

## *Dialogue on Best Practices in New Product Development*

# **PERSPECTIVE: Establishing an NPD Best Practices Framework**

by Kenneth B. Kahn, Gloria Barczak, and Roberta Moss

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*Achieving NPD best practices is a top-of-mind issue for many new product development (NPD) managers and is often an overarching implicit, if not explicit, goal. The question is what does one mean when talking about NPD best practices? And how does a manager move toward achieving these?*

*This article proposes a best practices framework as a starting point for much-needed discussion on this topic. Originally presented during the 2004 Product Development Management Association (PDMA) Research Conference in Chicago, the article and the authors' presentation spurred a significant, expansive discussion that included all conference attendees. Given the interest generated, the decision was made to move forward on a series of rejoinders on the topic of NPD best practice, using the Kahn, Barczak, and Moss framework as a focal launching point for these rejoinders. A total of five rejoinders were received and accompany the best practices framework in this issue of JPIM. Each rejoinder brings out a distinct issue because each of the five authors has a unique perspective.*

*The first rejoinder is written by Dr. Marjorie Adams-Bigelow, director of the PDMA's Comparative Performance Assessment Study (CPAS), PDMA Foundation. Based on her findings during the CPAS study, Adams comments on the proposed framework, suggesting limitations in scope. She particularly points out discrepancies between the proposed framework and the framework offered by PDMA's emerging body of knowledge.*

*Dr. Elko Kleinschmidt, professor of marketing and international business at McMaster University, wrote the second rejoinder. Based on his extensive research with Robert G. Cooper on NPD practices, he points out that best practices really raise more questions than answers.*

*Thomas Kuczmarski, president of Kuczmarski and Associates, is the author of the third rejoinder. Kuczmarski highlights that company mindset and metrics are critical elements needing keen attention. Where do these fit—or should they—in the proposed framework?*

*The fourth rejoinder is written by Richard Notargiacomo, consultant for the integrated product delivery process at Eastman Kodak Company. Notargiacomo compares the proposed framework to a best practices framework Kodak has used for new product commercialization and management since 1998. The distinction of the Kodak framework is the inclusion of a product maturity model component.*

*Dr. Lois Peters, associate professor at Rensselaer Polytechnic Institute (RPI), is the author of the fifth rejoinder. She brings out issues of radical innovation, a natural focal issue of RPI's radical innovation project (RRIP). It is highlighted that radical innovation may require unique, distinctive process characteristics a single*

*framework cannot illustrate. Multiple layers of frameworks may be more appropriate, each corresponding to a level of innovation desired.*

*The overall hope is that the discourse on best practices in this issue of JPIM generates more discussion and debate. Ultimately, the hope is that such discourse will lead to subsequent continued study to help discern what NPD best practice means for our discipline.*

The search for best practices to manage new product development is ongoing, driven by managers' desire to identify and implement an optimal new product development (NPD) process. Because best practices represent tactics or methods that have been shown through real-life implementation to be successful (Dooley, Subra, and Anderson, 2002), companies and various associations have ardently conducted benchmarking studies in the search for learning about, exchanging, and adapting these practices to their organizations. Two

recent examples include the Product Development & Management Association's (PDMA) Comparative Performance Assessment Study (CPAS) (Adams-Bigelow, 2004) and the American Productivity Quality Center (APQC) NPD best practices study (Cooper, Edgett, and Kleinschmidt, 2002, 2004a, 2004b). Characteristic of benchmarking efforts, these two studies provide a compendium of notable practices for NPD management, describe these practices, and recognize potential best practices.

Other disciplines like sales forecasting have capitalized on benchmarking data by organizing disciplinary learning's into an integrative best practices framework (cf. Mentzer, Bienstock, and Kahn, 1999). However, the NPD discipline, to our knowledge, has not proffered such a framework even though data exist for creating one. The benefit of having such a framework is to illustrate how better and best practices may be attained through the setting of key milestones during the course of improving one's NPD activities (cf. Camp, 1998).

The present article presents our view for a best practices framework of NPD management. Though the CPAS Benchmarking study by PDMA is complete, results have not been published at the time of this writing. Thus, we relied on the 1995 PDMA benchmarking study published by Griffin (1997). Using results of noteworthy published benchmarking studies by Griffin (1997) and Cooper, Edgett, and Kleinschmidt (2004a, 2004b), we review NPD practices and construct a process framework comprising six NPD dimensions across four levels of sophistication to describe states of poor, better, good, and best practice pertaining to new product management. We discuss managerial implications of this framework and how a framework may serve to underlie NPD process audits in the course of process reengineering to achieve better, if not best, practice. We also discuss research considerations, with particular regard to the need to clarify what best practice means within the NPD context.

#### BIOGRAPHICAL SKETCHES

Dr. Kenneth Kahn is associate professor of marketing in the Department of Marketing and Logistics at The University of Tennessee. His teaching and research interests concern product development, product management, and new product forecasting. He has published over 30 articles, with recent publications in the *Journal of Product Innovation Management* and *Journal of Business Research*. Dr. Kahn is currently vice president of publications for the Product Development & Management Association (PDMA).

Dr. Gloria Barczak is associate professor of marketing at Northeastern University in Boston. She received her Ph.D. degree in marketing and innovation management from Syracuse University. Her current research interests include the role of information technology in the new product development (NPD) process and the impact of team emotional intelligence on NPD team behaviors and performance. She has published her research in a variety of journals including the *Journal of Product Innovation Management*, *IEEE Transactions on Engineering Management*, *Research\*Technology Management*, *R&D Management*, and *Marketing Management*. She is a member of the editorial board for the *Journal of Product Innovation Management* and *IEEE Transactions on Engineering Management*.

Roberta Moss is former director for applications and program development for the National American Cancer Society in Atlanta and managed many codevelopment projects with other nonprofits, government agencies, and for-profit companies. She's also worked in for-profit sales and radio and television broadcasting. Her current consulting interest—with nonprofit and government agencies—includes program development, program management, and successful NPD practices in these cultures. Roberta has been an active Georgia PDMA board member and spearheaded the chapter's university and student outreach initiative. She received her M.P.H. degree in health education and administration from Hunter College in New York.

## The Why and How of Benchmarking

Benchmarking is viewed as a keen way to create a sustainable, competitive advantage through improved business performance (Camp, 1998). Benchmarking achieves this by identifying gaps between organization practice and the competition, showing how industry leaders do things and thereby to identify what may have to change and then motivating people with achievable goals and strategies based on other companies' experience. This is accomplished through three phases: (1) performance benchmarks, which provide data that measure the gap between an organization's performance and others; (2) process proficiency, where the respective organization inventories and documents its processes and assigns ownership for process improvement to become proficient; and (3) best practice mastery, where the respective firm incorporates what it sees as best practice (cf. Camp, 1998).

An invaluable tool for enacting and satisfying the first two of these phases is a best practices framework, which provides a standard set of descriptions and characterizations and a basis of evaluation for complex functional processes (Camp, 1998). A best practices framework also provides understanding because it evaluates performance, identifies keen challenges, and suggests directions for process improvement. Use of a best practices framework is extremely beneficial because it gives a context in which to describe one's own activities and to delineate process characteristics as being favorable or unfavorable. This gives direction to where further process improvements may be enacted, if needed.

## Development of an NPD Process Benchmarking Framework

To develop a best practices framework or benchmarking framework for the NPD discipline, a review of recent benchmarking studies of NPD practices was conducted. Whereas the context of best practice studies has been profit oriented product or service organizations, the proposed framework intends to serve and address the needs of not only these organizations but also nonprofit organizations. Note that the term of product is used, but the term of service or offering can be substituted.

Adapting the approach described by Mentzer, Bienstock, and Kahn (1999), new product develop-

ment can be delineated across multiple dimensions into which various characteristics can be classified. Various NPD studies have proposed such classification schemes, albeit different schemes across each study. For example, Loch (2000) portrayed NPD practice across the dimensions of customer orientation and demand pull, cross-functional cooperation, top-management support, existence of a champion, and good planning and execution with a defined process with formal measures. Dooley, Subra, and Anderson (2002) used the four general dimensions of strategic implementation of NPD (i.e., project selection, goals, technological leadership, product strategy, customer involvement) while controlling the execution of NPD (i.e., process control, metrics, documentation, change control), enhancing human resources involved in NPD, and improving the fuzzy front end of NPD; the latter two were noted as receiving little attention, despite a strong call for such (Dooley, Subra, and Anderson, 2002). And Cormican and O'Sullivan (2004) offered the dimensions of strategy and leadership, culture and climate, planning and selection, structure and performance, and communication and collaboration. Amid these demarcations of NPD dimensions and characteristics, Davidson, Clamen, and Karol (1999) stated a need to illustrate how a company can manifest and sustain better and best practices versus simply listing process architecture and organizational structure elements, which is indicative of most NPD benchmarking studies. Put another way, they argued that a demarcation is still needed of how practices may be—should be—adopted as a firm's NPD activities mature.

Using PDMA's work on NPD certification (PDMA, 2004), NPD practices are delineated across six NPD management dimensions. These include strategy, portfolio management, process, market research, people, and metrics and performance evaluation. Each dimension is described across four levels of sophistication, with each level corresponding to a particular set of characteristics describing poor or rudimentary practice (level one), better practice (level two), good practice (level three), and best practice (level four). In this manner, four general states of NPD practice are illustrated on each of the six NPD dimensions so that an organization can characterize its own process relative to these four general states. If an organization does not characterize itself as best practice on a particular dimension, then the characteristics portrayed by more sophisticated states would suggest what needs to be done. Accordingly,

milestones for how to achieve greater NPD sophistication are offered for charting a process improvement effort. Each of the six dimensions is now discussed.

### Strategy

Strategy represents defining and planning a focus for the NPD efforts of a small business unit (SBU), division, product line, or individual project. Cooper, Edgett, and Kleinschmidt (2002) clarified that strategy is important to guiding NPD activities and that almost 65% of companies report doing a good job of defining the strategy for their NPD efforts. Consequently, product development is viewed as a strategic, long-term endeavor. Organizations that look for future market opportunities and can recognize and identify customers' real or unarticulated needs are considered more sophisticated in terms of identifying a clear, new product strategy (Cooper, Edgett, and Kleinschmidt, 2002).

Figure 1 portrays four levels of sophistication for strategy. Level-one companies do not set NPD goals, view NPD as very short term and tactical, have prevalent pet projects, and make NPD decisions as part of the normal budget cycle (typically annual budget process). Level-two companies have NPD goals that derive from the organizational mission, but such goals are obtuse, general, or not directly achievable. These organizations also identify products and programs for regular updating and modification. Level-three companies clearly align goals with their organizational mission and strategic plan and allow the mission and plan to identify or specify areas of opportunity,

although market studies may provide some guidance into particular priorities to pursue. Level-four companies embrace opportunity identification, which uses the mission and strategic plan to define opportunities but also responds to and highlights opportunities stemming from market changes and new technologies. Level-four companies reserve resources to pursue critical innovations and futuring exercises and thereby truly view NPD as a long-term strategic endeavor.

### Portfolio Management

Portfolio management represents the screening out of product concepts to identify the preferable product concepts with which to proceed (PDMA, 2004). Work by Cooper, Edgett, and Kleinschmidt (2002) indicated that only 21.2% of companies report having a well-executed portfolio management system in place and that many companies rate their portfolio management as very weak in terms of the degree to which it is put in place. NPD organizations that are considered more sophisticated have a formal and systematic portfolio management approach, which results in better allocation of human and other resources. Sophisticated organizations also have portfolios containing a balanced percentage of radical or breakthrough types of projects and incremental projects (Cooper, Edgett, and Kleinschmidt, 2002). Less sophisticated companies have unbalanced portfolios that favor incremental projects and an inefficient system for allocating resources.

Integrating these results, portfolio management practices are conceived as ranging from nonexistent

LEVEL 1	LEVEL 2	LEVEL 3	LEVEL 4
No NPD goals	Unclear NPD goals	NPD goals are clearly aligned with organization mission and strategic plan	Mission and strategic plan help define strategic arenas for new opportunities
Short-term, tactical view of NPD	Organizational mission and strategic plan drives NPD project selection	Clearly defined and organization awareness of NPD goals	Opportunity identification is ongoing and can redirect the strategic plan real-time in order to respond to market forces and new technologies
NPD projects are identified during budget process and resources allocated accordingly	NPD products, programs, or services are identified for regular updating	Strategic Plan identifies areas of opportunity	There are strategic buckets of resources to facilitate innovation and futuring
Funding drives NPD project selection	Most NPD projects fit with mission, but some pet projects that do not fit mission may exist	Market studies guide Strategic Plan priorities	Long-term, strategic view of NPD
Pet projects are prevalent		Pet projects are minimized	

Figure 1. Strategy



portfolio management activities to a formal, systematic portfolio management process. As shown in Figure 2, level-one companies do not have a process for portfolio management, nor do they prioritize NPD projects; pet projects are the predominant driver behind project selection. Level-two companies prioritize NPD projects, predominantly stemming from decisions during the annual budgeting cycle; they have pet projects—but such projects would not dominate the portfolio landscape—and use a portfolio management process on existing products versus new concepts. Level-three companies diminish the existence of pet projects and force a discipline around project selection. Resources are allocated to new ideas and opportunities that fit the mission, or strategy, of the organization. Level-four companies have keen consideration for balancing the number of projects and available resources in the course of a formal and systematic portfolio management process.

### Process

Process represents the NPD stages, corresponding activities, and gate criteria for moving products to launch. Cooper, Edgett, and Kleinschmidt (2002) found that more “NPD advanced” organizations use a common, formal process with clearly defined stages and gates that are visible, documented, and

used. Their results indicate that almost 47% of responding companies reported having clearly defined criteria to evaluate projects at each gate (Cooper, Edgett, and Kleinschmidt, 2002). Results also indicate that over 40% of companies designate a process manager to own the process and ensure its use; 65% report having a process that was adaptable and scalable to different types of projects and situations (Cooper, Edgett, and Kleinschmidt, 2002). These results are similar to a PDMA-sponsored study conducted by Griffin (1997) where 60% of profit organizations indicated using a Stage-Gate process for NPD, whereas 39% indicated no formal process at all.

As shown in Figure 3, level-one companies do not subscribe to any NPD process, nor do they reflect a discipline for managing NPD development activities. Level-two companies use an informal, decentralized process where different functional groups employ their own tailored process with limited documentation. Product champions are critical to moving projects through the process of level-two companies. Level-three companies establish a common, documented NPD process and are disciplined in adhering to this process, both of which cut across organizational groups. Product champions play a role in NPD but are not necessary for project success. Level-four companies establish for the entire organization a formal Stage-Gate process that is highly visible and well

LEVEL 1	LEVEL 2	LEVEL 3	LEVEL 4
No process for undertaking portfolio management	NPD project prioritization occurs during the annual budget process	Resources can be made available should a new opportunity come onto the horizon (pop-up)	A formal and systematic portfolio management process is in place
No prioritization of NPD projects	A variety of NPD projects are supported with little to no regard for mix appropriateness	Trade-offs are made between project ideas within a department or SBU (projects are evaluated as a set within a particular group)	There is keen consideration for balancing the number of projects and available resources
No concern over types of NPD projects being developed	Most NPD projects are aligned with the organization's mission	Very few, if any, pet projects exist unless approved by management	There is a ranking or prioritization of projects
NPD projects may or may not be aligned with organization's mission / strategic plan	Pet projects exist	Trade-offs are made in an informal fashion to manage new offerings (done in a subjective fashion)	There is balanced variety of projects
Pet projects are prevalent	A portfolio management process is used to manage existing offerings		All projects must be aligned with the organization's mission/strategic plan
	The ability to secure funding drives NPD project selection and development		An idea bank exists
	NPD concepts/project ideas are reviewed independently		

Figure 2. Portfolio Management

<i>LEVEL 1</i>	<i>LEVEL 2</i>	<i>LEVEL 3</i>	<i>LEVEL 4</i>
No NPD process exists	Informal, decentralized NPD process exists where different groups use their own tailored process	A common NPD process cuts across organizational groups	One formal stage-gate type process is employed for the entire organization
There is a flurry of NPD activity without any discipline surrounding the management of NPD development activities	Limited documentation on the NPD process	Documentation on the NPD process is available	The NPD process is quite visible and well-documented
Criteria for evaluating NPD projects are not defined	The process can be readily circumvented by anyone	Idea database is maintained	Personnel are very disciplined in using the process to develop all new offerings
There is no NPD process owner or NPD process champion	A few standard criteria are used for evaluation of NPD project activity	Time critical projects may skip stages of process	Go/No-Go criteria are clear and pre-defined for each review gate
	Idea generation is structured and formal	Product champions play an important role, but are not mandatory	The NPD process is flexible and adaptable to meet the needs, size, and risk of individual projects
	Different processes exist for ideas coming from internal and external sources	One individual or group can be readily identified as the process manager	There is an intranet for NPD process documentation
	Minimal testing performed	There is an apparent NPD discipline	
	Product champions are critical to NPD success		

**Figure 3. Process**

documented. Personnel in level-four companies are disciplined in using the NPD process and are aware of the go–no-go criteria for each review. Though formal, the process in place within level-four companies is flexible and adaptable to meet the needs, size, and risks of individual project situations.

### *Market Research*

Market research includes application of activities for sensing, learning about, and understanding customers, competitors, and macroenvironmental forces in the marketplace. Overall, more sophisticated organizations employ a variety of market research techniques so that the customer can be involved throughout the development process (Griffin, 1997). These include concept testing, both internal and external product testing, and market testing to determine product definition and customer response (Cooper, Edgett, and Kleinschmidt, 2002). Leading organizations provide adequate resources to support the market research function and to gather a variety of market information to learn customers' current and unarticulated needs, problems, and benefits; customer reaction to the proposed product and price sensitivity; market size and potential; expected sales revenue; and

competitive situation (Cooper, Edgett, and Kleinschmidt, 2002).

Four levels of sophistication for NPD market research are suggested in Figure 4. Level-one companies do not perform market research, relying on anecdotal evidence that suggests an internal orientation toward product development focused on current problems and needs. Level-two companies use market research in a reactive fashion to clarify an issue that may arise. These companies wait until a project begins before initiating a market research study, since funding for such market research will be tied to the project itself. They also rely heavily on pilots, or product testing, for obtaining feedback from customers. Level-three companies are more proactive in using market research, as they have a formal, budgeted market research group that gets involved in helping to develop the product definition. Level-three companies use concept, product, and market testing across projects, although not all projects will undergo the same types of testing. Level-four companies have ongoing market research and make it an integral part of the NPD process. The purpose of such research is not only to help in defining the product but also anticipate or to identify future customer needs and problems. Concept, product, and market testing are common to all NPD projects.

<i>LEVEL 1</i>	<i>LEVEL 2</i>	<i>LEVEL 3</i>	<i>LEVEL 4</i>
<p>No market research performed; if any, market research is predominantly anecdotal evidence</p> <p>Focus on current organization needs and problems</p> <p>Customer/user is uninvolved in NPD process</p> <p>No concept, product, or market testing undertaken</p> <p>No studies done to understand marketplace</p>	<p>Market research is reactive in nature</p> <p>Secondary research is performed once a project begins</p> <p>Market studies are performed once a project begins</p> <p>No market research function; primary market research is outsourced</p> <p>Pilot testing predominant form of testing</p> <p>No real evaluation of testing results</p> <p>Subject matter experts are used for macroenvironmental research</p>	<p>Market research used to help develop product definition</p> <p>A formal market research function exists in the organization</p> <p>Concept testing, product testing, and market testing are used in some, but not all NPD projects</p> <p>Results of testing are formally evaluated.</p> <p>Market research is budgeted</p>	<p>Product definitions are based on market research with customers/stakeholders</p> <p>Customer/user is an integral part of the NPD process</p> <p>Market studies are ongoing</p> <p>Concept, product and market testing is consistently undertaken and expected with all NPD projects</p> <p>Anticipate/identify future customer needs and problems through ongoing market research</p> <p>Market research has an integral relationship with NPD activity</p>

**Figure 4. Market Research****People**

People encompass human resources and team-related initiatives. Cooper, Edgett, and Kleinschmidt (2002) found that leading organizations rely greatly on cross-functional teams throughout the NPD process and are likely to have a centralized NPD function at the

corporate or divisional level where NPD specialists work full time on such activities.

Figure 5 suggests a continuum from department silos to cross-functional teams. Level-one companies are characterized as functionally divided with strong departmental silos and individualistic NPD. Level-two companies begin to dedicate individuals to NPD

<i>LEVEL 1</i>	<i>LEVEL 2</i>	<i>LEVEL 3</i>	<i>LEVEL 4</i>
<p>NPD is performed by individuals</p> <p>Prevalent department silos</p> <p>No project leader(s)</p> <p>Personnel take on too many projects</p> <p>No identifiable NPD group</p>	<p>NPD is decentralized within each business unit/department</p> <p>Champions shepherd projects and are a mainstay of project success</p> <p>Full-time employees dedicated to NPD</p> <p>No NPD teams but cross-functional meetings are used to discuss new ideas/projects</p> <p>NPD is committee-focused</p> <p>Subject matter experts, volunteers and possibly Board of Advisors influence opportunity identification and concept generation stages</p>	<p>Department liaisons comprise established NPD teams (multi-functional teams are used)</p> <p>Identifiable new product managers within business unit/department</p> <p>Each project has a project leader</p> <p>Champions exist for each project, but not necessary for project success</p> <p>Not all projects go through NPD group; some projects are simply handled by department managers</p> <p>Some NPD training</p>	<p>Cross-functional teams underlie the NPD process</p> <p>Each project has a core team which remains on the project from beginning to end</p> <p>NPD is team-focused</p> <p>Clearly identifiable project leader</p> <p>A NPD group exists and is dedicated to just NPD work</p> <p>Use of project management software and techniques to manage projects</p> <p>Ongoing NPD training and NPD awareness</p>

**Figure 5. People**

activities but rely strongly on a committee approach for NPD activities and decisions. Level-three companies rely on department liaisons via multifunctional teams (Kahn, 2000)—using a project team leader to shepherd the project—but not all projects are under the auspices of an NPD team leader. Level-four companies use cross-functional teams to underlie the NPD process and have a clear structure for identifying project team leaders. Level-four companies also have ongoing training to manifest and sustain organizational NPD awareness.

### *Metrics and Performance Evaluation*

Metrics and performance evaluation pertain to how NPD performance is measured, tracked, reported, recognized, and rewarded. The work of Cooper, Edgett, and Kleinschmidt (2002) demonstrated that sophisticated organizations have defined go-kill gates and specific gate criteria, with an emphasis on strategic criteria such as fit with core capabilities, market need, and financial objectives. These organizations are also more likely to gauge how well the project met specific NPD goals such as market share, customer satisfaction, time to market, sales volume, and customers' attitude toward the brand (Cooper, Edgett, and Kleinschmidt, 2002).

Based on Cooper, Edgett, and Kleinschmidt (2002)'s results, Figure 6 presents a continuum that ranges from no standard criteria or metrics to use of standard criteria and multiple reviews. Specifically, level-one companies are characterized as having no standard criteria for evaluating NPD projects or standard criteria for evaluating their overall NPD efforts. Level-two companies use general criteria as guiding principles with an emphasis on revenue or customer volume, but the evaluation process is mostly informal in nature. Level-three companies employ scoring models and checklists as they employ a team approach for evaluating NPD projects and the overall NPD process. Level-three companies use a formal set of business analyses across a series of gate-review points, with middle to upper management involved in the decision-making process. Level-four companies have a standard set of criteria for evaluating NPD projects and their overall NPD efforts. A distinction of level-four companies is the use of an evaluation team, which is charged with the task of NPD evaluation, and the storage and tracking of metric data for possible latter analyses.

### **Conducting an NPD Process Audit**

The proposed best practices framework would be applied in the course of an NPD process audit, which

<i>LEVEL 1</i>	<i>LEVEL 2</i>	<i>LEVEL 3</i>	<i>LEVEL 4</i>
No standard criteria for evaluating projects	There are some general guiding principles for evaluating projects	Scoring models / checklists are used	There is a standard set of criteria for individually evaluating NPD projects
No standard criteria for evaluating the overall NPD effort	Revenue or members served is the predominant metric for NPD project success	Team approach is used to evaluate and make final decision on NPD projects	There is standard set of criteria for evaluating the overall NPD effort
Projects are never killed	Some initial screening criteria used but very informal in nature	Projects can be stopped/killed at any time	Multiple reviews and reviewers are used to evaluate NPD projects and NPD progress
	One person does all evaluations	Formal business analysis is undertaken	There is a group charged with the task of evaluation
	Some projects may be killed/dropped	Business plans must be approved by Directors, VP's	An evaluation software tool is employed
		Multiple review points	Metric data is tracked and stored
		Board of Directors must approve really new ideas/projects and/or big projects	Metric data can be readily accessed for analyses

**Figure 6. Metrics and Performance Evaluation**



would be conducted by mapping NPD process characteristics onto the framework based on the review and evaluation of NPD staff, team members, third parties, or a combination. The level of sophistication for a particular dimension would be where the majority of characteristics typifying that organization are found. Naturally, an organization may reflect a number of varied characteristics, but experience suggests that one level of sophistication is usually more prevalent. For example, a company might be profiled as 334211 across the six dimensions and could then compare itself against the ideal case of 444444 or the best practitioner in the industry, for example 434322. Ostensibly, this serves as a diagnostic for indicating where the organization should focus its attention; in this example, the respective company could choose to match the best practitioner on the first, fifth, and sixth dimensions.

Based on Cooper, Edgett, and Kleinschmidt (2002) and our own experience, a number of companies are characteristically level one or partially level two when it comes to NPD sophistication. In general, these companies do not have an NPD process; do not prioritize NPD projects or use a portfolio management approach; have a predominance of pet projects; lack standard criteria for evaluating NPD projects and the overall NPD effort; take a short-term, tactical view of NPD; and do not use market research to their potential, if at all. This contrasts a true level-four company where there is a formal NPD process including portfolio management, visible gates, proactive market research, cross-functional teams, and standard criteria to support NPD as a strategic initiative.

Transitioning from level one to four is not easy and immediate. Based on Mentzer, Bienstock, and Kahn (1999), companies appear able to rapidly transition from level one to two. It takes longer to transition from level two to three and even longer to transition from level three to four. For some companies and industries, level three is acceptable due to diminishing returns from expending resources to secure all level-four characteristics. Level-two and -three characteristics represent competitive practices that enable the company to compete effectively; level-four characteristics represent practices that provide distinctive competitive advantage (Dooley, Subra, and Anderson, 2002). Companies certainly do not want to be level one and should not reflect a preponderance of level-two characteristics.

## Conclusions

The proposed best practices framework is an initial attempt to organize benchmarking data from published studies supplemented by the experiences of the authors in recent NPD process benchmarking efforts. The portrayal of new product development from a multidimensional view is important because it shows that the courses of action a company may take to improve the sophistication of its NPD effort are varied. These paths focus on six general themes for NPD best practice:

- (1) Instill a strategic, long-term orientation toward NPD.
- (2) Have a formal portfolio management process.
- (3) Implement a formal NPD process supported by a discipline to adhere to this process.
- (4) Conduct market research proactively.
- (5) Use cross-functional teams.
- (6) Utilize standardized criteria and metrics.

These themes spark an immediate question concerning what truly represents an NPD best practice. The proposed best practices framework suggests a continuum from nonexistent to formalized strategy, portfolio management, process, market research, people, and metrics and performance evaluation. Conceivably, formalization may not be necessarily conducive for stimulating innovation, especially in radical or entrepreneurial contexts where informality over choice of direction manifests creativity and innovation. Too much formalization also has the potential of stymieing the NPD process to a standstill—both in terms of novel ideas and speed. Hence, the conceptualization of formal activities representing level-four characteristics may be a misnomer. Indeed, a curvilinear relationship between formality and characteristics across the four levels of sophistication may persist, where formality is necessary up to a certain point in organizational NPD maturity, after which introduction of informal initiatives are needed for stimulating new product development and commercialization.

Loch (2000) even contended that no one best practice NPD process exists. That is, although the Stage-Gate process serves as the NPD backbone, company survival depends on how well that company adapts to specific environments. Companies essentially need to develop a customized NPD project portfolio and a corresponding mixture of processes that together meet strategic innovation needs across incremental

projects, extensions into new markets, and radical innovation projects. Radically new NPD projects would require less structure and more exploration than incremental projects. It is imperative that rigidity of the process and a lack of linkages to other company processes be avoided in the course of formulating the strategic innovation needs of the business units and translating them into a collection of NPD efforts that appropriately serve the company context (Loch, 2000). A similar conclusion was made by Davidson, Clamen, and Karol (1999), who emphasized the need for process flexibility so that the process can be continually adjusted to the organization's needs and desires.

A second question pertains to the inclusiveness of the six dimensions. Topics regarding the fuzzy front end, launch, and life-cycle management are conspicuously lacking. Do these topics require a separate dimension, or can elements of these be linked to the present six dimensions? Of these, an argument for establishing a life-cycle management dimension is particularly strong (Ausura, Gill, and Haines, 2004).

Several other research questions are posed. Though it is likely that the six dimensions are correlated, it is unknown to what extent, if any. If strong correlation exists, there might be an alternative, more preferable clustering of characteristics. Even if the framework implicitly portrays dimensions as having equal weightings, certain dimensions may be more critical than others or may have greater bearing on NPD proficiency and effectiveness. This would suggest that dimensions are unequal in weight. Such weights for each dimension may likely depend on the industry, organization, or other characteristics. And given the breadth of and rapid pace of change in the NPD discipline, how stable and thorough are the descriptive characteristics of each dimension? Do characteristics change over time?

Additionally, various studies contend that as an organization becomes more sophisticated, the NPD effort will become more effective, leading to direct bottom-line benefits. Work by such authors as Montoya-Weiss and Calantone (1994), Cooper and Kleinschmidt (1995), and Crawford and Di Benedetto (2003) exemplifies how a well-implemented and sophisticated NPD process can bring about significant and appreciable bottom-line results. Research is therefore needed to examine whether NPD sophistication can lead to sustainable bottom-line benefits. To do this, it will be necessary to quantify the characteristics along a continuum, as one reviewer had prescribed: for exam-

ple, level one, 80–100% pet projects; level two, 60–80% pet projects; Level three, 40–60% pet projects; and level four, 0–40% pet projects. Such efforts to quantify the proposed framework through the development of scales will facilitate the measurement effort and will offer more potentially concrete results, which can then be more readily linked to financial performance. These efforts also should include examination of possible industry effects to ascertain whether practices and best practices offered by benchmarking studies and the proposed best practices framework are generalizable across industries and various circumstances. For example, nonprofit organizations favor the use of pilot testing versus concept, product, and market testing (Barczak and Kahn, 2004).

We hope the proposal of this framework stimulates discourse over what truly represents an NPD best practice. Continued work to operationalize, validate, and augment NPD best practices and the proposed framework will only improve our discipline's understanding of poor, better, good, and best NPD practice. Indeed, previous benchmarking work has found that notable, popular companies are not necessarily the best-performing companies (Camp, 1998; Mentzer, Bienstock, and Kahn, 1999). That is, some companies noteworthy for their sales volume and having received public accolades actually have a propensity to misallocate resources and to employ sub-optimal procedures. In short, there is a need to recognize that NPD best practice should be distinguished from popular press favoritism and market capitalization. Naturally, further investigations will only serve to clarify what deserves recognition as a best practice along with corresponding implications for companies. To assist in these investigations, the proposed framework is offered as a tool for characterizing and delineating NPD practices, which until now was something our discipline did not possess.

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