

# Six Best Practices for Product Development

## V. James Lesjak

The Alliance has been concerned from its inception with identifying best practices for product development; our lead article gives a recent perspective. Our second article deals with the issue of technology transfer from University to Industry, drawn from the presentation to the May 1999 Alliance Conference.

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### **Introduction**

As companies reach the end of the road on downsizing and cost cutting, the focus must shift inevitably to revenue enhancement. Price increases, once the easy answer, are now severely limited by customer resistance and competitive pressures. Building market share with existing products is also competitively constrained. That leaves new products as the only viable alternative.

But new product development is itself a hazardous undertaking. Various studies have estimated new product failure rates in the 25% to 50% range. Still, some companies do much better. Why? Typically, it's a well-defined and consistently applied new product development process.

Over the past three years, Business Genetics has done a series of best practices benchmarking projects, focusing on different as-

pects of the new product development process. Close to fifty best-in-class companies have been studied, including Northern Trust, 3-M, Anheuser-Busch, Chrysler, Gillette, Hallmark, Hewlett-Packard, Toyota, Marriott, Merck, and Nabisco.

The studies included comprehensive written profiles of each of their processes based on in-depth interviews. This was followed by workshops in which, typically, six best-in-class companies would meet directly with our client. In these workshops, the focus was on learning how each firm arrived at its current practices - what worked, what didn't work, and what needed further refinement.

Six core best practices emerged:

**Future Mapping** - something more than just the CEO's vision of the future

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**Platforming** - generating multiple new products from a single development project

**Portfolio Management** - limiting the project list to projects with only the highest potential, and to only as many as can be efficiently developed within available product development resources

**Stage Gating** - using consistent and well-defined stages in the development process, with management review of all functional inputs and next-stage resource approval only at pre-established gates, with specific hurdles that must be satisfied before passing to the next stage

**Voice of the Customer** - product developers interfacing directly with customers to better understand customer needs, preferences and priorities

**Cross Functional Teams** - bringing together relevant functional expertise in dedicated work teams working synergistically to develop better new products faster

### **Future Mapping**

No, this is not the equivalent of a Jean Dixon prognostication. Nor even one by Bill Gates. Remember that it was Bill whom in 1981 said "640K ought to be enough for anybody". Future mapping is a much more structured forecasting process developed in response to two basic stimuli. The first is the increasingly rapid change occurring in most markets. Changes in users and user needs, wants and preferences, as well as changes in technology.

The second is the decentralization of modern corporations. No longer is there one person at the top of a monolithic structure mapping out the future for the entire organization. The decision on what the future will look like has been shifted down to business units, who need a more structured process to develop and support their forecasts.

Best-in-class companies typically use one or more of the following future mapping tools: Functional Mapping, Group Scenario Forecasting and/or Future Market Simulation.

**Functional Mapping** is a tool developed by Wheelwright and Clark at Harvard. The basic premise is that change is continuous. We just are not aware of it in its early stages. So, if you look at a ten to twenty-year history of any trend, you can get a pretty good idea of where it's heading. The key is to find quantitative measures for all the important trends impacting on the category.

It was functional mapping that persuaded Nabisco to focus their development efforts against healthier snacks. The result was the development of the Snackwell line of products that generated incremental sales of over \$1 billion.

**Group Scenario Forecasting** is a qualitative process that brings together internal and external industry experts to discuss and ultimately prioritize and assess alternative scenarios for the evolving market under study. The group sifts through different visions of how the market will develop, weighs the differing likelihoods and then decides, as a group, which are the most likely, and what their impacts would be on the company.

Nutrasweet, in anticipation of aspartame coming off patent in 1990 and the knowledge that a number of competitive sweeteners were in clinical testing, went through this exercise to help them come up with an effective business protection plan. By concentrating their efforts against their two major customers, Coke and Pepsi, they were able to maintain their dominant position in the artificial sweetener market.

**Future Market Simulation** is a methodology that attempts to project target users of a radical new product into a future environment relevant to that new product, and measures the product's business potential in that environment. Business potential is derived from target user measures of intensity of interest, degree of preference and intent to purchase. It is fundamentally the same methodology that is used in market test simulations widely employed in packaged goods industries as a substitute for actual limited-geography test marketing.

An example is General Motor's research into the potential of non-gasoline-powered automobiles. Target users were exposed to a variety of communications about the attributes and features of electric and natural gas cars. The communications included regular television commercials, public relations materials, simulated consumer report ratings, and computer programs that enabled target users to examine in depth all the features of each of the cars, both technical and aesthetic. The outcome was General Motors' decision to proceed with the development of their electric car, beating competition by at least two years.

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### **Cross Functional Teams**

Of the six core best practices, the use of cross-functional teams is undoubtedly the one that is now most widely applied by new product development teams. The same name, however, is used to describe a great variety of team structures, functions, responsibilities and decision-making authority. Not all are equally effective.

As used by best-in-class companies, cross-functional teams are typically made up of four to eight core members, representing the core functions impacted by the project. Between gate decision points, these teams are empowered to make whatever decisions they deem necessary to surmount the hurdles to the next stage. They reach decisions by consensus. They remain with the project from its inception through scale up and launch. They are usually given initial training and on-going facilitation support to help them function more effectively. At any one time, they would be members of no more than three or four teams. Fulfilling their team responsibilities accounts for most of their time, with their functional area responsibilities allocated only a minor part.

The modern, effective cross-functional team must not be confused with its cross-functional *communication* team look-alike. The two may seem to be the same, but they are not. Characteristically, the latter consists of twelve to thirty participants who meet regularly to get updated on progress and accept assignments for specific pieces of the project. Decisions are not made as a team. They are made outside and simply reported to the team. The result is that all the relevant input is not incorporated, and the time of a lot of people is wasted in non-productive informational updates.

The Polaroid team involved in the dental imaging project is a good example of best-in-class practices. It was made up of five core members - a program manager, an R&D manager, a software integrator, a manufacturing manager and a facilitator. It negotiated with its strategic business unit its mission, milestone dates, resources and deliverables, and recruited sub-team volunteers for the project.

It received two days of training, was given responsibility for all decisions between gates and operated on a consensus basis. Interestingly, on strictly functional issues, the functional expert on the team was given fifty per cent of the vote. Only ten per cent of the time of team members was allocated to other-than-team matters. Meeting agendas were issued twenty-four hours before the weekly meetings (held at the same time each week) and summaries were circulated

within twenty-four hours after each meeting. Lotus Notes were used as the primary communication vehicle.

Some best-in-class cross functional teams rotate team leaders during the course of a project, aligning the functional expertise of the leader with the functional importance of the particular stage of the project. Typically, evaluations of team members are 360°, i.e. by subordinates, peers and superiors. Rewards are based on these evaluations and sometimes consist of innovative bonuses tied to the new product's performance. 'Attaboy' recognition is typically not regarded as adequate.

### **Platforming**

Platforming is the development, by a single project team, of a common architecture from which multiple new products can be developed. The architecture can consist of a common technology or a common production process or even a common marketing concept. Typically, the multiple new products represent a new generation of products with significantly improved user benefits.

The Boston Consulting Group was the first US proponent of the process and Japanese electronic companies were early adopters. A single VCR platform, for example, can generate eight to twelve variations, with more or fewer bells and whistles, directed at different price points and even different retail accounts.

Hewlett-Packard uses platforming extensively. In the printer division, they typically have four platform development teams each working on a different generation of DeskJet printers. Each platform, with an assumed life of about twelve to eighteen months, generates five to six different models. The auto industry is another good example. Chrysler's many different 'cab forward' models are all grounded in one basic platform.

While early applications of the process were focused on high technology industries, the process is now being applied across a broad range of industries. Because of platforming's potential to generate multiple new products, best-in-class companies typically assign more experienced developers to the platform project teams. The payoff, particularly in speed of development, often significantly exceeds expectations.

### **Portfolio Management**

One of the universally most difficult things to do in new product development is to kill a project once it is underway. The participants feel personally committed and cannot easily volunteer a declaration of failure. Man-



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agement is reluctant to write it off since it obviously was once thought to have enough potential to be initiated. The project develops a life of its own and inertia takes over. The result is that scarce development resources continue to be applied to questionable projects, while the development of more promising projects is slowed by resource availability limitations.

The increasingly widespread use of cross-functional development teams has exacerbated the problem. On the one hand, they eat up more manpower. On the other, team members working on too many projects can paralyze progress.

Portfolio management is a process that addresses this thorny issue. It ranks all new product development projects, ensures that the total number of projects are within available development resources, and establishes how the resources will be deployed across different categories of projects, e.g. minor enhancements, platform projects, and radical innovations.

A key element is a rating methodology. Each project must be rated under a common set of criteria to which all levels of management have agreed. Based on these ratings, projects are then ranked within their project categories. The lowest ranking projects in each category that are beyond the resource capabilities allocated to that category are dropped.

Projects are typically rated at initiation, and the ratings are then updated at each stage gate in the development process. This is to ensure that as new information emerges, its impact on the overall potential of the project is evaluated and reflected.

In 3M's Commercial Office Supply Division, the portfolio management system rating questionnaire measures five basic issues - estimated user interest, degree of innovation, degree of fit with the division, sales and profit potential, and probability of success. Five questions on each of these basic issues are answered on a scale of one to five. The responses are then weighted to reflect the company's focus. User interest, for example, gets the primary weighting at 44%, with innovativeness assigned 35%.

The typical effect of the implementation of a portfolio management system is a dramatic reduction in the number of

active projects. At 3M, the number of active projects was cut in half, while the number of successful projects increased. An even greater reduction occurred at a Johnson & Johnson Company, from 200 to only 40. Here, the category of minor enhancement projects, previously accounting for over 80% of the projects, was given an allocation of only 55% of the development resources. Platform projects/new brands were given 35%, and 10% was allocated to radical innovations.

### **Stage Gating**

Recycling has long been a bane of new product development. Frustration abounds when everything seems to be proceeding nicely down one path only to be diverted back to ground zero. Unknown or unclear management expectations are often the culprit. Stage gating is an effective way of overcoming these problems.

Originally proposed by Bob Cooper, stage gating divides the new product development process into relevant stages and establishes gates at the end of each stage. Each gate contains a set of hurdles, agreed to by management, which must be cleared before the project can proceed to the next stage. Gatekeepers are appointed to ensure that the hurdles have been met and that resources are available for the next stage.

Stage gating represents a new way to manage cross-functional development teams. At the gate reviews, the inputs of all functional areas are reviewed simultaneously. Constant management updates are no longer necessary.

Depending on the complexity of the project, there are typically four to six stages and gates. The basic principle applied by best-in-class companies is that gates are established at development points where there will be significant escalations of risk or investment.

Champion International, with five stages, provides an example of the content of each stage and the hurdles that must be met. Stage I is focused on idea generation and typically includes brainstorming along with research on customer needs and in-depth reviews of industry intelligence. To pass on to Stage II requires a concise written statement of the new product idea, an attractiveness rating audit and a Stage II proposal.

Stage II is directed towards doing the ground work necessary to develop a marketing plan and prelimi-

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nary financial projections. The work includes the definition of project deliverables, technical and manufacturing feasibility studies and preliminary user assessments. To proceed to Stage III requires detailed product specifications, competitive product assessments, a detailed technical development plan, a manufacturing site proposal, a detailed project schedule, an updated attractiveness rating and a moderately detailed financial plan.

Product development represents the core activity in Stage III. The product is developed through limited mill trials. Potential users assess the mill trial product. Concurrently, more detailed marketing plans are drawn up. Along with the updating of the attractiveness rating, common to all gates, the requirements to proceed to Stage IV are a positive technical review, detailed marketing plans, an expanded mill trial plan and a customer test plan.

The full mill trial is the major activity in Stage IV. Based on mill trial results, the financial, marketing and sales plans are refined and updated. These updated plans, along with a written mill trial assessment and a report on the user evaluations, are the hurdles that must be met to move to the final stage.

Stage V is the execution of the broadscale launch program. In addition, provision is made for a post audit a year after launch. The post audit includes both a quantitative assessment of the success of the new product as well as a qualitative assessment of the development process with action recommendations for future projects.

Procter & Gamble alters the number of gates to fit the project risk - the greater the risk, the more gates to provide for more oversight. General Electric, for more complex technical projects that can take up to ten years to develop, uses as many as twelve gates.

### **Voice of the Customer**

In the evolution of product development from essentially engineer-driven to more and more customer-driven products, market research has played an increasingly important role. Traditionally, that role has been to gather customer information, distill it, refine it and summarize it for the product developers. The one-page summary, however, has room for only the key findings and little, if any, of the textural information from which insights can be formed and real understanding generated.

Voice of the Customer overcomes that deficiency by linking customers directly to product developers. The

direct interface and consequent in-depth appreciation of user needs and wants enables product developers to make much better decisions when faced with the inevitable development trade-offs. It works best when all product development team members receive some training on how to conduct objective and non-leading interviews, and how to analyze and assess the results.

Originally used as an integral element in the House of Quality, the basic design tool of the management process known as quality function deployment (QFD), the principles have been incorporated in three more widely used product development tools: Concept Engineering, Lead User Prototyping and Beta Testing.

An example of the application of Voice of the Customer in *Concept Engineering* is Polaroid's above mentioned development of a new dental imaging device for use in dentists' offices. The project began with the core product development team getting two days of training in interviewing and analytical techniques. Two team members visited each of twenty dentists. In addition to the interviews, the visits included direct personal observation of the dentists using existing dental imaging equipment. All of this was video taped so that the entire project team had access to all of the interviews and observations. The outcome was the successful launch of three new camera products for dentists, moving Polaroid from number 2 to number 1 in the market.

*Lead User Prototyping* is an opportunity identification process originally developed by Professor Eric von Hippel of MIT. Successfully applied by him in industrial applications, Business Genetics has adapted it, with his help, to consumer packaged goods.

The key to the process is the direct interface between lead users and client product developers. Lead users are users whose current needs anticipate the needs of the broader user group. They also have the expertise and creativity to have developed modifications of existing products or totally new product concepts that better meet their evolving needs. The interface with client developers takes place in workshops where the lead users' ideas are discussed and refined. The process has generated new product concepts for companies as disparate as Northern Telecom and Nabisco.

*Beta Testing* is widely used by software developers to gauge acceptance for a new or upgraded product and to ferret out potential glitches. Early copies of the new product are distributed to a cross section of heavy users and their comments are reviewed in detail by product developers.

## Best Practices

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### **Summary**

Not all of these six best practices are used in exactly the same way by all best-in-class companies.

Clearly, the culture within each business enterprise differs, as do the organizational strengths and weakness. However, the principles embodied by these practices have universal applicability. Their proven success cries out for broader application. If new product development has a poor record of speed and success in your firm, appropriate adaptation and implementation of these best practices ought to be considered.

## Authors' Biographies

Jim Lesjak, Senior Vice President of Business Genetics, has been providing general management, marketing and product development consulting services to major U.S. companies for the past eight years. Previously, he held senior executive positions in marketing and general management at Procter & Gamble and SmithKline Beecham, both in the U.S. and internationally. He has an MBA from the University of Toronto, and an Honors Economics degree from McMaster University in Hamilton, Canada.