

**R&D PORTFOLIO MANAGEMENT
BEST PRACTICES:
METHODS USED & PERFORMANCE
RESULTS ACHIEVED**

by

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About the Authors

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Bob is considered to be the father of the *Stage-Gate process*, now widely used by leading firms around the world to drive new products to market. His NewProd series of research -- an extensive investigation over the last 20 years into the practices and pitfalls of product innovation in hundreds of companies and over 1000 new product projects -- has been widely cited. He has published more than 75 articles and four books on new products, including the popular, "Winning at New Products: Accelerating the Process from Idea to Launch".

Bob's dynamic talks have captivated thousands of business people in North America, Europe and the Pacific. He has consulted in the field of new product management for leading companies worldwide, including: IBM, Proctor & Gamble, Exxon Chemicals, DuPont, BP (UK), Courtalds (UK), SC Johnsons Wax, Shell-Wavin (Netherlands), Kodak, WR Grace, Corning, Hallmark, Northern Telecom, Lego, Emerson Electric, BF Goodrich, Polaroid, the Royal Bank of Canada, Pfizer, Carlsberg Breweries, Rohm & Haas, Hoechst (US), US West, Bell-Canada, and Reckitt & Colman (UK&US). Many of these companies have implemented his Stage-Gate approach to accelerating new products to market.

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Elko has international experience working in Europe, North America and Africa. He has presented numerous seminars to companies in North America, Europe, Asia (China) and Australia primarily in the area of new product development and marketing.

His consulting activities have included market forecasts, new product aspects and developing new product processes for companies.

Elko holds a mechanical engineering degree, an MBA and a Ph.D in Business Administration. His practical work experience includes engineering tasks, investment analysis for technical projects and technical marketing.

Portfolio Management Best Practices: Methods Used & Performance Results Achieved

Introduction

New products are vital to the success and future prosperity of the modern corporation. Driven by rapidly advancing technologies, globalization of markets, and increasing competition at home and abroad, effective new product development is emerging as *the major corporate strategic initiative* of the decades ahead. Those corporations which succeed at new product development will be the future Mercks, HPs, 3Ms and Microsofts; those companies which fail to excel at new products will invariably disappear or be gobbled up by the winners.

A vital question in this new products warfare is how should the business most effectively invest its R&D and new product resources¹? Portfolio management is seen by many as the solution: portfolio management addresses questions such as: which new product or development projects should you undertake? what's the right balance and mix of projects? and how should you allocate your resources across various development projects? Portfolio management is a critical topic because it integrates a number of key decision areas, all of which are problematic (1): project selection and prioritization; resource allocation across projects; and implementation of the business's strategy (2,3).

Purpose of the Best Practices Study

The underlying goal of the current investigation is to provide insights into how businesses manage their R&D and new product portfolios, what the top performers do differently, and the lessons that companies can put into practice in order to achieve more effective portfolio management. An exploratory study, already undertaken, focused on a limited sample of leading firms, and described and categorized their portfolio management approaches (see 4,5,6). The current study broadens the base, and seeks insights into which portfolio management approaches are the most popular, the strengths and weaknesses of each method, and which methods yield the best performance results. The details of the research method are in the sidebar.

Businesses in the survey sample cover a wide variety of industries (see sidebar), with chemicals and advanced materials industry representing the largest group. Almost half the businesses in the sample have annual revenue in the \$100 million to \$1 billion range, with 37.9 percent larger than \$1 billion annual revenue.

¹ Some firms restrict "portfolio management" to new and improved products, and platform projects with new product potential. Other firms include virtually any development project, such as process improvements, cost reductions, minor product improvements, customer projects, and so on. Thus we use terms such as "new product portfolio" or "R&D portfolio" interchangeably in this article.

Portfolio Management Performance

How well is portfolio management working? This is both a fundamental and a vital question. We outline *portfolio management performance results* in the first section of this report, since the answer underlies so many of results reported later.

Portfolio performance is a multi-faceted concept, so six metrics were constructed to capture how well the business's portfolio is performing. These metrics include decision effectiveness and efficiency; and having the right balance of projects, high value projects, and a strategically aligned portfolio — see Exhibit 1 for a listing. All are metrics that emerged as goals in our exploratory study (4).

The Average Business

Portfolio management appears to be working in a *moderately satisfactory fashion* on average in our sample of businesses. Mean scores across the six performance metrics are typically mid-range — not stellar, but not disastrous either — although there are some differences across metrics (see Exhibit 1: the black bars show mean values). The results:

- ▶ Businesses on average obtain *fairly good alignment* between their portfolio of projects and the business's strategy.
- ▶ Portfolios contain *moderately high value projects* on average.
- ▶ Spending breakdowns (across projects) *reflect the business's strategy fairly well*, on average.

But portfolio performance is markedly lower, on average, in the area of the *right number of projects* and *project balance*, namely:

- ▶ Project gridlock exists in the portfolio pipeline, on average, with *projects not being done on time!*
- ▶ Businesses tend to *lack a balanced portfolio* of projects (balance in terms of short term versus long term, high risk versus low risk, and so on).
- ▶ Businesses have *too many projects underway*, given the resources available (which might in

How the Research Was Done

A detailed survey questionnaire was developed in concert with the IRI's Research on Research Committee. The questionnaire dealt with a number of topics including:

- importance of portfolio management and reasons why;
- general nature of the portfolio management method used by the business;
- details of the portfolio methods used;
- dominant method used;
- criteria used for selecting and ranking projects;
- satisfaction with method(s) used;
- performance of the business's portfolio management method; and
- general demographics (industry, business size, etc.).

Most of the questions are close-ended (i.e., require the respondent to check a box or circle a number), although some open-ended questions were included to solicit verbal comment. Many of the questions require ratings on 1-5 scales.

The questionnaire itself was carefully structured, exhaustively reviewed by a committee of industry experts from the IRI, pre-tested on eight businesses via personal interviews, and finalized.

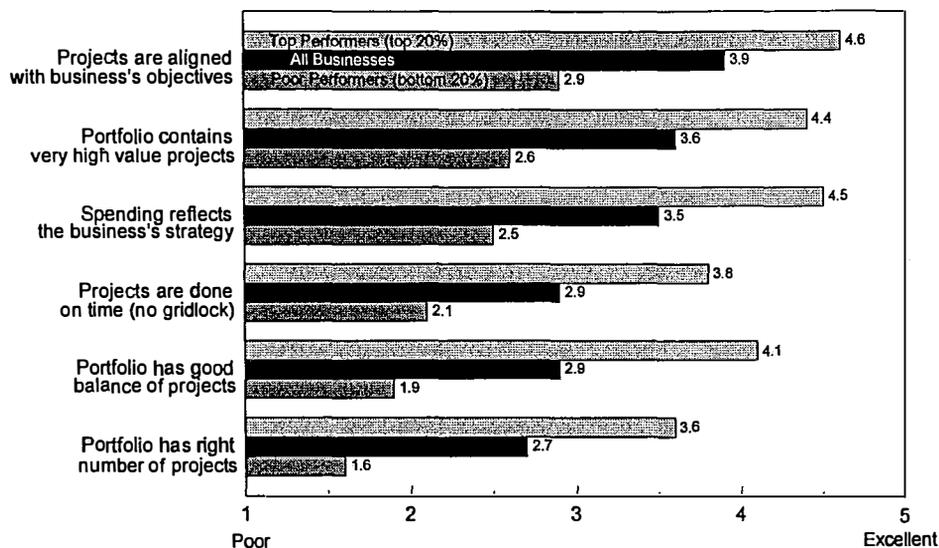
A listing of businesses known to be active in product development in North America was prepared, including the IRI membership list (largely CTOs of larger firms in the U.S.) as well as other private lists compiled by the authors. Although not the total population of all firms undertaking R&D and product development in the U.S., the list is a fairly representative one.

The eventual response rate was a respectable 205 businesses (25.8%), and there are no noticeable biases in the responding businesses versus those in the original mailing (i.e., the responses reflect the population). Additionally there are no differences in the response patterns between IRI and non-IRI members; between major industry groups; thus the two samples are combined and results are presented together.

The breakdown of respondents by industry is:

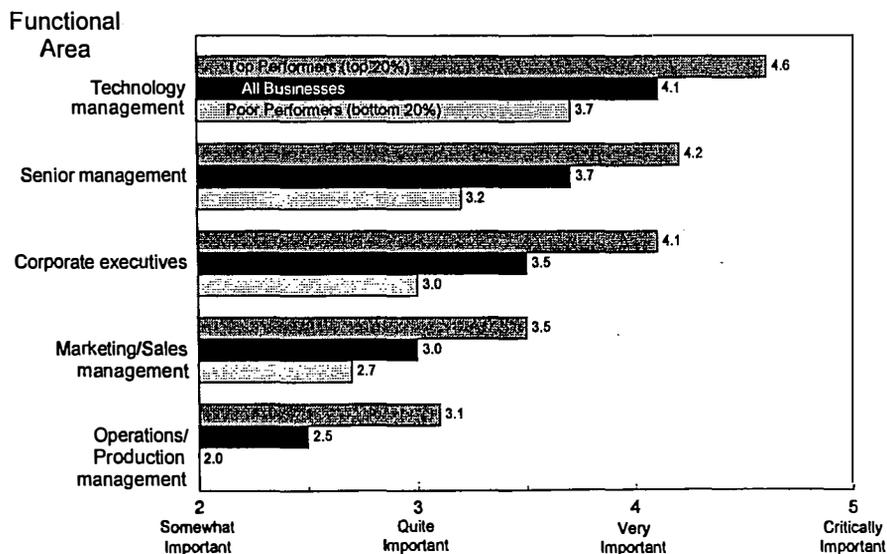
High technology	17.6%
Processed materials	8.3%
Industrial products	8.3%
Chemicals & advanced materials	28.3%
Consumer products	12.2%
Health care products	6.3%
Others	19.0%

Exhibit 1: Portfolio Performance Results On Six Key Metrics



- All differences between Top & Poor Performers are significant at the 0.001 level.
- Performance metrics are rank-ordered according to mean scores (best at top of exhibit).

Exhibit 2: Importance of Portfolio Management



- All differences between Top and Poor Performers are significant at the 0.001 level.
- Rank-ordered according to mean scores (highest scores at top of exhibit).

turn explain the gridlock and timeliness problem above). Performance on this metric is the weakest of the six.

The *distribution of performance results* between the best and the worst businesses is very broad, with some firms achieving excellent performances, others reporting dismal scores:

<u>Performance metric</u>	Percent of Businesses	
	<u>No or Poor²</u>	<u>Yes or Good</u>
Projects are aligned with the business's objectives	8.7%	74.4%
Portfolio contains very high value projects	9.7%	55.1%
Spending reflects the business's strategy	15.9%	57.4%
Projects are done on time — no gridlock	30.2%	29.7%
Portfolio has good balance of projects	35.9%	30.8%
Portfolio has right number of projects	43.5%	24.1%

Therefore mean or average performance ratings shown as bar charts in Exhibit 1 should be used with caution, simply because only a minority of businesses are average.

These substantial differences in portfolio performance across businesses, together with the moderate-to-poor mean performance scores on some metrics, are provocative. They suggest that *many businesses are performing in a substandard fashion*, and that *much improvement is needed* in the way many enterprises' portfolios are managed.

The Top Versus Poor Performers

This large performance spread begs the question: what is it that the better performers are doing differently than the poor performers? To answer this question, a *single portfolio performance gauge* was developed, based on the six individual metrics in Exhibit 1³. The top 20 percent of businesses, measured by their portfolio performance on this gauge, were singled out, and their results and practices were contrasted to the bottom 20 percent of businesses. So the term "top 20 percent" means the 20 percent of businesses whose portfolios perform the best in terms of the six metrics in Exhibit 1.

As might be expected, the top 20 percent achieve dramatically better portfolio performance results across all six performance metrics (Exhibit 1, the pairs of shaded bars). However, the two areas where the top 20 percent really excel are:

- portfolio balance — achieving the right balance of projects; and
- the right number of projects for the resources available.

² No or Poor score = 1 or 2 on the 5-point scale; Yes or Good score = 4 or 5.

³ Factor analysis was undertaken on the six performance metrics in Exhibit 1 (SPSS-X routine, Varimax rotation, principle components analysis). The results: only a single factor was uncovered, suggesting that the six performance metrics could be combined into a single scale (simple unweighted addition of the six metrics) -- a composite score. This single performance scale or gauge is a very robust one, with a high internal consistency (Cronbach coefficient alpha = 0.812).

Both are areas where the average business performs fairly weakly.

Importance of Portfolio Management

The Average Business

Portfolio management is a critical task in the business — vitally important to success — according to at least some senior management. Exhibit 2 provides the mean importance scores, broken down by executive function. Not surprisingly, senior management in technology (CTOs, VPs of R&D, etc.) give portfolio management the highest importance ratings of all functions; they are followed by senior management overall and then by corporate executives (all three management groups score in excess of 4 out of 5, where 5 = critically important).

The fact that Marketing/Sales managements score only a mid-range 3.5 out of 5 is a concern. Clearly there is a view that the heads of one of the most important partners in product development — namely those who interface with the customer — do not place the same importance on the role of portfolio management. The fact that Marketing/Sales senior management has not vigorously bought into the concept and importance of portfolio management represents a serious deficiency in the widespread acceptance and implementation of portfolio management. Additionally, and perhaps less of a surprise, Operations/Production managements view portfolio management as the least important of all functional management groups.

The Top 20 Percent of Businesses

The top 20 percent of businesses *place much more importance on portfolio management* than do poorer performers — consistently and significantly (see Exhibit 2, the pairs of shaded bars). This is true regardless of functional area. Thus, there is a direct link between whether a business recognizes portfolio management to be important, and the portfolio results it achieves. Once again, however, technology managers score by far the highest here, with senior technology management in the top 20 percent rating portfolio management a very high 4.6 out of 5 in importance. Marketing/Sales and Operations/Production managements continue to see portfolio management as less vital, even among the top performing businesses.

Satisfaction With Portfolio Management Methods

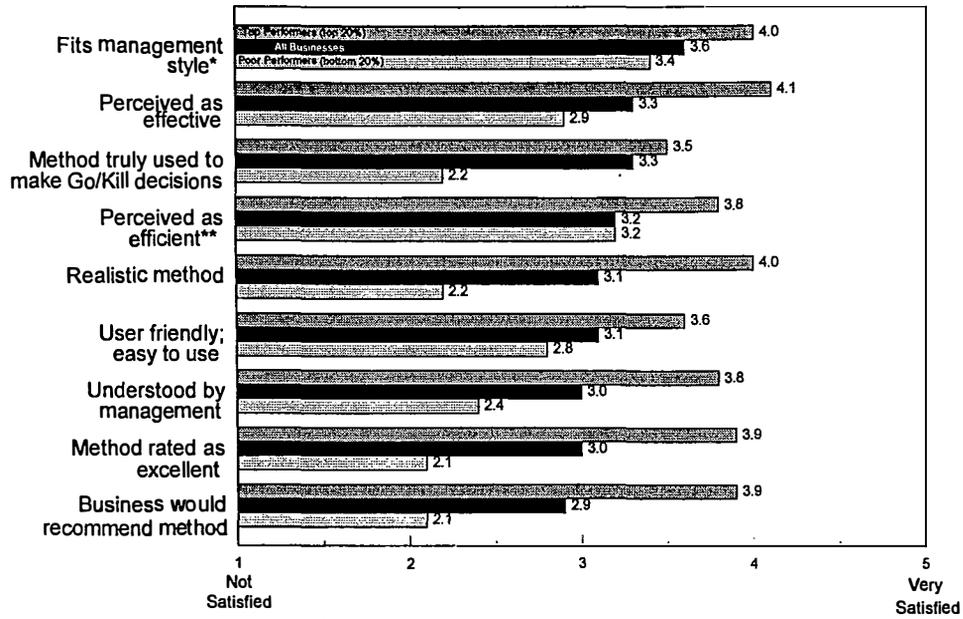
How do managements view their portfolio management methods in terms of key parameters such as effectiveness, efficiency, realism and ease-of-use? And would they recommend their approach to other businesses?

The Average Business

Management is *not particularly satisfied* with their portfolio management approach (see Exhibit 3). Note the mid-range, middle-of-the-road scores achieved here. The most positive facets of the process, and both are important, include:

- ▶ the portfolio management process used fits the business's management style; and

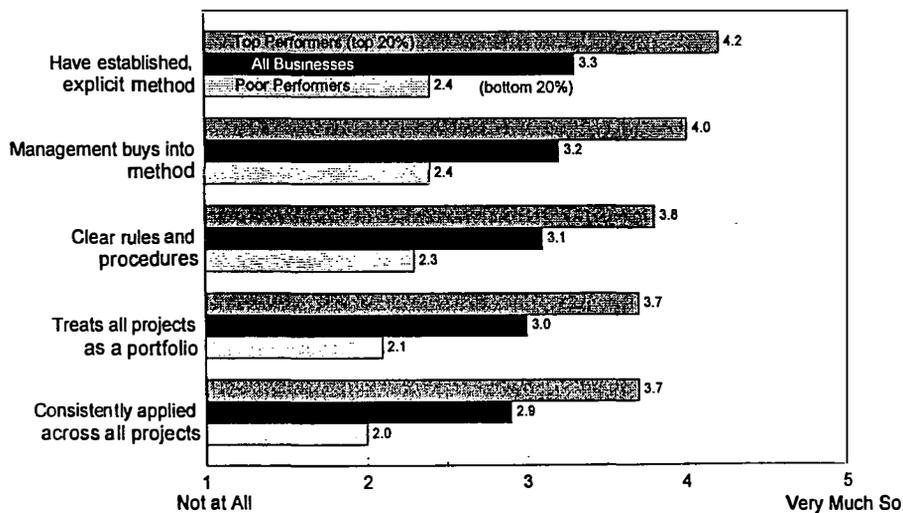
Exhibit 3: Satisfaction With Portfolio Management Method



- All differences between Top and Poor Performers are significant the 0.001 level except unless otherwise indicated.
- Rank-ordered by means.

*significant at the 0.01 level
 **significant at the 0.005 level

Exhibit 4: How Explicit & Formal Is Portfolio Management?



- All differences between Top and Poor Performers are significant at the 0.001 level.
- Rank-ordered by means.

- ▶ the method is perceived as being effective (i.e., makes the right decisions).

These elements are the best, but still the mean scores achieved here point to much room for improvement. The remainder of Exhibit 3 reveals much more disturbing results. On average ...

- ▶ the portfolio method is used ... somewhat;
- ▶ it is not particularly efficient (somewhat laborious and wastes time);
- ▶ it is not especially realistic in capturing key facets of the portfolio problem;
- ▶ the method is not particularly user friendly and easy to use; and
- ▶ it is not well understood by senior management.

The two lowest scoring items in Exhibit 3 are noteworthy. On average, businesses do not rate their method as excellent (rather, a mid-range, fairly mediocre rating is given); nor do they strongly recommend their portfolio approach or method to others.

Once again, there is a *large spread in responses* between businesses. This range or spread in responses underscores the substantial differences in performance and satisfaction — that about 10 percent or fewer businesses and their managements are indeed *very pleased* with their portfolio management approach, but that *the great majority are not*. For example, almost one-third of businesses surveyed rate their portfolio management approach as anything but excellent (the bottom two boxes on this five-point scale); and more than one-third would clearly not recommend their approach to others! Repairs are clearly needed in the case of most businesses.

The Top 20 Percent of Businesses

As might be expected, managements in the top 20 percent of businesses are much more satisfied with their portfolio management methods than are managements in the poorer performers. Consider the differences between the top 20 percent performers and the bottom 20 percent in Exhibit 3:

The three strongest discriminators between top and poor performers in Exhibit 3 are:

- ▶ the top 20 percent boast *more realistic* portfolio methods, that capture key facets of the portfolio problem;
- ▶ they rate their method as *excellent*; and
- ▶ the top 20 percent would highly *recommend their methods* to others.

Additionally, the portfolio methods used by the top 20 percent tend to be understood well by senior management, are perceived to be effective, and are indeed used to make Go/Kill decisions.

Nature of Portfolio Methods Employed

How Explicit is Portfolio Management?

Is portfolio management really done via an explicit, well-defined method, with clear procedures and which encompasses all projects, as some recent books on the topic suggest it should be (1,4)? Or is portfolio management more an unconscious or informal decision process — no defined method, no rules of the game? Even more important, does it really matter? Should businesses be relying on more systematic portfolio methods? Or are the pundits all wrong? The *formality* and *explicitness* of the

portfolio management methods used are explored here, along with their impact on performance.

The Average Business

The typical business fares in a fairly mediocre fashion when it comes to the explicitness of the portfolio management process (see Exhibit 4). For example, on average ...

- ▶ businesses use a somewhat established, somewhat explicit method for portfolio management and project selection (a mid-range score here);
- ▶ management somewhat buys into the portfolio management method — their actions support its use; and
- ▶ the rules and procedures for portfolio management are somewhat defined.

But, portfolio management methods score lower in terms of ...

- ▶ treating all projects as a portfolio (considering all projects together and comparing them against each other); and
- ▶ consistently applying the method — across all appropriate⁴ projects.

Note that the range and spread of practices and scores is quite high in Exhibit 4, suggesting major differences in practices across the sample of businesses. Indeed the frequency count of businesses along each measure reveals the magnitude of the spread and the major differences. That is, some businesses are indeed using an explicit, consistently applied method; others are not, as follows:

	Percent of Businesses	
	<u>No or Low⁵</u>	<u>Yes or High</u>
Have an established, explicit portfolio method	28.2%	46.3%
Management buys into the method — supports its use	27.2%	43.6%
Rules and procedures are very clear	30.6%	35.0%
Treats all projects as a portfolio (compares them)	34.2%	37.1%
Portfolio method consistently applied (all projects)	36.5%	32.5%

The Top 20 Percent

Having a consistently applied, explicit portfolio management process impacts strongly on performance. Consider the major and significant differences between the top 20 percent and poorer performers in Exhibit 4:

The top 20 percent, when compared to poorer performers ...

- have an explicit, established method for portfolio management,
- where management buys into the method, and supports it through their actions;
- the method has clear rules and procedures,
- treats projects as a portfolio (considers all projects together and treats them as a portfolio),

⁴ Not all projects *should be included* in the portfolio (for example, very minor projects or maintenance type projects); thus we specify “appropriate” projects here.

⁵ No or Low score = 1 or 2 on the 5-point scale; Yes or High score = 4 or 5.

- and
- is consistency applied across all appropriate projects.

These differences between top and poor performers are major, and all differences are highly statistically significant. Moreover, all differences are about equal: no one element has a greater impact on performance than another. The conclusion is that businesses that achieve positive portfolio results — a balanced, strategically aligned, high value portfolio, with the right numbers of projects and good times-to-market (no gridlock) — boast a clearly defined, explicit, all-project, consistently applied portfolio management process which management endorses. Poor performers lack this!

Formal Versus Informal Portfolio Method

The majority of businesses claim to be using a *formal system* for portfolio management (56.5 percent of businesses — see top half of Exhibit 5). The rest use an informal system or no system at all. The top 20 percent of businesses clearly have a preference, however, for a formal system. Note that great majority of the top businesses (77.5 percent) use a formal portfolio management system. By contrast, only 41.5 percent of poor performers have elected a formal portfolio management system here.

Autocratic Versus Management Group Decision-Making

Group decision-making appears to be the dominant mode in portfolio management: 44.8 percent of businesses handle Go/Kill and investment decisions on projects in a management meeting; managers discuss projects as a group, use their best judgement and make decisions (see bottom half of Exhibit 5).

In another 6.6 percent of businesses, a senior manager or executive makes the portfolio or Go/Kill decisions. Finally, both decision processes apply in 48.6 percent of businesses.

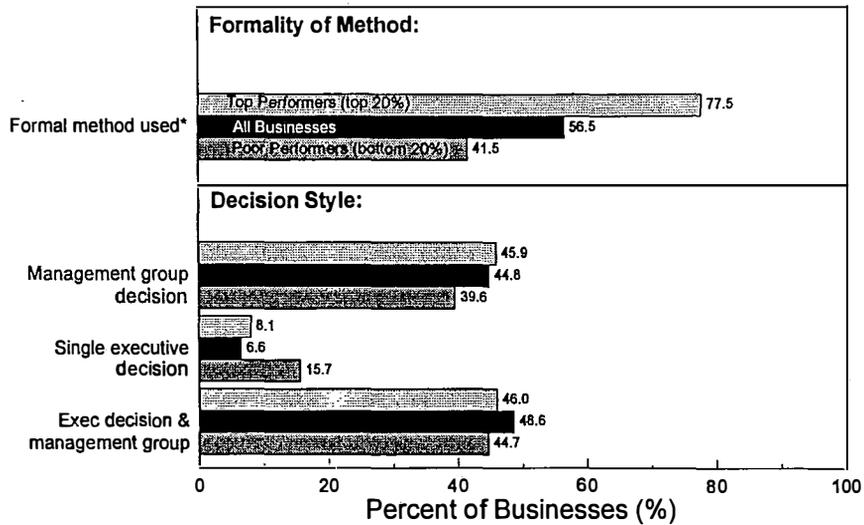
The group decision approach appears to work better, however; at least, it is the choice of the top performing businesses. The top 20 percent emphasize the management group approach more so (45.9 percent of businesses versus 39.6 percent for poor performers), whereas poor performers rely more heavily on a senior executive making the decision (15.7 percent of poor performers versus only 8.1 percent of the top 20 — see Exhibit 5). These differences are tendencies only, and not statistically significant.

Business Unit Versus Entire Corporation

Almost half the businesses use portfolio management only at the Business Unit or SBU level. That is, funds or resources are somehow allocated to the Business Unit (for example, via a corporate planning and allocation process), and then the Business Unit operates and manages its own portfolio of projects. A total of 48.4 percent of businesses indicate that this is their mode of operation — see Exhibit 6.

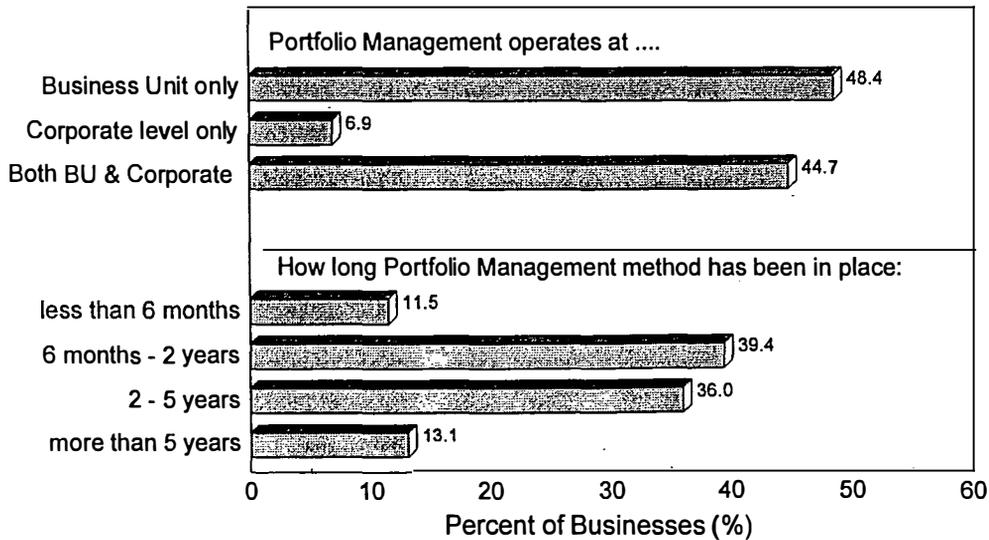
A very small minority undertake portfolio management at the corporate level only (6.9 percent of respondents). That is, all projects from all businesses are considered together and centrally; projects are prioritized and/or selected, and resources are allocated across business to undertake these

Exhibit 5: Portfolio Management Characteristics -- Formality and Decision Style



* Significant differences between Top and Poor Performers at the 0.05 level.

Exhibit 6: Portfolio Management Characteristics -- Level in Corporation & Years in Use



projects. In effect, the project portfolio model becomes part of (or supersedes) the corporate planning and resource allocation method.

A significant number of businesses do both: that is, they operate portfolio management within the Business Unit; and they also have a centralized or corporate portfolio management method (44.7 percent of respondents).

How Long the Portfolio Management Method Has Been In Place

In spite of its importance, ironically, most businesses are *quite new to portfolio management* in development. About half the businesses have been using their current method of portfolio management for two years or less; and only a small minority (13.1 percent) have used their current portfolio method for five years or more (see Exhibit 6):

The top 20 percent have the edge when it comes to longevity of the portfolio method. A total of 69.2 percent of top performers have used their method for more than two years, compared to only 40.0 percent of the poor performers (recall that about half of the businesses have used their current method for two years or more).

Specific Portfolio Methods Employed

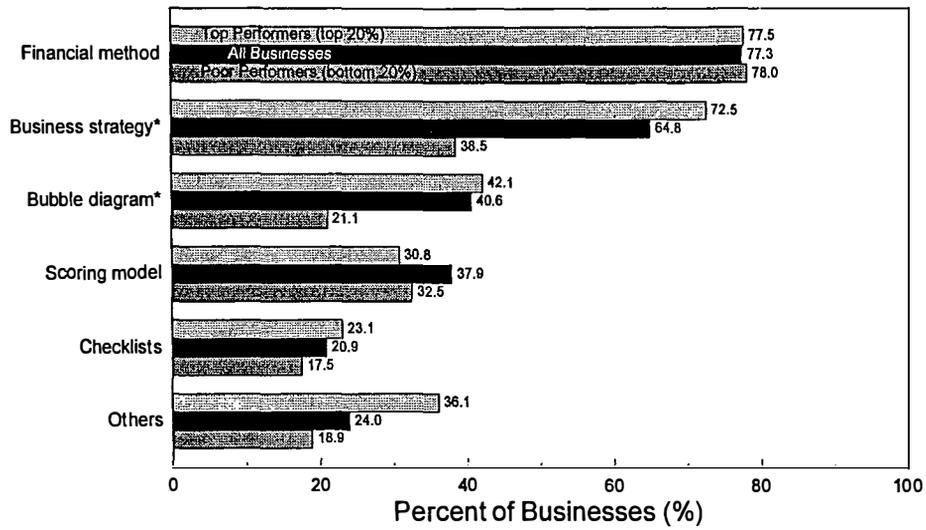
Which are the most popular portfolio methods in use? And which portfolio methods dominate the portfolio decision process? Here, we explore the frequency of use of the various methods, and whether or not each method is the dominant decision tool. Note however, that just because a method proves popular is *not a reason* for assuming it is the *correct method* or even yields better performance. As we see later, quite the reverse is true: the most popular method yields the worst results!

Popularity of Methods Used

Financial methods dominate portfolio management and project selection approaches. Financial methods include various profitability and return metrics, such as NPV, RONA, ROI or payback period. A total of 77.3 percent of businesses use such an approach in portfolio management and project selection — see Exhibit 7. Most often, a financial method is used to rank projects against each other. That is, the project's expected financial results or *economic value* is determined, and that value is used to rank order projects against each other in order to decide the portfolio of projects (38.1 percent of all businesses employ this ranking approach). A slightly less popular method is the use of a financial measure compared against a hurdle rate in order to make Go/Kill decisions on individual projects (which, in turn, determines the list of active projects, hence the portfolio; 28.4 percent of businesses). Some businesses do both: the project's financial value is used to rank projects against each other, and also is compared to a hurdle to make Go/Kill decisions (10.2 percent of businesses).

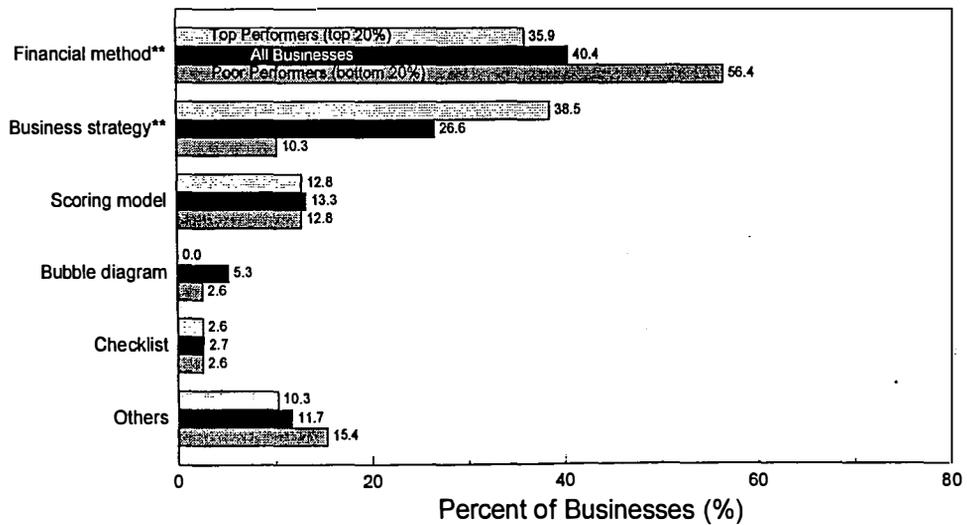
Many businesses use multiple methods, so that the percentages in Exhibit 7 add up to well over 100 percent. Thus we queried respondents about which method is the *dominant one* — the method that dominates the decision process. Exhibit 8 shows the breakdown of dominant methods used (adds to

Exhibit 7: Popularity of Portfolio Methods Employed



Significant differences between Top and Poor Performers at the 0.05 level.

Exhibit 8: Dominant Portfolio Method Employed



Note: Dominant methods employed adds to 100%.

**Significant differences between Top and Poor Performers at the 0.001 level.

Exhibit 9: Popular Bubble Diagram Plots

Rank	Type of Chart	Axis		Axis	%
1	Risk Vs. Reward	Reward: NPV, IRR, benefits after years of launch; market value	BY	Probability of success (technical, commercial)	44.4
2	Newness	Technical newness	BY	Market Newness	11.1
3	Ease Vs. Attractiveness	Technical feasibility	BY	Market attractiveness (growth potential, consumer appeal, general, attractiveness, life cycle)	11.1
4	Strengths Vs. Attractiveness	Competitive position (strengths)	BY	Attractiveness (market growth, technical maturity, years to implementation)	11.1
5	Cost Vs. Timing	Cost to implement	BY	Time to impact	9.7
6	Strategic Vs. Benefit	Strategic focus or fit	BY	Business intent, NPV, financial fit, attractiveness	8.9
7	Cost Vs. Benefit	Cumulative reward	By	Cumulative development costs	5.6

Rank ordered, in descending order of popularity; last column shows percentage breakdown of bubble diagram usage (as a percent of businesses using bubble diagrams).

100 percent). Once again, financial methods prove the most popular, with 40.4 percent of businesses citing this as their dominant portfolio management and project selection method.

Other methods are also popular, and in descending frequency of use, include (see Exhibits 7 and 8):

- ▶ The *business's strategy* as the basis for allocating money across different types of projects: for instance, having decided the business's strategy, money is allocated across different types of projects and into different envelopes or buckets. Projects are then ranked or rated within buckets (4,6). A total of 64.8 percent of businesses use this approach; for 26.6 percent of businesses, this is the dominant method. The dimensions of these buckets vary greatly by business, but the most popular splits or buckets, according to the study, are:
 - by market;
 - by development type (maintenance, exploratory, systems, frontier research, line extensions, and so on);
 - by product line;
 - by project magnitude (major or minor);
 - by technology area;
 - by technology platform types;
 - by area of strategic thrust; and
 - by competitive need.
- ▶ *Bubble diagrams or portfolio maps*: here, projects are plotted on an X-Y plot, much like bubbles or balloons. Projects are categorized according to the zone or quadrant they are in (e.g., pearls, oysters, white elephants, and bread-and-butter projects) (1,4,5). A total of 40.6 percent of businesses use portfolio maps; only 8.3 percent of businesses use this as their dominant method.

Myriad bubble diagram plots are possible; thus Exhibit 9 shows the more popular plots identified in the current study, with the common risk/reward plots at the top of the list, and by a considerable margin. In order of frequency of use, common bubble diagram plots include:

- risk versus reward (e.g. NPV versus probability of success);
 - newness (technical newness versus market newness);
 - ease of execution/implementation versus project attractiveness;
 - business strengths versus project attractiveness;
 - project cost versus time to market;
 - strategic fit/importance versus project benefit to company; and
 - project cost versus benefit to company.
- ▶ *Scoring models*: here, projects are rated or scored on a number of criteria (for example, low-medium-high; or 1-5 or 0-10 scales). The ratings on each scale are then added to yield a Total or Project Score, which becomes the criterion used to make project selection and/or ranking decisions. A total of 37.9 percent of businesses use scoring models; in 18.3 percent, this is the dominant decision method.
 - ▶ *Check lists*: projects are evaluated on a set of Yes/No questions. Each project must achieve either all Yes answers, or a certain number of Yes answers to proceed. The number of Yes's is used to make Go/Kill and/or prioritization (ranking) decisions. Only 17.5 percent of businesses use check

lists; and in only 2.7 percent is this the dominant method.

- ▶ *Others:* Twenty-four percent of businesses indicate that they use some “other method”— other than the ones described above. A closer scrutiny of these “other” methods reveals that most are variants or hybrids of the above models and methods, for example:
 - Many respondents describe a strategically driven process, much like the strategic method outlined above.
 - A number use multiple criteria — profitability, strategic, customer appeal — but not necessarily in a formal scoring model format.
 - Some businesses use probabilities of commercial and technical success, either multiplied together, or multiplied by various financial numbers (EBIT, NPV) — a variant of the financial methods above.

Use of Specific Methods by the Top 20 Percent

Businesses whose portfolios perform the best have decided preferences for which portfolio model or method dominates their decision process (see Exhibit 8).

- ▶ Top performing businesses *rely much less on financial models* and methods as the dominant portfolio tool than does the average business. By contrast, poor performers place much more emphasis on financial tools. For example, only 35.9 percent of the top 20 percent rely on financial models as their dominant method, whereas 56.4 percent of poor performers use this as their dominant portfolio method.
- ▶ The top 20 percent let the business strategy allocate resources and decide the portfolio much more so than do poor performers. Only 10.3 percent of poor performers use the business’s strategy as the dominant method, compared to 38.5 percent of the top 20 percent. Indeed, business strategy methods are *the number one method for the top 20 percent of businesses*, used even more than popular financial approaches as the dominant decision tool here — see Exhibit 8.

The use of other methods — scoring models, check lists, bubble diagrams — as the dominant approach is too infrequent to allow meaningful comparison of top and poor performers (Exhibit 8). Similarly, whether or not various methods — financial, scoring models, etc — *are used at all* does not correlate with performance, simply because there is such overlap of methods used; the typical business uses 2.4 different portfolio methods or tools (Exhibit 7), hence it is difficult to correlate mere usage with performance.

Strengths and Weaknesses of Specific Portfolio Methods

What are the strengths and weaknesses of each of the popular portfolio methods used? Note that managements *are not particularly satisfied with their portfolio approaches* across a broad array of satisfaction measures (Exhibit 3), while portfolio methods used generally achieve *only moderate-to-mediocre performance results* (Exhibit 1). Here, we look again at the satisfaction and performance scores, but this time for each specific portfolio method. In so doing, the strengths and weaknesses of each method are pinpointed.

Only four portfolio models are the dominant method in enough businesses so that conclusions about key strengths and weaknesses can be made about each. These are: strategic approaches, financial methods, scoring models and bubble diagrams.

Strategic Approaches

Overall, portfolio management based on strategic approaches fares well overall in terms of most performance metrics and many of the satisfaction measures⁶ (see Exhibits 10 and 11):

1. Strategic approaches yield a portfolio of projects that is *aligned with the business's strategic direction* — not surprisingly, the number 1 method here (tied with bubble diagrams).
2. The resulting portfolio of projects contains *excellent value projects* — the number 2 method here; only scoring models do better.
3. The resulting spending breakdown of projects in the portfolio reflects the business's strategic priorities — the best method here.

Thus, strategic approaches, not surprisingly, have particular strengths in the areas of strategic alignment and strategic priorities, but also yield a portfolio of excellent value projects.

Additionally, strategic approaches are viewed positively in terms of the following:

4. They fit management's style of decision making — the number 1 method here, along with scoring models.
5. The method is well understood by senior management — number 1 here;
6. It is a very realistic method and captures many facets of the decision situation — the number 2 method here, next to bubble diagrams;
7. The method is user friendly and easy to use — the number 2 method, again second to bubble diagrams.

Additionally strategic approaches are thought to be about average in terms of both effective and efficient decision methods for portfolio management, yielding the right decisions, and in a time efficient manner.

The only weakness of strategic approaches are that the method is not really used to make Go/Kill decisions on projects (although all methods suffer here as well; but strategic approaches fare worse than average); and the method does not yield the best balance of projects in the portfolio (again all methods suffer here).

Financial Methods

Financial methods, in spite of their popularity, are rated as having *many more weaknesses than strengths*:

1. Financial methods fail to match the right number of projects in the portfolio for the resources available — all methods are weak here, but financial methods yield the worst results.
2. They fail to yield a properly balanced portfolio — balance between high risk and low risk between long and short term; etc. Financial methods are the weakest of all methods here,

⁶ Some of these differences in performances and satisfaction are statistically significant; others are not (see Exhibits 10 and 11), but nonetheless show definite trends and tendencies.

Exhibit 10: Strengths/Weaknesses for Each Portfolio Method
(based on Performance metrics)

Performance Metric	Financial Methods	Strategic Methods	Scoring Model	Bubble Diagrams	Signif Diff. between methods (ANOVA)	Methods that are better (Duncan)
Projects are aligned with business's objectives	3.76 ✗	4.08	3.95	4.11 ★	NS	-
Portfolio contains very high value projects	3.37 ✗	3.77	3.82 ★	3.70	.05	Scoring & Strategic > Financial
Spending reflects the business's strategy	3.50	3.72 ★	3.59	3.00 ✗	NS	-
Projects are done on time – no gridlock	2.79 ✗	3.22 ★	3.13	2.90	0.10	Strategic > Financial
Portfolio has good balance of projects	2.80 ✗	3.08	3.20 ★	3.20 ★	NS	-
Portfolio has right number of projects	2.50	2.93 ★	2.70	2.25	NS	Strategic > Financial

★ = Best method on each performance criterion
 ✗ = Worst method on each criterion.

Ratings are 1-5 mean scores for each method, when used as dominant portfolio method. Here 1=Poor and 5=Excellent

Exhibit 11: Strengths/Weaknesses for Project Selection Methods
(based on Satisfaction metrics)

Performance Metric	Financial Methods	Strategic Methods	Scoring Model	Bubble Diagrams
Method truly used to make Go/Kill decisions	2.87 ✗	2.87 ✗	2.95	3.00 ★
Fits management style	3.52	3.72	3.73	3.40 ✗
Understood by management	2.83 ✗	3.25 ★	3.13	3.00
User friendly easy to use	3.10	3.14	3.04 ✗	3.40 ★
Realistic method	3.06 ✗	3.16	3.13	3.30 ★
Perceived as efficient	3.09	3.23	3.47 ★	2.90 ✗
Perceived as effective	3.08 ✗	3.29	3.47 ★	3.70 ★
Method rated as excellent	2.91 ✗	3.06	3.04	3.20
Business would recommend method	2.80 ✗	3.06	2.82	3.50 ★

producing the most unbalanced portfolios.

3. They fail to deal with the portfolio gridlock issue (many projects are late to market) — again the weakest of all methods.
4. Financial methods and their results are not totally understood by management — the weakest of all methods.
5. They are not really used to make Go/Kill decisions (although all methods are weak here).
6. They are not particularly realistic methods, failing to capture key elements of the situation and decision — again, the worst of all methods.
7. Financial methods are not effective decision tools: that is, they yield the wrong decisions, the worst of all methods here.
8. Finally, they are not particularly time efficient — the second worst, with bubble diagrams faring worst.

No particular distinctive strengths are evident for financial methods.

Scoring Models

Scoring models, although used by a minority of businesses as their dominant portfolio method, appear to have *a number of redeeming features*, particularly with respect to selecting high value projects and suiting management's decision-making style. Surprisingly, scoring models also fare well in strategic terms:

1. Scoring models yield portfolios that are aligned with the business's strategic direction — a strong rating, and number 3 here, very close behind strategic methods and bubble diagrams.
2. They yield portfolios with *high value projects* — the best of any method.
3. They fit management's decision-making style — the best of all methods.
4. They also yield a portfolio whose spending breakdown reflects the business's strategic priorities — number 2 next to strategic methods.
5. Scoring models are time efficient — number 1 here.
6. They are also effective, yielding the right decisions — number 2 here, next to bubble diagrams.
7. Scoring models result in well-balanced portfolios (tied with bubble diagrams for number 1).
8. Of all the methods, scoring models are the most used for truly making Go/Kill decisions, but recall that all methods are deficient here.

Scoring models tend to be weaker in terms of user-friendliness (not as easy to use as some methods are), and also when it comes to having the right number of projects in the portfolio for the resources available.

Bubble Diagrams

Bubble diagrams see less frequent use as the dominant method, and therefore the strengths/weaknesses accorded them are based on a much more limited sample size. Particular strengths are:

1. Bubble diagrams are the best method for yielding a portfolio of projects aligned with the business's strategic direction (tied with strategic methods).
2. They are effective models, yielding the right decisions — the number 1 method here.

3. Bubble diagrams are user friendly and easy to use — number 1 of all methods.
4. They are a realistic method, capturing many facets of the decision situation — number 1 here as well.
5. Bubble diagrams also yield a high value portfolio of projects (second to scoring models here).

Bubble diagrams do have a few weaknesses, however:

1. Bubble diagrams do not deal well with the issue of number of projects in the portfolio for the resources available (they yield too many projects, tied for worst method here).
2. They are not particularly time efficient models, and are rated the most laborious of all methods.
3. Bubble diagrams are weakest when it comes to yielding a portfolio whose spending breakdown reflects the strategic priorities of the business.

Specific Project Selection Criteria Employed

The specific selection criteria used to select projects were also investigated. Exhibit 12 reveals the proportion of businesses using different criteria for selecting and prioritizing projects against each other. Note that because multiple criteria are used, these percentages add up to well over 100 percent.

Not surprisingly, the top two criteria parallel the portfolio methods used, noted in Exhibits 7 and 8. They are:

- strategic fit and ability to leverage core competencies; and
- pay-off (financial and reward).

Approximately ninety percent businesses use each criterion to select and compare projects, with the strategic criterion used slightly more often (see Exhibit 12). Other vital criteria, although used somewhat less frequently, include:

- project risk and probability of success;
- timing; and
- technological capability of the business to undertake the project.

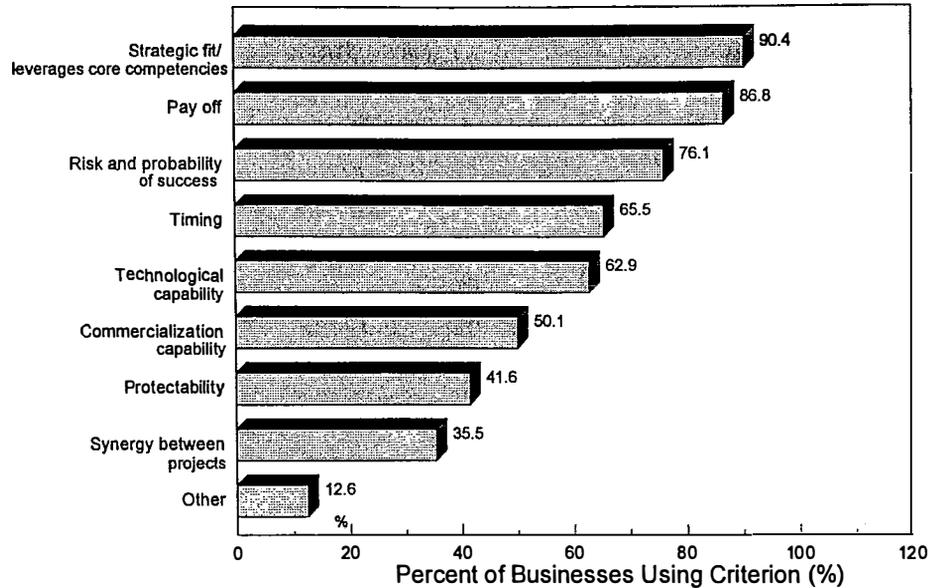
Commercialization capability, protectability of the venture (e.g., ability to achieve sustainable competitive advantage via patents or proprietary knowledge) and synergy between projects are relied on much less so as important selection and prioritization criteria (see Exhibit 12).

Note that most businesses use multiple criteria for project selection and prioritization. For example, the percentages in Exhibit 12 add to 523 percent, the conclusion being that the average business uses about 5.2 criteria each to select projects. This result is reassuring, because much anecdotal evidence suggests that some firms are too quick to rely on a single criterion — namely financial — to select projects, and in so doing, are making naive selection decisions. Moreover, using *more criteria* seems to be connected to better performers: the top performers on average rely on 6.2 criteria for project selection, whereas the poor performers use only 4.4 criteria on average.

Selecting Projects in Rounds

A hierarchical approach to project selection is proposed as one method of using selection and ranking criteria for project selection. A hierarchical approach uses rounds where projects are rated

Exhibit 12: Criteria Used to Rank Projects Against Each Other



Percentages add to more than 100% due to multiple mentions.

Exhibit 13: Selection Criteria in 1st and 2nd Round Trade-offs Percentage of Businesses Citing

Criteria	Important in First Round	Important in Second Round
Strategic fit/ leverages core competencies	78.3%	22.2% [8]
Pay-off	69.5%	36.9% [5]
Risk & probability of success	54.7%	39.4% [4]
Technological capability	48.3%	31.0% [6]
Timing	34.0%	42.9% [1]
Commercialization capability	33.5%	40.9% [2]
Synergy between projects	15.3%	26.6% [7]
Protectability	14.2%	39.9% [3]
Other	40.3%	-

First round criteria are rank-ordered (by usage).
Second round rankings are shown in parenthesis.

and ranked, and the best are selected. The first round may use several criteria, such as “strategic fit” and “pay-off”, and weeds out the poorer projects; the second round uses other criteria, such as “timing” and “risk/probability of success” and narrows down the field of projects. The result after several rounds is a short list of the top-ranked projects. The method is a familiar one, and likely captures what many people do, whether intuitively or formally, when selecting projects. The method is similar to a scoring model in that a list of criteria is used; but instead of weights to give certain criteria more importance (as in scoring models), rounds are used, with the more important criteria applied in the earlier rounds. The use of Must Meet criteria followed by Should Meet criteria is an example (4, 7).

The specific criteria used in each selection round are shown in Exhibit 13. Not surprisingly, the same list of criteria, with approximately the same rank-order, appears (compare Exhibits 13 with 12). For the first round decision, the two most important criteria are once again:

- strategic fit and ability to leverage core competencies; and
- pay-off (financial and reward).

And the rest of the first round criteria are much as they are in Exhibit 12: risk, technological capability and timing. Once again, note that most businesses uses multiple criteria for the first round, with the average business relying on 3.9 criteria each.

What is interesting is to observe the *second round criteria*: that is, given that the project meets the pay-off or strategic fit criteria, what separates the “good projects” from the “poor” in the next round? The most important is timing, followed by commercialization capability and protectability (see Exhibit 13). The distribution of responses for round two is much more diverse than round one, however, with the top three criteria mentioned only somewhat more frequently than the next three (risk and probability of success; pay-off; and technological capability).

The Path Forward

This article provides insights into how businesses manage their R&D and new product portfolios, what the top performers do differently, and the lessons that companies can put into practice in order to achieve more effective portfolio management. Six metrics are defined to capture effective portfolio management; based on these metrics, the top 20% businesses are defined, and become the basis for comparison.

A great variety of different portfolio methods are used, with most businesses relying on multiple approaches. Most popular are: financial methods; strategic approaches (whereby funds are allocated into strategic buckets; and strategy drives the selection of projects); bubble diagrams; and scoring models.

The top 20% of businesses rely far less on financial methods for portfolio management and project selection. Instead, the top 20% prefer strategic approaches while poor performers place much more emphasize on financial tools in portfolio management.

Less than half of businesses have an explicit portfolio management method, where the rules and procedures are spelled out, which handles all projects, and that is consistently used. The top 20%,

by contrast, have an explicit and established portfolio method, with management buy-in and support, clear rules and procedures, treating all projects as a portfolio, and consistently applied across all appropriate projects.

Overall, portfolio management is considered a very important topic by the businesses leadership team. In particular, the senior technology manager, senior management (e.g., the business unit's general manager) and corporate executives all perceive portfolio management to be critically important. Interestingly, Marketing/Sales management and Operations Management see portfolio management as less important. The top 20% rate portfolio management as much more important than do poorer performers.

Strengths, weaknesses and businesses' satisfaction levels with the different portfolio methods, are assessed. Generally, strategic approaches and scoring models fare the best. By contrast, financial methods have little to commend them. They suffer a multitude of weaknesses, yet ironically are the most popular of all methods, both overall and as the most dominant method.

The overall conclusion is that none of the portfolio methods have a monopoly on the list of strengths; and some, including the most popular and the most hyped methods, definitely have their weaknesses. This conclusion strongly suggests that *no one method provides the universal solution*, and points to the need for a *hybrid or combined approach* — using several portfolio methods concurrently — as the preferred solution (4). Additionally, one might wish to de-emphasize the use of financial methods as the single or dominant approach.

Overcoming the challenge of developing an effective portfolio approach is no small task. Our investigation points to several fundamental truths. There are no magic solutions. A number of companies, however, are developing, implementing and achieving better results from their portfolio management approach. As this study has indicated, the best businesses, in terms of portfolio performance, are indeed doing many things differently than the poorer performing organizations, and serve as a model to your business.

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