Title: Critical Success Factors and Strategies for New Product Development Analysis

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Numerous studies into new product success and failure, together with case studies and publications and books, have suggested myriad factors that ought to drive new product development performance. From-these, five key factors seem to be essential [1][2]:

A. **Process**: the firm 's new product development process and the specific activities within this process. Processes that promote a strong market orientation, undertaking the marketing tasks in a quality fashion, doing the predevelopment activities well, and having sharp, early product definition, are purported to yield positive outcomes.
B. **Organization**: the way projects are organized. The use of a cross-functional team, interfaces between departments, and an empowered leader yield much better results than a functionally based new product development effort.
C. **Strategy**: the firm 's total new product strategy. Having an explicit new product strategy,-- which defines the role and goals of new product development in the company's overall strategy, specifies product/market arenas as areas to focus on, and formalizes the necessary organizational structures for implementation--results in more positive performance.
D. **Culture**: the firm's internal culture and climate for innovation. Facets of a positive climate include: encouraging intrapreneurship; providing support (rewards, risk, tolerance, autonomy, and acceptance of failures without punishment); fostering the submission of new product ideas; and providing free time and resources to undertake creative activities.
E. **Commitment**: senior management involvement with and commitment to new product development. Success factors here include: senior management commitment to risktaking; clear messages from senior management about the importance of new product development; and availability of funds and resources for product development.

I - Factors that drive New Product Development Success

1.1 - A high-quality new product process [1][2]

Here are the six ingredients when considered together, add up to a quality process and positive performance.

- Instead of leaping into the development process with all of the pressure of time and budget , it is necessary to take some unstructured time up front to understand the problem, to let the core team gel, to explore and trade off the alternatives, and to fully identify the elements of risk and find ways to reduce them:

  Many projects move from the idea stage right into development with little or no assessment.

  Preliminary market assessment: a preliminary and quick assessment of the market potential, need level, and customer requirements, must be done very early in the project.

  Preliminary technical assessment: a parallel activity to identify the technical possibilities and risks is also essential.

  Detailed market studies: user needs and wants studies, competitive analysis, and concept testing. Successful companies such as Sun Microsystems use a systematic competitive analysis.

Detailed technical assessment: determination of the probable technical route, risks, patent position, manufacturability, costs and capital requirements, timing and resources required.

Financial and business analysis: based on the above actions, a profitability analysis (a discounted cash flow with sensitivity analysis) and the business rationale for moving ahead with the project.

- A sharp and early product definition is necessary before development work begins. Failure to define the product --its target market; the concept, benefits and positioning; and its requirements, features and specifications--before development begins is a major cause of both new product development failure and serious delays in the development cycle. Some companies, such as Hewlett-Packard, place major emphasis in their Phase Review Process on getting the product definition pinned down before a formal development project is approved.
- There are tough Go/Kill decision points in the process, where projects really do get killed. Projects tend to take on a life. In many companies, projects move far into development without serious scrutiny. And it is only as the project approaches commercialization that the hard truths is discovered: the market is not quite as large as expected, or manufacturing costs are higher than anticipated, and so on. The lack of tough Go/Kill decision points mean too many product failures, resources wasted on the wrong projects, and a lack of focus. The result is too many marginal projects in the pipeline, while the truly meritorious projects are starved. For example, in Rohm & Haas's WIN process, there are five gates, where senior management reviews the deliverables, evaluates the project against pre-set criteria, and approves the action plan and resources for the next stage. The decision process is timely and efficient, and ensures that poor projects are weeded out before excessive spending occurs.
- There is a focus on quality of execution, in which project activities are carried out in a quality fashion. Top-performing firms work at improving quality of execution of key tasks and activities throughout the process, from idea generation right through to launch. Some companies, such as ECC in Atlanta (the world's major producer of clay) have re-engineered their product development processes in order to achieve quality of execution improvements. By specifying the key deliverables at each gate or decision point, and by conducting a thorough review at the gate, (where the quality of work done in the previous stage or phase is rigorously scrutinized), the quality of work is significantly improved. Project teams and leaders know what rigor is expected of them, and hence set their own quality or action standards higher.
- The new process is complete or through; every needed activity is carried out, with no hasty corner-cutting. Many companies discover that not only is the quality of work lacking, but in some cases, the work is lacking altogether. That is, key tasks, such as market analysis, business assessment, and customer research, are simply not done (or left until far too late in the process). This deficiency causes some companies to redesign their processes, building in these tasks at the appropriate point in the process. In North Telecom's process, deliverables are defined a priori for each decision-point or gate review; these deliverables specify what is required at a given point in the project, and hence determine what work or tasks must be undertaken within a given stage.
- The new product process is flexible; stages and decision points can be skipped or combined, as dictated by the nature and risk of the project. One pitfall some firms encounter when they do re-engineer their product development process is the failure to build in flexibility. Instead of being a template or roadmap, the "formal process" becomes a straightjacket beset with

bureaucracy. By contrast, companies such as Procter & Gamble specify in their new product process that flexibility is key, that certain steps and activities can be omitted, and that the beginnings and ends of succeeding phases overlapped "provided that we understand the risks involved and have agreed at the previous decision checkpoint" [4]. A high-quality new product process clearly pays off.

1.2 - **A defined new product strategy for the business unit.**

Here are the four main ingredients of a positive new product strategy, which when taken together, add up to positive performance:

There are **goals or objectives** for the business 's total new product effort (e.g., what sales, profits etc. the new products development will contribute to the business). How many businesses lack defined, clear and written goals for their total new product development effort. And the lack of this rather basic ingredient of strategy had negative consequences for the business. However, leading firms, such as 3M, make new product goals such as "30 percent of our division's sales will come from new products introduced over the next three years" an explicit part of every division's business goals. Other commonly cited goals, besides percentage of sales, are "dollar sales to be generated from new products"; "percentage of profits"; and "numbers of major and minor launches per year."

The role of new products in achieving business goals is clearly **communicated to all.** The reason for having goals is that everyone involved in new products development can have a common purpose something to work toward. Often, the people who worked on new product projects were not aware of their business's new product objectives, or the role that new products played in the total business objectives. The message is this: do what 3M does. Set goals for the new product effort (e.g., percentage of sales, profit or growth over the next X years), and make them clear to everyone involved.

There are **clearly defined areas** of strategic focus-- strategic arenas--to give direction to the business 's total new product effort. The new product strategy specifies "the arenas where the company will play the game," or perhaps more important, where they won't play . . . what is in bounds and out of bounds. These arenas are often defined in terms of the types of products, markets or technologies the business unit would focus on. With arenas undefined, the search for specific new product ideas or opportunities is unfocused; over time, the portfolio of new product projects is likely to contain a lot of unrelated projects, in many different markets, technologies or product types.

The business 's new product effort has a **long-term thrust and focus**, including some longer-term projects (as opposed to short-term, incremental projects). The short time horizon of firms is a criticism widely voiced. A sound new product strategy lies at the heart of a business's new product effort. Those businesses that lack goals for their total new product efforts—where arenas or areas of strategic thrust had not been defined, where the strategy and projects were short-term in nature, and where the strategy was not well communicated-- are at a decided performance disadvantage on both performance dimensions.

Measurement tools must be developed in order to conduct design reviews at critical milestones and conduct progress reviews when the businesses need information.

1.3. - **Adequate resources of people and money.**

Topperforming firms have in place the needed resources to undertake new products; that is, senior management makes the necessary resource commitment, and keeps it. All functions of the business should be involved (early) in the new product development process. Three main ingredients lead to resource adequacy and, in turn, positive performance for the business:

The necessary resources are devoted by senior management to achieve the firm's new product objectives. In an effort to overcome weak new product performance, some management undertake a re-engineering or strategic planning exercise. The problem is that the resulting strategy, goals or processes are not backed up with the needed resources. Sometimes there simply are not the necessary people in place, nor the time available to do a quality job. The result are that corners are cut, activities are done in haste, tasks are left out—and the results are predictable. The point is: for positive results, the resource commitment must be aligned with the business 's new product objectives and processes.

R&D budgets are adequate to achieve the stated objectives. This is just another facet of the resource question.

The necessary people are in place, and release time is given for specific new product projects. Projects are approved, and people are assigned to them. Often the assigned people are expected to work on another six projects, or in the case of marketing and manufacturing people, to do "their real job" in addition to the new product project. Some enlightened firms, however, are taking steps to overcome this deficiency. At Alcoa's Knoxville packaging division when a project's action plan is approved at each gate review, the plan spells out resource commitments, people and their time allocation. Assignments of personnel to specific projects are made realistically, and in full awareness of their other duties and obligations. Having a solid new product process is only part of the answer. So too is having an enunciated new product strategy. Unless the process and the strategy are properly resourced with people, time and money, and the commitments kept, it is not worth expecting stellar performance.

1.4. - **Innovative climate and culture.**

In the organizational structure, a priority should be given to product over function. This behavior provides essential structural support to team-based development, by asserting that organizations must be build primarily around the product being developed. The climate for innovation within the firm is a success factor. Positive creative and innovative climates are ones in which:

There is a new product idea scheme within the business unit, which solicited ideas from all employees.

Technical people are given free time, scouting time or time off to work on projects of their own choice.

Resources are made available to employees so that they can informally advance their own projects or undertake creative work of their own choice. Such resources often include seed money for technical research, bootstrapping accounts to fund unapproved projects, etc.

Skunk works or teams working on unofficial projects are encouraged.

1.5. - **Cross-functional team**

This second facet of the project team. Positive performance are achieved when:

All projects have a defined need and accountable team leader a person who is responsible for advancing the project.

Project leaders are responsible for the project from beginning to end (as opposed to being responsible for only one phase of a project, or having project leadership changing hands many times during a project's life).

All projects have an assigned team of players, who work on specific projects.

Assigned players, who execute projects, are a cross-functional team--from R&D, Marketing, Manufacturing, Engineering, etc.

Businesses that consistently use cross-functional teams are rewarded.

1.6. **High-quality new product teams.**

A high quality and high performance team, in the new product development process means::

The team leader are dedicated to one project (as opposed to trying to lead many projects, or having many other assignments). Sadly, in many business units, team leaders are spread too thinly across too many projects or have too many other duties to run projects effectively. Here the concurrent as well as the matrix concepts may be misunderstood or misapplied.

The team interact and communicate well and often, with frequent project update meetings, progress reviews, and problem resolution sessions. The best teams have short but weekly meetings to ensure that the entire team is up to speed.

Decisions made by outsider groups or people (outside the team) are handled quickly and efficiently. This was usually the result of proficient team actions. For example, a good team should be able to do whatever internal marketing, communication and persuasion . This is necessary to get outsiders on board and to deliver quick, efficient decisions.

1.7. - **Management commitment.**

Businesses with greater management commitment to, and involvement in, new products boast more profitable total new product development efforts. As a design evolves, decisions are made that incrementally constrain the outcome. This is a natural consequence of the design process and not a bad thing at all. Too often, however, managers wait until late in the project to become involved, when little can be done, outside of heroic efforts, to influence the course of the design. Firms where management is involved in new products are ones in which:

Management is strongly committed to new products and product development.

Management is committed the necessary resources to achieve the firm's new product goals.

Management is closely involved in the project Go/Kill and new product spending decisions.

1.8. **Management accountability.**

Management accountability captures the degree to which new product performance are measured, and senior management is held accountable for the program results.

New product development performance is a part of senior management's personal performance objectives.

Senior management's compensation or bonus scheme is tied to the business unit's new product performance. Very few businesses employ this practice.

The performance results of the new product development program is actually measured (e.g., percentage of annual sales generated by new products; or success, fail and kill rates).

1.9. - **R&D spending.**

R&D spending for product development is one of the strongest determinant of the impact of the new product development effort. But R&D spending has no significant effect whatsoever on the other performance dimension; namely, profitability of the total new product effort. Here, the message is clear: if your performance goal is to have a high-impact new product effort--for example, to achieve a high percentage of your business unit's sales from new products development-- then increased R&D spending is the most obvious lever to pull.

II - A successful implementation of the NPD process through team based R&D

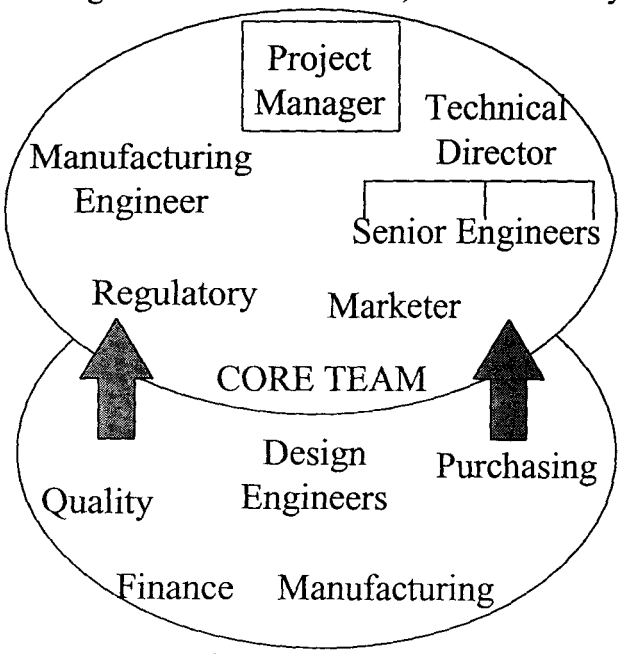
To carry out world-class, team based R&D, the nine key factors previously listed should be fully implemented:

A high-quality new product process
A defined new product strategy for the business unit
Adequate resources of people and money
Innovative climate and culture
Cross-functional team
High-quality new product teams
Management commitment
Management accountability
R&D spending

In order to fulfill these conditions management has to adopt several critical disciplines that will make team-based management successful. Here are three of them identified as keys:

- Concurrent (or simultaneous) Engineering (Figure 1 and 2.)

Who will participate and what will be accomplished? To do it right means giving project managers and their teams real, formal authority over budgets, resources and people.



- Fully empowered project managers
- No "hands-offs"
- "Conception-to-birth" core teams
- Broad team authority and responsibility

Figure 1. Complete, product-oriented, development teams [3][5]

It is important to separate the projects into discrete, manageable phases, punctuated by intense reviews, so there is no waste or add time to a project. In fact, it saves time by reducing risk and catching mistakes before they can escalate into larger problems. This is managed risk escalation.

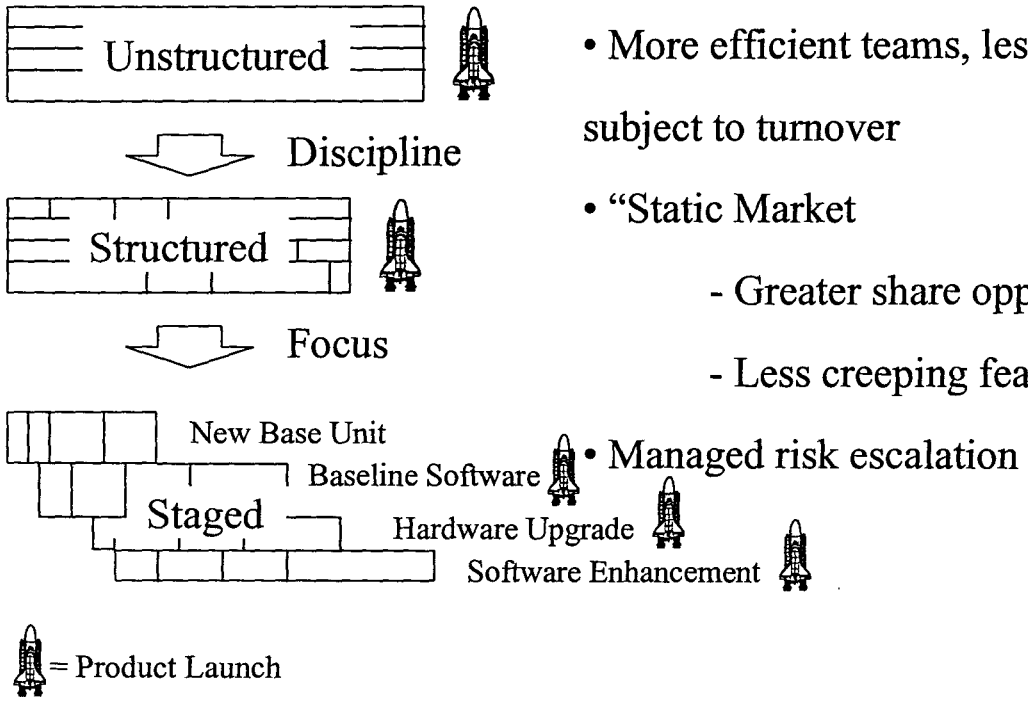


Figure 2. Achieve shorter time-to-market through phased development and project intensity.[3][7]

- Project performance tracking (figure 3.)

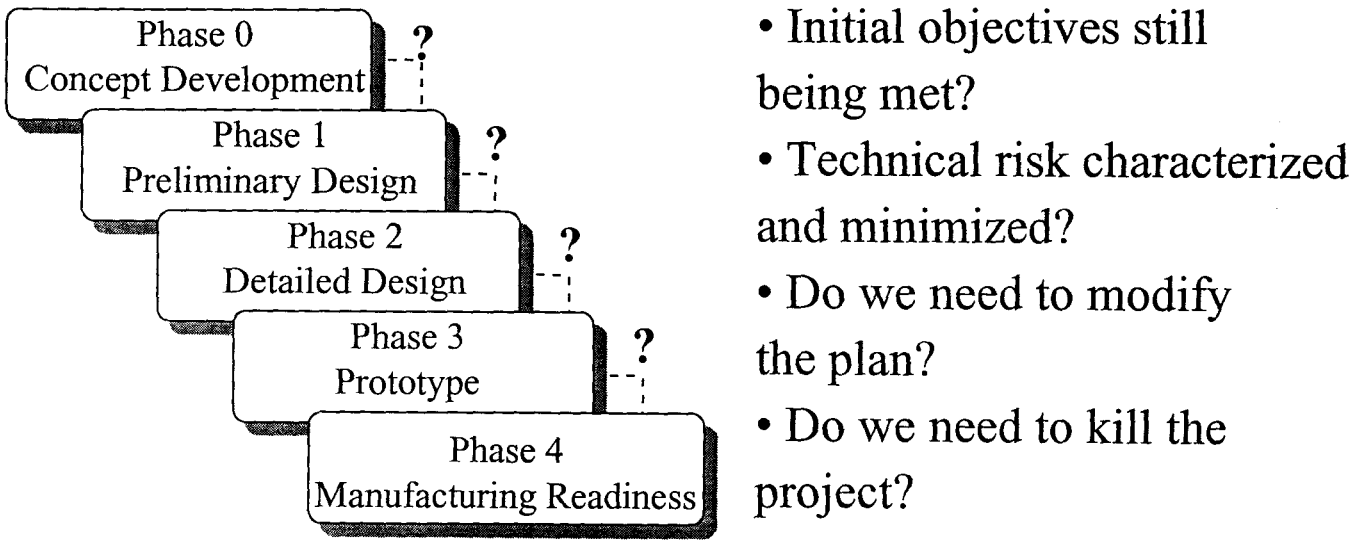


Figure 3. Conduct formal design reviews at critical milestones, and be able to answer these questions after each phase.[3][8]