Title: The Role that Innovation Plays in New Product Development

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Abstract: The purpose of this individual paper is to present my findings on what kind of a factor that innovativeness plays in new product development. The method used for this short study includes gathering data from industry leaders that is supported by quantitative measurement. This paper explores the establishment of trends that can be measured for cause and effect rather than merely gathering comments or opinions from industry observers.

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"The Role that Innovation Plays in New Product Development"

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Table of Contents

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Executive Summary: ***The purpose of this individual paper is to present my findings on what kind of a factor that innovativeness plays in new product development. The method used for this short study includes gathering data from industry leaders that is supported by quantitative measurement. An example is the statement of innovative approach to be first in launching a new product for the leader in an industry has resulted in a 49.1% figure of sales from products introduced in the last five years compared to only 10.7% for those firms in the bottom third of their industry. This paper explores the establishment of trends that can be measured for cause and effect rather than merely gathering comments or opinions from industry observers. The model of Technology Innovation Program, or TIP, is also proposed. It consists of the factors of innovation, foundations, eliminate mistakes, place customers first, develop a business strategy, design the actual product, and improve continuously.***

Introduction: Why have so many executives suddenly become intrigued with product innovation? Because for most firms, innovation drives their success. Also, new ideas are revolutionizing innovation by slashing its cost and time up to 90 percent.

Fascinated by this revolution led to my researching leading technological companies (makers of autos, airplanes, computers, and electronics) in the United States and abroad. Based upon this information, I have borrowed the best practices and offer a seven-step strategy to stay ahead (at the **tip**) in innovation. This strategy is called the Technology Innovation Program, or TIP. Many key words crossed my mind as I wrote this model, such as: Outflanking, Outburst, Outthink, Overmatch, Overpass, Pacemaker, People, Pioneers, Playmakers, Professionals, and Promoters to spell TOP. These certainly are keywords in this process too, and also support the thinking that to be innovative you must think and work to be on TOP of the market. However, the importance of the concept of innovation deserves to be in the name. And so TOP became

TIP. This paper explains what TIP is; why it is so effective; and how it is implemented.

Innovation: The innovation a firm achieves today defines its tomorrow. In consumer electronics, there are many examples of new product onslaught. Japanese firms successfully eliminated most of their U.S. competitors, and no U.S. firm manufactures VCRs today.

But the opposite occurred in the bicycle industry, because U.S. firms innovated, and today dominate the market. Especially with the highly popular mountain bikes, U.S. firms have pioneered new features and control two-thirds of the domestic and over half of the European markets.[1] What is the secret? Michael Sinyard, innovator of the mountain bike and head of the firm Specialized, urges his employees, "Innovate or die!"[2]

If Reebok's inflatable athletic shoe, the Pump, was regarded as a separate firm, sales of the Pump alone would make it the fourth largest athletic shoe company in the United States.[3]. Wall Street analysts say that the innovation of the Pump is what fueled Reebok's impressive turnaround.[4] Compare the situation Apple Computer confronts. Its highly novel Macintosh produced top profits for many years, but that era is gone. Now, in a strategic thrust, Apple vows to reignite itself with more innovation. Former CEO John Sculley declared, "We want to show that Apple can be as innovative in the mid-1990s as it was (with the Macintosh) in the mid-198Os.[5] In fact, decision makers at Apple were innovative enough to replace Mr. Sculley. This certainly proves that Andrew Grove (Intel CEO and author of a book titled "Only the Paranoid Survive") is right on yet another point - that either managers change themselves to deal with changes that face their company or they will be forced out. Mr. Craig Barrett, also of Intel,

is known to have walked into a room at Intel where many top managers were meeting on the topic of changing manufacturing emphasis from memory chips to microprocessor chips and remarking that many managers there would soon be gone. Research unequivically confirms that innovation is vital.[6] Table 1-1 below summarizes a study of more than a hundred technically related firms, conducted by Albert Page of the University of Illinois.[7] The top companies in an industry were strikingly more innovative than others, with far more of their sales from new products. Top to bottom, a firm's performance directly correlated to its ability to innovate. The conclusion is powerful. Firms that fall behind in innovation will lose. Firms that rapidly innovate what customers want will win.

TABLE 1-1: The Leading Firms Are More Innovative

Position of Firm in its Industry	Percent of Sales from Products Introduced in Last Five Years
Leader in industry	49.1
Top third of industry	33.8
Middle third of industry	26.9
Bottom third of industry	10.7

The most successful companies revealed that they consciously follow a strategy for innovation. This strategy ties a firm's product development to its business goals and its market. This perception can be used to formulate a comprehensive strategy for product innovation, which I have named Technological Innovation People (TIP).

It would be useful to see how TIP works and I will use two methods of product development to present my method. The best way to see how TIP works is by examining two firms with successful product development processes; 3M and the General Electric Aircraft Engines Division, which makes jet engines.

3M makes industrial, office, medical, and other products, including Post-it Notes. While many multibillion-dollar firms seek only new products with very large sales that affect the bottom line, 3M is happy with products with small sales. It follows the motto, "Make a little, sell a little." 3M knows that small sellers might grow into big ones. Post-it Notes, for example, failed their initial market test, but they are enormously successful. 3M also wants its new products to be first into a market and thereby occupy the high ground. It calls this concept FIDO - "First In, Destroy Others." In the past five years alone, 3M has launched 750 products into the market. These products were not mere extensions of existing lines but were conceptual innovations.

Since 3M accepts a low-volume product if it is profitable, it has to keep its product development costs low. Most of its new products are innovated by small teams, or even by one person with help from others. This means that anyone in the firm who comes up with a product idea can develop it - and management encourages everyone to do just this. Each worker in a technical area is allotted 15 percent of his time to tinker, to try to develop something new.

3M's management team promotes a culture of innovation, asserting that even a short conversation with a lower ranking employee can produce a new product idea. To promote innovation it proclaims an eleventh commandment: "Thou shalt not destroy a new product idea."

Understanding what customers want is vital, since an innovation is useless unless it sells. Knowing this, 3M actively promotes the flow of market information through its organization. Because anyone can generate a new product idea, everyone is encouraged to visit with customers to learn about their needs. Some of 3M's business units sponsor monthly "ideation" sessions where employees and customers jointly generate product ideas.

3M also eagerly solicits ideas from outside - from the firm's public, suppliers, and customers. Inquiries about its product development process often quickly results in the person asking the question being placed in a phone call with an employee from the new product department answering the phone with the immediate inquiry, "What is your idea?"

Not all ideas become products that get to the market, of course. 3M has a sophisticated screening process to capture the better ideas. But any new idea is sought, heard, and at least initially supported. In summary, 3M's product development process actively seeks new product ideas and develops many new products. Its innovation strategy thus meshes its business and marketing strategy with its process for product development.

The GE process is quite different. Developing a jet engine demands billions of dollars, thousands of people, and seven years. GE's principal challenge is to manage a billion-dollar project. It must manage hundreds of thousands of interrelated tasks, ranging in size from a few thousand to millions of dollars. All of these tasks GE must coordinate and get finished on schedule and within budget. Since performance is crucial with jet engines, many of the hundreds of thousands of tasks solve very difficult technical problems. One group develops a

new nozzle, another a new high-temperature material, and another a specialized software package. To keep on schedule the groups must do detailed risk analyses, and any obstacle must be discovered quickly, have resources applied quickly, and be resolved quickly.

Even though GE operates at the raw limits of technology and even though a jet engine has thirty thousand parts (any of which could fail), quality must be essentially perfect. When GE is asked about defect measures, they point out that at thirty-five thousand feet there is no such thing as allowing something to go wrong. 3M produces top quality, too, of course, but defects in Post-it Notes and Scotch Brand adhesive tape do not endanger people's lives.

The GE and 3M product development processes differ in other ways. Where 3M wants everyone to come up with new product ideas, for example, GE's product of jet engines is fairly fixed. So instead of pondering new products, most GE employees perform specific technical tasks. Also unlike 3M, GE does not need many of its employees to meet with customers to get new product ideas. Jet engines have only a few customers such as airframe manufacturers for commercial planes and governments for military planes. GE assigns a development team to each category of customer, and these teams work with the customer every step of the way.

A comparison of these two firms would be useful because it supports why my model named TIP serves as a new product development guideline. Although the 3M and GE product development processes are different, both handle innovation strategically as I demonstrate in Table 1-2 below.

The TIP model requires that different companies in different industries use different execution, depending upon the products, product life cycle, product timing, and targeted markets. TIP is efficient because it matches the product development process to the market and consciously plans the process that will most effectively develop those products.

TABLE 1-2: Comparison of 3M and GE Product Development Processes

	3M	GE Jet Engines
Number of projects at one time	Many	Few
Cost of typical project	Small	Very Large
Customers	Everyone	Few
Employee involvement with customer	As many as possible	A few key groups
Management	Manage small groups of people	Manage very complex projects with many steps and uncertainties
Number of people involved	Few	Thousands

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By contrast, mediocre firms put out new products usually because they have to respond to the market or because someone has had an idea. Lacking a coherent strategy, mediocre firms fumble more. They lack a strategy because they suffer from a misconception so widespread that nearly everyone shares it with them: They believe that innovation is an uncontrollable phenomenon that happens by chance. Like a flash of lightning, the great idea pops into one's head, and then people produce a new product.

That belief, however, could not be further from the truth. Innovation is not spontaneous or random. Successful innovation requires that a company integrate the factors of marketplace, the customer, the technology, and the manufacturing. The more that I look into the reasons of why one company in a particular industry is more financially successful; or has built better customer respect; or has a market dominating position; it is due to a failure in any one of these factors named above. Failure in these factor areas can mean a failure in innovation. What use is an idea if manufacturing cannot produce a product based on it, or if customers do not want that product? TIP is designed to prevent failure. Just as lightning rods focus natural lightning bolts on the highest buildings and move the danger to a safe ground, TIP focuses the lightning of ideas on marketplace success. TIP focuses and manages the lightning of new product ideas.

The results one can expect from TIP are many. It can considerably cut the cost and time of product development, and some innovations come out lightning fast and lightning cheap. I am going to include some results from companies that have incorporated some or all of the factors correctly - without them knowing that they are applying some of the good rules of TIP, of course. There is a lot to be said about experience in your own industry to know what works and what does not work. Today I call this process TIP and in two years I may name it MIP to change emphasis from technology to manufacturing. The names of re-engineering or concurrent engineering or total quality management may change but many of the concepts have been used and in effect for years. I would like to mention results that Motorola, GE, and Xerox had at certain stages in their existence. The director of semiconductor applications at Motorola noted