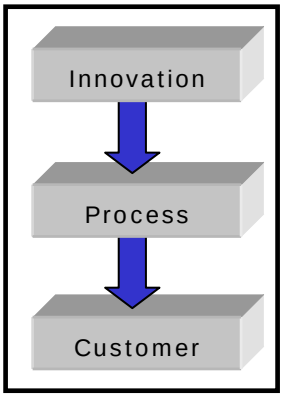
Successful Delivery of Product Innovations

Throughout history, innovative products have revolutionized the way people live and work. From the wheel to the hula-hoop to the spread-sheet to the most complex medical innovations, businesses have profited from these innovations often growing from start-ups to billion dollar corporations. And throughout, many of these innovations have become timeless icons in human memory and their markets.

INNOVATION has become a primary force in determining company growth, performance, and valuation. Unfortunately, a wide gap exists between executives' aspirations to innovate and their ability to execute. Successful innovations are not spontaneously generated. They require customers with a need (or whim), resources consisting of people, capital and intellectual property, and executives who can identify and act upon their customers' needs such that innovations lead to products and solutions that are delivered in a timely and cost effective way. How can executives promote innovation and deliver products to market that customers will buy in large quantities?

Innovation, Process, Customer



For years corporations have watched their executives succeed and often fail at this essential management mission. **Innovation**, **Process**, **Customer** is a tactical execution structure which attempts to merge creativity and process while always keeping the customer's perspective in mind. It has three goals.

1. Order is the enemy of invention, so free **innovation** from rigorous process.
2. Institute a rigorous **process** of product requirements, risk analysis, financial analysis, and resource allocation to satisfy stakeholder expectations.
3. Insure the voice of the **customer** is always heard.

Product innovation is a business. In this white paper we will use the **Innovation, Process, Customer** execution structure to discuss the activities executives must undertake to increase their odds at identifying and then successfully bringing to market new product innovations. At the end there is a brief summary of organizational actions senior executives can undertake to promote innovation within their company.

Specifically there are eight areas where executives must focus in order to succeed.

1. Always listen to the customer.
2. Hear the voices of innovation.
3. Understand each market participants' view of the company.
4. Identify innovations that have the best chance to succeed in the market.
5. Support product innovations with comprehensive market requirements that provide a road map for market delivery and insures success within the company and with customers.
6. Develop business models that summarize the projected financial impact of new product innovations. Senior executives make no lasting decisions that are not financially supported.
7. Deliver product action plans and life cycle management feed-back loops that executives can monitor throughout the product life cycle. Create a knowledge base for successor product team members.
8. Maintain a culture of innovation at the company.

And most important, executives must clearly define stakeholders' roles, and find ways to keep them actively involved in the entire product development and delivery process!

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Market Participants' View of the Company

Companies of all sizes interact with their markets every day. These markets have industry specific, application specific, geographic, demographic, complex, simple, niche or a myriad of other attributes. The market participants are the customers, competitors, suppliers, channels, trade press, and others. It is important for executives to know and describe each market where each product is sold. However, it is more important that executives know how each market participant views their company from the perspective of specific products sold in these markets. As an example, are the company and its product(s) considered an old line incumbent, a leader in price, cost or market share, an innovative #2, or maybe a new entrant? Executives need to know this information to better understand how the various market participants will individually respond to new product innovations.

Hear the Voices of Innovation

There are many voices of innovation. Customers and sales people are usually the most vocal. Channels are also a good source, particularly in geographic markets. Developers and integrators in applications specific markets often do a better job of listening to their customers. And experienced executives can often sense changes in the market. A great source of information and technology transfer for the biotech industry is at government sponsored national laboratories, and research and teaching hospitals. However, this is not exclusive to biotech as the important issues of the day are being researched in the universities and other organizations that receive federal grants for research. Issues such as energy, recycling, security, telecommunications policy, information technology, identity protection and many other areas of research can be found by executives in the various registries of research grants made by federal agencies.

As can be seen in Figure 1, it's not only important that executives hear the voices of innovation, but react to the information they hear. Sometimes the voices executives hear present opportunities for new products or more often enhancements to existing products. When smart executives are attuned to the research community, they can acquire intellectual property for future product innovations. But threat assessment is an equally and important responsibility for executives. All of these sources are continuously interacting with market participants so there is a steady stream of information to be analyzed. When threats are foreseen, the company's business strategy must be modified to counteract the potential conflict that will arise.

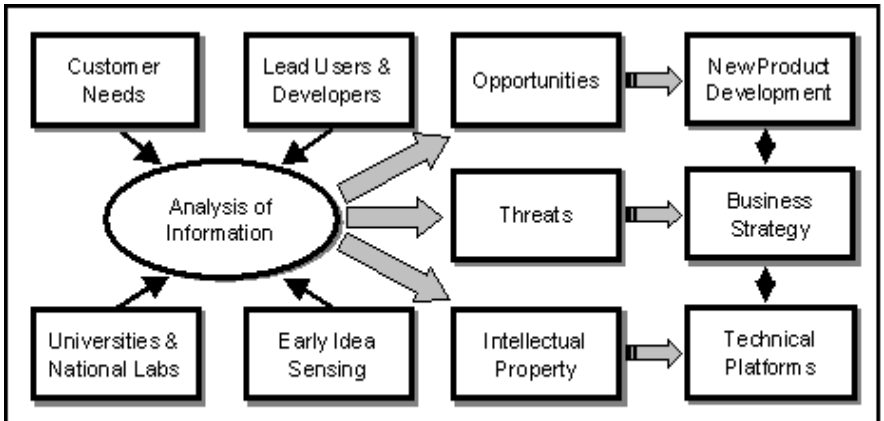

Figure 1: Hear the Voices of Innovation

Innovations that Succeed in the Market

Often the mere introduction of new product innovations into the market creates a threat. Competitors will become wary when new innovations invade their turf. Therefore, executives must develop strategies to deliver new product innovations to the market in ways that mitigate the impact of competitors.

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Disruptive vs. Sustaining Innovations

In his book, *The Innovators Dilemma*, Clayton Christensen has characterized innovations as either disruptive or sustaining. When Microsoft and Intel partnered in the mid-eighties, they created disruptive innovation that IBM, a well managed firm, could clearly see. However, IBM was paralyzed to respond. Hence IBM was denied a leadership role in the PC markets and recently exited the business after twenty years as a third rate competitor. What happened?

Up until the mid-eighties, the markets clearly viewed IBM as the dominant computer market incumbent. As an incumbent, IBM successfully produced sustaining innovations that improved the performance of their products. However six years prior to their own PC, new entrant companies like Apple and Vector Graphics began to show computer hobbyists that the price point for computer power did not have to be so expensive. By the late-eighties, IBM continued to produce sustaining innovations that "over-shot" the needs of their mainstream customers. Apple's and Vector Graphics' future PC competitors in alliance with Microsoft and Intel had clearly passed the hobbyist market, and began attracting IBM's mainstream customers who were now receiving less marginal utility from IBM mainframe product improvements. As a well managed company, IBM clearly saw the PC threat and adopted what turned out to be unsuccessful business strategies to counteract the threat.

IBM's PC failure as well as many other product successes and failures can be graphically analyzed in Figure 2. The trajectory of most incumbents' sustaining innovations are typically steeper than their customers' behaviors can change to adopt these new innovations. As a result the incumbents over-shoot their core customers' needs such that they become over-served. This creates an opportunity for new entrants' simpler or cheaper innovations to arrive from down market and pull the least demanding customers away.

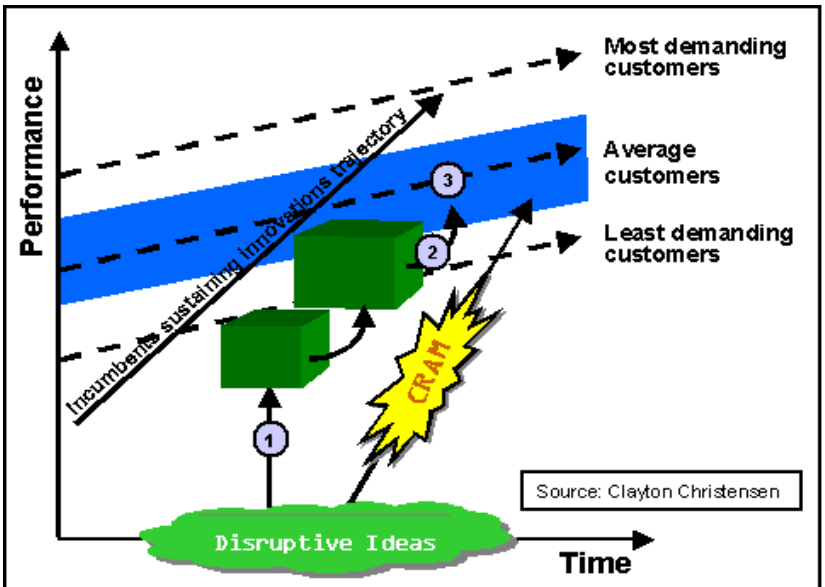

Figure 2: Disruptive vs. Sustaining Innovations

At first the incumbents do not even recognize these new entrant intrusions because the customers are so marginal. But successful down market innovations typically move up market and take more market share. The incumbent's ability to respond is based on the value networks used by the new entrant to develop and deliver its product innovation to market. A value network consists of all those value chain participants used to develop and deliver a product to market as well as the cost structure. If a new entrant uses value networks that are similar to the incumbent's, the incumbent can adopt the familiar value chain and "cram" a new solution into the market that defeats the new entrant. If as happened to IBM in the PC market, the value networks are completely different, the new entrant can not be defeated.

Potentially disruptive innovations can be identified if they meet all the following three litmus tests.

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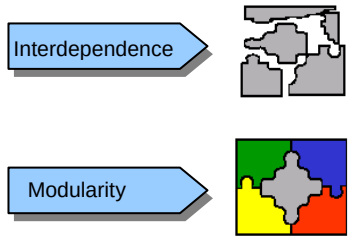
1. Does a growth opportunity exist in either a new application outside the mainstream market or a new business model targeted toward the least demanding mainstream customers?
2. Can the new innovation attract customers away from the core of the mainstream market despite its limitations relative to the incumbent's offering?
3. How will the incumbent respond? Is the option to respond either unattractive or impossible, or has the innovation developed a completely independent value network?

Interdependence & Modularity

In the early stages of a product's life cycle, its functionality is often not good enough to meet the needs of mainstream customers. Firms that strive to improve the functionality of a product almost always find it necessary to manage the entire product design and development processes, producing key components internally.

Figure 3 shows a puzzle at the top where all the pieces cannot fit together. In this early stage of a product or service's development, centralized management is typically required to coordinate design and development. Thus, a single firm that is either vertically or horizontally integrated, or both, is needed to coordinate the design of the puzzle and build *interdependent* parts. For example, in the early days of the computer industry, it was necessary for a single firm to produce all of the computer's components because of the complex interdependencies inherent in making the computer function well enough to meet mainstream customers' needs. The eventual creation of AT&T as a monolithic monopoly also illustrates how complex interdependencies are best handled by an integrated firm.

Once the functionality of the product gets good enough, and firms find that they need to compete on metrics such as speed and flexibility, the industry tends to disintegrate around "modular" interfaces. In Figure 3, the bottom puzzle pieces all fit together around defined interfaces. In this manner, individual firms can produce key pieces of the product. Figure 3 also describes the three key tests an interface must meet before it is defined as modular: its attributes must be specifiable and measurable, and the interactions between components must be robustly predictable.



- Management is the only tool that can coordinate the complex interdependencies within the product/service
- Vertically integrated firms are better suited to develop these products and services

- Pieces of product/service can be outsourced
- Specialist firms can understand and easily handle interdependencies
- Value goes to the value network "integrator"

Determining Questions of Modularity:

1. Specifiability: Can executives specify what attributes are critical to the interface between components?
2. Verifiability: Can these attributes be accurately measured?
3. Predictability: Are there no poorly understood or unpredictable interdependencies between all the components of a system across the value network?

Figure 3: Interdependence vs. Modularity

Market Change Classification Model

It is important to note that not all successful innovation is disruptive. In fact most incumbents remain successful by meeting their customers' needs through timely sustaining innovations. However, Clayton Christensen points out that over the long term, successful incumbents such as 3M and EMC eventually disrupt their sustaining innovations to remain competitive. Therefore, for executives to succeed with their product innovations there needs to be a way of classifying those innovations to best understand the implications for each competitor in each market. The Market Change Classification Model for Disruption, Discontinuity, Displacement, and Distraction is a simple way to make these comparisons.

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1. A Disruption meets all the litmus tests described above for a disruptive innovation. Another example of disruptive innovation is the Internet's impact on brick and mortar retailers. However, it's important to understand that a disruption for one incumbent may be sustaining to another, e.g. catalog retailers.
2. A Discontinuity does not meet the disruptive litmus tests, but is a radical improvement for the market to consider. It is usually led by an incumbent and targeted at mainstream customers. Typically it involves a radical change in technology and is expensive to deliver. The best example is the telecommunications network transformation from analog to digital technology through the late seventies and eighties.
3. A Displacement occurs at a point of modularity and is often led by a new entrant moving into an incumbent's market as when MCI began to offer its long distance network in competition with AT&T. Typically the competitor deploys existing technology with a new marketing plan. What the Internet did for catalog retailers is also a Displacement.
4. A Distraction is incremental sustaining innovation that occurs at a point of interdependence and is usually led by an incumbent. It provides a temporary competitive advantage and is easy to implement. The best example of a Distraction is the repackaging of a product such as Jell-O to boost sales. Another example is the continuous introduction of new rate plans used by airlines and telecommunications carriers, the most famous of which was MCI's Family and Friends plan.

Comprehensive Market Requirements

Once executives know where a new product innovation fits into each market and understand the competitors' possible responses, they must fully document the product. By doing so peer executives can evaluate the product concepts, and recommend the commitment of resources to develop and deliver the product to market. These market requirements are unique to every product introduced and to every company that introduces new products. However, this does not change the need to document the product. Successful executives will work with product development peers to get their commitment on those areas that need to be covered to fully document the new product. The following is a broad list of areas that executives will want to discuss with their peers to determine those areas of documentation required to fully describe the product and its market requirements.

1. Market Opportunity Analysis – A high level description of a product's market(s), customers, competitors, initial and long term volumes, applications, features, benefits, market window and delivery milestones or roadmap.
2. Competitive Value Networks – The product's proposed value networks vs. the competition, disruptive vs. sustaining innovation paradigm, market change classification model, competitive analysis, and a summary of incumbents' and competitors' responses.
3. Market Delivery – target market segments, collateral material and demo system requirements, public relations, branding, trademarks, and launch schedules and requirements.
4. Development and Engineering Requirements – Human interface, form factors, detailed feature requirements, patent and intellectual property issues, analysis of technology required, integration, documentation, safety and electro-magnetic interference, environmental, target cost of sales, and Mean Time Between Failure targets.
5. Manufacturing and Logistics Requirements – Delivery intervals, packaging, tooling, long lead items, inventory assumptions, quality assurance standards, special manufacturing environments, optimum location(s), in-house/out-source, manufacturing technology, and customer delivery logistics.
6. Installation and Service Requirements – Domestic and international regulatory issues, customer environment, installation preparation, project management, special manpower skills, system integration, acceptance testing, and Mean Time To Repair targets.

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7. Training Requirements – Customer, installation and service, product support, sales and sales engineering, special training environments and support systems, associated cost estimates.
8. Product Support Requirements – Company activities and processes to be developed, personnel skills, special systems, scalability resulting from growth, associated costs, delivery timescales.
9. Go to Market Strategy – Channel management and associated costs, business partner alternatives, sales systems (auto-quote, order processing, etc.), selling cycle times, target customers, decision makers and recommenders, proposal process, and preliminary sales forecasts.
10. Willingness-to-Pay – Customer financial benefits, competitive pricing, product pricing components, product pricing models, maintenance and recurring pricing models.
11. Risk Assessment – Define all possible risk scenarios and develop a mitigation plan for each. Prediction markets are a great way to identify and mitigate risk.

Quantitative Business Models

One result of documenting comprehensive market requirements is the quantitative information flow that can be used to develop business models that project a new product innovation's financial performance. Insist on this product level accounting. Senior executives will require this information to summarize projected financial impact on the company before making any decisions to fund development.

The best way to approach these business models for new entrants and incumbents alike is to treat a new product innovation as a start-up company. That means projections are developed for start-up costs, revenue drivers, revenue projections, target cost of sales, running costs, SG&A burden, capital expense, inventory costs, receivables, payables, and funding requirements throughout the product life-cycle. Summarize these projections using normal GAAP financial reporting tools; Income Statements, Balance Sheets and Cash Flows. And analyse these projections using internal rate of return and effects on market capitalization (or company valuation). This format and analysis is most familiar to senior executives, especially senior financial executives, and can be easily integrated into the company's financial reporting process. However, financial analysis is not the only method to measure new growth ideas. There are other quantitative methods to measure success that should be added to the analysis, e.g., target market share, achievement of unit sales goals, promotional requirements, and operational efficiencies.

In order to learn the true financial impact of a specific product innovation, it is necessary to keep the projected revenues and costs as separate and distinct as possible from the rest of the company financials. In this way true return on investment, discounted cash flow, and break-even analysis can be accurately calculated over the projected product life-cycle. It is also useful for executives to persuade the company's senior financial executive to dedicate a financial resource to oversee development and use of these business models. When the models and analysis are complete and they point to favorable result, the senior financial executive will already have a positive stake in the successful delivery of the innovation.

Rather than wait until the market requirements process is completed, it is best to develop and begin using these business models in parallel with the development of market requirements. That way if the preliminary business models are not measuring up to company expectations, alternative development and delivery paths can be explored. Or, based on the general consensus of the management team, the project could be delayed or aborted saving resources and capital that could be applied toward other opportunities with more attractive returns.

Product Action Plans

Once the market requirements, associated delivery plans, and financial analysis are completed to the satisfaction of all parties, including senior management, and a "go" decision is made at the appropriate

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level, a final product action plan must be approved and put into place. Although each company will more than likely have its own standards to follow regarding product action plans, the items below will serve as a guideline and may even augment the company standard.

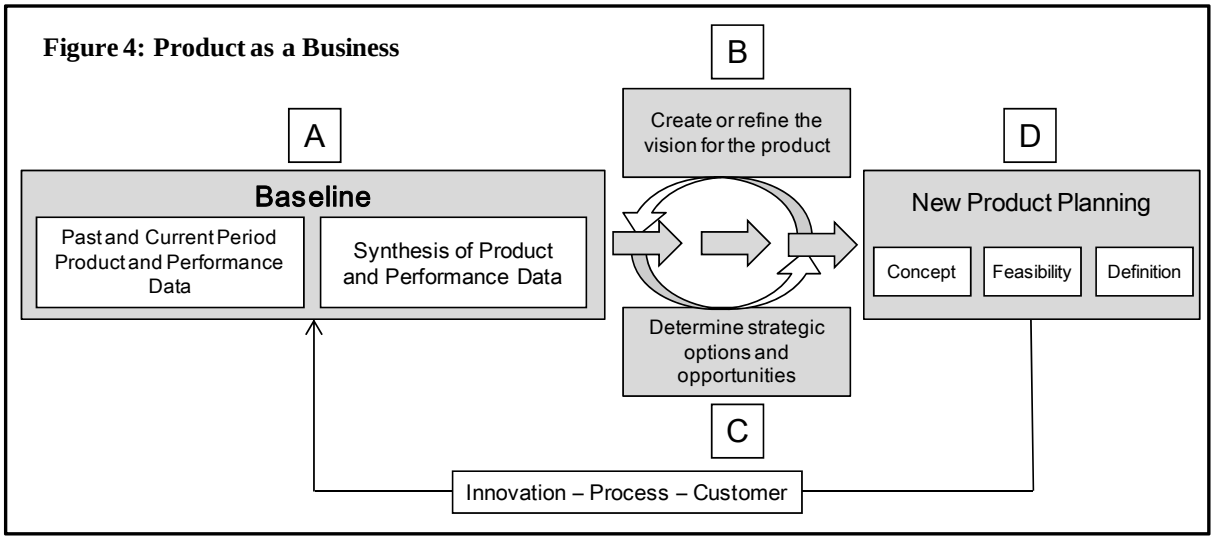
1. Appoint an interdisciplinary product team with chairman and an associated project office.
2. Approve product development and delivery budgets and sales forecasts that flow from the quantitative business models.
3. Integrate and approve associated schedules consistent with management and market delivery expectations; including (as required) product team reviews, product management, engineering, manufacturing, training and market delivery.
4. Maintain market requirements and update quantitative business models continuously.
5. Approve a "gating factors" process to mitigate market and project risks.
6. Institute a senior management review process and schedule the first review.

As product development begins, executives will want to incorporate standard project management tools into the process. These tools most effectively highlight schedule and budget exceptions, and their reports are easily read and understood by product team members and senior management alike.

Life Cycle Management

As a product or product line matures in the market, a continuing strategy is required to insure the product maintains relevance and profitability. Steve Haines of Sequent Learning Networks has proposed the use of a product master plan that carries forward the "product as a business" notion described in this white paper. The process documented in Figure 4 below is divided into four major areas to summarize the steps used and data collected to achieve three goals.

Figure 4: Product as a Business



Step A gathers a product's history of its most relevant financial, market, and business metrics, and establishes the product's direction in the market by comparing this history with the current state. A baseline for future direction is also created. Once documented, the historical data creates a product knowledge base that is passed along to successive product managers and product team members.

Step B is a re-formulation of the product vision (as required). Make sure the required resources are identified. Understand where these resources are to be focused and why that direction is best.

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Step C interacts with Step B to identify strategic options for possible future elements of the marketing mix, the desired industry and competitive postures, and other supporting business functions which need to be brought into the decision making process.

The work in Step A is detailed and often complex due to the amount of data that must be collected. However, a simple matrix (below) provides the basis from which to plan the work and organize the data. The main focal point in the matrix below is the Product/Market Element. Data is collected for each cell (plan, results and delta) and documented accordingly for the two years prior to the Current Year as well as the Current Year (to the right).

Current Year -2			Current Year -1			Product/Market Element	Current Year		
Plan	Results	Delta	Plan	Results	Delta		Plan	Results	Delta
						External Indicators			
						Industry Activity			
						Competitor Activity			
						Research and development activity			
						Customer/market segments			
						Internal Indicators			
						Company financial situation			
						Skills & capabilities			
						Retrospective Roadmap Information			
						Features			
						Models or versions			
						Dsigns or styles			
						Colors or sizes			
						Techonology used			
						Performance levels			
						Safety elements			
						Competitive positioning			
						Product Life Cycle Performance			
						Revenue			
						Gross Profit			
						Return on investment			
						Market share			
						Pricing programs			
						Promotional activity			
						Distribution channel activity			
						Product Operational Performance			
						Product quality			
						Customer satisfaction			
						Repair and return data			
						Inventory turns			

Once the data collection is complete, it must be organized for analysis. SWOT is the best analysis tool to do this. Mentioned previously, SWOT – strengths, weaknesses, opportunities, threats, provides an organized perspective of how the product is faring in the market place. It can also be shared with management in the form of a product review, which could include perspectives from Steps B and C.

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Step B involves the possible recasting of the vision for the product. If the SWOT analysis of the data collected in Step A warrants an updated product vision, this can be shared with management in the product review. Otherwise the vision is left as is.

Step C considers the future strategic options for the product. The way forward is set out in a matrix similar to Step A (below) and documents opportunities to pursue in one year or less, one to two years, and three or more years into the future.

Product/Market Element	Less Than 1 Year	1-2 Years	3 or More Years
External Market Focus			
- What industries will you focus on?			
- What product features will you compete with?			
- Which segments or customer types will you pursue?			
Internal Support			
- How much money will you need?			
- What skills will you need?			
Product Roadmap Elements			
- How will you evolve the product's functionality?			
- Which models or versions will you introduce?			
- How will designs or styles change?			
- What technologies or architectures are to be used?			
Other Marketing Mix Strategies			
- How will pricing strategies change?			
- What type of promotional strategies will be needed?			
- How will channel strategies evolve?			
Future Life-Cycle and Strategic Performance			
- What unit volumes and revenues are anticipated?			
- What market share will you obtain?			
- What quality guidelines will you follow?			
- What customer satisfaction metrics do you seek?			
- What is the accepted level of inventory turns?			

Once a product's future plans are assembled in each cell, each opportunity must be prioritized based on financial, human resource, and company-wide strategic implications. The product management team will need to make recommendations to senior management about what opportunities to pursue and why. Some recommendations will wind up in the company's annual budget (or business plan) while the others may end up as place holders, and will require further business case analysis to justify investment.

In some cases, life cycle analysis of existing products may turn up the need to develop new products as shown in Step D. In those cases the concept, feasibility, and definition of a proposed new product are fed back into the Innovation, Process, Customer model described in this white paper.

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Maintain a Culture of Innovation

To this point we have focused on a tactical execution model with an objective to identify product and service ideas, assess those ideas as possible products or services, and successfully deliver the chosen products and services to market. This is all well and good if there is a leadership team that can execute. To make matters worse, a recent McKenzie study (fall 2007) says that making top talent available for projects to meet innovation goals is the single biggest challenge for senior executives. In fact 40% of these senior executives do not even think they have the right kinds of managers for the innovation projects they need to pursue.

So how can senior executives create and maintain a culture of innovation within the leadership team that empowers managers to keep the innovation pipeline full? We all know that company-wide change programs are daunting and time consuming for everyone. Most disturbing, they often have only limited impact. The solution, skip the "Big Company Program" concept and focus on leadership role-modeling as well as formal organizational mechanisms, such as collaboration networks, to promote innovation. Here are several ways to build a more innovative culture.

1. The top executive team must embrace innovation as a team, promote it as a core part of the company's strategy, reflect on ways their own behavior reinforces (or does not reinforce) it, and decide on ways to role-model the change to successfully engage middle management.
2. Identify managers who have traits of innovation leadership within the company, coach and facilitate these skills and make these managers innovation leaders.
3. Build a culture of innovation leadership through managed experimentation and quick successes. Everyone wants to be a part of success. This laboratory approach will yield results as new topics and ideas are tried, and the most effective organizational and leadership approaches are tested. The goal is to give as many influential employees as possible a positive experience of innovation.

Innovation is a big idea with big potential. However, approach it in small steps. Most important, you will find that the initial steps in this value creating journey are the most critical of all.

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