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Author(s): A. Gonzalez

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Abstract: Critique of the IEEE Transactions on Engineering Management article, "Cultural Evaluation of Product Development Cycle Time and Commercial Success."

**Critique of the IEEE Transactions on Engineering
Management article, "Cultural Evaluation of
Product Development Cycle Time and Commercial
Success."**

A. Gonzalez

EMP-9673

PORTLAND STATE UNIVERSITY

EMGT-520



Management of Engineering and Technology

Critical Evaluation of
**Individual Research Paper: "Product Development Cycle
Time and Commercial Success" by Marc H. Meyer
and James M. Utterback; IEEE Transactions on
Engineering Management, Vol. 42, No. 4, pp. 297-304.
Nov. 1995**

Dr. Dundar F. Kocaoglu

submitted by

Alberto Gonzalez

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CONCEPTS

The development of new products faster than competitors do is a formidable strategic weapon to succeed in an increasingly turbulent market, or is it? As more research is done on reduced cycle time, it appears that reduced cycle time does not guarantee success in the market place. One view point is that reduced development times with higher quality extends the life cycle of the product, increasing market share and profitability. This also allows leaders in their chosen industry to set the standards in technology. However, other research indicates that some companies, such as pharmaceutical companies, can be late in that clarity of use and efficiency are more valuable in product development than accelerated product development, especially in a highly technical product.

Customers do not want a product that is too cumbersome to use. It seems to be important to continually update existing products through out their life cycle by ensuring greater quality while providing enhanced functions in the product at a reduced cost. Another area companies should look at is the ability to create a large assortment of products that share a basic product manufacturing process. The product should be carefully developed with more value for the money for the customer, while reducing the cost of manufacturing the product. Also, if the market being entered is unfamiliar then the degree of uncertainty for the new products success is considerably higher. It is for this reason that development should proceed slowly with little investment until the market is fully understood.

It is the overall purpose of the paper being studied to prove that there is not a relationship between product development time and commercial success in new product development. The other hypothesis of the paper is that a technological firm's uncertainty lies in the customer's needs and not in the technological uncertainties.

METHODOLOGY

The firm studied has certain necessary characteristics for the analysis. It is an international leader in its industry and has substantial technological strengths in its principal consumer and industrial product-market areas. However, there have emerged new technologies that might be considered as a threat for these established technologies. Their sales in the market have become stagnant and the continued growth was realized by management to come from the development of new products. For some of the firm's products, technologies were brought to existing customer application. For others, technologies have been influencing customer applications such as new methods of selling. One of the main management concerns was for the

company to quickly bring new product ideas to the market with quality in the product design and manufacture, being conscious about the possible conflict between new ideas development speed and the implementation of them. These concerns were faced under a competitive environment for the firm.

The sample of 24 of the company's new product development efforts of the past five years, represented about half of the efforts. Therefore, the sample represented the whole very well.

Development time and expected performance were two measures utilized as the dependent variables in the analysis. The measure of development time was calculated from the origin of a product concept to market introduction. Performance was defined as "the overall success of the new product as perceived by company management."

Several characteristics of products were measured in order to compare them with previous studies so they could be adopted as own measurements. The following are the studied characteristics of new products:

- core 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, i.e., budget

The information for each product was gathered by interviewees to the project leaders in which the content and degree of newness for many of the measures were obtained. The same approach was utilized in other areas such as manufacturing processes, customer groups, and distribution channels. Another relevant obtained information was the cumulative budget.

LITERATURE CONTRIBUTIONS & FUTURE RESEARCH

Based on statistical analysis, no relationship between the time to develop new ideas and perceived performance was found. As a matter of fact, the rapidity of developing new product concepts and bringing them to market should be rushed only if the opportunity cost is high and the development risk is low. Additionally, it could be concluded that in certain market circumstances with extremely high rates of product obsolescence and the need for constant new

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product introduction, time to market may be a very important factor to succeed. However, opportunity cost, which is determined by the intensity of competition, importantly influences the need for quick product development. In actuality, both reduced cycle time and strong performance are still caused by the nature of the firm's product generation process among other fundamental factors.

On the other hand, there are certain characteristics of the product that notably influence product development times. For instance, the number of product technologies that must be integrated and their newness to the firm, the newness of customer groups and channels, and the overall newness of the product to the market relative to existing products as well as larger development budgets are found strongly related to longer product development times.

Another important contribution of the paper is the explanation for the longer development times associated with the ventures. The strong influence between ventures and product line extensions in their selling channels is a primary explanation of it. In addition to this, the need to integrate multiple technologies in product development is another factor that can extend development time. Although this finding seems to be an evident one, no previous studies had emphasized this important contribution.

Multidisciplinary team management as well as budgeting and testing approaches must be very important factors integrating technology. They adapt the increase in problems and communication requirements accompanying an increase in the number of product technologies incorporated into the architecture of a new product.

Due to the difficulty of learning new customer needs, and of building new relationships outside the firm for distribution, newness of customer and distribution channels increases development times. In order to reduce uncertainty, lower familiarity with either technologies or markets will require greater patience and commitment and demand that the firm work hard to build effective relationships with individuals and organizations on the outside.

Several issues arise for future research with respect to how to better manage the merging of distinct technologies. More effective integration can be hypothesized to result from understanding, following, and helping to establish industry standards.

OTHER RESEARCH PUBLICATIONS

Companies considering Fast Cycle Time should not attempt to decrease cycle time by simply demanding shorter development schedules or increasing the speed of current work. Instead, an ongoing ability, obtained through continual organizational learning, is preferable over

single event capability and will result in long-lasting effectiveness. Organizational learning is important because it requires that a company integrate what it learns on a long-term basis.[2]

Fast Cycle Time success rests on a company's ability to redesign its organization into multifunctional teams, with highly visible and measurable timelines, streamlined processes and employee accountability. In brief, the old methods of product development and production do not work within the Fast Cycle Time paradigm. Unfortunately, many companies still believe that increased development speed necessarily yields lower-quality products. [2]

Companies that get products to market faster than their competitors generally capture greater market share. Time to market is specially critical in the highly aggressive ~~in the~~ electronics and semiconductor market, where product designs, pricing, and distribution strategies see some of the most rapid and revolutionary changes of any manufacturing industry.

One of the first phases in reducing cycle time is to examine the ways major companies shorten product -development time. The 10 best practices for product development were then compiled to guide groups and operations in reducing their individual cycle times.

1. Total cycle-time reduction. Processes for developing, manufacturing, and distributing products must be continuously improved if the company is to remain competitive in getting products to market as quickly as possible.
2. New product-development process. The entire process for designing and ensuring high quality and manufacturability of new products must be streamlined for maximum speed and efficiency.
3. New products driver. Customer needs, demands, innovations, and expectations must come first in deciding what new products will be developed.
4. Engineering metrics. Methods must be established for measuring effectiveness in meeting the needs of both internal and external customers.
5. Robust design and training. The whole technology platform must be pushed to the edge to make sure products are design using up-to-date methods.
6. Engineering tools. Similarly, the most up-to-date technology, equipment, and software must be used to develop robust products.
7. Electronic networks and interfaces. It is important to access, exchange, communicate, and use information quickly through available sources such as computer networks and the Internet, including the World Wide Web.
8. Empowerment and customer visits. Designers are empowered to seek customer input so that everyone is involved in product development.

9. Research labs and technology sharing. The technology that is created in groups such as research labs should be shared throughout the company and disseminated throughout industry.
10. Reuse and career recognition. Projects should first consider using previous processes without reinventing the wheel each time. Individual accomplishments should be rewarded and recognized.[3]

According to Bob Meng of Caterpillar, cost savings and the opportunity to earn higher margins earlier are the real drivers to reduce cycle time. A major corporate-wide initiative has been a move to global teams. The New Product Introduction teams, while global, are cross-functional, including design, marketing, product support, technical, service, accounting, suppliers, all those functions gathering and sharing information from around the world about customer needs in new products, and doing so faster, up front, with more of the decision-making going on collectively rather than in isolation.[4]

The results from a study of 188 new product development projects indicate that use of nontechnical outside assistance lengthens the product development cycle time, where as output control can shorten or lengthen product development cycle time dependent on the market's growth rate and product's innovations.[5]

Reduction of new product development cycle time and improvements in product performance have become strategic objectives for many technology-driven firms. These goals may conflict, however, and firms must explicitly consider the tradeoff between them. A multistage model of new product development process which capture this tradeoff explicitly is introduced. It is shown that if product improvements are additive, it is optimal to allocate maximal time to the most productive development stage. An indication is made of how optimal time-to-market and its implied product performance targets vary with exogenous factors such as the size of the potential market, the presence of existing and new products, profit margins, the length of the window of opportunity, the firm's speed of product improvement, and competitor product performance. It is shown that some new product development metrics employed in practice, such as minimizing break-even time, can be sub-optimal if firms are striving to maximize profits. The minimal speed of product improvement required for profitably undertaking new product development is determined.[6]