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From Experience: The Invisible Success Factors in Product Innovation

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Dr. Cooper lowers the microscope on the state of product innovation and examines the common reasons for poor results. The critical success factors are noticeably absent from the typical new product project. The article outlines how companies can recognize one of the seven common innovation problems that Dr. Cooper refers to as the new product development "Blockers" to avoid repeating the same mistakes.

Keywords:
Product innovation process, critical success factors, blockers, portfolio approaches, and capacity analysis

From Experience: The Invisible Success Factors in Product Innovation

By Dr. Robert G. Cooper

Those That Cannot Remember the Past …

… are condemned to repeat it[1]. Twenty five years of research into why new products succeed, why they fail and what distinguishes winning businesses, and are we any further ahead? Some pundits say no! Today's new product project teams and leaders seem to fall into the same traps that their predecessors did back in the 1970s; moreover, there is little evidence that success rates or R&D productivity have increased very much.

So what's the problem? Surely, after myriad studies into new product performance, almost every product developer should be able to list off the 10 or 15 critical success factors that make the difference between winning and losing. This journal, and others, have published numerous such articles over the years … so many that anyone introduced to new product management since 1980 should be as familiar with the critical success factors as a school child is with their ABCs.

But we still make the same mistakes. The success factors are invisible… not found in typical business practices. Recent studies reveal that the art of product development has not improved all that much – that the voice of the customer is still missing, that solid up-front homework is not done, that many products enter the development phase lacking clear definition, and so on [3,9].

Has an entire generation of product developers missed the message?

Has management be blind to what ails innovation, and what makes winners? Or maybe we researchers are guilty of missing the boat here – of focusing on the wrong problems, or of communicating poorly, or of not making the success factors more visible.

This article lowers the microscope on the state of product innovation … on the fact that product innovation does not happen as well as it should, and that the critical success factors are indeed noticeably absent from the typical new product project. The article outlines the reasons why so many companies and senior managements have failed to heed the messages, and continue to repeat the same mistakes. And solutions are proposed – no, not another process, and not another market research methodology – but approaches designed to tackle the difficult question of management's failure to listen, and businesses' failure to embrace the critical success factors.

The ABCs: The Critical Success Factors

What are these critical success factors that are so noticeably absent in most businesses' new product projects? Research has uncovered two types or classes of success factors. The first deals with doing the *right projects*; the second with doing *projects right* [13].

Type 1. Doing *the right projects* is captured by a number of external or environmental success factors, over which the project team has little control. These include characteristics of the new product's market, technologies, and competitive situation, along with the ability to leverage internal competencies. While not within the control of the project team, these are nonetheless useful factors to consider when selecting and prioritizing projects. For example, develop a scoring model for project selection that scores projects positively when they're in attractive markets, with positive competitive situations, and that leverage the business's core competencies.

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Type 2. These success factors emphasize *doing projects right*, and focus on process factors or action items – things the project team does (or too often doesn't do). And they are the invisible ones. But these actions are controllable and discretionary, so they *are indeed seen* from time to time. The annuls of business history contain numerous examples of exemplary project teams … teams that understood and built in these critical success factors. Some examples [4]:

Transitions Optical, a joint venture between PPG Industries of Pittsburgh and Essilor International, Paris, has a stunning success in the eye-glasses market with its *Transitions III* plastic lenses that adjust to sunlight for prescription eye-wear. Extensive market research revealed that consumers were unhappy with the traditional product – *Photo Gray Extra* from Corning. This 20-year-old technology was perceived as heavy, for older people and "worn by farmers". But the concept of variable-tint eye-wear – whose tinting changes to accommodate bright sunlight or darker rooms – was appealing. Market research was undertaken in numerous countries to *identify customers' needs* in this lucrative market.

The research showed that consumers were looking for light-weight, modern, variable-tint eye-wear, whose tinting changed quickly; at the same time, the lens had to be really clear when worn indoors. PPG, a world leader in the production of glass and coatings, was capable of developing the photochromic technology, and Essilor possessed the distribution network. But would the proposed product be a winner? To find out, numerous *concept tests* were undertaken with the proposed product – shopping mall interviews and focus groups of consumers – to confirm customer liking and purchase intent, not only in the U.S., but in France, Germany and the U.K. When *Transitions III* was launched in the mid-90s, it proved to be *right on* for the market, and very quickly achieved the leading market share. Sales are still growing at 25-30% yearly.

Here's another example of a superb team effort: A strategic decision at the Fluke Corporation of Seattle to diversify into new markets led to the creation of the Phoenix team – a project team whose mandate was to deliver a superior new handheld instrument product to the chemical industry. Facing a totally new market, the project team had no one in the company to turn to. So they began their *voyage of discovery* with some prework, namely project planning, Synectics (creativity training for the team), a review of the trade literature, and visits to chemical industry trade shows. Next came customer plant field visits – simply spending a day in the control room, chatting with and observing the ultimate customer, the plant instrument engineers. The project leader calls this "fly on the wall research"; others might call it "anthropological research" or "camping out"2.

After some 25 customer site visits, the project team acquired a good understanding of the instrument engineers' problems and needs: that fact that too many different instruments were needed to calibrate the plant's gauges; and the excessive time the instrument engineers spent recording readings in the field.

The solution:

• a universal calibration instrument – could calibrate any gauge in the plant (this was made possible via the use of software rather than hardware in the hand-hand tool); and

• an instrument that recorded the readings in the field – the user simply keys in readings, which go into the tool's memory; and upon returning to the control room, down-loads these directly into his computer.

The *Documenting Process Calibrator* – "the universal calibration tool that does its own paperwork" – went on to become a great success.

What The Winners Have Taught Us

Studies of these and hundreds of other cases reveal just what makes the difference between winners and losers. And many of the factors are indeed controllable. So, let's have a quick review of the "controllable" success factors – the *eight common denominators* of successful new product projects – and the levers you can pull to heighten your odds of success (Exhibit 1) [4].

1. **Up-front homework pays off** [2,3]

Too many projects move from the idea stage right into Development with little or no assessment or up-front homework. The results of this "ready, fire, aim" approach are usually disastrous. Research shows that inadequate up-front homework is a major failure reason [12], while other studies show that solid up-front homework drives up new product success rates significantly and is strongly correlated with financial performance [3,7,13] . Successful project teams undertake superior up-front homework (more time, money and effort; and better quality work) than do failure teams [7,8] , while a recent benchmarking study reveals that homework is a key ingredient in a high quality new product process, and is significantly and positively correlated with both the *profitability* and the *impact* of the business's total new product efforts [9].

2. **Build in the voice of the customer**

Successful businesses, and teams that drive winning new product projects, have a slave-like dedication to the voice of the customer. New product projects that feature high quality marketing actions – preliminary and detailed market studies, customer tests, field trials and test markets, as well as launch – are blessed with more than double the success rates and 70% higher market shares than those projects with poor marketing actions, according to one study [5]. Sadly, a strong market orientation and customer focus is noticeably lacking in many businesses' new product projects, however [6,7,9].

Exhibit 1: Eight Actionable Critical Success Factors

1. Solid up-front homework – to define the Product and justify the project.
2. Voice of the customer – a slave-like dedication to the market and customer inputs throughout the project.
3. Product advantage – differentiated, unique benefits, superior value for the customer.
4. Sharp, stable and early product definition- Before Development begins.
5. A well-planned, adequately-resourced and proficiently-executed launch.
6. Tough go/kill decision points or gates – Funnels not tunnels.
7. Accountable, dedicated, supported cross-functional teams with strong leaders
8. An international orientation – international teams, multi-country market research and global or "glocal" products.

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3. **Seek differentiated, superior products**

One of the top success factors is delivering a *differentiated product* with *unique customer benefits* and *superior value for the user*. Such superior products have five times the success rate, over four times the market share, and four times the profitability as products lacking this ingredient, according to one study [7]. This quest for a superior product that met customer needs better than the competition really made *Transitions III* and Fluke's *Documenting Process Calibrator* the winners they are.

Surprisingly, very few firms can point to specific facets of their new product methodology that emphasize this one vital success ingredient. Often "product superiority" is absent as a project selection criterion, while rarely are steps deliberately built into the process that encourage the design of such superior products. Indeed, quite the reverse is true: the preoccupation with cycle time reduction and the tendency to favor simple, inexpensive projects actually penalizes projects that lead to product superiority [10].

4. Demand sharp, stable and early product definition

A failure to *define the product* – its target market; the concept, benefits and positioning; and its requirements, features and specs – before Development begins is a major cause of both new product failure and serious delays in time-to-market [7,8,13]. In Fluke's new product process, for example, a *definitional gate* exists before the project proceeds into Development. In spite of the fact that *early and stable product definition is consistently cited as a key to success,* however, firms continue to perform poorly here [9].

5. Plan and resource the market launch ... early in the game!

Not surprisingly, a strong market launch underlies successful products. For example, new product winners devote more than twice as many person-days and dollars to the launch as do failure teams. Similarly, quality of execution of the market launch is significantly higher for winners. The need for a quality launch – well planned, properly resourced and well executed – should be obvious. But not every project team and business devotes the same effort and attention here. In some businesses, it's almost as though the launch is an after-thought – something to worry about after the product is fully developed.

6. Build tough go/kill decision points into your process – a funnel, not a tunnel.

In too many companies, projects move far into development without serious scrutiny: once a project begins, there is very little chance that it will ever be killed. The result is many marginal projects approved, and a misallocation of scarce resources. Indeed, having tough Go/Kill decision points or gates is strongly correlated with the profitabilities of businesses' new product efforts [9]. Sadly, tough Go/Kill decision points is *the weakest ingredient* of all process factors studied! Further, for 88 percent of projects investigated, the idea screen is deficient; 37 percent of projects do not undergo a pre-development business or financial analysis; and 65 percent do not include a pre-commercialization business analysis [6].

7. Organize around true cross-functional projects teams.

"Rip apart a badly developed project and you will unfailingly find 75 percent of slippage attributable to (1) 'siloing' or sending memos up and down vertical organizational 'silos' or 'stovepipes' for decisions, and (2) sequential problem solving", according to Peters [15]. Numerous studies concur: good organizational design is strongly linked to success [13]. Good organizational design means projects that are organized as a cross-functional team, led by a strong project leader, accountable for the entire project from beginning to end, dedicated and focussed (as opposed to spread over many projects), and where top management is committed to the project. While the ingredients of a "good team" should be familiar ones, surprisingly many projects are found lacking here, and receive mediocre ratings on the team dimension [1].

8. Build an international orientation into your new product process.

New products aimed at international markets (as opposed to domestic) and with international requirements built in from the outset fare better [7]. This international dimension is often missed by North American companies, however. An international orientation means defining the market as an international one, and designing products to meet international requirements, not just domestic. The result is either a *global* product (one version for the entire world) or *glocal* product (one product concept, one development effort, but perhaps several variants to satisfy different international markets). An international orientation also means adopting a transnational new product process, utilizing cross-functional teams with members from different counties, and gathering market information from multiple international markets as an input to the new product's design.

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These are but eight commonly-cited success factors, based on rigorous research into why winners win and losers lose. But note how poorly businesses and projects perform on each success factor, on average. If these success drivers are so fundamental to winning, then *why are they so invisible in practice* – why do so many businesses and project teams fail to build them in?

The Winners Are All Too Rare

Examples such as Fluke's *Documenting Process Calibrator* and PPG's *Transitions III* are superb examples that hard work and brilliant execution on the part of the project team, along with the right kind of management involvement, pays off. The trouble is, these examples are all too rare. But is the rarity of such exemplary team efforts due to lack of knowledge – that fact that with few exceptions, teams simply did not know what they should do, or did not know how to do it? We believe no! Most often, teams and management know what has to be done, and they know how to do it, but somehow, the work doesn't get done, and the outcome is less than satisfactory. As one executive at P&G exclaimed, after seeing the results of a study of 60 P&G new product projects: "What's clear is that we do know how to do it … there's lots of evidence of teams doing the right things … the right market studies, superb product development and testing, and so on. The issue is one of *consistency* … we do some plays well, some projects, some of the time. But that's *not* how you win championship, year after year".

Indeed there is a *quality crisis* in product innovation! No, not the usual kind of product quality deficiencies, but a quality of execution crisis. In studies of hundreds of projects, quality of execution of key tasks from idea generation through to launch was rated as deficient, scoring an average of about 6.2 out of 10 [6,7,8]. If this was a factory, and that's the quality of work you were getting at each workstation, you'd shut the factory down!

These results are confirmed in an industry-practices benchmarking study, where senior people were asked to rate the quality of their new product process on 11 measures. Again, the same message comes through: the process is broken: managers rate their processes across many elements at a meager 56 points out of a possible 100.

Even more evidence:
We've conducted in-depth problem detection exercises in over 100 companies over the last five years – exercises whereby a large and representative group of employees break into teams and identify what's going wrong. The inputs were provided by more than 2500 people, but are private to the companies. But the issues and deficiencies identified play like a broken record:
· insufficient market input, a failure to build in the voice of the customer, and a lack of understanding of the marketplace,
· poor up-front homework,
· ill-conceived, inadequately resourced launches,
· lack of a true cross-functional team organization,
· failure to get stable product definition early in the project – the product specs keep changing,
· failure to kill projects when they should be – they get a life of their own,
· poor or no project prioritization procedures,
· lack of management commitment and leadership, and so on.
There is a consistent message here: the new product process is broken – we are blind to the success factors.

The same in-company exercises also attempt to identify the underlying causes of this quality of execution crisis. Seven possible reasons – I call them "blockers" – are offered by managers for why the success factors are invisible and why projects seem to go wrong, or take too long, or aren't well carried out. And each requires an antidote or specific action to overcome it:

Seven Blockers – A Preview:
1. Ignorance: our people simply don't know *what should be done* in a well-executed project.

2. Lack of skills: we don't know *how to do* the key tasks – for example, the market research know-how and business analysis acumen are missing; and we often underestimate what's involved in these tasks.

3. Faulty or mis-applied new product process: we have a process, but it doesn't work: it's missing key elements; it's laden with bureaucracy; and it's over-applied.

4. Too confident: we already know the answers, so why do all this extra work?

5. A lack of discipline: no leadership.

6. Big hurry: we're in a rush, so we cut corners!

7. Too many projects and not enough resources: there's a lack of money and people to get the job done.

If your business is typical, chances are that one or some of these reasons or blockers apply to you too, and might explain why too many projects seem to go off course. Let's deal with each of these, expand on them, and explore solutions. The first few blockers are common and obvious ones, and many companies have taken steps to overcome them. The solutions are evident:

Blocker #1. Ignorance: We Don't Know What Should be Done

Some companies' leadership teams and project teams simply don't understand what's required to make new products successful. That is, they lack a complete and balanced perspective on what a well-run project looks like – what the important tasks and events are. For example, in a technology based company, often project team members, and indeed even senior management, are somewhat in the dark when it comes to what marketing tasks are essential, particularly in the early phases of the project. Ask a project engineer what's needed in order to pin down product requirements, and he might reply : "marketing research". But push him on just what market research, and you're just as likely to get blank stares or the reply "hire a consultant". Equally, product managers or project leaders from a marketing group may not fully understand what's required from a technical standpoint. Ask the typical marketing person to list the important

technical activities in a project and here too she's likely to miss half of them. But it's not just a matter of functional silos and cross-functional ignorance: Sadly, some of the marketing folks aren't even aware of what marketing actions make for a well-executed project! Finally, many senior managers are inexperienced at new product management: for example, when it comes to making project go/kill decisions, they aren't sure what their role is, have received relatively little training here, and rely on the wrong decision criteria.

One problem here is that some of the "must do" actions in a well-run project are not very visible and also are based on *soft science*. For example, market research is often considered an intangible ingredient, and when compared to physical science (engineering, chemistry and physics), not very predicable. Money spent on technical work, such as R&D, usually yields a tangible deliverable, such as a lab-tested prototype product; but money spent on market research yields only information as a deliverable – intangible and sometimes very "soft".

"When the R&D Director seeks extra money, the General Manager asks, 'what will I get for it?'. And the head of R&D replies: 'a working prototype ready for production, 90% certain'. When I, the head of Marketing, ask for more money for a market study, I can't guarantee that the result will be even 50% accurate!" exclaimed a frustrated Marketing Director. 'And so, guess who gets the extra budget?'"

And so the uninformed manager moves ahead without the market study ... he simply doesn't understand its importance to success. Other important activities that make the difference between winning and losing – such as obtaining sharp product definition based on facts, doing solid up-front homework, project planning, and building in the international dimension – often fall prey to the same illogical reasoning as the market study, and so they too are left out.

Solution: Processes! That's what the 90s have been all about – re-engineering business processes.

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Solution: Processes! That's what the 90s have been all about – re-engineering business processes.

Processes have become "instant cook-books": they create adequate chefs out of even the worst of us!

As part of this re-engineering or process overhaul exercise, many companies have designed and implemented new product processes, such as Stage-Gate® [4]. These are roadmaps, blueprints or game plans for driving new products to market. They lay out the key steps and activities, stage by stage; they define decision points or gates, complete with go/kill and prioritization criteria; and they build in best practices. In some companies, such processes have evolved to the point where they specify all the steps and activities in a well-run project, complete with "how to" instructions – for example, what market studies are typically required, how to secure product definition, how to make go/kill decisions, and the like.

Guinness Breweries has developed a new product process, that goes well beyond a roadmap for project leaders – it provides instructions and guidelines. Their new product process is totally electronic and paperless: the process "manual" or instructions are on web-pages that the project leader and team can easily access via Intranet. All activities are outlined, along with templates for deliverables. The "manual" is comprehensive and detailed, but the user only sees what she needs to. As one manager declared: "If you can read, you know what needs to be done".

These new product processes have become very popular in the last decade. The *PDMA Best Practices* studies reveal that "60% of firms have adopted a Stage-Gate process" [11,14]3. Our research concurs … almost! Certainly, a high proportion of firms *claim* to have a process in place. But often the process does not yield the expected positive results. Here's why:

· First, a process per se is *not the solution*. Rather, a process is a guide, roadmap or enabler designed to help people find their won way and

reach a solution. Instead, we see too many managements relying heavily on the process, and demanding strict and mind-numbing adherence to the process, regardless of the situation.

· Second, a process may lay out the tasks and steps clearly. But processes presuppose that project team members and management understand what is required in the execution of the process – that they have the skills to execute, and understand what constitutes best practices. The issue of lack of skills and a failure to understand what's required is blocker #2, below.

· Third, the process may be simply a poorly conceived one – it is a badly designed process, and is missing the key elements of a "high quality" process (this is blocker #3, below).

· Finally, the process is a good one, but it's not adhered to – it's an imaginary process (blockers #4-7, below).

So setting up a task force to design and implement a new product process is a only partial answer. It's a good start, and if you lack a systemic, well-oiled new product process, maybe that's the place to begin [4]. But go further. So let's continue with blockers #2-7.

Blocker #2. Lack of Skills: We Don't Know *How* to Do It and/or We Underestimate What's Involved

The needed skills and knowledge are missing! Today's complex projects require a multitude of technical and people skills to be an effective, well-rounded team leader or player. Some of these skills include, for example:

· how to undertake the needed market studies (user needs analysis, competitive analysis, concept testing, segmentation and market analysis, etc.).

· how to do the up-front homework, build a business case and undertake a business and financial analysis.

· how to design an effective launch plan – both operations and marketing.

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how to run projects – project management tools and techniques; project planning.

· how to deal with joint venture or alliance partners (including the legal side).

· a knowledge of the technology required to design, develop and produce the product.

· how to lead an effective cross-functional team – conflict resolution, communication, etc.

· and so on.

The required skill set is a daunting one, suggesting a renaissance man or woman at the helm of the project. But such all-seeing, all-knowing people are few and far between.

One recurring problem is the lack of experience and/or education of people expected to undertake new product projects. In the typical consumer goods firm, marketers tend to dominate project teams. But they are too often freshly minted MBAs – self-assured and articulate, but lacking depth, wisdom and experience. Even worse, the new product project leader is often the assistant brand manager, recently hired. In industrial product companies, the problem is often quite different. Far from dominating project teams, marketers are usually noticeably absent and frequently untrained as marketers. This may in part explain in why marketing activities are consistently rated as poorly handled in new product projects.

It's not just marketing skills, however. There are many other talents needed to make a project a success, as noted in the list above. And too often, project team members are either lacking in experience or deficient in education and training in these skill areas as well.

A second and related problem is that both management and project team members underestimate what it takes to perform many of the tasks above. Building in the voice of the customer, doing solid up-front homework, or getting sharp, stable product definition is not as easy as it sounds. A handful of focus groups and some desk research constitutes "good market research", is the view of many marketers – all that's needed to build in the voice of the cus-

too many companies amounts to key members of the project team cloistered together to agree on a set of product specs. Again, wrong! If your homework phase, building in the voice of the customer, and gaining sharp product definition amounts to focus groups, desk research and some inhouse meetings, then you're not achieving the best practice standards of performance. Witness the two examples cited above – *Transitions III* and Fluke's *Documenting Process Calibrator* – where extensive homework and painstaking market research resulted in winning product concept. These are examples of best practices.

Most companies' new product projects fall far short of the mark, however [3]. The vital homework, research and definitional activities, as found in *Transitions III* and Fluke's Calibrator, are time consuming tasks, requiring considerable effort and skill. But this effort is often underestimated. For example, a study of industrial product companies' new product efforts reveals that certain critical tasks received relatively little attention. The average detailed market study amounted to a meager 16.2 person-days of effort per new product project; while pre-development business and financial analysis took only 13.6 person-days per project [7].

Solutions: There are four solutions recommended here, and the first two are fairly obvious, but perhaps not to everyone:

1. Team training. Too many companies assume that their employees will simply rise to the occasion when it comes to new products. Management assigns people to project teams from a variety of functions in the company, but few have received formal training in the area of product innovation. Even worse is the plight of the project leader: She is often thrust into the team leader role, with little training and lacking many of the skills needed to drive the project to market. So train, train, train!

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Lucent Technologies, a company that has dramatically improved its overall and new product performance in recent years, offers a comprehensive package of training courses for would-be project team members. Here are some of the topics covered in these 2-3 day courses: Life Cycle

Management, Competitive Intelligence, Targeting Your Markets, Marketing & Business Plans, Effective Strategies for Launching New Products, New Product Introduction, Project Management Essentials, Product Technology Roadmapping, and so on (there are 22 such courses in the Product Management curriculum!).

And don't forget training senior management. Often their skill set can also be improved when it comes to their role in product innovation. A number of companies, such as Rohm and Haas, Reckitt & Colman, PECO Energy, Exxon Chemical, Guinness, and Arco Chemical have implemented new product "gatekeeper training sessions" targeted at senior management.

2. True cross functional teams. Lacking a renaissance man or woman as a team member or leader, the next best thing is a cross functional team comprised of members from various functions and with complementary skills. Our research shows that a *true* cross-functional team dramatically improves both time to market and success rates [8]. I emphasize the word "true", simply because there are so many "pretend" or dis-functional project teams in existence. Here's what winning teams have in common in this study[8]:
· an assigned team of players – it is clear who is on the team (too often, team membership was vague and unstable; such teams did not perform as well).
· cross functional, from many departments and functions in the business, with each member having an equal stake in the project (as opposed to a leader from one department dictating to the other team members and departments).

· a dedicated, accountable team leader – that is, not doing too many other projects or other assignments at the same time; and held accountable for the project's results.
· accountable for the entire project as a team – from beginning to end (not just one phase of it). Other facets of an effective cross-functional team include genuine commitment of resources to the team by management. That is, the functional bosses become resources providers, and give defined release time to team members; and once resources are committed to a project, functional bosses cannot arbitrary overrule the team, and renege on resource commitments:

The head of product development at one of Reckitt & Colman's largest business units explained:
You've got to "work with a project team, and a project team from a number of functions ...
people who are empowered to take decisions. It's not much good having a project team with people who say 'yes, we can do that', and then go off and speak to their bosses and find out 'well, I made a mistake'. Getting a project team to work simultaneously with you so you can speed up the whole process, and work towards a common goal, is essential".

3. Groom project team leaders. I call this the "care and feeding of good project leaders". Good project leaders are rare: Project leadership is an acquired skill, and typically does not materialize on one's first project. One reason for the paucity of exceptional project leaders is that management does not give them the chance to mature – management typically promotes them to more lucrative jobs after a successful project. As one team leader put it: "Being a new product project leader is a career enhancing and very visible job – assuming the project is a winner. But I'll only do it once ... Then I'm on to something bigger and better." The point is this: if you have successful and skilled project leaders, let them advance their careers in this area. Provide rewards, incentives, recognition, pay increases and promotions for the good ones to remain as project leaders.

Royal Bank of Canada, one of the largest banks in North America, has selected and groomed a team of project leaders to head projects in their Business Banking unit. Previously, projects were led by Product Managers or their assistants – busy people who had neither the time nor experience to run new product projects. Concerned that a lack of project leadership was hurting projects, the Process Manager of RBC's new product process hand-picked project leaders from inside and outside her company, trained them, and ensured them long term, rewarding positions as full-time project leaders. After several years, she now has a superb team of project leaders in place.

4. Define standards of performance expected. This is perhaps the most difficult of the four solutions. It begins with an understanding of what constitutes best practices. A thorough literature review combined with in-depth benchmarking studies of best practices in other companies is one place to begin. Much has been written in the literature on different approaches, prescriptions and methods to improve product development, especially in *JPIM*. So access it – chances are your desired best practices have already been published and are in the public domain. Benchmarking studies of practices in other firms is also a useful way to identify new methods and approaches. Some benchmarking studies have been published (see Griffin and Page [11,14]); but likely you'll need a more in-depth look at practices, getting into the details and how these processes really work within companies.

Having decided what are desired or expected practices, next, build these into your new product process. Do this via defined stages complete with explicit deliverables for each gate review. For example, in Procter & Gamble's *SIMPL* new product process, deliverables in the form of "endpoints", complete with templates, are defined for each stage - it's clear what's expected of the project team. Additionally, each stage in the *SIMPL* process defines "Current Best Approaches" – suggestions for a project leader, that represent standards of performance. Note

That P&G's *SIMPL* process is a third generation one, has been many years in its evolution, and represents the collective wisdom derived from hundreds of product launches.

Blocker #3. A Faulty or Mis-Applied New Product Process

More than half the companies today claim to have a new product roadmap or process in place – one that guides them from idea to marketplace [11]. The trouble is, the process is missing key elements and/or it's poorly applied.

Missing success factors: The eight critical success factors outlined in Exhibit 1 aren't even part of most companies' new product processes. Audits of new product roadmaps reveal that they consistently miss the mark. That is, management goes through the motions of re-engineering their product development process, but fails to mandate that the re-engineering team build in the critical success factors highlighted above. Sometimes it's not clear that either management or the reengineering team even know what the success factors are in product innovation ... do you?

A review of the new product process in a division of a major U.S. food company revealed serious omissions. When questioned about his business's greatest new product successes, the head of R&D replied with words like "dynamite products ... breakthroughs ... Clearly differentiated ... superior performance and great value for money for the consumer ...". But when asked to point out where in his new product process "dynamite products" was the focus, or where the process would result in such products, he was silent. For example, *none of the project selection criteria* at gates even asked the question; nor were *any of the activities* within the stages designed to yield unique and superior products. Even worse, if a project team followed the division's process literally, they would probably end up with a product that was quite the opposite of a dynamite product. In short, his re-engineering task force had neglected to build into the process the number one success factor! Rather they had merely

merely documented their current methodology (instead of building in best practices and the eight success factors), and in so doing, they had *institutionalized poor practices*.

Our research shows that just having a new product process has absolutely no impact on performance. Rather it's *the nature of that process* – and whether or not it builds in key success factors – that makes the difference [2,3,9].

Bureaucracy: A second process deficiency is that the process is too bureaucratic – it encourages much non-value added activity. Some of this unproductive work inherent in bad processes includes:

Bullet-proofing for gates: The process has become an end in itself in some businesses, as teams go to great lengths to prepare for gate meetings. As one team leader in a well-known Danish company put it: "Our team spends more time preparing for gate meetings than we do actually progressing our project". Project teams were delivering documentation in excess of 75 pages at the gates. Ironically, when polled, senior management indicated they expected about a 10-page summary ...not a 75 page essay! At a major US chemical company, the gate meetings on the surface appeared to require a minimum of paperwork and preparation – for example, presentations were kept to a maximum of 10 overhead transparencies. But as one team leader exclaimed in frustration: "... Of course, that doesn't include the 65 transparencies I have in my briefcase when I arrive at the gate meeting – I want to have a slide that will handle any possible question they can throw at me ... I'm bullet-proofing myself".

Too many gates, too many stages: More is not necessarily better. The typical proficient new product process contains about four or five stages and gates (not counting the ideation stage and post launch review). Much more than that, and bureaucracy sets in. At one large consumer packaged goods corporation, their *New Product Roadmap*, featuring seven stages and

Gates to hell". Management has taken steps to streamline the process.

Inflexibility: The new product process is a risk management tool. If the project's risk is high, then one should adhere fairly closely to the prescriptions of the roadmap. But if risk is low, then detours designed to speed projects through certainly are recommended. Sadly, some companies' new product processes have become straitjackets: they fail to recognize that some projects are small, low risk ones, and should be fast-tracked – stages collapsed and gates combined. That is, management tries to force fit their "large project process" to every project, even the small, no risk ones.

Management control system: A final and serious process deficiency is that the business's development process has become a *command and control system* rather than a super-highway to the marketplace. In short, senior management views the process as a way to keep them engaged in projects – to keep them informed of what's going on, and to enable them to interject their demands and decisions, and worse, to micromanage projects. For example, there are too many presentations to senior management, too many status reports, and generally too much deference and reporting to senior people.

At a hardware and software developer in the Boston area, senior management *could not let go*. In addition to go/kill decision meetings, the leadership team (all the VPs) insisted on monthly reviews of all projects, as well as event-driven milestone reviews. In management's view, this was their way of "staying on top of projects" and providing guidance to project leaders. But all these reviews, preparations for reviews, and management interference was driving project leaders to distraction, and both cycle time and morale were suffering.

This is wrong! The whole concept of a new product process is a system built for speed, and not a

control and information process for the convenience of senior management. A well-designed, properly implemented new product process should be a system designed *for and by project leaders* and teams ... to enable them to get new products to market quickly and successfully.

Solution: Time for an overhaul! If your new product process is more than two years old, it probably needs up-dating and fixing [2] . Conduct a post launch audit of your past projects, and find out what made them successes or failures. Make a list of these success factors. And as you overhaul your new product process, build in these success factors, by design, not by accident.

Next, undertake a critical review of your new product process. For example, take the list of eight critical success factors above, and see which ones your process builds in or omits. If some are missing, take strong steps to redesign your process to incorporate these success factors. Don't get caught like the food company division, where your process overlooks key success factors.

Finally, get rid of the time wasters and *speed bumps* in your process. Take some completed projects and work with the team on a retrospective analysis of their project. Map or "flow-chart" the project from idea through to launch – month by month, activity by activity. Then lower the microscope on each major activity, and brainstorm with the team: "How could you have done it better? How could you have done it faster". Do this on enough projects, and you gain insights into how your process should be overhauled – making it better and faster. Some examples we've seen of the results of such an exercise designed to accelerate the process:

· moving long lead time items forward (such as major equipment purchases) with cancellation clauses in the event the project is canceled.

· outsourcing legal or patent searches (rather than waiting for the company's legal department to find the time).

· using outside tollers to provide limited production quantities to speed up field trials or test markets.

· making the Board meeting on capital appropriation requests event-driven rather than holding it twice per year (this can save up to six months!).

· dumping the annual budgeting exercise, or at least changing it to allocate funds to envelopes (for project types) rather than to specific projects (this means that if a better project comes along, it does not wait until the next budget year to be funded).

· involving people from international units on the project team – a trans-national team – in order to build off-shore design requirements and volume data into the project early enough to make a difference.

Example: When overhauling their new product process, a large US energy company reviewed the critical success factors listed above, and added a few of their own. Then the "re-design task force" set about designing a process that deliberately built in each factor. Here's are some specifics:

· they incorporated major market research efforts, designed to identify and articulate customer needs and wants, as a standard component of the pre-development phase (previously, only concept tests, largely via focus groups, had been part of the "old" process).

· they redesigned project reviews to be decision points or gates, complete with defined deliverables and visible, quantifiable go/kill criteria (previously, these project review meetings were really project up-dates, rather than go/kill decision points; no criteria or list of deliverables existed; so no projects were killed once underway).

· they mandated a sharp, early product definition before the development phase (the project is halted unless product definition is on the table, based on facts, and signed off by the project team; previously, rather vague and unstable product definitions, non fact-based, had been the rule).

· and they required a preliminary market launch plan to be delivered, before the "go to development" decision point (in the "old" process, launch plans were put together just before the launch phase, so often the sales force and

The Final Four Blockers – Tougher To Deal With

What if the players know what to do; they have the necessary training and skill set; and they have a good process or game plan in place in the company ... but still it doesn't happen right!

As one senior person in Lucent Technologies exclaimed:

We have a very visible stage-and-gate process, with stages and gates clearly defined. It's a *good* process too! And most of our people have been trained on it. But it really hasn't been totally implemented ... that is, many projects don't rigorously follow the process."

The four explanations I hear most often are:
· over-confident – we already know the answers.
· a lack of discipline – a lack of leadership and a failure to comply.
· the desire to get to market quickly – we cut corners and circumvent the process.
· too many projects and not enough resources – a lack of people and money, so the job doesn't get done.
None of these deficiencies is easily solved. Let's explore each in more depth.

Blocker # 4. Too Confident: We Already Know the Answers

This is a lame excuse and it's like leading with one's chin ... a cocky attitude that says : "why bother doing this product test or this market study ... we already know what the result will be". The argument might be a legitimate one if it were not for the compelling body of evidence against it. The most frequently omitted activities in the new product process are the early market assessment and market research tasks along with other activities in the homework phases of the project [3,7,8,13]. But consistently, a lack of good market information and inadequate homework are cited as the number one reasons for new product failure! If we already know the answers, then why is it that products continue to fail for the same reasons?

Solution: There's no breakthrough solution here except common sense. So look at the evidence! New products fail because of omission of key activities or sloppy quality of execution. If you're still a non-believer, as part of your retrospective analysis of past projects, lower the microscope on each activity in the project (the flow-charting exercise above). Rate the quality of execution of each activity, and try to pinpoint the weak ones. And if your company is typical, you'll discover two truths:
· many activities and key tasks aren't done well, or don't happen at all.
· success and failure hinges on certain of these poorly handled key tasks.
Before you skip over key activities because you think you "already know the answers" or that the project is a simple and obvious one, pause for a moment: chances are, you're wrong! The evidence strongly suggests that at least some of key assumptions you've made are faulty, and these assumptions will come back to haunt you!
· Some of your "market information" (based on opinion and guess-work, rather than fact) is almost certain to lead to wrong conclusions. Just about every major new product market study I've been involved with *changes in some important way the key assumptions* about product design requirements, pricing, target market, benefits sought and so on. The original view of the project was wrong, and had we proceeded based on that view, the product and project would have underperformed.
· Apparently "simple, obvious" projects are often far more complex than originally thought. The project looks simple, so one charges in without the adequate up-front homework. Only later in the project is it discovered that there more here than anticipated – a lot more uncertainties and risks than first thought. And so the project team has to retreat and retrench, and do the needed work. The trouble is, by the time the project gets back on track, much time and money has been spent.

A word of warning: Be very careful about deleting actions that have been shown to be pivotal ones. It's alright to have flexibility, but detours should be made consciously and in full awareness of the risks and costs involved.

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Blocker #5. A Lack of Discipline: No Leadership

The complaint is this : "We lack the discipline … we don't want to follow the process: it takes some extra effort". Human nature is such that we often avoid doing something, even when we know it's the right path – a lack of discipline or unwillingness to comply with a well-conceived and logical prescription.

One of the problems in product innovation is that many of the prescribed actions in a well-run project are *discretionary* or *optional*. For example, one does not have to do market research or the up-front homework or even extensive product testing in order to get the product to market. And because these actions are optional, they can be too easily deleted or omitted … and so they are! Another example: instead of making tough Go/Kill decisions and gaining focus, it's so much easier to keep adding projects to the active list. And so management does!

Often the lack of discipline *comes from the top*. The leadership team of the business "talks the talk", but doesn't walk the talk. Indeed the leadership team is often the first to break rank – to break discipline. Here are five very common negative behaviors of management or leadership teams we witness:

8. "*Just go do it!*". Frustrated with projects that seem to take forever, some senior people adopt a cavalier attitude and urge their people to "just get on with it." In one major firm, a senior executive criticized his new products people for "narrow perfectionism and extreme risk avoidance" when he witnessed projects with extensive market research, product testing, business analysis and the like. But a subsequent analysis revealed that the company's new product results were improving every year (higher success rates and higher NPVs per project), and far superior to what they had been before the company had adopted this disciplined approach. His pleas to forget the discipline probably would have resulted in disaster.

9. *A failure to demand that the project team embrace best practices.* Senior management allows projects to proceed without key steps and activities completed – missing the market studies, up-front homework, international outlook, sharp product definition, and the like. In short, management fails to challenge the team, and fails to set high standards for quality of execution.

10. *Inappropriate behavior as gatekeepers.* Senior managers often miss project review meetings (or postpone them); they fail to make the needed decisions at such reviews, leaving the project team in limbo; they make decisions based on opinion rather than fact, on emotion rather solid criteria; and they progress pet or executive projects, circumventing the process altogether.

11. *Changing project priorities too often.* Projects are on again, off again; management reassigns people without considering the impact on projects; and senior people renege on resources previously committed to a project leader.

12. *Micro-managing projects from a distance.* Management tries to over-manage the details of projects, but is not engaged enough to fully understand the implications of senior level decisions on projects.

13. *Insisting on too many make-work activities.* Senior managers demand myriad reports and presentations on the project. Do these behaviors sound familiar? If so, read on for some action solutions.

Solution: There are three solutions proposed for a lack of discipline; #1 and 2 below are aimed at senior management.

1. The leaders must understand the vital role of new products in their business. Too often, senior management treats new products as an afterthought. Senior management is so tied up with day-to-day business issues and the pressures of achieving quarterly financial results that they seem relatively distant from new products. In one major US company, the CEO asked me at a management briefing meeting the question: "Can you really make money at new products?".

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To him, product innovation was a sideshow and simply not worth spending much time on. The lack of appreciation of the role of innovation, coupled with a short term results focus, explains the doubtful behavior of senior people as innovation leaders. The first requirement, then, is that your leadership team be educated about the vital role of new products. For example, in this firm just cited, a study was undertaken within the company to show the impact of new products – their profitabilities, margins, and impact on sales. The results were impressive, but prior to the analysis, had not been well understood. Additionally there is much evidence available to make the case the new products are vital, and that one of senior management's most critical roles is to lead the charge here.

2. The leaders must demonstrate leadership. And they must lead by example, practicing discipline and adherence to the principles that underlie best practices in product innovation [4]. To the leadership team of your business, I preach the following message: Yes, re-engineer your new product process. But most important, demonstrate that you're committed to the process by your actions, not just your words. Here are some positive leadership actions observed in companies, based on an unpublished study4:

Senior management ...
· should have an in-depth understanding of company's new product or stage-gate process and a commitment to adhere to its principles and "rules of the game".
· must make timely, firm and consistent Go/Kill decisions.
· must prioritize projects objectively.
· should establish visible and clear deliverables for successive project review or gate meetings.
· must commit and ensure availability of necessary resources.
· should mentor and enable project teams.
· must set high standards for quality of execution of project tasks.

"An effective gatekeeper is less an old-style manager – a judge and critic – and more an enabler and resource provider", concludes the author of the study. Further, the last item in the list is worth noting. Instead of tacitly approving sloppy work, missed deliverables, or hasty corner cutting, senior management should challenge the project team, and set high standards for tasks and deliverables. As one senior executive at Hoechst-US put it: "The gates are the quality control check points in the new product process. And I view my job as a 'quality controller' – I ask tough questions at the gates to ensure that the [project] work is being done, and in a high quality fashion".

Next, develop a set of "rules of the game" that your leadership team agrees to adhere by [4]. And make sure you live by them! Example:

An audit of new product performance and practices at one Rohm and Haas business unit revealed that the leadership team was the problem, and not so much the project teams. So, senior management agreed to be trained. For example, although the leadership team had endorsed their business's new product process, many senior people were not familiar with its prescriptions, best practices and reasons why. Next, the leadership team developed a set of *rules of conduct* to address their lack of discipline ... rules they committed to live by. Some examples of this business unit's "rules of the game" are in Exhibit 2.

3. Install a process manager. To my knowledge, there has *never been a successful implementation of a new product process* without a process manager or facilitator in place! No process, no matter how well-designed and needed it is, will never implement itself. It needs someone to make it happen. This person is the process manager; and for larger businesses, this is a full-time position. Indeed, the best performing businesses have incorporated process facilitation for their new product efforts [9].

Exhibit 2: Gatekeeper Rules of the Game

· Gatekeepers must hold the gate meeting and be there; if you cannot attend, find a proxy.

· Don't wait till gate meeting to raise key issues; and contact the project team to resolve issues
before the gate meeting begins.

· No "catching up" on projects at gate meetings, and no surprise attacks!

· Gatekeepers must make their decision based on the criteria for that gate.

· All projects must be treated fairly and consistently – no hidden agendas; no pet projects!

· A go/kill decision must be made – within that working day

· If the decision is Go, the gatekeepers support the agreed-to Action Plan, commit the resources, and
agree to release people to the project leader.

The role of this process manager – often called the key master, process facilitator, gate meister or process keeper – is to make sure that the new product process works, efficiently and effectively. The process manager facilitates every important gate meeting, acting as a referee, ensuring that gatekeepers follow the rules of the game (above), and that a decision is made. She coaches the project teams, helping them overcome difficulties and roadblocks, and making sure that all the key deliverables are in place. The process manager up-dates the process, and provides for continuous process improvement; he trains new employees on how to use the system; and most important, he is the scorekeeper in the game, keeping the necessary metrics on projects, their progress and outcomes.
The process manager typically reports directly to a senior person, such as the head of Marketing or R&D, although the position itself may not be a senior one.

Blocker # 6: In Just Too Big a Hurry

The *speed argument* is a tough one to refute in today's fast-paced world. It goes like this: "We've got some tough deadlines ... a limited window of opportunity. This product must be launched for the trade show in September. So we're going to have to cut some corners – cut out the market studies, cut short the product tests, do a quickie sales force training effort – in order to make that deadline.
Let's just get it out there!"

The fact that the product must be to market as quickly as possible is a compelling reason to take some chances, cut corners or collapse activities. But the results are often negative:

A well-known manufacturer of marine paint (paint for ships' hulls) was in a hurry to get a new product to market. In the interest of saving some time, management urged the project team to rush the product to market and cut short the product testing phase. All went well until two years into launch, when ship-owners started to notice that the paint was peeling off the their hulls – a full three years sooner than the scheduled re-painting. Putting a ship into dry-dock for unscheduled repainting is a costly proposition, and soon the legal actions began. Not only does the paint company have a failure on its hands, but it's lost credibility in the eyes of its customers, and it's also fighting dozens of legal actions from angry customers.

The story is repeated in almost every industry. Ford's Taurus suffered heavily in warranty costs and low resale value, largely because of steps taken to reduce development cycle time. Today, Mercedes faces a problem with a new car model that flips over – not enough product testing, perhaps? Only the computer software industry gets away with launching incomplete products or products that don't quite work. But their day too will come.

Our study of fast-paced project teams reveals that the speed argument above is false economy. Rather, project teams that emphasize doing the up-front homework, doing the necessary market studies, building in the voice of the customer, getting sharp early product definition based on facts, and practicing quality of execution not only achieve a higher success rate, their time performance is the best – they get there time efficiently and on time [8]. And the strongest driver of cycle time reduction is the use of a true cross-functional team.

Solution: Recognize the need for cycle time reduction. But also recognize that some things done in the interest of saving time have exactly the opposite effect. Indeed, there is a dark side to accelerated product development, according to Crawford [10]. The quest for cycle time reduction leads companies to focus on the mundane – to develop trivial products and line extensions, rather than genuine breakthrough products; it results in short-cutting certain key activities – product testing, careful product definition, market studies – at the expense of quality of execution with negative consequences; and it is disruptive to the team concept, thereby resulting in greater people costs and chewed up resources.

Cycle time reduction is certainly a worthwhile objective. Our studies reveal a strong positive correlation between time efficiency and profitability in new product projects [8]. Further, note that not everyone is guilty of this misplaced emphasis on cycle time reduction. Finally, often the problems resulting here arise not so much from the goal of cycle time reduction, but rather from how people go about achieving the goal – the fact that they *mismanage* their cycle time reduction efforts.

As noted in blocker #4 above, flexibility is fine, as long as short-cuts aren't taken for the wrong reasons. And be careful that efforts taken to reduce time to market do not compromise quality of execution or the team process; and that accelerated time lines are realistic, given the resources available. This is one more reason to install a full time process manager – someone that can enforce discipline when either the team or management are in too big a hurry.

Also, consider building short-cut rules into your new product process:

Example: One major consumer firm's *Product Delivery Roadmap* outlines when it's OK to cut corners, and when it is not:
"It's OK to cut corners when …
· the concept is strong.
· product testing results are strong.
· concept testing results are very positive and no change in the competitive environment has occurred since the concept tests were done.
· we know the category well and have been successful here in the past.
· the marketing plan is simple and incorporates only known elements.
· the sales and advertising pieces are ready.
· the technology is known and in use within the Company.
· reliable production capacity exists."

If these conditions exist, it may be appropriate to cut some corners. But if they don't exist …

Blocker #7. Too Many Projects and Not Enough Resources: A Lack of Money and People to Do the Job

Most businesses have too many projects and not enough resources to do them properly. This is the result of two management failures: either management (1) doesn't provide the necessary resources to achieve the business's new product goals; or (2) they approve too many projects for the limited resources available. Indeed, the performance of project teams is often jeopardized by senior management. Here's an example seen too often:
One frustrated new product project leader at her company's technology conference exclaimed: "I don't deliberately set out to do a bad job. Yet, when you look at the job that the project leaders around here do, it's almost as though our goal is mediocrity.

But that's not true … we're good project leaders, but we're being *set up for failure*. There simply isn't enough time and not enough people or the right people to do the job we'd like to do!" She went on to explain to senior management how insufficient resources and budget cuts coupled with too many projects were seriously compromising the way key projects were being executed. She was right! The point is: *the resource commitment must be aligned with the business's new product objectives, strategy and processes* for positive results.

Our research shows that poor project selection approaches and a lack of project prioritization is the weakest facet of new product management [5,9]. Management in the businesses studied rated themselves …
• very poor in achieving the right balance between numbers of active projects and available resources (too many projects); and
• also very poor at undertaking solid ranking and prioritization of projects.

In spite of all the proposed solutions, management has been slow to adopt new and better project selection and portfolio management approaches.

This lack of resources coupled with the failure of management to make tough project choices – to prioritize projects – leads to many negative consequences. Indeed, much of what ails product development can be directly or indirectly traced to too many projects in the pipeline. Here's why:

· Management's failure to make tough choices results in a *lack of focus*: far too many projects for the limited resources available [5].

· Too many active projects in turn means that resources and people are *too thinly spread*. Projects end up in a queue, pipeline gridlock occurs, cycle time starts to increase, and quality of execution suffers. So, not only are projects late to market, their success rates drop!

· Lack of effective and rigorous go/kill decisions leads to *too many mediocre projects* in the pipeline: too many extensions, minor modifications and defensive products that yield *marginal value* to the company – a noticeable *lack of stellar new product winners*.

· Finally, the few really *good projects are starved* for resources, so that they're either late to market, or never achieve their full potential.

Solution:

Strive for funnels, not tunnels! That is, move to a funneling process, where many concepts enter the process, but at each successive stage and after new information is delivered, a certain percentage of projects are cut. To do this, build *tough go/kill decision points* into your new product projects in the form of gates [4]. And develop criteria for use at gates – criteria that are used to make go/kill and project prioritization decisions. (Criteria used by one leading chemical company are shown in Exhibit 3 – a validated scoring model, next page).

Ensure that the decision-makers or gatekeepers are defined for each gate, and receive training on how to be an effective gatekeeper. And get senior management engaged at some of the key gates in the process – for example, the "go to Development" and "go to Launch" decision points. Finally, don't forget gatekeeper rules to ensure that gatekeepers themselves are disciplined.

But do more than merely implement a gating process. Move towards effective *portfolio management*. Note that a stage-and-gate process focuses on *one project at a time*; by contrast, portfolio management considers *all projects together*. That is, stage-gate processes deal with the fingers (individual projects) whereas portfolio management deals with the fist [5].

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In a well-designed portfolio approach, senior management periodically reviews the entire list of projects. Here, they look to achieve three goals [5]:

· **Maximization of the value of the portfolio:** A variety of approaches can be used to "value" and hence rank-order projects. These range from financial methods (Expected Commercial Value; Productivity Index; and Options Pricing Theory [5]) through to scoring models, as in Exhibit 3.

· **Seeking the right balance of projects:** Bubble diagrams appear most popular here, whereby the business's projects are plotted as bubbles on an X-Y plot in order to display balance [5,16].

· **Ensuring that projects and the spending breakdown mirror the business's strategy:** Strategic Buckets and scoring models can be used here [5].

One consistent weakness in portfolio approaches is that they often fail to deal with capacity-versus-demand or throughput. Maximizing the value of the portfolio, balance, and strategic alignment are all worthwhile goals, but merely achieving these three in your portfolio does not deal with the issue of numbers – namely, *too many projects* in the portfolio.

Thus, when you implement portfolio management, be sure to undertake a *capacity analysis*. You can do this in one of two ways:

1. Do you have enough of the right resources to handle projects currently in your pipeline? Begin with your current list of active projects. Determine the resources required to complete them according to their timelines. Then look at the availability of resources. You'll usually find major gaps and hence potential bottlenecks. Finally, identify the key resource constraints – the departments, people or capabilities that you run out of first (see Exhibit 4 at end for details).

2. Do you have enough resources to achieve your new product goals? Begin with your new product goals. What percent of your business's sales should come from new products?

Exhibit 3: Project Selection Criteria
(19 Scoring Model Criteria – taken from Hoechst-US [5])

1. Reward:
· Absolute contribution to profitability
· Payback period
· Time to commercial start-up

2. Business Strategy Fit:
· Strategic fit
· Strategic impact

3. Strategic Leverage:
· Proprietary position
· Platform for growth
· Durability: the life of the product in market place
· Synergy with other /businesses in company

4. Probability of Commercial Success:
· Existence of a market need.
· Market maturity (growth rate)
· Competitive intensity
· Existence of commercial applications skills in company
· Commercial assumptions (predictability)
· Regulatory/social/political impact

5. Probability of Technical Success:
· Size of technical gap
· Program complexity
· Existence of technological skill base in company
· Availability of people & facilities

Now, determine the resources required to achieve this goal. Again you'll likely find a major gap between demand based on your goals, and capacity available. It's time to make some tough choices about the realism of your goals or whether more resources are required (again, see Exhibit 4 at end for details).

Both analyses usually point to the need to reduce the number of projects in the pipeline (better prioritization) and/or increase the resources available for new product projects.

Conclusions and Eleven Action Items

The ABCs that underlie new product success have been identified, and should be clear to everyone. But blockers get in the way, and consistently make these success factors invisible. I now integrate the solutions highlighted in this article into eleven action items, beginning with the leadership team of the business:

1. Your leaders must lead. The leadership team of the business must adopt a long term commitment to product development. They must commit the necessary resources that are realistically required to achieve the business's new product goals. They must understand and support the business's new product process, and agree to live by the rules of the game. The leaders must make consistent, timely and stable project go/kill and prioritization decisions, and commit the necessary resources and people's release time to project leaders. And they must play the role of enablers, facilitators, and resource providers.

2. Design and implement a new product process or Stage-Gate$^{(R)}$ system. Set up a task force and charge it with a mandate to design a best practices new product process. Refrain from simply documenting current practice, and in so doing, merely institutionalizing bad behavior. Rather, identify the critical success factors, both from the ABC's list above and from your own analysis of your past projects. Then set out to build in each success factor and best practice.

3. Overhaul your process. If you already have a new product process in place, and it's more than two years old, it's time for an overhaul. Start by conducting a review of past projects that went through your existing process via flow-charting – a retrospective analysis. Identify the weak areas, the areas needing improvement, and the and time wasters. Identify what works, and consider suggestions for improvement from both project teams and gatekeepers. When you know what needs fixing, then proceed as in action item 2 above.

4. Define standards of performance expected. Build best practices into your new product methodology by defining key activities and clear expectations regarding the nature and quality of work required. Establish menus of explicit deliverables (perhaps in the form of templates) into your process. And use the gates as quality control checkpoints, where the quality of deliverables is gauged against these performance standards.

5. Install a process manager to oversee the process, to make sure that the process works. This is a full time job in most medium and larger businesses. This process manager or process facilitator ensures that gate meetings are effective, that project teams and leaders are on course, and that the discipline and spirit of the process are adhered to. Far from being extra overhead, this person pays for herself almost immediately. Without a process manager with some clout in place, don't expect your re-engineered process to work very well.

6. Build in tough go/kill decision points with defined criteria. Many companies have formal review points in projects. But they're not very effective at killing projects and focusing resources on the deserving projects. When you overhaul or design your new product process, ensure that the gates are in place, and that they're rigorous one. Gates should have:
. clearly defined and operational go/kill and prioritization criteria (for example, a project scorecard used right at the gate meeting);
. a menu of deliverables for each gate;
. defined gatekeepers for each gate – who makes the decision (the locus of decision making defined);
. and gate procedures, and agreed-to rules of the game.

7. Use true cross functional teams, with team members from various functions, each with an equal stake in the project. Ensure the team has the necessary resources, with people with specified release time. And empower the team, but also make them accountable for results. Finally, designate a project leader, ideally from beginning to end of project.

8. Provide training for project team members as well as gatekeepers. Don't assume that running a project, mentoring a project team, or gatekeeping is easy stuff. New product management is one of the most challenges management tasks in business ... so educate those involved! And groom good project leaders, providing them rewards, recognition and support.

9. Seek cycle time reduction, but don't become a *speed freak*. There is a dark side to speed. It's fine to build flexibility into the process ... for example, to collapse stages, combine gates, and even overlap stages or bring long lead-time activities forward. But make sure these detours are made consciously, in full awareness of the risks, and at gate meetings. Make it as rule:don't delete or move over these because you think you know the answers. And for higher risk projects, stay close to the prescribed game plan – not too many detours.

10. Move to portfolio management. Implementing a solid gating process is an excellent first step, but stage-gate processes look at each project on its own. Ultimately, however, you must treat all projects together, and handle these R&D and marketing investments as a portfolio decision. Thus, implement portfolio management in parallel to a stage-gate process. Have portfolio review meetings semi-annually or quarterly, staffed by the senior gatekeepers. Review the list of active and on-hold projects, assessing the value of the active portfolio (what are the "go" projects really worth to the company?). Adopt a valuation method, either a financial approach or scoring model. Look for balance in the portfolio, using one of the bubble diagrams recommended or the pie chart breakdowns of spending alloca-

Finally, ensure that all active projects are aligned with your business's strategy, and that your spending breakdowns mirror strategic priorities.

11. Cut back the number of projects underway. Undertake a resource capacity-versus-demand analysis in your business (Exhibit 4). Identify what resources are required to undertake the currently active projects to meet their scheduled launch date versus the availability of resources. Repeat the same exercise, but with your business's new product goals as the demand driver. Determine how much over-capacity you are, what the right number of resources or projects should be, and where the bottlenecks are. If there is a significant gap between resource needs and availability (there usually is), then make tough choices: either add resources consistent with your new product goals, or rethink the realism of your goals.

* * *

The quest for successful innovation continues. Just when we think we know all the answers, we realize that the success factors are invisible – they've vanished. The eleven action items above may not solve every problem. But they'll go a long way to introducing common sense and putting the success factors back into product innovation.

Exhibit 4: Two Ways to undertake a Capacity-Versus-Demand Analysis

1. Demand Created by your Active Projects; Determine demand:
. Begin with your current list of active development projects, prioritized from best to worst (use a scoring model to prioritize projects as in Exhibit 2, or one of the financial approaches mentioned above [5]). Develop a prioritized project list table [5].
. Then consider the detailed plan of action for each project (use a timeline software package, such as Microsoft Project).
. For each activity on the timeline, note the number of person-days of work (or work-months), and what group (or what department) will do the work.
. Record these work-day requirements in the prioritized project list table – one column per department. In other columns, note the cumulative work-days by department.
What is your capacity?
. Next, look at the capacity available – how many work-days each department1 has available in total. (These work-days look at all people in that group or department, and what proportion of their time they have available for new products.
Be sure to consider their "other jobs" in this determination – for example, the fact that a Marketing group likely has 90% of their time eaten up by day-to-day assignments).
. Then mark the point in your prioritized-list-of-projects table where you run out of resources – where demand exceeds capacity.
Results:
You'll likely learn three things from this exercise:
· You really do have too many projects, often by a factor of two or three;
· You'll see which department or group is the constraining one; and
· You'll also begin to question where some departments spend their time (and why such a small propor-tion is available to work on new products!).

2. Demand Generated by your Business's New Product Goals:
Determine demand:
. Begin with your new product goals – what sales or percentage of sales you desire from new products.
. Translate these goals into numbers of major and minor new product launches annually.
. Then, using your attrition curve – how many Stage 1, Stage 2, Stage 3, etc. projects does it take to yield one successful launch? – determine the numbers of projects per year you need moving through each stage.
. Next, consider the work-days requirements in each stage, broken down by function or department. The numbers of projects per stage combined with the work-days requirements yield the demand – namely, the work-days and personnel requirements to achieve your business's new product goals, again by department.
What is your capacity?
. Now turn to availability – how many work-days are available per department (as per the second part of method 1 above).
Results:
. Again you'll likely find a major gap between demand and capacity.
. At this point, you either modify your goals, making them a little more realistic; or make tough choices about adding

[1] In a smaller business, this demand-versus-capacity analysis can be done on a group or even individual person basis, rather than by departments. The same method applies, however. resources or reassigning people in order to achieve your goals.

These two exercises can be done either with work-days (people x days) or dollars as the measure of resources.

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From Experience: The Invisible Success Factors in Product Innovation

Endnotes:

1. Quotation attributed to George Santayana, American philosopher.

2. "Camping out" is the term that Hewlett-Packard uses to describe this immersion research, whereby the project team or designers spend much time with customers, really learning the customers' operation, needs, problems, etc.

3. Stage-Gate[(R)] is a trademark of R.G. Cooper & Associates Consultants Inc., a member company of the Product Development Institute Inc..

4. Source: L. Gastwirt, formerly of Exxon Chemical and father of their *PIP* Product Innovation Process; now with the Stevens Institute. Dr. Gastwirt studied the behaviors of effective gate-keeping or leadership teams.

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