Since 1990, the Product Development & Management Association (PDMA) has sponsored best practice research projects to identify trends in new product development (NPD) management practices and to discern which practices are associated with higher degrees of success. The objective of this ongoing research is to assist managers in determining how to improve their own product development methods and practices. This paper presents results, recommendations, and implications for NPD practice stemming from PDMA’s third best practices study, which was conducted in 2003. In the eight years since the previous best practices study was conducted, firms have become slightly more conservative in the portfolio of projects, with lower percentages of the total number of projects in the new-to-the-world and new-to-the-firm categories. Although success rates and development efficiencies have remained stable, this more conservative approach to NPD seems to have negatively impacted the sales and profits impact of the new products that have been commercialized. As formal processes for NPD are now the norm, attention is moving to managing the multiple projects across the portfolio in a more orchestrated manner. Finally, firms are implementing a wide variety of software support tools for various aspects of NPD. NPD areas still seriously in need of improved management include idea management, project leadership and training, cross-functional training and team communication support, and innovation support and leadership by management. In terms of aspects of NPD management that differentiate the “best from the rest,” the findings indicate that the best firms emphasize and integrate their innovation strategy across all the levels of the firm, better support their people and team communications, conduct extensive experimentation, and use numerous kinds of new methods and techniques to support NPD. All companies appear to continue to struggle with the recording of ideas and making them readily available to others in the organization, even the best. What remains unclear is whether there is a preferable approach for organizing the NPD endeavor, as no one organizational approach distinguished top NPD performers.

**PDMA’s Best Practice Studies**

The Product Development & Management Association (PDMA) conducted its first study of best practices (BP1) in new product development (NPD) in 1990 (Page, 1993). This study found that, although firms had implemented a number of new methods and techniques to improve the way new products were developed in recent years, very little absolute progress in success rates had been made. About 58% of the products of the 37.5 products they had introduced in the past five years were successful, firms commercialized one successful product for every 11 projects started, and the average new product required 3.0 years to bring to market. More than three quarters of the 189 firms responding to this survey...
were using multidisciplinary teams in new product development; however, only 54.5% had a well-defined NPD process, and only 56.4% had a specific new product strategy.

In 1995, the PDMA fielded their second best practices study (BP2), obtaining 383 responses to a much-expanded survey, which not only updated NPD trends but also benchmarked the practices of “The Best” firms in NPD versus “The Rest” (Griffin, 1997, 2002; Markham and Griffin, 1998). Though success rates were stable at 59%, only 6.6 ideas were now required to generate a new product success. Furthermore, projects that were terminated during the NPD process were eliminated earlier in the process than previously—meaning that less money was being spent on developing products that ultimately would be marketplace failures. While the percentage of firms reporting that they used a formal NPD process rose to 61.5%, only 55.6% had a specific new product development strategy. The best did not succeed by using just one NPD practice more extensively or better but by using a number of them more effectively simultaneously. Furthermore, no one practice was found to be either necessary or sufficient to guarantee that a firm was one of the best in developing new products. On the other hand, practices statistically more highly associated with the best included the following:

- The use of formal NPD processes.
- Having a specific NPD strategy.
- Measuring NPD outcomes and expecting more out of NPD efforts.
- Using cross-functional development teams.
- Using multiple different types of qualitative market research, including voice of the customer, customer visit, and beta-testing techniques.
- Using engineering design tools such as computer-aided design (CAD) and computer simulations.
- Closing NPD projects with completion dinners.

In the eight years between the second and third best practices studies, the business and competitive environments have continued to change—sometimes in an evolutionary manner and sometimes in a much more revolutionary one. Competition has continued to become more globalized, with knowledge work as well as manual labor suffering from “offshoring.” The dot.com boom and bust proved that products had to create revenue streams if firms were to remain in business over the long term. Increased accounting regulation has funneled spending in some companies from supporting innovation to grow the business to increasing financial oversight and control to allow the business to remain a well-managed ongoing concern. Following Moore’s law, computing power has increased at least 16-fold over this time period, allowing a significant amount of trial-and-error prototype, build-and-break steps to move to computer-based analytical tests. Other computer programs now enable designers to visualize products before they have been developed and even to produce three-dimensional holographic images of them that designers, managers, and potential customers can walk around and view from different angles. Our expectation was that these trends had impacted how new products are developed.

In 2003, the PDMA Foundation assembled an advisory committee to organize the fielding of their third major study of new product development trends and best practices (BP3). The committee consisted of Doug Boike, Abbie Griffin, Brian Ottum, Michelle Roloff, and Davis Webb and was assisted by George Castellion, Steve Markham, and Steve Uban of the

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**BIOGRAPHICAL SKETCHES**

Dr. Gloria Barczak is professor of marketing and chair of the Marketing Group 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 and best practices in new product development. She has published more than 25 papers in a variety of journals including the Journal of Product Innovation Management, Research & Technology Management, IEEE Transactions on Engineering Management, R&D Management, and Marketing Management. She is a member of the editorial board of the Journal of Product Innovation Management, IEEE Transactions on Engineering Management, and Creativity and Innovation Management.

Dr. Abbie Griffin holds the Royal L. Garff Presidential Chair in Marketing at the David Eccles School of Business at the University of Utah, where she teaches business-to-business marketing and first-year core M.B.A. marketing. She is a member of the board of directors of Navistar International, a $16 billion manufacturer of diesel engines and trucks, and was the editor of the Journal of Product Innovation Management from 1998 to 2003. Dr. Griffin’s research investigates means for measuring and improving the process of new product development.

PDMA Foundation. The committee was chaired by Marjorie Adams, who managed the project, ran the fielding of the study, cleaned the data set, and performed the initial analyses that were presented to the sponsor firms at various PDMA conferences. The PDMA Foundation provided the funding to field the research from donations from sponsor companies: Abbott Laboratories, Air Products & Chemicals, Alticor, Avery Dennison, Baker Hughes, Black & Decker, COBE Cardiovascular, General Mills, GlaxoSmithKline, Harris, Herman Miller, Johnson & Johnson, J. M. Humber, Navistar International Truck and Engine, Lubrizol, McCormick & Co., PTC, Sargento Foods, The Timken Co., Unilever, and Valvoline.

Methodology

The survey fielded in 2003 was 16 pages in length. Questions covered issues about the following:

- The NPD process
- The fuzzy front end (FFE)
- Portfolio management
- Organizing for new product development
- Market research tools
- Engineering design tools
- Technology and organizational tools supporting NPD
- Product development outcomes
- Background information on the respondents

All of the outcome questions were worded identically to those in the 1995 survey. In contrast to the previous studies, many questions required respondents to provide separate answers for radical innovations, more innovative projects, and incremental innovations. The sections on the FFE and portfolio management were completely new, and the number of tools supporting product development was expanded significantly, reflecting the changes in the NPD, computing, and organizational environments since the previous survey.

The hard-copy mailed survey was piloted in April 2003, and several questions were reworded for increased clarity. The hard-copy survey was mailed to PDMA members in May 2003, who were prenotified by e-mail that they would be receiving it. The prenotification e-mail was followed 10 days later with a two-page personalized cover letter and the survey. The mailing also included a 12-page glossary of key terms for the survey and a two-page explanation and definition of the industry categories. Three days after the surveys were sent out, an e-mail reminder was sent that included the link to the online registration and offered the opportunity to attend a Webcast introduction to the survey where an overview was provided along with the opportunity to ask any questions. This was followed two weeks later with a postcard reminder and one week after that with a second e-mail reminder that included details about future Webcasts (dates and times). A second wave of surveys was sent one month later, with subsequent phone calls and a third wave of surveys. A small incentive was offered—two names were drawn from the respondents and awarded $500.

The Performance Measurement Group LLC developed the online version of the survey, which was piloted in May 2003. The link was provided to those who were sent the hard copy, providing an alternative means of responding. The link also was provided at the PDMA website home page. A glossary and industry category explanations also were available online.

All visitors to the PDMA website could click on the research announcement prominently displayed to have survey materials sent to them. In addition, targeted mailings were made to the Institute for the Study of Business Market’s (ISBM) member list and to individuals from the CorpTech and IIR mailing lists. It was hoped that a large, diverse sample would provide the opportunity to look at specific subsets of the data, including examination at the industry level.

Sample and Summary Demographics

Completed surveys were received from 416 respondents. Most respondents (245) were practitioner members of the PDMA. The remainder came from the following sources: ISBM (28); CorpTech (84); IIR (11); and the PDMA website (48). A large variety of industries were represented by the sample including capital goods (88), chemicals and materials (81), technology hardware (49), health care (48), consumer services (39), fast-moving consumer goods (38), industrial services (36), and software and services (33). Table 1 presents the summary demographics for the sample, which indicate that most of the respondents are from larger goods manufacturers in business-to-business markets. These results are consistent
with previous studies of PDMA practitioner members. Additionally, 32% of these respondents ascribe to a prospector innovation strategy, valuing being first to market with new products and technologies, whereas 37% pursue a fast follower strategy (Miles and Snow, 1978). This sample is thus likely to be more innovation oriented than the general population of firms, which we would expect, as the vast majority of the sample consists of PDMA members, an organization whose mission is to improve the effectiveness of individuals and organizations in product development and management.

Table 1. Sample Demographics

<table>
<thead>
<tr>
<th></th>
<th>Number</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Product Type</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Primarily Goods</td>
<td>231</td>
<td>56</td>
</tr>
<tr>
<td>Mix</td>
<td>133</td>
<td>32</td>
</tr>
<tr>
<td>Primarily Services</td>
<td>46</td>
<td>11</td>
</tr>
<tr>
<td><strong>Technology Base</strong></td>
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<tr>
<td>Primarily High Tech</td>
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<td>36</td>
</tr>
<tr>
<td>Mix</td>
<td>107</td>
<td>26</td>
</tr>
<tr>
<td>Primarily Low Tech</td>
<td>157</td>
<td>38</td>
</tr>
<tr>
<td><strong>Market</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Primarily Consumer</td>
<td>100</td>
<td>25</td>
</tr>
<tr>
<td>Mix</td>
<td>61</td>
<td>15</td>
</tr>
<tr>
<td>B-to-B</td>
<td>246</td>
<td>60</td>
</tr>
<tr>
<td><strong>Sales</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;$100 MM</td>
<td>164</td>
<td>41</td>
</tr>
<tr>
<td>&gt;$100 MM</td>
<td>236</td>
<td>59</td>
</tr>
</tbody>
</table>

Table 2. Success Trends

<table>
<thead>
<tr>
<th></th>
<th>2004</th>
<th>1995</th>
<th>1990</th>
</tr>
</thead>
<tbody>
<tr>
<td>Percent Successes</td>
<td>59</td>
<td>59</td>
<td>58</td>
</tr>
<tr>
<td>Percent Success-Profits</td>
<td>54.2</td>
<td>54.6</td>
<td>—</td>
</tr>
<tr>
<td>New Product Sales Percent of Total</td>
<td>28.0</td>
<td>32.4</td>
<td>32.6</td>
</tr>
<tr>
<td>New Product Profit Percent of Total</td>
<td>28.3</td>
<td>30.6</td>
<td>33.2</td>
</tr>
</tbody>
</table>

Results

**NPD Trends: Outcomes**

New product success rates continue to remain stable. Since BP1 in 1990, about 59% of new products commercialized have been considered “successful,” however the firm defines that term. Consistent with the 1995 results, 54% of commercialized new products were successful from a profit perspective (Table 2). A declining trend, however, is observed with regard to the percentage of sales and profits accounted for by new products. Only 28% of sales and profits come from new products compared with 32% and 30%, respectively, in 1995.

The mortality of new product ideas across the product development process also is stable from 1995 (Figure 1). Represented by the mortality curve, 14% of the initial ideas generated actually become commercial successes. Turning that around, firms
start on average seven new NPD projects for every success in the marketplace. A likely contributor to this stability is firms’ continued use of a new product strategy to guide their idea screening activities.

Cycle time for all types of development projects have declined, with the greatest decline (42.5% faster) attributed to new-to-the-world products (Table 3). New-to-the-world products now average 2 years for development compared to about 3.5 years previously. The smallest decrease occurred, not surprisingly, for incremental products (−12.1%). Radical projects spend significantly more time on each stage of the process than more innovative projects. Likewise, more innovative projects spend significantly more time on each stage than incremental projects.

**NPD Trends: New Product Process**

A formal process for NPD is now the norm. A total of 69% of firms report using a formal, cross-functional process for NPD (Figure 2). This represents an increase from 60% in 1995. Correspondingly, fewer firms (6%) report having no process for product development compared with about 14% in the last PDMA study. As well, only 15% of firms indicate that they have an informal NPD process (vs. 25% in 1995). Processes are revised on an ongoing basis for 30% of the firms and every two to five years for 37% of the firms.

Radical and more innovative projects use formal process owners to help their NPD teams move through development stages more than 70% of the time compared with incremental projects, which use them only 60% of the time (Figure 3). Whereas only about 40% of the radical or more innovative projects have overlapping gates or skip stages in the NPD process, 46% of the incremental projects have overlapping gates and 59% skip entire stages in the process. About 50% of all projects proceed with conditional decisions made at the gates, where the conditions for continuance are specifically stated. These results suggest that a significant number of firms have moved from second-generation to third-generation types of new product processes, which are more flexibly applied across different types of projects (Cooper, 1994).

Given the complexity of radical projects, more than 50% of such projects involve collaboration with partner organizations (Figure 4). These figures are 42% for more innovative projects and less than 25% for incremental ones. Though top management is actively involved in implementing more than 75% of these collaborative agreements in more innovative projects,
less than half are supported by concrete enabling tools and techniques such as joint team building and training, joint project management, or supporting information technology management tools (Figure 5).

**NPD Trends: The Fuzzy Front End and Portfolio Management**

A total of 74% of respondents report that they have a specific new product strategy to guide product development efforts. About 40% of the firms develop their strategy using a balanced mix of input from senior and middle managers, whereas a quarter favor a 75/25 senior/middle mix and another quarter favor a 25/75 senior/middle manager balance of input. Of the respondents, 55% indicate that they have a well-defined, structured process for portfolio management. About one third of the projects in the portfolio are generated by formally planned activities designed to fill identified gaps in the firm’s product portfolio.

Over the last 20 years, firms have moved to having more product improvement projects and fewer line addition projects in their portfolios (Figure 6). Portfolios in the last eight years have trended to fewer new product lines and new-to-the-world products, with small increases in the percent of projects that are initiated as repositionings and cost reductions. Firms have focused more than in the past on maintaining their current product lines rather than on expanding into new competitive spaces. These trends may explain at least some of the decrease in the percent of sales and profits accounted for by new products developed within the past five years.

To manage their portfolios, firms use a variety of tools and techniques. The results suggest that they evaluate their portfolio with four different analytical tools, on average. The top three techniques used are rank ordering of projects (used 65% of the time) and discounted cash flow and payback periods (each used 61% of the time) (Figure 7). Most firms review their new product portfolios quarterly (34%), monthly (26%), or annually (18%).
Idea generation and management seem to be rather poorly managed in the FFE. Only a bit more than one third of the ideas for radical and more innovative projects are generated by formal planned activities to fill identified gaps in the product portfolio (Figure 8). By contrast, almost as many of the ideas for incremental projects come without specific prompting from a wide variety of people as they do from formal, planned activities. Only 60%–65% of the ideas that are generated are formally recorded in any way, and less than half of the ideas that have been recorded are in a place that is conveniently searchable by someone other than the idea originator. New product ideas have a seemingly short shelf life—if an individual doesn’t pick up on an idea and run with it immediately, it has the possibility of fading away as a potential opportunity. Finally, only about 60% of the ideas selected for advancement into the NPD process are selected using a formal process—the remaining move forward through some informal advancement mechanism, and about half of those have no budget allocated to move them forward. Though formal portfolio decision-making processes have been put in place at many firms, initial idea selection still seems to be a very political and champion-based activity.
NPD Trends: Organizing for Product Development

BP2 asked questions about where NPD resided in the firm’s organizational structure and leadership generally. NPD most frequently was led by a project leader formally appointed by management. NPD responsibilities also resided in two different places in organizations. In 1995, firms were equally likely to assign NPD responsibilities to a separate NPD staff department, the strategic business unit (SBU) manager, an NPD process owner, a new product standing committee, or to place it under the responsibility of a particular functional area. Marketing, research and development (R&D), and engineering were equally likely to be the function in which NPD resided when a functional structure was used. The overall organizational results could be interpreted as having NPD reside in one place in the organization that developed products that supported maintaining the continued health of the ongoing business (e.g., under the direction of the SBU manager and under the control of a particular function in the organization) and in a second place in the organization that supported the firm’s movement into new “white spaces” (e.g., in a stand-alone NPD department or venture group). Unfortunately, none of the organizational issues of BP2 were associated with practices more likely to be pursued or used by the best firms than by the rest of the firms.

To try to tease out more information about organizational issues and in hopes of uncovering information associated with best organizational practices, BP3 asked about structures and leadership separately for incremental, more innovative and radical projects. It also included additional sections addressing what team development and project leadership development actions the firm undertakes.

Incremental NPD projects are managed in as many as three different organizational places across the firm, but almost two thirds of the time they are developed under the auspices of a stand-alone project management function managed by a new product committee (Figure 9). These projects are also more likely to reside in a separate NPD department with a permanent multifunctional staff (58% of the time).
More innovative projects may reside in one of two places in the firm, and radical innovation in firms appears to reside in one place, although there is no consistency across firms as to where it is placed. Both of these types of projects are slightly more likely to be developed either within a particular function or under the auspices of a temporary new product committee of functional resource owners—but without a formal project management function managing the projects. For radical projects, marketing and R&D are equally likely to be the function that owns the project, whereas, for more innovative projects, marketing is the organizational owner 44% of the time and R&D claims responsibility only 26% of the time.

NPD leadership is both idiosyncratic and seemingly somewhat neglected as a potential means to improve the process of developing new products. Firms use a panoply of different leadership structures to manage NPD projects, but for all types of projects the most likely leader is a part-time project leader who has other duties (Figure 10). These project leaders receive formal project management leadership training only 36% of the time. The next most popular leader for both radical and more innovative projects is a professional project manager whose only job is project management, suggesting that for these more complex projects, at least some firms see a benefit to having them led by a professional. If not led by a part-time project leader, incremental projects are likely to be self-directed or led by a champion. Incremental projects especially would seem to operate in somewhat of a formal leadership vacuum.

Both team and management development also seem to be potent areas for NPD improvement. Cross-functional team training, cross-team exchange of lessons learned, and quick start-up team formation still occur in less than 50% of NPD projects (Figure 11). Less than 60% of projects have team members that understand the concerns of other functions and help deal with them effectively. Only about two thirds of the NPD teams have clear goals and objectives and ones clearly related to their SBU’s strategy. Marketing, manufacturing, and technology managers ensure that their people participate actively and effectively on NPD teams for only about 60% of the NPD projects undertaken in their firm (Figure 12). Overall, senior

![Figure 9. Organizing for NPD](image-url)

![Figure 10. NPD Leadership: All Firms](image-url)
managers support innovation by ensuring that structure, processes, available resources, and other organizational mechanisms support innovation teams less than 60% of the time. Senior managers make long-term investments to support ongoing innovation less than 55% of the time. Clearly, these are aspects of new product development that could be strengthened.

The most frequent rewards and incentives given to NPD teams are project completion celebration lunches and dinners, the opportunity to work on a bigger project in the future, and recognition in organizational newsletters (Figure 13). Project-based profit-sharing, stock, and stock options are virtually never used as rewards.

NPD Trends: Tools/Methodologies

Similar to the 1995 results, the 2003 top three market research tools used by firms are (1) beta testing; (2) customer site visits; and (3) voice of the customer. The rankings of the tools have changed, however, with beta testing now ranked first and voice of the customer sliding from the most used market research technique to the third most used. Only beta testing and customer site visits are used in more than 50% of the radical and more innovative projects undertaken by these respondents (Figure 14).

Other established market research tools are still used by firms as well. These include alpha testing, lead users, concept tests, and focus groups. Gamma testing, which involves more long-term product use testing by customers, and ethnography are being used by firms in at least 25% of the projects undertaken. Techniques used in less than 25% of the projects undertaken include test markets, trade-off analysis, pretest markets, and creativity sessions.

Three engineering, R&D, and design tools are approximately equal in use, with about 40% of the projects using them (Figure 15). Design for manufacturability (DFM) takes into account manufacturing capabilities and issues when designing the
product. Concurrent engineering (CE) enables faster product development by doing multiple activities simultaneously. Failure mode and effect analysis (FMEA) analyzes aspects of design performance prior to the building and testing of prototypes. Though firms that manufacture physical goods use these tools in about 45% of all projects, those developing and selling services use these techniques in only about 15% of their projects. Interestingly, although widely touted as important in the business press, Six Sigma analysis is used in less than 25% of the projects.

Other technology tools often used by firms are CAD and computer-aided engineering (CAE), project management systems, document management systems, and rapid prototype systems (Figure 16). Such tools provide benefits in terms of faster development times and better organization of projects. The least used tools include knowledge management systems, portfolio management software, and customer needs analysis software. One potential reason for the low use rates of these tools may be the perceived complexity and time associated with developing/purchasing, training, and implementing such tools.

The top three tools used to support project teams are (1) face-to-face meetings; (2) teleconferences; and (3) PERT/GANTT charts (Figure 17). Face-to-face meetings allow for faster and more informal communication as well as provide a means for team members to get to know each other and develop trust, which is essential for effective teams. Teleconferences enable communication when team members are geographically dispersed. PERT/GANTT charts provide a visual illustration of the flow of the project along with milestones and deadlines. Only 40% of projects have a dedicated project intranet or dedicated space on the firm’s intranet, and only 29% of the projects use “groupware” software packages that allow group interaction. We expect that the lack of use of these team support tools has the potential to create significant communication difficulties, especially since less than 36% of teams are collocated and less than 29% of them have been put through team-building exercises.
Summary of Trends

- Success rates and efficiencies (projects started per commercial success) remain stable, although new products are contributing a lower percentage of revenues and profits than previously.
- Companies have become more conservative—portfolios have become more incremental, with the sales and profit impacts of new products commercialized declining.
- Cycle times continue to drop dramatically, especially for more radical projects.
- Formal processes are now the norm. Having a formal process is no longer a differentiator, and many firms have moved to third-generation types of NPD processes. As expected, processes for radical projects are more complex than for incremental projects.

- Firms have moved from implementing NPD processes to help manage individual projects to implementing portfolio management processes to help manage multiple projects simultaneously.
- Multiple customer needs gathering market research tools are used by most firms.
- Firms are starting to use a wide variety of software support tools for engineering design and project management and support. Team online support tools are just starting to come into use in firms.

Areas of NPD seriously in need of improved management include the following:

- Idea management.
- NPD project leadership and training.
- Cross-functional training and team communication support.
Innovation support and leadership by senior management.

*The Best versus the Rest*

As in previous best practices studies, the sample was split into two groups based on new product performance across multiple criteria. Firms labeled *the best* are those that simultaneously are (1) either the most successful or in the top third in their industry success and above the mean in (2) program success and in (3) sales and profit success from NPD. Although BP2 found that the best succeed at new product development through doing a number of things differently from the rest, no one tool, technique, or method was either necessary or sufficient to achieve status as one of the best at innovation. All differences noted in this section are statistically significant (*p* < .05).

As in previous studies, the best firms in this sample are significantly more effective than the rest across multiple performance measures (Table 4). More than 75% of the products they have commercialized in the last five years were successful, with 47% of sales and 49% of profits accounted for by these new products.

This compares with a 54% success rate for the rest of the firms, with only 21% of either profits or sales generated by their new products. The rest find that 47% of their profits from new products are profits from incremental projects, whereas for the best that number is only 39%. The best also need fewer ideas for one new product success—one in four ideas results in a commercial success versus one in nine for the rest. The one outcome measure for which there is no statistical difference between the best and rest is in the number of new products commercialized over the last five years. As was found in BP2, the best are not being successful by sheer numbers of products commercialized but by being more effective.

Strategy matters, and the gap between the best and the rest is growing. The best firms are significantly more likely to have a new product strategy that guides their new product development efforts (86% vs. 69%) and are more likely to start their innovation projects off with a product line planning activity. Furthermore, that strategy is applied to 74% of the projects in their portfolio versus to just 53% of the rest’s projects.

### Table 4. Best versus the Rest: Success Rates

<table>
<thead>
<tr>
<th></th>
<th>The Best</th>
<th>The Rest</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Firms</td>
<td>96 (24)</td>
<td>303 (76)</td>
</tr>
<tr>
<td>Successes</td>
<td>75.5%</td>
<td>53.8%</td>
</tr>
<tr>
<td>Successes-Profits</td>
<td>72.4%</td>
<td>47.9%</td>
</tr>
<tr>
<td>Sales from New Products</td>
<td>47.6%</td>
<td>21.4%</td>
</tr>
<tr>
<td>Profits from New Products</td>
<td>49.1%</td>
<td>21.2%</td>
</tr>
<tr>
<td>Number of Ideas for One Success</td>
<td>4.0</td>
<td>9.2</td>
</tr>
</tbody>
</table>
They also are almost twice as likely to pursue a first-to-market innovation strategy (49.5%) as the rest (26.3%) (Figure 18). This gap is more than nine percentage points higher than the difference in BP2. Additionally, though 10.3% of the rest follow a reactor innovation strategy, responding to others’ innovation efforts only when forced to by environmental pressures, none of the best firms follow that strategy.

While BP2 did not find any differences in the structure of the project portfolios of the two groups of firms, this research finds four significant differences. In general, the rest have a less innovative portfolio than the best. Of the best firms’ portfolios, 11% consist of new-to-the-world products versus 7.3% for the rest. The best also have 5% more of their portfolio as next-generation projects than the rest. On the other hand, the rest have 4.5% more incremental projects and 2% more projects that are repositioning products in the marketplace.

The best always use a standard approach to product development and are significantly more likely to use a formal, cross-functional approach to NPD. Their processes for radical innovations are more likely to include formal steps for 10 different activities: (1) product line planning; (2) project strategy development; (3) idea generation; (4) idea screening; (5) business analysis; (6) development; (7) testing; (8) manufacturing development; (9) launch; and (10) process review. In idea generation for radical and more innovative projects, the best are more likely to use formally planned activity to fill identified gaps in the product portfolio and less likely to use informal activities than the rest (Figure 19 and Figure 8).

Although the best are no more likely than the rest to work collaboratively with partners in developing new products, when they do they are more likely to put in place formal mechanisms that both support the joint endeavor and increase its probability of success (Figure 20). These include the following: integrating project portfolio planning; having interlocking concurrent development processes; using shared websites and groupware, joint team building and training; peer review for...
performance appraisals; sharing risk, reward, and performance structures; and having both formal sub-contract and technology licensing agreements in place.

The best have a well-defined, structured portfolio management process to a significantly greater extent (65%) than the rest (51%). However, the only portfolio management decision-making tool that they use more frequently to evaluate projects than the rest is strategic buckets. The strategic buckets method for evaluating a portfolio is a top-down approach that operates from the simple principle that implementing strategy equates to spending money on specific projects that mirror the business’s strategy (Cooper, Edgett, and Kleinschmidt, 1998).

BP2 found no differences between the best and the rest with regard to organizing or leading NPD. While BP3 also finds no significant differences between them in how they organize for NPD, other organizational differences emerged. More innovative projects at the best firms are more likely to be led by a process owner than they are in the rest of the firms (Figures 21 and 10). Incremental projects are less likely to be led by a professional project manager, a full-time leader, or part-time project leader for the best, which are more likely to be self-directed or led by a champion or process owner.

The best firms develop better project teams than the rest by using multiple organizational processes

![Figure 21. NPD Leadership: The Best](image1)

![Figure 22. NPD Team Practices: The Best versus the Rest](image2)
related to improving team effectiveness and cross-functional cooperation (Figure 22). The best are significantly more likely to develop and articulate clear goals and objectives that align with strategy (and are more likely to have a strategy). Team members from the best firms fit their expertise to the project and understand the concerns of other functions. The best firms also have functional and senior managers that support innovation with appropriate resources, structures, and processes (Figure 23). Additionally, they provide leadership training to project managers to enhance their effectiveness. The best firms use an average of 2.5 rewards to provide incentives to their NPD teams versus just 1.8 for the rest. The best use project-based profit sharing; compensation time; recognition at award dinners; plaques, pins, and project photographs; project completion celebrations; and the opportunity to work on a bigger project next time to a significantly greater extent than the rest as rewards for NPD teams (Figure 24).

The best use significantly more of all four different types of tools/methodologies than the rest of the firms: (1) market research; (2) engineering, R&D, and design; (3) technology; and (4) team support. Figures 25–28 show which specific tools are used more by the best. All of the marketing research tools used significantly more by the best, except trade-off analysis, are tools for obtaining a more qualitative understanding of potential consumers and how they interact with and use the products and services being developed. The newest of the design engineering tools and methods is Six Sigma, whereas the oldest methodology is concurrent engineering (i.e., both the product and manufacturing process are designed
concurrently). The technology tools figure (Figure 27) illustrates the astounding number of new, usually software-based tools that NPD teams and project leaders can choose from to try to better organize and manage the information and data associated with a project. We expect use of these tools to expand in the future. Figure 28 shows that the best understand the value of colocating teams when possible. The large numbers of tools used more frequently by the best suggest that they may be more open to experimenting with new tools and methodologies and to leverage existing tools and methodologies to improve the efficiency and effectiveness of their projects.

Summary of the Best versus the Rest

- The best are indeed different from the rest, and much can be learned from their practices.
- The best have fundamentally different business strategies that are linked to their success. They are more likely to have first-to-market innovation strategies that result in a higher percentage of radical and next-generation projects in their project portfolio.
- They use more formal processes for generating ideas.
- They are more likely to put supporting organizational mechanisms and processes in place for
Managing collaborations with other firms.

- Giving individuals from multiple functions the ability to work together as a team.
- Supporting team leaders.
- Obtaining needed support from functional and senior managers.
- The best are more likely to test and implement many different kinds of NPD tools for
  - Marketing research.
  - Engineering design.
  - Technology.
  - Team support.

Discussion, Implications, and a Partial Agenda for Future Research

From the results just presented, it is clear that product development strategy—as developed and implemented at multiple levels in the firm—matters in
differentiating the best from the rest. At the firm level of strategy, almost half of the best follow a first-to-market innovation strategy, nearly twice the proportion of the rest. Then, the best are more likely to use the strategic buckets approach to project selection, putting their NPD investment dollars into projects that align with their stated strategy. Likely as a result of this, their project portfolios carry a higher proportion of projects whose purpose is to extend the firm into new competitive spaces that are new to the world or further encroach on competitor’s spaces through developing new product lines or extending the breadth of their current lines to better meet the needs of a larger target population of customers. At the business-unit level, the best are more likely to have a product line planning activity and then to develop a specific strategy for each project initiated that relates the goals of that project to the overall strategy for the product line. More of their idea generation activities are thus strategy driven to fill specific gaps in the product line or extend it in specific strategically developed directions. From the project level to the business-unit level to the firm level, NPD is strategically driven.

The project portfolios of the best firms also consist of a lower percentage than the rest of projects that are fixing past NPD “failures”—projects whose purpose is to either reposition a product in the marketplace (a marketing failure) or to reduce the cost of a product (an engineering design failure). Perhaps this is so because not only do they start from strategy such that the projects initiated likely will not be cut later due to lack of fit with the firm’s goals but also because they engage in more qualitative market research and they use more engineering design tools such as value analysis, design for X, rapid prototyping, and Six Sigma. Qualitative market research tools allow them to better understand how the market is segmented, what unfulfilled needs consumers have, and how much of a price premium a differentiated product might permit, minimizing the probability that an already commercialized product will not have to be repositioned later because the firm really didn’t understand the marketplace in the first development project. These particular more highly used engineering design tools help ensure that the cost to make the product allows sufficient profit for the firm at the price they can charge the market. One result of this strategy-driven NPD with significant effort spent on understanding customer needs and the cost ramifications of design decisions is that they need to initiate fewer NPD projects to achieve one success. George Castellion, who attended and made a number of the sponsor presentations on these results, articulates this as “the best ‘toss a bird and not an egg’ . . . . The best’s ideas at the start have been given more thought and honest voice of the customer. As one result, they have a fledgling’s ability for flying as they go into concept engineering and evaluation before the business case. The rest toss more eggs, most of which go splat on their journey to a business case” (personal communication, February 7, 2008). Clearly, additional research on developing effective NPD strategies and on integrating NPD strategy across levels of the organization would be useful, with potentially powerful outcomes.

Prior results show that teamwork and communication matter as well in successful NPD. Yet according to these BP3 results, the practice of how NPD teams are assembled, trained, enabled, supported, and managed in practice in the average firm is not consistent with recommendations from published research on such topics as marketing and R&D interface (Gupta and Wilemon, 1988; Lucas and Bush, 1988; Souder, 1988) and NPD team performance (Pinto and Pinto, 1990). One reason for this may be that there is no one person or function in the organization that is responsible for or can even orchestrate all of the different resources, organizational processes, technology tools (e.g., team intranet workspaces), and even attitudes that need to be put into place and managed to produce routinely effective NPD teams.

Two other crucial differentiators between the best and the rest is that the best (1) have focused more on the “soft” tools and processes that are needed to better support the operation of teams and team leaders, and (2) encourage and enable both functional and senior managers to pay more than just lip service to achieving effective cross-functional integration and obtaining high-performance project teams. Best practice firms put into place multiple mechanisms, ranging from low-tech solutions like more frequent face-to-face meetings and collocation of teams, to more high-tech solutions such as Internet-based protected workspaces that foster constant and open communication across team members and between the team and other stakeholders both inside and outside of the firm. While these results show that the best firms have put these types of tools and processes in place, what is not clear from this survey research is how they have gone about doing so. Richer, in-depth qualitative research would be required to better understand how (and why) they have been able to more effectively imple-
ment these team and leadership communication and performance-enabling processes.

The third major differentiator between the best and the rest is in the best’s seeming willingness to continually experiment with new tools and technologies, especially (but by no means limited to) new technology-based tools. Given the continuing increase in computer processing speed, the speed and ubiquitous nature of the Internet, and the increasing availability of protected collaborative workspaces, we expect new tools based on these and other types of technology capabilities to proliferate in the future. This survey included 12 different types of technology tools, and the best used each type more than the rest did. However, teams and even firms cannot afford the time to investigate and implement all 12 types of tools. At this point, it is likely that different teams in a firm are stumbling across different types of tools (and even different products for a particular class of tool) and implementing whatever one they prefer of those to which they have been exposed. The result likely is an uncontrolled use of different tools by different teams—with results that vary enormously. Therefore, it is likely that in the future someone in the firm who has a deep understanding of the firm’s products and NPD process needs to think more strategically about the capabilities of each of these different types of tools and work to rationalize at least part of the use of these tools. At the same time, of course, new tools that help manage or organize other parts of the NPD process will continue to be commercialized. It is clear that the best will simultaneously need to continue to investigate new tools while refining and rationalizing their use of currently available tools.

The one task that firms seem to be least effective at is managing idea generation, capture, and distribution. Even for the best, almost half of the ideas generated for NPD come from either an informal process or without specific prompting (i.e., they randomly arise from someone within the organization). The rest of the firms generate nearly two thirds of their new product ideas informally or randomly. There are significant problems with the status quo in idea generation.

The first concern is that ideas have a specific and short life span in an organization. If someone does not capture an idea within a short period of time, it will disappear, rather like a feather that floats on breezes but, when the wind dies down, falls to the ground to be forgotten or trampled. This problem of losing an idea because of its short shelf life is compounded by the fact that less than two thirds of the ideas generated are captured in formal storage systems, and, of those, less than 50% of the stored ideas are accessible to someone other than the idea originator. In other words, only about one third of the total number of ideas that are generated are available across time to multiple people within the firm. Many ideas that may be useful at some point in the future are lost. This is an inefficient process in firms.

Another concern with having such a large percentage of the ideas being generated coming from informal or random methods has to do with the potential quality of those ideas. For the best, we found that strategy matters. Ideas that are more closely aligned to strategy are more likely to lead to a project that proceeds to commercialization and is successful in the marketplace. This is more likely when the ideas are generated using a formal process—especially one that starts from strategy and then ideates to fill a gap in the product portfolio. Ideas that arise informally in the organization, and especially those that arise randomly, are less likely to be aligned with strategy. And that suggests that fewer of them are likely to lead to importantly successful products in the marketplace.

**An Outstanding Issue in NPD**

The PDMA best practices research still has not been able to supply clues, let alone answers, on how to organize most effectively for NPD and how best to lead projects. The BP3 Best Practice Study included more questions than previously about how firms organize for product development, including how they organize for different levels of project innovativeness. Unfortunately, the results are very disappointing in their inability to differentiate between organizational structures used by the best and those used by the rest. Furthermore, the lack of consistency or even a general tendency for a particular organizational form even within different levels of project innovativeness is baffling, with some results just not making sense. For example, incremental projects are much more likely to be developed in a separate new product department with a permanent product development staff than are either more innovative or radical projects. It would seem that this structure should produce more freedom to pursue projects that were more likely to move the firm into new competitive space, as it is not beholden to any one functional area or business unit. Radical and more innovative projects are most likely to be developed either by a new product committee of functional resource owners or within a single dominant
It would also seem that getting either of these structures to “break out of the box” might be more difficult than a structure less tightly tied to one function. Clearly, this area of research is in need of attention—or maybe there is just “no one best way,” which in and of itself could be an important finding.

In Closing

The PDMA will continue to undertake best practice studies to identify trends in NPD management and to discern those practices associated with higher degrees of success. As Griffin (1997, p. 430) states, “If the world was stable, there would be no need to change business operations and methods, nor to understand what has changed and what works well. However, firms operate in dynamic environments, not stable ones. Both the competitive and internal environments in which firms operate evolve over time. In response, management processes must also change over time so that firms can remain effective and profitable through the changing situation.” PDMA’s best practices research plays a crucial role in establishing reference points on which the discipline can track how NPD practices evolve and change as the dynamic environment of the business world creates new opportunities and challenges.

References


