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Ten ways to make better portfolio and project selection decisions

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Good portfolio management (PM) is a key to success in New Product Development (NPD). But good PM still frequently eludes even the biggest brightest corporations. In this article, Bob Cooper and Scott Edgett outline ten ways to make better portfolio and project selection decisions. A related article by Peter Heinrich and Eugene Kania on PM resource management can be found in the April 2006 (Visions, pp 20-23).

Much like the stock market, picking the right portfolio of investments in New Product Development (NPD) is one key to getting more bang for your buck. Indeed, significant productivity gains in NPD are possible through more astute selection decisions, according to a major study of industry best practices. Moreover, businesses that perform the best in New Product Development have in place a systematic portfolio management method—one that brings discipline and rigor to their project selection decisions and effectively guides their resource allocation. These firms recognize that every R&D or new product project is an investment; and like stock market investing, R&D investments must be managed in a professional and systematic way. This article outlines the top 10 practices of these best performing businesses when it comes to portfolio management and project selection.

One of the weakest facets of NPD is effective project selection and resource allocation.¹ As shown in Exhibit 1 on page 12, only 21 percent of businesses' portfolios contain high value-to-the-corporation projects; only

one-in-four businesses effectively rank and prioritize their projects; and less than one business in five has the right balance of projects in its development portfolios. These are dismal results, but the story continues: The great majority of businesses (76 percent) have too many projects for the resources available, which means that projects are under-resourced; and only 21 percent have a systematic portfolio management or project selection system in place.

By contrast, companies that are doing well at NPD—the best performers with the highest NPD productivities—have superior portfolio management practices (also shown in Exhibit 1). Although far from perfect, these best performers effectively rank and prioritize projects, and they boast a systematic portfolio management system much more so than do worst performers. (Here “best” and “worst” performers were identified on a number of productivity metrics including: NPD profitability versus funds spent; NPD profitability versus competitors; percentage of NPD projects meeting sales and profit targets; and on-time performance).

Ten “best practices” in Portfolio Management

What are the secrets to those businesses that achieve superior portfolio and NPD results? Here is a list of 10 best practices that leading companies were found to use to improve their project selection methods.²

The 10 Best Practices in Portfolio Management

These practices improve a company's portfolio management, according to studies conducted by Bob Cooper and Scott Edgett.

1. Focus on data integrity; front-end load the project
2. Install a systematic idea-to-launch process and makes the gates work
3. Adopt an incremental commitment or “options” approach
4. Know when to walk away
5. Remember, one size does not fit all
6. Triangulate since there is no one best way to pick projects
7. Try scorecards, one of the top-rated but overlooked methods
8. Use success criteria, too
9. Use the right financial approaches
10. Build in periodic portfolio reviews to force rank your projects

1. Focus on data integrity; front-end load the project

The best project-selection system in the world is worthless unless the data are sound. As one executive cynically remarked about his firm's adoption of an elaborate financial evaluation tool, “They're trying to measure a soft banana with a micrometer,” noting that the precision of the tool far exceeded the quality of the data on projects.

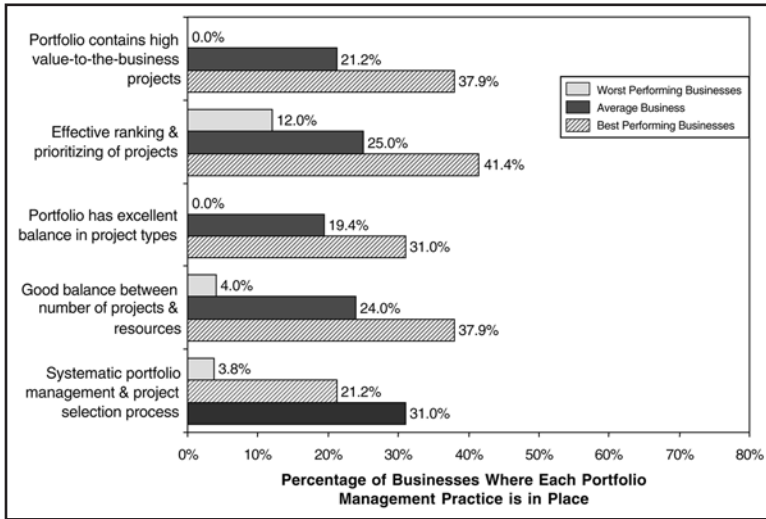
The lack of good, early information plagues many companies' new product projects. Exhibit 2 on page 12 shows a sample of quality of market information, one of the weakest areas. Note that on entering the development stage, only one firm in five has good information on customer price sensitivity (what customers are prepared to pay for the new product); three-quarters of businesses lack data on customer reaction to the new product (for example, via a concept test); and almost two-thirds of firms do not have reliable data on market size and forecasted sales revenue from the new product.

Fact-based decision making in NPD pays off! As Exhibit 2 reveals, those businesses that spend proportionately more effort in the early phases of a project—for example, seeking and obtaining better market information—are rewarded with much higher performing NPD efforts. Best performing businesses are twice as likely as the worst performers to obtain solid information on market size and market potential prior to development; they are three times as likely to get good price sensitivity information; and they are four times more likely to have good insights on customer reaction to the proposed product before development begins.

“One of the weakest facets of NPD is effective project selection and resource allocation.”

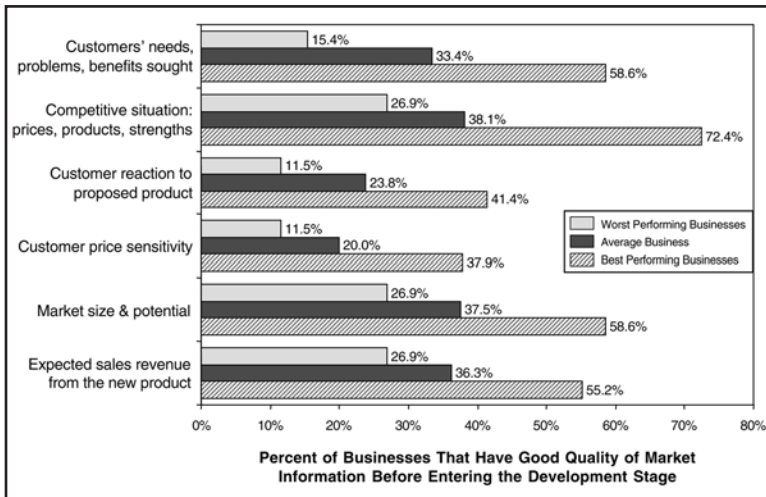
Impact on NPD performance

Exhibit 1: By Portfolio Management Practices



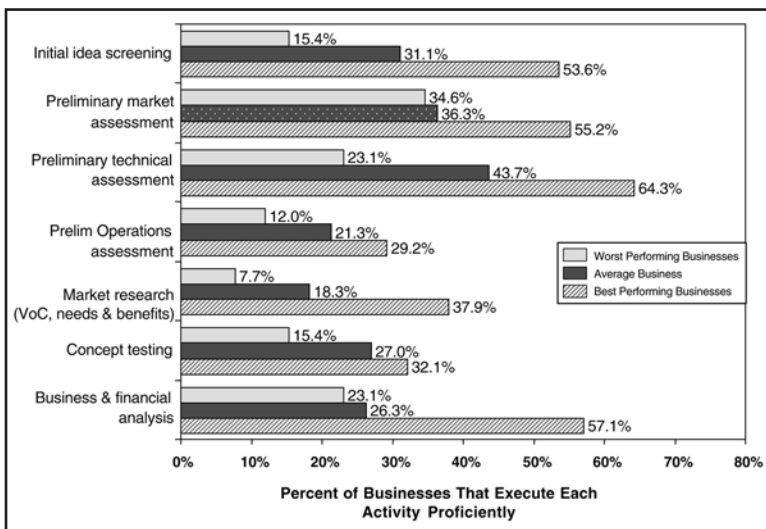
SOURCE: Studies outlined in Endnote 1

Exhibit 2: By Quality of Market Information



SOURCE: Studies outlined in Endnote 1

Exhibit 3: By Quality of Execution of Front-End Activities



SOURCE: Studies outlined in Endnote 1

Define your information needs

The first step to getting better data for more effective project-selection is to *make sure information needs are defined* for each of the Go/Kill decision points or gates. As one executive put it, “If the expectations are clear, there is a much better chance that project teams will deliver.” But too often project teams are uncertain about just what information is required—what they should deliver—to enable the executives to make Go/Kill decisions. If senior management needs to know “expected sales” or the “target price” to plus-or-minus 10 percent, then make that requirement loud and clear to project teams! These information requirements should be spelled out in the form of *gate deliverables* for each of the gates in the business’s gating process.

Next, *front-end load your projects*—that is, move the center of gravity of the work effort forward. This translates into placing much more management emphasis on doing the up-front or front-end homework *before a project moves into the development phase*. At Toyota, where a front-loaded process is one of its seven principles of effective NPD:

*Early engineering rigor, problem solving and designed-in countermeasures, along with true cross-functional participation, are key to maximizing the effectiveness of the Product Development process. By effectively segregating this inherently ‘noisy’ phase of the Product Development process from the execution phase, Toyota is able to minimize downstream process variation that is crucial to both speed and quality.*³

The evidence on front-end loading is very strong: Exhibit 3 on this page shows some of the front-end activities typical of new product projects. Again, there is strong evidence of serious deficiencies: For example, only 18 percent of businesses execute the front-end market research well; and only one company in four develops a proficient business case for its development projects. What stands out in Exhibit 3, however, is how much better the top performers execute the Front End of the project. Due diligence pays off!

2. Install a systematic idea-to-launch process and make the gates work

One way that many companies have attempted to build in these best practices is to install an idea-to-launch process or Stage-Gate® system.⁴ This process helps to ensure that better information is available at gates

- By defining what key tasks—for example, what market research, concept test, or technical assessment—should be undertaken in each of the stages of the project, and
- By specifying deliverables: What information is really needed at each gate.

Exhibit 3 lists key best-practice activities in the front-end of a project, tasks that are typically executed poorly, yet make the difference between winning and losing. Make sure that these are built into your idea-to-launch process.

A second pay-off of installing a stage-and-gate system is the existence of gates. Gates are much more than just a project review or milestone check point. Rather gates are the “bet points” or Go/Kill decision points in the process when resources are allocated to the positive projects, which then move forward. Equally important, gates identify weak projects, which can then be culled before additional resources are wasted. To ensure more effective gates, we

recommend the following practices, again based on observations in better companies:

- Make the gates visible in your idea-to-launch process. Typically there are about four or five gates in a major project.⁴ P&G's SIMPL™ process, for example, features four well-defined gates from “project establishment” to “launch authorization,” as illustrated in a recent *Visions* article.⁵
- Ensure that the right gatekeepers are at the gate meeting. Gatekeepers are typically a cross-functional decision-team of senior managers who own the resources required for the project to move forward. Single department gatekeeping groups, or worse yet, single gatekeepers, don't work; they miss many of the nuances and multi-functional input required in a complex project.
- The full project team should also be at the gate meeting, especially for larger and important projects, making their project presentation and dealing with questions from the gatekeepers. This should be a transparent decision-making process.
- Make the decision—Go or Kill—and commit the resources, right at the meeting. The project leader should leave the gate meeting with a decision; and if Go, a check cut!
- Use a gate facilitator—a referee or process manager—to ensure focus and that a decision is really made that day.
- Consider using rapid gates, electronic gates, or even self-managed gates for lower risk, fast projects.

3. Adopt an incremental commitment or “options” approach

This is analogous to buying a series of options on a property. In order to manage risk, purchase an option to buy; the cost of the option is low, usually a small fraction of the full investment. Then investigate the property further, and buy a further option; and finally decide whether or not to make the full investment. The mistake that a lot of management makes is to make an irrevocable “Go decision” on a NPD project very early in the project when relatively little is known, and

then never seriously consider stopping or killing the project once past this initial Go decision. As one executive put it:

In our company, projects are like express trains. Once underway, they pick up speed. They may slow down at the stations, but never intend to stop until they reach the final destination, the marketplace.

The result in this business was a rapid process that yielded a lot of speedy failures!

Your idea-to-launch process must be an incremental commitment process. At the idea screen, don't bet the farm! Rather place a small bet—commit enough resources to have a look at the project. With better information at successive gates, increase the size of the bets. The goal is to build in a series of Go/Kill decision points, with each successive gate involving more and more resource commitments, much like the poker game of *Texas Hold'em*.

Exhibit 4: A Scorecard for Project Selection—For the new products' bucket

<p>Factor 1: Strategic Fit & Importance</p> <ul style="list-style-type: none"> • Alignment of project with our business's strategy • Importance of project to the strategy • Impact on the business <p>Factor 2: Product & Competitive Advantage</p> <ul style="list-style-type: none"> • Product delivers unique customer or user benefits • Product offers customer/user excellent value for money (compelling value proposition) • Differentiated product in eyes of customer/user • Positive customer/user feedback on product concept (concept test results) <p>Factor 3: Market Attractiveness</p> <ul style="list-style-type: none"> • Market size • Market growth & future potential • Margins earned by players in this market • Competitiveness – how tough & intense competition is (negative) <p>Factor 4: Core Competencies Leverage</p> <ul style="list-style-type: none"> • Project leverages our core competencies & strengths in: <ul style="list-style-type: none"> - technology - production/operations - marketing - distribution/salesforce 	<p>Factor 5: Technical Feasibility</p> <ul style="list-style-type: none"> • Size of technical gap (straightforward to do) • Technical complexity (few barriers, solution envisioned) • Familiarity of technology to our business • Technical track record on these types of projects • Technical results to date (proof of concept) <p>Factor 6: Financial Reward versus Risk</p> <ul style="list-style-type: none"> • Size of financial opportunity • Financial return (NPV, ECV, IRR) • Productivity Index (PI) • Certainty of financial estimates • Level of risk & ability to address risks <p>Projects are scored by the gatekeepers (senior management) at the gate meeting, using these six factors on a scorecard (0 - 10 scales). The scores are tallied and displayed electronically for discussion. The Project Attractiveness Score is the weighted or unweighted addition of the six factor scores (averaged across gatekeepers), and taken out of 100. A score of 60/100 is usually required for a Go decision.</p>
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SOURCE: Robert Cooper and Scott Edgett

As resource commitments increase at successive gates, information is better and uncertainties are reduced; hence, risk is managed.

4. Know when to walk away

The professional gambler knows, “When to hold them, when to fold them, when to run, and when to walk away,” as the Kenny Rogers' song goes. Sadly, in too many firms in spite of building in gates throughout the process, management simply lacks the will or the mechanism to kill bad projects. As one senior executive remarked, “We never kill projects ... we just wound them,” an admission of his management team's inability to stop a bad project. The point is that Go/Kill meetings must yield some kills; and unless some projects are stopped, the gatekeepers are not doing their job. Also, like the poker player wisely folding his hand, management must recognize that a *correct kill is a success*—it just saved the company a bag of money and a heap of trouble.

5. One size does not fit all

If your financial advisor uses the same criteria to evaluate and select different categories of investments—stocks, bonds, and real estate—then you should get another advisor. Quite clearly, these are different types of investments and require the use of quite different investment criteria for each. The same is true of development projects. There are huge differences between small incremental projects, genuine new products, and platform developments. Yet too often we see a failure to recognize the differences and handle each differently.

The solution is to *categorize your developments projects into buckets*, such as:

- New products
- Platforms and technology developments
- Improvements, modifications, and extensions
- Customer requests.

These four types of projects are as different from each other as stocks are from bonds. So *use different criteria for different buckets*. For example, employ financial criteria (profitability or payback) for relatively predictable projects, such as improvements and modifications; but use more qualitative and strategic criteria in the form of a scorecard for platform developments or innovative new products.

“The best project selection system in the world is worthless unless the data are sound.”

Exhibit 5: Ranking of New Product Projects

Project Name	Gate Score (0-100)	Stage	Productivity Index	Resources Required (Loadings: Person-Days)	Cumulative Loadings (Person-Days)	Rank
			NPV Person-Days			
Murray	83	3	206	120	120	1
Timor	83	4	194	140	260	2
Bering	75	3	180	90	350	3
Elk	78	2	142	180	530	4
Berlin	70	4	148	100	630	5
Columbia	80	Hold at Gate 3	150	120	-	Hold
Snap	70	Hold at Gate 2	160	80	-	Hold
Moose	75	Hold at Gate 2	108	130	-	Hold
Banda	73	Hold at Gate 3	129	110	-	Hold

SOURCE: Robert Cooper and Scott Edgett

This chart ranks New Product Projects using the Productivity Index and gate score until the resource limit is reached. "loadings" is the person-days required to undertake the project (next quarter). The limit is 650 person-days in this example, denoted by the bold line.

6. There is no one best way to pick projects, so triangulate

In wartime when intelligence officers attempt to determine the accurate location of an enemy radio signal, they *triangulate*. They set up three listening posts and hone in on the correct location, simply because one listening post cannot provide the total answer. Similarly, in NPD, when trying to make the correct Go/Kill decision, recognize that all methods are somewhat unreliable; so consider using *multiple selection methods in combination* and hone in on the correct decision. Use as many as three different selection methods to make the tougher decisions (for example, in the case of new products or new platform developments). Best performing businesses rely on an average of 2.4 new product selection methods per firm, simply because one alone won't do the job.²

7. Try scorecards, one of the top-rated but overlooked methods

Although scorecards are not the most popular Go/Kill decision tool, they produce surprisingly good results in terms of the resulting portfolio of projects. For example, scorecards yield higher value portfolios and more balanced portfolios.² Moreover, of all selection methods, they fit management's style the best and are rated by users as the most efficient and effective of all methods, yielding the right decisions without being too burdensome. By contrast, financial tools, by far the most popular, yield inferior portfolios on a number of metrics, including portfolio value, balance, and strategic fit.

The proponents of the scorecard approach argue that many qualitative factors are known

drivers of success in NPD.⁶ For example, new product projects that leverage the business's core competencies, sell into an attractive market, and boast sustainable competitive advantage, have higher success rates and make more money. The theory is that if you can explain success, *then you can predict success*. Thus, construct a scorecard using these same factors that are known drivers of success, and use the scorecard at your gate meetings to rate and rank projects. That is, the gatekeepers (not the project team) score the project

on six to ten key evaluative criteria (a sample scorecard is shown in Exhibit 4 on page 13). The resulting scores are then combined to yield an overall *project attractiveness score*. This scoring exercise and final score become key inputs to the Go/Kill decision (although many users of this approach claim that it's the process—a senior decision-making group going through a set of key questions, debating their scores, and reaching closure on each—that provides the real value, and not so much the final score itself).

8. Use success criteria, too

A second selection method and one employed with considerable success at firms, such as P&G, is the use of *success criteria*.⁷

The company [P&G] relies primarily on success criteria to help make better Go/Kill decisions on projects. Specific success criteria for each gate relevant to that stage are defined for each project and are agreed to by the project team and management at each gate. These success criteria are then used to evaluate the project at successive gates and are also key evaluation criteria at the post-launch review. Did the project team achieve what was agreed to?

In addition, a number of businesses have developed general screening tools and scorecard methods to assist the leadership team in selecting ideas that will enter the SIMPL™ process.

Success criteria typically include metrics on profitability, first year sales, launch date, and even expected interim metrics, such as test market results. The method allows the project team to custom-tailor criteria to suit the nature of its project. Further, it forces the team to make much more realistic and accurate sales, costs, and time projections, which provide better data for management to make the Go/Kill decision. The method has the added benefit of instilling project team accountability. At the post-launch review, the project's results are compared against the original projections made by the team. A word of caution here: This success criteria method does have risks; and its use should be reserved for businesses with considerable experience with gating systems and a solid track record of making realistic sales, cost, time, and profit estimates.

9. Use the right financial approaches

Most financial people concur that the NPV (Net Present Value) is the correct method for capital budgeting and hence for making Go/Kill decisions. NPV recognizes that money has a time value. It places progressively less weight on future and distant revenue estimates; and because it is a cash flow method, it avoids many of the problems inherent in accounting or accrual methods. But there are some important caveats when using NPV.

First, some projects are simply too small or too short term to merit a full-fledged financial analysis involving NPV. For these smaller projects, such as Sales Requests, use a simpler financial index (perhaps a Sales-to-Cost ratio) or a very simple scorecard.

For new product projects, which involve uncertainty and risk, consider using a probability-adjusted NPV. For example, the Expected Commercial Value method based on decision-tree analysis and the Monte Carlo simulation approach both effectively deal with risk, uncertainty, and probabilities.⁶

Use the *Productivity Index*, an extension of NPV, as well. At some point, projects must be prioritized simply because resources are constrained. The Productivity Index is a financial approach based on the *theory of constraints*. The argument here is that in order to maximize the value of your portfolio subject to a constraining resource, take the factor that you are trying to maximize—for example the NPV—and divide it by your constraining resource; for example: the person-days (or costs) required

“Gates determine weak projects, which can then be culled out before additional resources are wasted.”

to complete the project, as shown in Exhibit 6 on this page.

Then rank your projects according to this index, as in Exhibit 5 on page 14, until you run out of resources. Those projects at the top of the list are Go projects, are resourced, and are accelerated to market. Those projects beyond the resource limit in Exhibit 5 are placed on hold. The method is designed to maximize the productivity of your portfolio yet stay within a resource limit.

10. Build in periodic portfolio reviews to force rank your projects

Setting up a gating process is an excellent first step, but it's not enough. One problem is that projects are evaluated one at a time at gates, but are never compared against other projects; nor are resource constraints considered when projects are viewed in isolation at gates. So it becomes too easy to say "yes" to every project at a gate, the result being *pipeline gridlock*, too many projects for the limited resources available.

To correct this yea-saying tendency, use portfolio reviews in conjunction with gates. Here the focus of a portfolio review is on the entire portfolio of projects—ensuring that your business has the correct set of Go projects, the right mix and balance of projects, the right priorities of projects, and sufficient resources to undertake these Go projects. Portfolio reviews are typically held about four times per year.

At a typical portfolio review, all projects initially are in the auction. Many companies start by categorizing their projects into the project-type buckets outlined in Exhibit 4 on page 13. Next the "must do" projects are highlighted in each bucket—projects that are strategically essential, are almost completed and are still good ones, or meet a key customer commitment. These "must do" projects are removed from the auction, are designated as top priority, and their resources are protected.

Next, the remaining projects are prioritized within each bucket as in Exhibit 5 on page 14. Be sure to prioritize within buckets, not across buckets, so that you never compare apples and oranges; use different criteria for different project types or buckets; and use multiple criteria as noted in Exhibit 5. For example, in the "New Product" bucket, rank your new prod-

Exhibit 6: Calculating the Productivity Index

The Productivity Index—How to calculate it			
Productivity = Index	Forecasted NPV	or PI =	Forecasted NPV
	Person-Days to Complete Project		Cost to Complete Project

SOURCE: Robert Cooper and Scott Edgett

uct projects by using a combination of the scorecard score (from the most recent gate meeting) and the Productivity Index in order to prioritize the projects. Projects are ranked until they are out of resources in each bucket. (As part of the development of an innovation strategy, management should have already made a strategic decision regarding how many resources go to each type of project or bucket using a Strategic Buckets approach).⁸

Finally check for balance. That is, estimate the proportion of resources going to projects across relevant dimensions, such as the split by market, by project type, by business area, or by risk level. Pie charts and bubble diagrams are a convenient way to display these resource splits.⁶

Practice Discipline

Picking the right portfolio of projects is paramount to maximizing your NPD productivity, so move forward. Design your portfolio management system by following the guidelines above, experiment with it, get the gatekeepers to endorse and commit to using it, and then stick to it. While none of the portfolio or project selection tools is perfect, most yield fairly good results. The worst situation is employing no system—a gut feeling, a political decision, or a shoot-from-the-hip approach. In short, any portfolio system is better than no system at all!

Robert G. Cooper is President of the Product Development Institute, a Professor at McMaster University, and creator of Stage-Gate®. Scott J. Edgett is CEO of the Product Development Institute.

Endnotes

- ¹ Results from an APQC study (American Productivity & Quality Center). See: Cooper, R.G., Edgett, S.J. & Kleinschmidt, E.J., *Best Practices in Product Innovation: What Distinguishes Top Performers*, Product Development Institute, 2003. www.prod-dev.com. A summary is reported in a three-part article series: Cooper, R.G., Edgett, S.J., & Kleinschmidt E.J., "Benchmarking Best NPD Practices," *Research-Technology Management*, 47,1, Jan-Feb 2004, 31-43; *RTM* 47, 3, May-June 2004, 50-60; and *RTM*, 47, 6, Jan-Feb 2005, 43-55.
- ² These 10 best practices are from two sources: an Industrial Research Institute study of portfolio management methods, summarized in: Cooper, R.G., Edgett, S.J. & Kleinschmidt, E.J., *Portfolio Management for New Products*, 2nd edition. New York, NY: Perseus Publishing, 2002. www.perseuspublishing.com, Chapter 6; and the APQC study in endnote 1.
- ³ A summary of Toyota's seven principles of NPD, as uncovered in a University of Michigan study, is found in: Morgan, J. "Applying Lean Principles to Product Development" report from SAE International Society of Mechanical Engineers, 2005 (www.shop.sae.org)
- ⁴ Stage-Gate is a registered trademark of the Product Development Institute Inc. See: Cooper, R.G. *Winning at New Products: Accelerating the Process from Idea to Launch*, 3rd edition. New York, NY: Perseus Books, 2001.
- ⁵ The P&G SIMPL™ idea-to-launch process is shown in: Cooper, R.G. & Mills, M. "Succeeding at New Products the P&G Way: A Key Element is Using the 'Innovation Diamond'", *PDMA Visions*, XXIX, 4, October 2005, 9-13.
- ⁶ Scorecards, Expected Commercial Value (ECV) and various portfolio charts are explained in: Cooper, R.G., Edgett, S.J. & Kleinschmidt, E.J., "Portfolio Management: Fundamental to New Product Success", in *The PDMA Toolbox for New Product Development*, ed. by Belliveau, P., Griffin, A. & Somermeyer, S. New York: John Wiley & Sons, Inc., 2002, 331-364.
- ⁷ Explained in (and paragraph taken from) *Visions* article on P&G's approach in endnote 5.
- ⁸ The Strategic Buckets resource allocation method is explained in: Cooper, R.G., "Your NPD portfolio may be harmful to your business's health," *PDMA Visions*, XXIX, 2, April 2005, 22-26; see also endnote 6.

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