## **RAPID PRODUCT DEVELOPMENT CYCLE TIME**

# CAN YOU AFFORD NOT TO <u>REDUCE</u> YOUR PRODUCT DEVELOPMENT CYCLE TIME?

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A Critical review of

"Product Development Cycle Time and Commercial Success" By: M. H. Meyer and J. M. Utterback

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"The future of any enterprise, from the largest multifunctional corporation to the smallest start-up company, depends on the skills with which it develops new products and services and brings them to the market. This means that new product development is one of the most exciting—and the most frightening—of challenges that forward-looking businesses face. While few experiences come close to genuine ecstasy of watching new product ideas come to life and take off in the market place, mistakes are costly and can weaken the organization as a whole."

Lewis W. Lehr Former chairman of the board and CEO, 3M [1]

"The rules of the game in new product development are changing. Many companies have discovered that it takes more than the accepted basis of high quality, low cost differentiation to excel in today's competitive market. It also takes speed and flexibility."

--Takeuchi and Nonaka, "The New New Product Development Game," Harvard Business Review (January/February) 1986.

As Lehr [2] and Takeuchi and Nonaka [3] clearly state, it is vital for any company to bring new products into life not just for growth, but for survival.

Meyer and Utterback [8] studied a large international company that has substantial technological strengths in its core consumer and industrial product-market areas. Since the firm's traditional product-market segment has plateaued, the firm has been faced with a new challenge: **Necessity of bringing new products to both existing and new customers quickly.** The authors' objectives were to enlighten the management regarding how quickly the new products were brought to market and about its impact on the quality of implementation at the expense of commercial success.

Based on the limited number of samples investigated, their research result showed that there is no significant correlation between product development cycle time and expected commercial success. In fact, they stated that trying to force rapid development in situations of high technological and market uncertainty may even produce failure. They also investigated potential factors that affect the time taken to develop new ideas and bring them to market. For example, they found that newness of customers, products and distribution channels can increase development time. Integration of multiple technologies in product development was also shown to extend development time.

Meyer and Utterback first identified research objectives and then determined what industry or firm to study in order to fully accomplish the research objectives. Next, they defined product development time and performance as a measure of success and finally summarized the data and reached the conclusion. The authors identified five questions which will be used as a backbone of this research paper in analyzing their contribution to the literature. In order to answer all five questions, they chose a company that is large, international and a leader in its industry. The chosen firm has substantial technological strengths in its core consumer and industrial productmarket areas and at the same time is facing challenges from its plateaued market of its established technologies. The firm already realized the importance of new products and several attempts had been made within the firm introducing new technologies to both existing and new customers.

Twenty four new development efforts of the past five years were chosen to be representative of the total population of the firm's new products. The shortest product development time was approximately one year while some product development efforts took as long as eleven years. The authors also identified and collected for each product several potential key factors that might play an important role for the development of new products. These are product technologies, customer groups targeted, distribution channels used for selling, manufacturing processes and technologies, product newness to the market and intensity of competition, product scope and product development resources. Each product development effort was evaluated in terms of product development time and performance based on discussions and interviews with corporate product development staff.

In the following, I would like to discuss the analysis results and conclusions of the Meyer and Utterback's research, weak and strong points of their research, how their paper differs from other researcher's work, and their conclusion in an exhaustive manner using their research objectives as a base.

The first objective of Meyer and Utterback' research was to investigate the relationship between product development time and performance for technology-intensive products. They also evaluated whether shorter development time always correlates with greater expected commercial success. They found no significant correlation between product development cycle time and expected commercial success. In fact, they stated that trying to force rapid development in situations of high technological and market uncertainty may even produce failure.

I would like to analyze their findings in three parts. The first part demonstrates the relationship, if there is any, between product development time and commercial success. The second part explains why and when decreasing product development time may produce failure. Also included in this part is a brief discussion on whether a firm really needs to reduce product development cycle time or not. The last part discusses weak and strong points of their research conclusions and contributions to literature.

The first part summarizes the literature search results showing that several competitive advantages raise from a fast development capability. Perhaps most obvious is that the products sales life is extended. If a product is introduced earlier, it scarcely becomes obsolete since for each month cut from a product's development cycle, a month is added to its sales life yielding an extra month of revenue and profit as illustrated in Figure 1 [9].



Figure 1. Early introduction of a product can increase its sales life and market share

For some products that have high switching costs the benefit is expected to be even greater since the early introducer gains on both ends of the cycle. If a product is introduced early, it gains more customers, who maintain their loyalty due to the cost of switching to another product. It was shown that their loyalty creates a sales tail that is roughly proportional to the prior sales of the product. Consequently, an earlier introduction develops momentum that not only carries the product's sales higher but also further into the future [9,5].

Early product introduction can also increase market share [9,3,10]. The first product to market has a 100 percent share of the market in the beginning. The earlier a product appears, the better are its prospects for obtaining and retaining a large share of the market.

Another benefit of rapid product development is higher profit margin. If a product reaches to market before there is competition, the company will enjoy more pricing freedom, making higher margins possible. The price may later decrease as competing products appear. However, by then the company will be moving down the manufacturing learning curve ahead of the competition as shown in Figure 2 [9].



Figure 2. Early entrants can enjoy premium pricing and cost advantages

George Stalk considers "time" as a strategic weapon that is equivalent to money, productivity, quality, and even innovation [10]. Smith and Reinertsen reported several success stories related with rapid product development times. For instance, Japanese auto-makers develop a car on average in 30% less calendar time and 50% less engineering hours than their North American counterparts. Xerox reports that they have cut in half the resources and time required to develop products. Honeywell has cut development time by 50-60% while decreasing labor hours 5 to 10% [9].

In the second part, I would like to say that Meyer and Utterback's research results did not show clearly that trying to decrease product development time results in failure. This is more their speculation since they did not give any reason about the failure of a particular product development effort. In addition, they reached this conclusion based on a limited number of new product development efforts studied within only one firm/industry.

I have not found any other article that implied or showed that trying to force a rapid product development may produce failure. However, some managers suspect that if the development cycle is compressed too much, resources will be used inefficiently and quality may have to be sacrificed. Gupta and Willemon say that the challenge in rapid product development efforts is not to cut corners or avoid undertaking important steps, but to perform the tasks of this process faster without sacrificing quality. Some managers also feel that speeding up the development process might rapidly inflate costs. Smith and Reinertsen say that most companies are far from this point and that managers who focus on only R&D expenses may be focusing too narrowly. They suggest that the firm's managers must understand why they are developing new products before they decide to minimize expenses or time. For example, if a company's product line is broadly in need of upgrading but the market place is not demanding new products quickly, the proper objective might then be to produce the greatest amount of product development for the available R&D funds [3,8,9,10]. A few reasons for failure for product development are reported as market size, product newness, poor positioning, poor understanding of consumer needs, channel distribution problems, forecasting errors, competitive response, changes in consumer's tastes, changes in environmental constraints, insufficient return on investment, and organizational problems [3,4,5,6,11]. Therefore, it is essential to identify causes of failure, which in this case is not speeding up product development efforts, but the firm's lack of strategic thinking.

Moreover, for companies that are in an industry where product life cycles are long such as aerospace and pharmaceuticals, fast product development cycles may not even be necessary. However, in many markets this is changing due to increased competition as reported by Fortune "The liability of slow product development is growing. Leisurely product introductions look more and more like corporate suicide" [3]. Companies in the shorter product development cycle markets such as semiconductors, computers, telecommunications, and instrumentation cannot afford slow development cycles [1,5]

One of the weak points of Meyer and Utterback's research is that they used only two criteria when evaluating new product development efforts: Product development time and performance. They evaluated the success of the product development effort based on the interviews and discussions with corporate product development staff. I believe that these two criteria are not enough to decide whether the new product development was fast enough and whether the product development speed can be correlated with success. In addition, it was shown that scoring type of measurements are biased and the results are skewed toward the median. The authors could have used more objective methods. For example, Cooper lists the measures of new product performance in a more exhaustive manner. Some of the criteria to be used when evaluating new product development efforts are the percentage of current company sales made up by new products introduced over the last five years; the success, failure and "kill" rates of products developed in the last five years; the extent to which the new product program met its performance objectives over the last five years; the importance of the program in generating sales and profits for the company; the extent to which profits derived from new products exceed the cost of the new product program; the success of the program relative to competitors; and the overall success of the program, a global rating. The answers from these types of questions will not be personal feelings of the interviewed people, but rather will be concrete and unbiased numbers [1,3].

After considering all the aspects of new product development efforts through intensive literature review, I believe that there is a strong relationship between the fast product development cycle time and the commercial success. I feel that Meyer and Utterback's conclusions were not sufficiently supported and requires further research for strengthening.

Meyer and Utterback's second objective was to investigate potential key factors that affect the time taken to develop new ideas and bring them to market. They looked at the primary components of the technological and market dimension of new products that reduce or increase product development time.

The authors found that the need to integrate multiple technologies in product development can be expected to extend development time. Newness of customers and distribution channels found to increase development times due to the difficulty in learning new customer needs and of building new relationships outside the firm for distribution. This finding is supported by prior research [3,8,9,10].

The authors suggested that a corporate culture should encourage sharing of technology between product groups, and a product planning and control system so that the entire firm will reach beyond single product, single period thinking which is postulated by Johne and Snelson, and Smith and Reinertsen [4,9]. Involving key groups such as R&D, marketing, engineering, and manufacturing early in the product development process accelerates the new product development [1,3].

Meyer and Utterback showed that lower familiarity with either technology or markets requires greater patience and commitment. They expressed the importance of multidisciplinary team management. They also found out that the firm has to work harder to build effective relationships with individuals and organizations on the outside to reduce uncertainty. This is important because strategic market relationships with other companies already participating in the new target market segments may facilitate the firm's understanding of and selling to new customers.

Meyer and Utterback claimed that the speed with which new products can be developed and marketed will rely heavily on the availability of the new technologies via acquisition or licensing, and the scope of the technology integration effort [6]. Gupta and Willemon identified three categories involving several strategies to accelerate product and process development. Their suggestions were supported by Meyer and Utterback's research findings [3]. Meyer and Utterback, however, did not cover the effect of how new products were introduced to the market, where they are being introduced, what type of market testing was carried out, and what type of results obtained. These types of information are necessary for the reader to evaluate whether the failure is caused by the rapid product development or marketing related problems, for instance. Gupta and Willemon emphasis the importance of assuring that the product is "right" for the customers' needs measured through market testing in order to avoid serious delays [3]. The purpose of the test marketing is to simulate in a test environment conditions of a later, full-scale market launch. The new product should be evaluated in terms of quality and performance by trade prospects, users, and by competition. It is essential that the test market is fully representative of the intended expansion area [2,11].

Meyer and Utterback finally investigated how a firm whose traditional product-market segments have flattened or are declining can renew itself by enhancing its core technological strengths to make products for new market segments.

They suggested that when a firm facing a declining market must venture into new market applications and they should adapt existing technological capabilities rather than build entirely new technological resources. I pose two arguments on their findings: First is that their ideas was not supported in their research. Second is that they reached this conclusion based on their study on the large, international firm. So, does this mean that they are suggesting the firm which is large, international and a leader in its industry with substantial technological strengths in its core consumer and industrial product-market areas, to adapt existing technologies rather than build their own? This contradicts with another work where it was suggested that small and medium sized companies should employ external technology to enhance distinctive internal competence in the company's own core technology [7]. Not the large companies!

Based on my literature review, I would like to define "*a holistic approach*" toward rapid product development efforts that can and will help the firms on their race to become a time-based competitor.

The first fundamental step is to realize that a shift from a cost to a time mindset is a must. Leading companies around the globe are discovering that rapid product development is a huge, untapped source of competitive gain.

Second is to remember that rapid product development is not a quick fix for getting one product to market faster. Instead it is a strategic capability that must be built from the ground up. Smith and Reinertsen believes that existing management practices are generally not well suited to developing products quickly. In order to gain advantage from rapid product development over the long haul a company must make swift, effective product development a way of life. Top management has to become much more proactively involved in the pursuit of new product development efforts and foster innovative and highly interactive environment [3,4]. This is due to the fact that new product development is a high-risk, high-cost activity which cannot be left to the inventiveness and personal endeavors of middle and lower management.

Accelerating product development cycle time without sacrificing quality requires the establishment of "*new work style*" that can be characterized by using multiple approaches to solve problems, being more creative and open to alternatives, developing a sense of urgency and responding to problems quickly, employing parallel processing of product development tasks, promoting flexible and more informal working modes with greater priority given to informal communication versus formal memos and reports.

Management should also support "*teamwork*". Experiences showed that the best way to overcome obstacles related to new product development is to have a strong champion who is allowed to pick his or her own team and given more authority and ownership [3,9]. Zirger and Hartley showed that fast developers have teams that are cross functional, dedicated, co-located, empowered. They consider fast time to market as a developmental goal. They have the full support from the top management [1,12].

Finally, a shift to integrate R&D, marketing, engineering and manufacturing expertise with customers, suppliers, distributors early in the product development process is a must for a successful and rapid product development.

"Shortening the development cycle is a tool that no company can afford to ignore if it wants to remain viable in the 1990's. The challenge of making this transition is great, but so are the benefits of rapid product development" says Smith and Reinertsen [9]. In the end, the companies that consistently develop new products quickly and effectively will step by step outpace those that cannot. Bringing one good product to market quickly is nice, but it will not assure the competency of the company. Only the companies that have a holistic approach will survive.

#### Future research ideas

I believe there are several issues that require further investigation in rapid product development. A few that I would like to suggest are as follows:

- 1. What type of product development strategies a company should follow if the company's strategy is to be an innovator or an imitator or a reactive ? What are the rapid product development key factors that makes one firm to decide to be an innovator while another decides to be an imitator?
- 2. What should an engineering manager do in order to provide an organizational environment that constantly produces and markets new products faster? How can he use his roles and functions to motivate the people for a rapid product development process? What is the importance of team work and strong leader?
- 3. Are there any acceleration techniques, for instance Computer Aided Design--CAD, that companies can use to decrease their product development cycle time? Why, how and when these techniques can be successful?

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