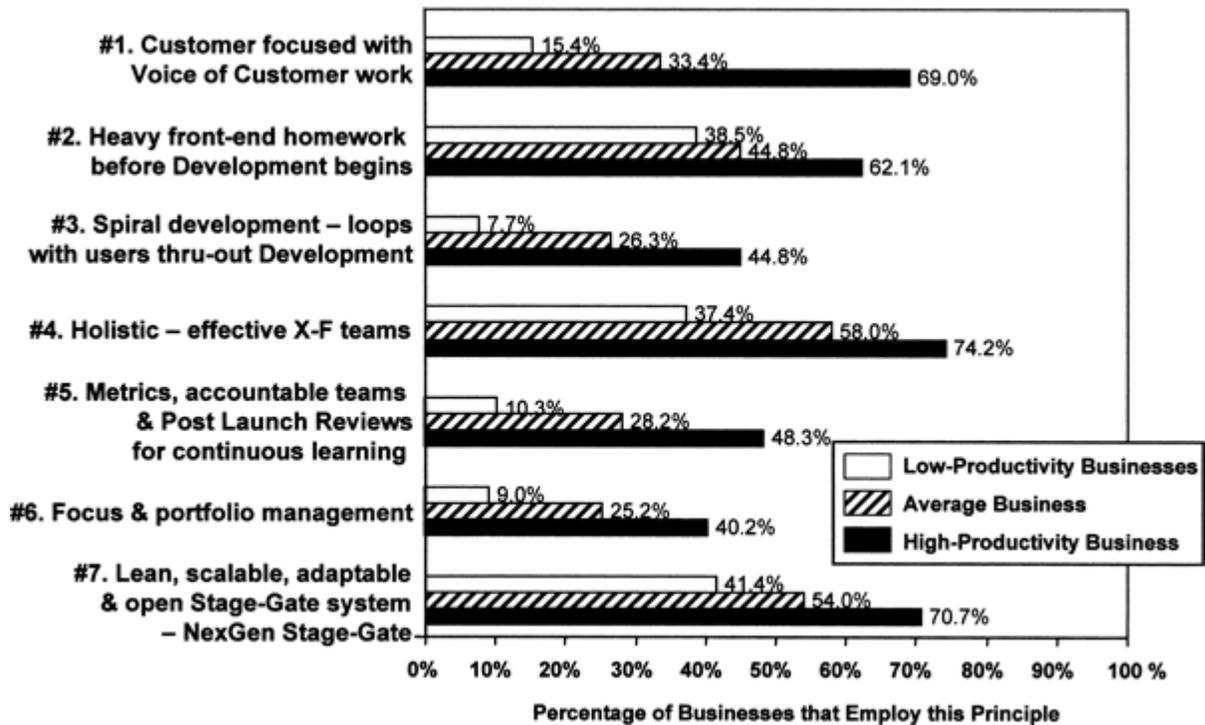

Figure 7 .—These are the seven principles of lean, rapid and profitable NPD. Note how much more the high-productivity businesses practice each principle.

13

Finally, NexGen Stage-Gate has been automated. Increasingly companies are utilizing software to underpin their development process and pipeline. And there are indeed some excellent software tools designed to accommodate and support a Stage-Gate system *(13)*.

Moving Forward

Whenever a progressive company crafts its unique philosophy and model for product innovation, invariably there is animated discussion to agree on the principles that should underlie the model. After all, any innovation model designed to change the behavior of the corporation should be founded on clearly spelled-out basic principles. Some examples:

- Toyota has fashioned its NPD approach on its Seven NPD Lean Principles *(14)*. A review of Toyota's principles of innovation sheds much light on why the company is so successful at creating new products; interestingly, there are many parallels to the list in Figure 7, but some of Toyota's principles obviously apply only to the automotive industry *(15)*.
- Procter & Gamble relies on Six Principles that underlie the company's SIMPL™ approach to product development. SIMPL, which stands for "successful initiative management and product launch" model, has been in part responsible for the company's stellar product innovation track record in recent years *(16)*.
- At Danfoss, a major European company, the company's high-productivity product innovation system is predicated largely on lean principles borrowed from the factory floor, and emphasizes continuous improvement designed to remove waste (7 *7)*.
- At Apple Computer, cycle time reduction is achieved via a global new product process that clarifies roles, nails down the timeline, and maps out the process end to end *(18)*.

The point is that if you and your fellow executives are not satisfied with the results and performance from your business's product innovation efforts, now is the time to take a hard look at the methods and systems that you rely on to conceive, develop and launch new products. And when you do overhaul your methods and systems, be sure to base your new model on some solid principles. The list of seven principles in Figure 7, derived from practices in best-performing companies, is a good place to start.

References and Notes

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