

Best Practices in the Idea-to-Launch Process and its Governance

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A study of new-product development practices at 211 businesses provides insights into best practices in both the idea-to-launch process and its governance.

OVERVIEW: Most firms now use some form of idea-to-launch process such as a Stage-Gate[®] system. The question is: Do these processes really work? And what are the elements of a best-in-class idea-to-launch system that really make a difference? A second and governance of the idea-to-launch model. Sadly, there is a lack of hard evidence as to what governance structure works best and just what its impact is, if any. This article reports the results of an American Productivity & Quality Center (APQC) and Product Development Institute (PDI) study of 211 businesses with a focus on performance metrics and practices. Top performing businesses are identified, and those practices that distinguish these businesses from the rest are probed. The article provides insights into best practices in both the idea-to-launch process and its governance that are strongly connected to positive innovation performance.

KEYWORDS: Idea-to-launch process, New product development, Metrics, Stage-Gate[®]

Numerous studies have probed why some new products are great successes while others fail commercially. These investigations have identified a myriad of success drivers, including developing a differentiated product with a compelling value proposition; building in the voice-of-the-customer input; undertaking the front-end homework; seeking sharp, early product definition; providing adequate resourcing; and relying on an effective cross-functional development team. (For a review of these studies, see Cooper, in press). A number of organizations have built these success drivers into their development methodologies in the form of a structured idea-to-launch process or system, such as Stage-Gate[®] (Koen 2003; Grönlund, Rönneberg, and Frishammar 2010; Adams and Hubilkar 2010; DOE 2007; Cooper 2011).¹

Similarly, other studies have probed why some businesses are so successful at new product development, while others are not (see, for instance, Cooper, Edgett, and Kleinschmidt 2003, 2004a, 2004b, 2005; Adams 2004; Jaruzelski, Dehoff, and Bordia 2005). Many success factors have been uncovered in these benchmarking studies, including having a product innovation and technology strategy to guide development efforts, fostering the right climate and culture for innovation, implementing effective ideation practices, putting the necessary resources in place and investing in the right projects (portfolio management), and having an efficient idea-to-launch system (Jaruzelski, Dehoff, and Bordia 2005; Cooper and Mills 2005; Cooper, in press).

A recurring best practice theme is the use of some form of gating process. For example, a global study of 1,000 firms revealed that “it’s the process, not the pocketbook. Superior results seem to be a function of the quality of an organization’s innovation process—the bets

it makes and how it pursues them—rather than the magnitude of its innovation spending” (Jaruzelski, Dehoff, and Bordia 2005, 11). Another more recent and large-scale study notes that “effective innovators tightly manage the innovation process. As they execute the four principal elements of innovation—ideation, project selection, product development, and commercialization—every company Booz Allen Hamilton talked to had a disciplined Stage-Gate process combined with regular measurement of everything from time and money spent in product development to the success of new products in the market” (Booz Allen Hamilton 2007). Other studies also note the wide reliance on some form of idea-to-launch process such as a Stage-Gate system (Griffin 1997; APQC 2002; Cooper, Edgett, and Kleinschmidt 2003, 2005; Koen 2003; Adams 2004; Mills 2007; Grönlund, Rönneberg, and Frishammar 2010).

The question is, do these processes really work? And what elements of a best-in-class idea-to-launch system really make a difference? For example, there is some debate about the optimal level of flexibility in such a system, or whether there should be different versions of the process to accommodate different types of development projects versus a one-size-fits-all model. A second and related question concerns the governance of the idea-to-launch model. A study by A.C. Nielsen revealed that for consumer products, a system consisting of “rigorous gates, scorecards and a governance body” works much better than looser gates with heavy executive involvement, achieving a remarkable six times the performance in terms of annual sales from new products (Agan 2010). Additional anecdotal evidence also suggests that the governance system is critical. Sadly, there is a lack of hard evidence to suggest what governance structure works best and just what the impact of governance is, if any.

¹ Stage-Gate[®] is a registered trademark of Stage-Gate Inc.

The Study

In 2011, the American Productivity & Quality Center (APQC) and the Product Development Institute (PDI) undertook a study to explore these questions, among others.² The purpose of the study was to identify best practices as they pertain to the idea-to-launch model; in particular, the research sought to answer two key questions:

1. Do Stage-Gate processes really work, and what facets of these systems really make a difference?
2. What type of governance structure works best for such processes?

Via a two-step data collection process that included both detailed questionnaires and in-depth site visits (see “How the Study Was Done,” above), the study sought information about the idea-to-launch practices of 211 best performing business units in a range of industries (Table 1). Business units in the study population have median sales of \$1 billion and a median workforce of 2,500 employees. Median R&D spending for participating businesses is 4.0 percent of sales.

How the Study Was Done

In the first part of the study, researchers distributed a detailed, lengthy quantitative questionnaire asking about companies’ idea-to-launch processes to APQC member companies indicating an interest in product innovation and to the PDI membership mailing list. In total, 257 companies responded to the e-mail solicitation. Refinement of the data sample plus the removal of small organizations led to a useable sample of 211 respondents. Questionnaire respondents included a mix of people ranging from executives to process managers.

Best-performing businesses were identified from an analysis of three performance metrics, namely overall new product productivity, the degree to which new products met the business’s profit objectives, and the degree to which new products met sales objectives. The practices associated with these best-performing businesses were identified as best practices and their impact on performance quantified.

The second part of the study involved in-depth site visits at a select set of businesses identified as having superb practices. These firms were selected by an expert panel based upon a detailed screening questionnaire. Site visits were conducted at five companies: Air Products and Chemicals; EXFO Inc.; Becton, Dickinson & Company; Electro Scientific Industries, Inc.; and Ashland, Inc. The site visits provided further insights into the details of these firms’ idea-to-launch processes and specific best practices within them.

A detailed discussion of the study methodology and population may be found in Edgett 2011.

² The full study was published as Edgett 2011; this article offers a new analysis of the data with a narrower focus on the effectiveness of Stage-Gate systems and their governance.

Table 1. Industry representation of participating businesses

Industry/Sector	% of Respondent Businesses
Consumer goods	18.5
Healthcare products, supplies, equipment	6.6
Industrial, equipment, mechanical (B2B)	20.4
Chemical, including polymers	7.1
Telecommunications equipment	5.7
Electronics/computers	4.3
Software	4.3
Other business-to-business	7.1
Services	15.6
Other	10.4

Identifying Best Performers

Identifying best and worst performers is the basis of a valid benchmarking study. Comparing the practices used by best versus worst performers allows researchers to zero in on drivers of performance and identify best practices. There are many metrics that measure a business’s performance at new product development, and some of these were considered in this study, including popular but problematic ones.

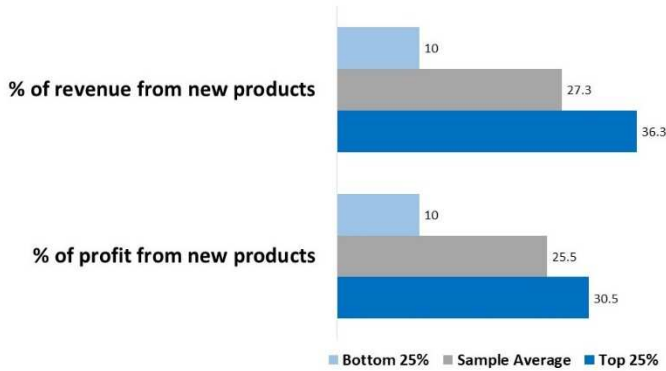
Revenue and profit from new products

The most popular metrics for new product performance are the percentage of sales (revenue) and the percentage of profits derived from new products. Businesses participating in the study averaged 27.3 percent of annual revenue and 25.2 percent of profits from products launched within the previous three years (Figure 1). Overall, these average percentages are very positive. But most impressive are the results from top 25 percent performers on these two metrics: 36.3 percent of sales and 30.5 percent of profits from new products.

However, although these are popular metrics, they may not be the right metrics to gauge new product performance; study participants identified many problems with their use. For instance, the use of these metrics can motivate the wrong behaviors; a CTO of a major engineered-products firm told us, “We introduced percentage of revenue as a metric to gauge new product performance of our business units. But then business units managed to redefine what counted as a new product. One business unit went as far as counting ‘anything requiring an engineering drawing,’ which included just about everything they shipped!” A new products executive in a large, innovative consumer and industrial products firm noted another undesirable behavior, “unnecessary chum in the product line,” caused by divisions replacing old but still successful products with new products just to get the vitality metric up.

These metrics may also not reflect the true value of the new product activity. An R&D director in a well-known food company told us, “A lot of our new products simply cannibalize the sales of our old products, and do not really add very much. So now we measure the ‘net sales value’ of new products—the increase in sales as a result of the new product.”

Figure 1. Revenue and profit from new products (launched within the last three years) for participating businesses



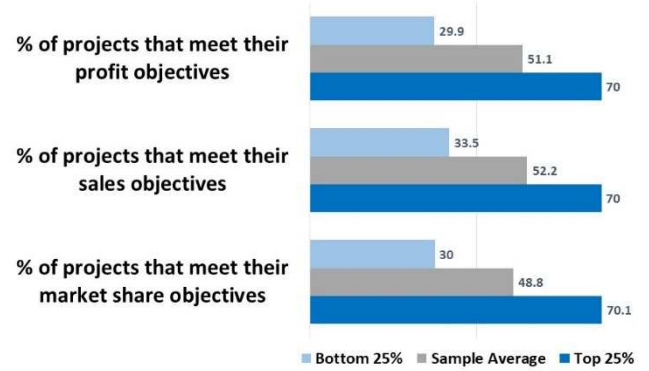
An additional problem with these popular metrics is the huge variability across industries. A food company that achieves 30 percent sales from new products is a stunning success, but that same 30 percent reflects a mediocre performance in the computer or software business, where product lives are quite short, often even less than the three-year window used to define “new products” in this study.

Proportion of projects hitting their targets

The portion of new product projects that meet their objectives is yet another popular performance metric. The performance on this metric for businesses participating in the study are both mediocre and provocative (Figure 2). The fact that the mean values are about 50 percent for all three measures—projects meeting profit, sales, and market-share targets—means that almost half of development projects fail to meet objectives. This result should be unacceptable to most senior management teams. But the distribution of results offers hope: the top 25 percent of businesses achieve almost 2.5 times the performance of the bottom 25 percent, demonstrating that better results are possible.

Respondents offered a variety of reasons for these mediocre results. Overly ambitious sales targets and poor forecasting were two suggestions offered. One respondent from a major consumer products firm told us, “Often the sales targets are too ambitious, the result of project teams wanting to ‘showcase their projects’ in order to secure needed funding approval, or being pushed by management into more aggressive, perhaps unrealistic targets.” A new products executive in another consumer products firm said that failing to meet targets is “often the result of a poor sales forecast—for example, the sales force providing an expected sales number based more on hunch than fact-finding, or the project team pulling a number out of the air.” Many respondents indicated that projects sometimes failed to hit sales and profit targets simply because they were poorly executed and badly launched; that is, the product or its launch did not perform as desired as a result of quality-of-execution issues.

Figure 2. Percentage of new product projects meeting profit, sales, and market share goals for participating businesses

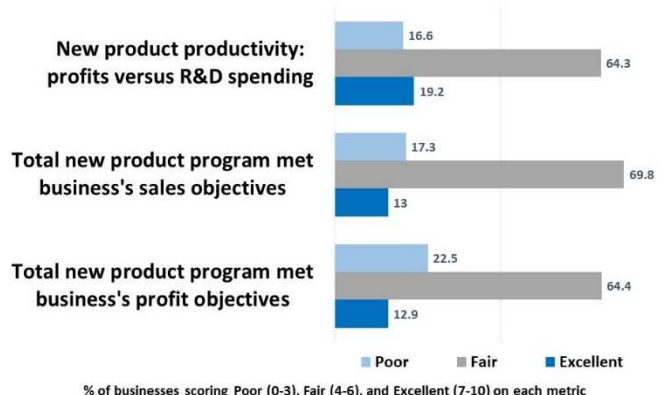


Creating a Meaningful Metric

Although all of these metrics can be useful, all have their drawbacks and none are sufficient performance measures in themselves. However, there are other ways to measure a business’s performance in product innovation. Two key indicators are the overall profitability of the business’s total new product effort relative to R&D spending (a productivity metric) and the business’s overall performance against sales or profit objectives for new-product development over the last three years.

To capture these indicators, we asked participants to rate their businesses on three measures—productivity (profitability versus R&D spending), performance against sales objectives, and performance against profit objectives—on a scale of 0 to 10 (Figure 3). A minority of respondents reported seeing their businesses as highly productive, with only 19.2 percent rating their new product efforts as very productive relative to R&D spending. The ability to meet sales objectives was even more weakly rated, with only 13 percent of businesses reporting having met their annual sales objectives for new products. Respondents reported even worse performance against profit objectives: only 12.9 percent said that their new product efforts met the business’s profit objectives.

Figure 3. Performance of participating businesses on R&D productivity, sales objectives, and profit objectives



% of businesses scoring Poor (0-3), Fair (4-6), and Excellent (7-10) on each metric

Figure 4. Best performers versus other on new product performance metrics



These scales were used to identify best, middle, and worst performers in the study. Best performers were defined as those who scored high (7–10) on at least two out of the three scales and at least medium (4–6) on the third. Similarly, worst performers scored low (0–3) on at least two out of the three scales. By this measure, 12.9 percent of participating companies were identified as best performers, and 17.4 percent of the sample fell into the worst performer range. The remaining 69.7 percent constituted middle performers—neither exceptionally good nor very poor.

A comparison of other metrics for best performers versus worst performers confirms the validity of the composite metric. The results demonstrate how consistently strong best performing businesses are, with almost three times the revenue and almost twice the proportion of projects hitting sales and profit targets as worst performers (Figure 4). **The best performers in our study are a truly remarkable group of businesses, with idea-to-launch processes and practices that clearly deliver.**

These best performers share a number of key idea-to-launch practices that drive their successes. For all of the best practices we report, the frequency of use among best performers was significantly higher at the 0.05 level or above (on a two-tail t-test: best versus rest and best versus worst performers). That is, the best performing businesses tend to employ the practices we have identified much more consistently than worst performing businesses do, marking these key behaviors as “best practices.”

Idea-to-Launch Practices of Best Performers

For more than twenty years, experts have urged managers to implement comprehensive new-product development systems, and the advice appears to have been heeded, as nearly three-quarters of participants in our study report having some kind of formal process in place. Nearly all of our best performers (90 percent, compared to only 44.4 percent of worst performers) have a clear, defined new-product development process—a game plan, playbook, or Stage-Gate system that guides new product development projects from idea to launch. In fact, best performers are between two and three times more likely to have implemented a successful new-product development process than worst performers, suggesting that simply having a formal process is itself a best practice.

Figure 5. Percentage of participating businesses with idea-to-launch processes meeting key criteria for success



The processes of the most successful firms share some key attributes (Figure 5):

- **They are visible and documented at an operational level.** Some firms claim to have a new product development process, but on closer inspection, it’s more of a high-level, conceptual process—a few flow diagrams with boxes and diamonds and little more. To be operational, an effective new product process should be well mapped and well documented. Among our study population, two-thirds of all businesses indicated that they have a reasonably well-documented process, and three-quarters of the best performers do.
- **They are really used.** The true test of a process is whether or not it is really used or is merely window dressing. Having a process mapped out and in place is one thing, but really living the process is something else. Less than half of all participants—44.9 percent—indicated a heavy use of their development process; 60 percent of the best performers reported that they really use their systems, whereas only 18.5 percent of worst performers indicated that they do.
- **They enable project teams to access the resources they need to succeed.** Another test of a successful idea-to-launch process is whether or not it facilitates development, helping project teams secure needed resources and get products to market (or, in the converse, acts as a bureaucratic barrier). Among best performers, 70 percent reported having a facilitating process compared to a population average of only 45.8 percent. Among worst performers, only 23.1 percent indicated that their process is a facilitator and enabler, marking this as another best practice.
- **They incorporate compliance checks to ensure that the process is followed.** Monitoring to see how well the process is followed is a good way to determine if the system is truly deployed. Overall this is a fairly weak area, with only 39.1 percent of participants reporting the use of such compliance checks and only half of best performers.
- **They are adaptable and scalable.** Is the process flexible, able to adapt to the needs, size, and risk of the project? Or is it a rigid, one-size-fits-all process that does not recognize differences between high- and low-risk projects,

or between large and small projects? The process should be flexible and scalable, having different versions— for instance, a full five-stage, five-gate process for major projects and a shorter, three-stage process for lower risk projects, such as enhancements, modifications, and extensions. Some firms have also evolved a three-stage process for more innovative projects and technology developments, where the criteria for “go” decisions are more qualitative and nonfinancial and where the stages are more flexible and iterative (Cohen, Kamienski, and Espino 1998; Koen 2003; Cooper 2006). New products are routed into different versions of the business’s process based on a number of criteria, such as project type; technical, market, and regulatory risk levels; the projected investment; and time to market.

Almost two-thirds of participating businesses (62.3 percent) boasted of a flexible, adaptable, and scalable process; 75 percent of the best performers have flexible processes, twice the proportion of worst performers.

Most firms (72.2 percent) had also appointed a Stage-Gate process manager to guide and oversee their gating system. This person’s job is to ensure that the process works, coach teams, facilitate gate meetings, maintain the project database, provide for training, and maintain the system and its documentation and IT support.

Another common practice was continuous improvement: internal learnings are leveraged and the process is improved over time. There is a need to be constantly on the alert for non-valued work or outdated methods, eliminating bureaucracy or waste that may creep into the process over time. The system should be designed to help project teams get their products to market, secure resources and senior management commitment, and remove roadblocks. Instead, too many processes, implemented with the best of intentions, appear to create bureaucracy and include much non-value-added work. One way to prevent this from occurring is to periodically review the process to make needed improvements; most companies in the study had revamped their processes recently, 73.2 percent within the past three years and 83.8 percent within the past five years.

All of the companies that were visited had in place a well- designed product development process. Each of these superior performers indicated that a solid, well-defined process with clearly defined activities in each stage and a well- defined decision framework for the gates (decision points) was a critical best practice (Table 2). The process yields a number of benefits; one business unit manager offered a central example—the process “allows us to fail fast and move on—cut one’s losses early—rather than carrying on with a bad and risky project too long.” As the former global process manager at Procter & Gamble (commenting on his current firm’s process), told us, “Stage-Gate is not optional. [It’s] essential to succeed in today’s environment.”

Table 2. Example respondent comments regarding the value of their idea-to-launch process

Company/Industry	Comment
Air Products and Chemicals, Inc. Chemicals	The organization uses a consistent, organization-wide process called “offering Development and Introduction” (ODI) that is modeled on the Stage-Gate® process. This process, a company-wide Stage-Gate framework, has become institutionalized and is ingrained in the language and culture of the company.
EXFO, Inc. Telecommunications Equipment	We have a well-defined Stage-Gate process that over the years has evolved as we have adapted to changing market needs. Our process is considered an asset.
Becton, Dickinson & Company Healthcare Equipment	BD’s global new product development system serves as an effective baseline for planning and managing NPD projects and provides a basis for functional transparency and accountability.
Electro Scientific Industries, Inc. Industrial, equipment, mechanical	The improved consistency of the process is helping to improve the quality of content, accelerate learning for new participants, and enable objective status reporting.
Ashland, Inc. Chemicals	We have been able to successfully combine our product development process (Stage-Gate) with our Six Sigma program. This combined approach allows us to produce high-quality products in a disciplined manner.

Gatekeeping Practices

In a well-defined idea-to-launch system, the gates are the go/ kill decision points at which the latest information on a project is reviewed and decisions are made to move the right projects forward. Thus, gates are the quality control check- points in the system; gates ensure that the right projects are done and that they are done right. Effective gates are central to the success of a fast-paced, product innovation process. Gatekeeping best practices, then, must be a central driver of idea-to-launch performance.

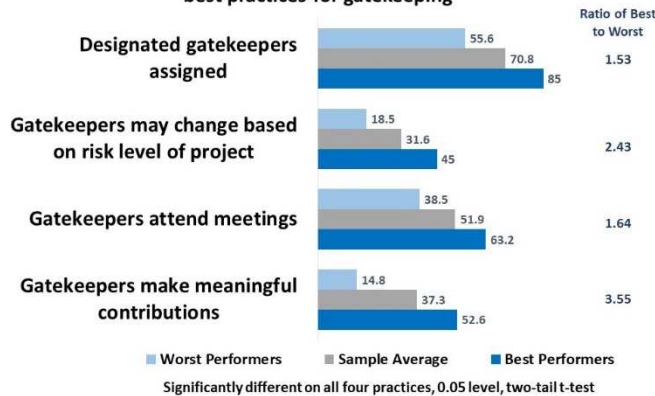
The Gatekeepers

In best performing businesses, gatekeepers play a vital role. Gatekeepers are clearly designated as the management team members responsible for the go/kill decisions at each gate. Gatekeepers may change from gate to gate depending on the evolving risk profile of the project. Gatekeepers are disciplined about scheduling and attending gate meetings, and they make high-quality, substantive contributions to the decision-making process (Figure 6).

- **Designated gatekeepers are assigned.** Sometimes it is unclear just who should undertake project reviews and whose authorizations are needed for a project to proceed. Defining the locus of decision making—the management team that makes the vital go/kill decisions at gates—is an important feature of many firms’ idea-to- launch processes. Most companies, 70.8 percent, have clearly designated gatekeepers. This is especially true for best performing businesses, with 85 percent having defined gatekeepers.

- **Gatekeepers may change based on the risk associated with the decision.** In some businesses, the gate decision makers remain the same from gate to gate, throughout the entire project and regardless of project type. But in other firms, especially the best performers, the gatekeeper may change depending on the risk associated with the decision. For example, best performers frequently use an abbreviated Stage-Gate system for lower-risk projects,

Figure 6. Percentage of participating businesses implementing best practices for gatekeeping



such as line extensions or modifications. Lower-level personnel may serve as gatekeepers at all gates for such low-risk projects, with more senior people—such as the leadership team of the business—being the gatekeepers for higher-risk projects. Forty-five percent of best performers employ this practice, which is far less prevalent among worst performers.

- Gatekeepers may also change from gate to gate, even in larger or riskier projects.** For example, more senior people may be the gatekeepers at points where significant commitments are required, such as at the “go to development” and “go to launch” decisions. By contrast, lower-level personnel staff the earlier gates—for example, the idea screen—where commitments and hence risks are lower. In 35 percent of the businesses we studied, gatekeepers change from gate to gate; in 26.2 percent, the gatekeeping group is totally static, with no change at all from gate to gate.

- Some businesses also considered geography in assigning gatekeepers.** When probed about global gatekeeping, the results were split: 46.9 percent of businesses indicated that gatekeepers have oversight for projects spanning multiple geographic locations, while a slight majority of 53.1 percent have not opted for globalized gatekeeping. There was no significant difference between best and worst performers in this regard.

- Gatekeepers schedule and attend meetings.** A number of respondents noted that compliance with the process is always an issue, especially for the gatekeepers. The fact is that in about half of the businesses studied, gatekeeper “no shows” and gate-meeting cancellations were common. By contrast, among best performers, there is more discipline: all of the key decision makers invited to participate as gatekeepers attend the gate meetings; gate-meeting cancellations are not acceptable; and when a gatekeeper cannot attend, the meeting still goes ahead (gatekeeper substitutes are often allowed, with full voting authority).

- Gatekeepers contribute to the decision-making process.** Anecdotal evidence suggests that in some businesses, gatekeepers frequently arrive at gate meetings poorly prepared and not informed enough to

make a good decision. Indeed, almost two-thirds of our respondents indicated that the quality of the gatekeepers’ contributions is not high, with only 37.3 percent reporting high-quality contributions from gatekeepers as a rule. In best performing businesses, on the other hand, gatekeepers consistently make high-quality contributions. That is, each gatekeeper comes prepared for the meeting, has read the project materials, and asks insightful questions to understand the risk associated with the project. For example, at J&J Ethicon Endo-Surgery, “Gatekeepers are expected to know the project.” In this firm’s “lean gate reviews,” the documentation has been reduced from 90- page reports to less than 5 pages, and gate meetings are not information meetings, but decision meetings, where gatekeepers must arrive prepared (Belair 2007, 14–15). This is the weakest area for the worst performers, less than 15 percent of whom report high-quality participation from gatekeepers.

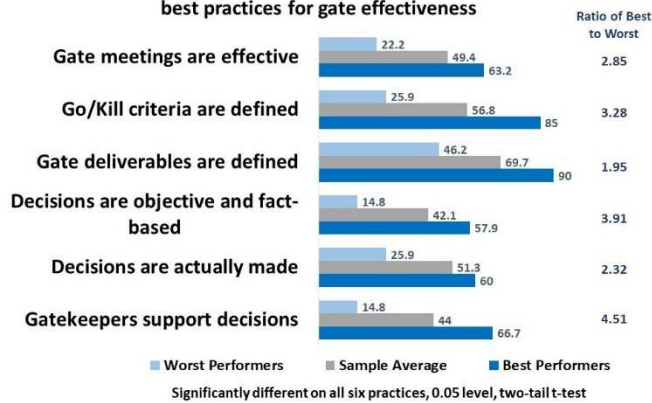
Improving Gate Effectiveness

Merely having a gate structure in place is not enough; rather, gate meetings and decision processes must be effective. Gate meetings were deemed “not effective” in about half the businesses studied, but best performers fare significantly better here, outdoing worst performers by almost three to one. In these more effective meetings, agendas are distributed in advance and adhered to during the meeting, meetings begin and end on time, and a record of all decisions is kept. In other words, good meeting protocols are developed and followed. Best performing businesses employ a number of techniques to make gate meetings more productive and effective, including defining specific go/kill criteria and deliverables for each gate; engaging in fact-based, objective decision making; ensuring that decisions are actually made at gate meetings; and enlisting gatekeeper support for decisions (Figure 7).

- Go/kill criteria are defined.** Having go/kill decision criteria defined for each gate, written down and visible to everyone, is a strong best practice, employed by best performers more than three to one versus worst performers. Almost all best performing businesses (85 percent) employ specific go/kill criteria—often in the form of a gate scorecard—to evaluate the merits of projects, assist management in making go/kill decisions, and make decision making more objective and less emotional. In spite of the logic of having gate criteria spelled out in this way, the lack of such criteria is fairly widespread, especially among poorer performing businesses, with only one-quarter of worst performers having specified go/kill criteria.

- Gate deliverables are defined.** To make good decisions, gatekeepers must have the right information available. Defined deliverables specify what information the project team must provide to enable decision making and provide a guide for the gatekeepers in approaching the decision. Having defined deliverables for each gate is a clear best practice: 90 percent of best performers set clear

Figure 7. Percentage of participating businesses implementing best practices for gate effectiveness



expectations, generally via a standard list of items that the project team is expected to deliver at each gate in the process, often in the form of a template.

- Decisions are objective and fact based.** The majority of businesses in the study indicated that a high-quality approach to decision making, in which decisions are fact-based and objective, is lacking at their gates. Even the best performers are somewhat deficient here, with just more than half claiming high-quality and objective decision making; even at that rate, the best performers still do much better than the worst performers, only 14.8 percent of whom indicate confidence in the quality and objectivity of their gate decisions.

- Decisions are actually made.** Gates are supposed to represent decision points; the result of a gate meeting should be a go/kill decision. As the CTO of a major engineered-products firm said, “Gates are an irrevocable decision to commit resources to a project and project team.” But in about half the businesses studied, gate meetings do not produce decisions. Rather, the meetings tend to function as information sessions or project updates. Best performers do much better here, running their gate meetings as true decision meetings that produce one of four or five outcomes (Table 3).

- Gatekeepers support the decisions.** Gatekeeper unanimity and support for gate decisions is a problem for more than half the businesses. Only the best performers fare well in this respect, reporting that each gatekeeper

Table 3. Typical gate meeting outcomes for best performing companies

GO	The project is approved along with the forward plan and resources needed to implement that action plan; a date for the next gate meeting and expected deliverables are agreed to
KILL	The project is a poor investment; all work and spending on it stops
HOLD	The project passes, but its timing is not right or there are other and better projects that require the same resources; work may continue at a later date when the prioritization and timing issues are resolved
RECYCLE	The project appears to be a good investment, but the project team has not provided required deliverables or the deliverables are substandard; the team is directed to try again
CONDITIONAL GO	The project is approved conditional on specified future events occurring or the completion of key actions

visibly supports the decisions made at gates, including committing resources from their departments. By contrast, less than 15 percent of worst performers report effective discipline in this regard.

The Messages for Management

The data clearly indicate that having a robust idea-to-launch system in place is in itself a best practice. However, our work demonstrates that there are also specific best practices for ensuring the effectiveness of the process, both for designing the system and for moving projects through the various gates. While many factors drive a business’s innovation performance, having an effective Stage-Gate system backed by effective governance is an important best practice in new product development.

References

Adams, M. 2004. PDMA Foundation New Product Development Report of Initial Findings: Summary of Responses from 2004 Comparative Performance Assessment Study (CPAS). PDMA Foundation, September.

Adams, D., and Hubilkar, S. 2010. Upgrade your new-product machine. *Research-Technology Management* 53(2): 55–67.

Agan, T. 2010. Secrets to revenue and innovation in new product development. [Weblog entry, June 22.] *Nielsenwire*, A.C. Nielsen Company. <http://blog.nielsen.com/nielsenwire/consumer/secrets-to-revenue-and-innovation-in-new-product-development> (accessed December 20, 2011).

American Productivity & Quality Center (APQC). 2002. *Improving New Product Development Performance and Practices*. Houston, TX: APQC.

Belair, G. 2007. Beyond gates—Building the right NPD organization. Presentation given at the First International Stage-Gate Leadership Summit, St. Petersburg, FL, February.

Booz Allen Hamilton 2007. Booz Allen study finds the world’s leading corporate innovators stepped up R&D spending in 2006. Press release, October 16. <http://www.boozallen.com/media-center/press-releases/48399320/2007Innovation1000?preview=1&psid=&ph> (accessed December 28, 2011).

Cohen, L.Y., Kamienski, P. W., and Espino, R. L. 1998. Gate system focuses industrial basic research. *Research-Technology Management* 41(4): 34–37.

Cooper, R. G. 2006. Managing technology development projects—Different than traditional development projects. *Research-Technology Management* 49(6): 23–31.

Cooper, R. G. 2011. *Winning at New Products: Creating Value Through Innovation*

Cooper, R. G. In press. New products—What separates the winners from the losers and what drives success. In *PDMA Handbook of New Product Development*. 3rd ed. K. B. Kahn. Hoboken, NJ: John Wiley & Sons.

Cooper, R.G., Edgett, S.J., and Kleinschmidt, E.J. 2003. *Best Practices in Product Innovation: What Distinguishes Top Performers*. Hamilton, Ontario: Product Development Institute.

Cooper, R.G., Edgett, S.J., and Kleinschmidt, E.J. 2004a. Benchmarking best NPD practices—Part 1: Culture, climate, teams and senior management’s role. *Research-Technology Management* 47(1): 31–43.

- Cooper, R. G., Edgett, S.J., and Kleinschmidt, E.J. 2004b. Benchmarking best NPD practices—Part 2: Strategy, resources and portfolio management practices. *Research-Technology Management* 47(3): 50–60.
- Cooper, R. G., Edgett, S. J., and Kleinschmidt, E. J. 2005. Benchmarking best NPD practices—Part 3: The NPD process & decisive idea-to-launch activities. *Research-Technology Management* 47(6): 43–55.
- Cooper, R. G., and Mills, M. 2005. Succeeding at new products the P&G way: A key element is using the ‘Innovation Diamond.’. *PDMA Visions* 29(4): 9–13.
- Edgett, S. 2011. *New Product Development: Process Benchmarks and Performance Metrics*. Houston, TX: American Productivity and Quality Center and Hamilton, Ontario: The Product Development Institute.
- Griffin, A. 1997. Drivers of NPD Success: The 1997 PDMA Report. Product Development & Management Association.
- Grönlund, J., Rönneberg, D., and Frishammar, J. 2010. Open innovation and the Stage-Gate process: A revised model for new product development. *California Management Review* 5(3): 106–131.
- Jaruzelski, B., Dehoff, K., and Bordia, R. 2005. The Booz Allen Hamilton Global 1000: Money isn’t everything. *Strategy+ Business* 41: 3–15.
- Koen, P. 2003. Tools and techniques for managing the front end of innovation: Highlights from the May 2003 Cambridge Conference. *PDMA Visions* 27(4): 16–19.
- Mills, M. 2007. Implementing a stage-gate process at P&G. *Proceedings, First International Stage-Gate Conference*, 27–38. St. Petersburg Beach, FL: Management Roundtable Inc. and Stage-Gate Inc.
- U.S. Department of Energy (DOE). 2007. Stage-Gate Innovation Management Guidelines: Managing Risk Through Structured Project Decision-Making. US DOE Energy Efficiency and Renewable Energy Industrial Technologies Program February. http://www1.eere.energy.gov/industry/financial/pdfs/itp_stage_gate_overview/pdf (accessed December 28, 2011).

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