Case #2

"BMW AG: The Digital Auto Project (A)"
Harvard Business School Case: #9-699-044 (Rev. Nov. 1, 2001)

Academic instructors who are registered with the publisher's website (http://www.hbsp.harvard.edu) may download the Teaching Note #5-603-117 (March 5, 2003) for this case free of charge.

ABSTRACT

BMW is known for its hand-craftsmanship in automotive styling and high standards of product excellence but they also have the longest product development process of 60 months as compared to 30 to 40 months by US and Japanese automakers. Since the time to market has become an increasingly competitive factor in auto industry, BMW took steps to shorten the product development cycle through computerization, concurrent engineering, and reengineering to minimize process steps. This case describes how BMW decided to select a specific car model as the "digital car" to refine the new product development process and how their design department struggled with the computer aided styling (CAS) technology over its traditional physical prototyping-driven styling process.

TEACHING OBJECTIVES

The objective of this case is to address issues related to the "redesign" of product development processes. It offers students the opportunities to talk about the competitive needs for higher development performance (time, cost, and quality) in the automotive industry, the use of technology enablers to speed up development processes, and challenges and efforts associated with balancing the emotional needs of designers with the reduction of development time dictated by the marketplace.

SUGGESTED QUESTIONS FOR CLASSROOM DISCUSSION

1. What are the competitive challenges in the automobile industry in 1997 and beyond? In what ways do these challenges affect BMW?

2. How would you evaluate the product development process at BMW? Why was the target objective of 50 percent reduction in development time set by BMW senior management?

3. What should BMW do with respect to the exterior styling process - go "digital" or "clay"? Why?

4. Would BMW derive any benefits from utilizing web-based engineering technologies in product development? Why or why not?

ANALYSIS

1. What are the competitive challenges in the automobile Industry in 1997 and beyond? In what ways do these challenges affect BMW?

The challenges are: (a) the European car market is the buyers market with a capacity of 20 MM cars and sales only 14 MM per year; foreign car entry into Europe is expected after 1999; (b) shorter product development time (e.g., Europe 58 months, USA 55 months, Japan 51 months) allows BMW competitors (noticeably Japan) a significant competitive advantage in satisfying market niches and customer preferences faster; Japan claims to have plans for further reducing its product development time to around 30 to 40 months; (c) changes in customer preferences for model variations, more options and less cost.

In mid 1990, European luxury cars were favored due to their prestige and driving performance. As such, BMW exceeded Mercedes sales by emphasizing tradition and continuity over change. Lexus also challenged both companies with cars that look and feel like Mercedes and BMW but that cost less.

These challenges exert pressure on BMW to reevaluate its corporate strategy. Being the automaker with the longest product development time and a strong tradition of perfection engineering at the same time serving a special niche market, BMW needs to change in order to survive – hence the reengineering efforts. The parallel is the Swiss watch industry (e.g., Rolex, Omega) versus the Japanese digital watches (e.g. Timex, Seiko), where prestige and tradition compete with accuracy and low cost.

2. How would you evaluate the product development process at BMW? Why was the target objective of 50 percent reduction in development time set by BMW senior management?

The product development process at BMW has been sequential, going for perfection at each step. It was suitable for marketing products to stable niche markets for customers who value tradition, luxury and prestige and have money to spend.

The technical goals for all tasks are the same except that they should be done faster with no loss of quality.

A. BMW started its reengineering effort using computers, initiated parallel tasking, decreased design iterations and speeded up task implementation. In the '70s and '80s, BMW used to have three prototyping cycles that brought forth very successful cars. Currently, BMW allows two major prototyping cycles that have decreased the product development time by 20 percent.

B.   The re-engineering task force focuses very properly on five (5) aspects covering 90 percent of all critical areas: body, climate control, fuel supply, engines/powertrain, and acoustics.

C.   Auto development requires collaboration between diverse people, including outside vendors.

Participants found difficulty to breaking away from the pressure of everyday business to devote their efforts to re-engineering. Management selected a highly visible project (ED-A project) to galvanize the firm into action. Allowing the staff to set their own priorities signifies a lack of management commitment to the re-engineering efforts.

D.   Styling is a link between the past and the future for the purpose of maintaining a familiar design (e.g., dual circular headlights and the double kidney front grille). At BMW, this is an area dominated by style artists who possess constant refined empirical skills. Artist trained in old schools are not comfortable with CAS (Computer Aided Styling). The implied assumption is that there should be no change in the objective of car styling (i.e., to achieve a distinctive line, contour and light reflection characteristics).

Why 50 percent? Japanese automakers are said to have plans to further whittle down their 51-month product development time to about 30 to 40 months. BMW therefore felt necessary to target at a 50 percent reduction in product development time in order to bring them on par with the Japanese. This goal setting exercise is based on external benchmarking.

3.   What should BMW do for exterior styling - go "digital" or "clay"? Why?

Clay is the favored method of styling by traditional artists at BMW. This technique has served them very well in the past. It involves multiple prototypes and allows a very adjustment of surface lines and contours to create a superior surface finish that sets BMW apart from the competition. In a way, this has been a core technology of BMW as well as a major source of corporate pride. However, it takes time and effort to style each car in this way and the preference of the marketplace has started to shift away from this distinguished product feature. Note that this value proposition is in direct contrast to SUVs which emphasize ruggedness and empowerment with a boxy and masculine image that is intended to appeal to a new generation of drivers.
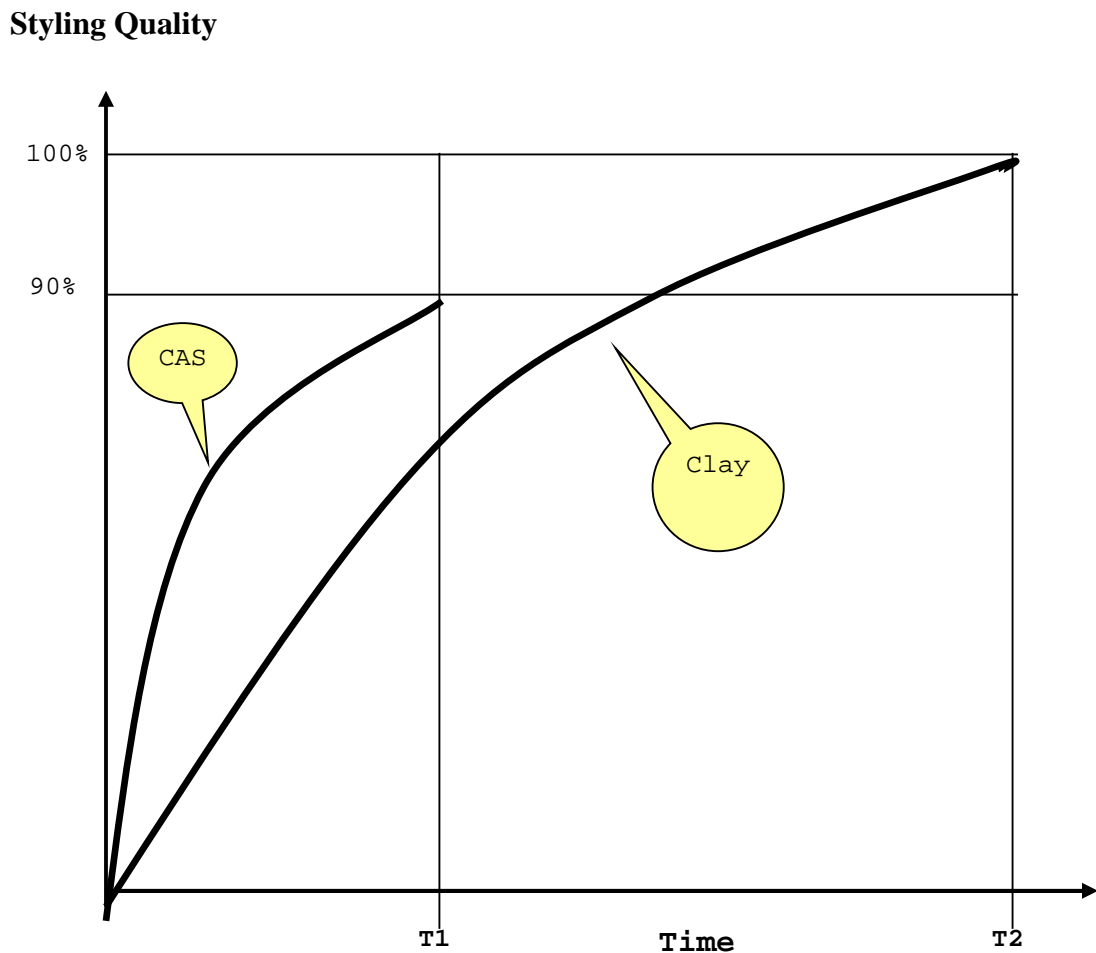
Computer Aided Styling (CAS) boosts efficiency, eliminates several process steps and completes the remaining steps faster. However, CAS is not able to deliver the high quality styling of BMW; it can deliver only up to 90 percent of the BMW requirement. If stylists try to achieve the same level of perfection for the

remaining 10 percent, they would experience a diminishing return
using CAS.

Market results indicate that BMW has been quite successful in
overtaking Mercedes Benz in the luxury car category. However,
the market success of Lexus suggests that luxury car customers
are starting to prefer cheaper models without the clay-based
styling. Thus, clay-based styling may no longer have the same
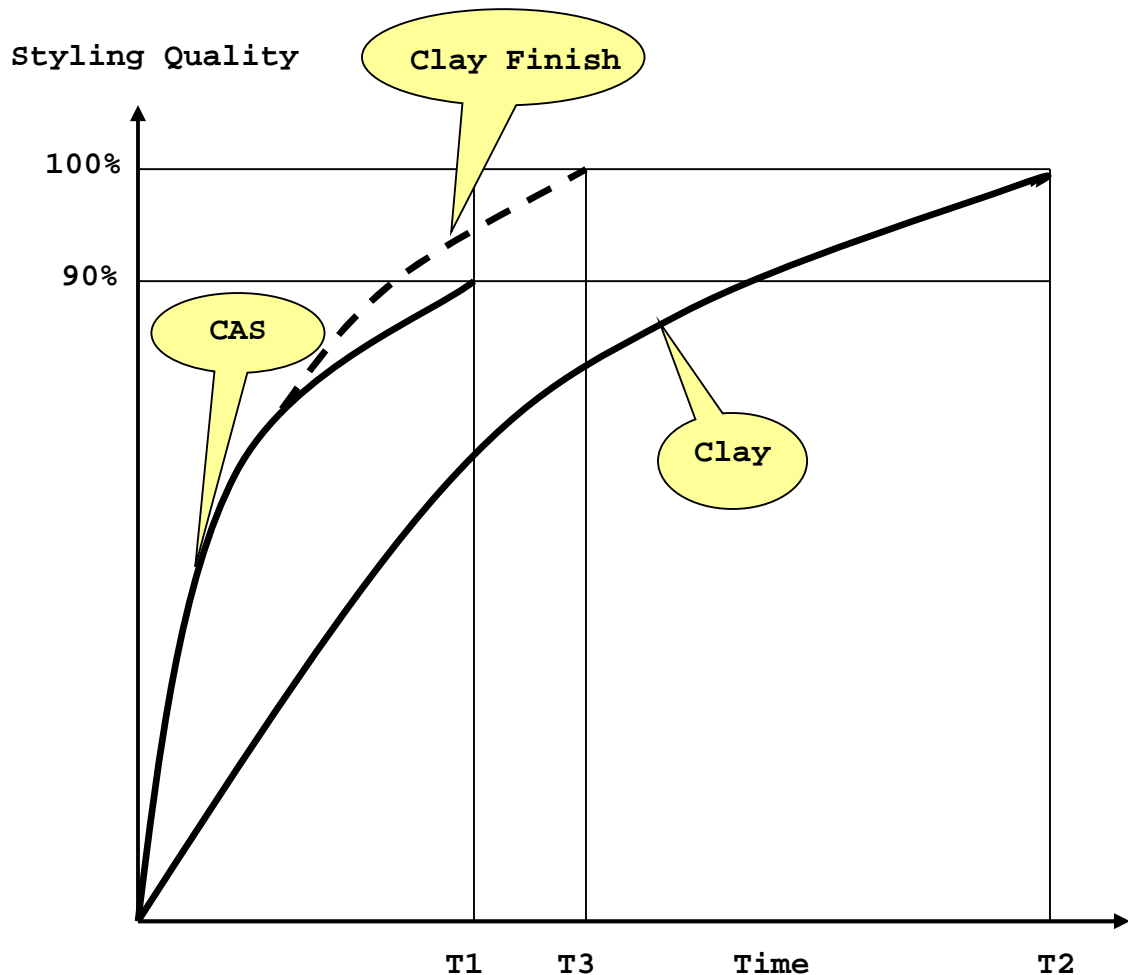market pull as before.

Should BMW opt for the slow clay process to achieve perfect
car styling results or should BMW elect for the fast but not
perfect CAS styling process? Or should BMW try something else?
(see Figure C2-1). So the options are: (1) continue the clay
styling tradition to retain this core technology as a corporate
differentiation in the marketplace, (2) go digital all the way as
the last 10 percent may not be that critical after all, and (3)
others?

FIGURE C2-1. TIME REQUIREMENTS FOR CAS AND CLAY

Styling Quality

A reasonably good solution is to adopt a combination strategy, as illustrated in Figure C2-2, by applying CAS initially and finishing up with the clay method. The total development time is scaled down from T2 to T3, but still satisfies the emotional needs of stylists and preserves a unique product feature of BMW.

FIGURE C2-2. COMBINATION STRATEGY FOR CAR STYLING

4.   Would BMW derive any benefits from utilizing web-based engineering technologies in product development? Why or why not?

BMW has already centralized engineering and product development in one building. It is reasonable to assume that BMW has its own server on site so that bandwidth, client equipment compatibility, transmission speed and security are not problems it faces.

BMW appears to share quite a number of capabilities with numerous web-based engineering design tools. However, there are several others which BMW may need to add. (See Table C2-1).

TABLE C2-1. WEB-BASED TOOLS POTENTIALLY USEFUL TO BMW

In summary, the capabilities listed below, if added, could further assist BMW in achieving its ambitious goal of reducing product development time by 50 percent. To become a global player in the automobile industry, BMW needs to start planning its own "build to order" system which appears to be the wave of the future:

Project management tool will make the product development process more transparent to those involved, thus motivating all not to delay the release of product design data. Reducing the "silo" effects will foster an intensified collaboration between departments. Training and management commitment will reinforce the priority of reengineering efforts and help staff break old habits of seeking perfection beyond the point of diminishing return.

Parallel tasking is not the same as concurrent engineering. BMW may need to learn more from Ford (i.e., C3P) by eliminating prototyping as a key step for achieving the 50 percent reduction of product development time.

There was no mention of embedded systems as new technologies to enable differentiation, as the case was focused on exterior styling. Obviously, BMW must aggressively pursue new technologies as another way to compete besides just relying on styling.

As the Big Three are moving toward "Build to Order" production system, BMW cannot afford to stay within the operational model of "Build to Stock" in the "old economy." If BMW wants to serve customers worldwide, then web-based engineering technologies must be employed sooner or later to facilitate global product development, manufacturing, marketing and distribution of its products.