
Identifying and Evaluating New Manufacturing Processes



A white paper by *Technology Futures, Inc.*

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There is one fundamental difference between technical innovations involving products and those involving manufacturing processes. In the case of the former, the innovation is apparent to competitors as soon as the product is introduced into the marketplace. In the case of the latter, the innovation may not be revealed to competitors for a long period of time. Failure to appreciate and take advantage of advanced manufacturing technology can place a company at a significant competitive disadvantage with regard to cost of production, profit margin, and flexibility. Thus, the ability to effectively analyze the current state of the art in manufacturing technology, as well as the probable rate and nature of technical advance in the area, is most important to the continuing success of any company in which manufacturing efficiency is a major factor. For more than two decades, Technology Futures, Inc. has assisted its clients in conducting analyses of this type. One example of TFI's experience in manufacturing process analysis is outlined below.

Challenge

Recently, the reorganization of a large consumer product company presented the executives of its manufacturing division with a major dilemma. Prior to the reorganization, this division had the responsibility for manufacturing any products developed by internal R&D groups. Under the new organization, product managers had the right to contract the manufacture of new products with any organization, internal or

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external, that they chose. In other words, the manufacturing division was faced with unaccustomed competition. The executives were confident that their manufacturing processes were efficient and dependable and were probably as advanced as those of any competing manufacturers. However, they felt that confirmation of these convictions was needed. Because of the requirement for a timely, high-quality assessment and the need for secrecy, the executives contracted with TFI to assist them in the conduct of the analysis. The objectives of the analysis were to:

- Determine the status of the division's manufacturing processes and equipment vis-à-vis those of their competitors.
- Identify specific areas where significant improvements in manufacturing processes were practical.
- Project future advances in relevant technologies and develop plans for taking full advantage of them.

Project Outline

Because he realized the importance of his staff working effectively with the TFI staff, the division manager began the project by having TFI conduct a two-day in-house Technology Forecasting workshop for selected division personnel. At the end of this workshop, TFI analysts, working with division personnel, set about accomplishing the following tasks:

- Defining the functions that had to be performed in each manufacturing process and the various ways in which these functions might be performed using *Morphological Analysis*.
- Determining past process adoption patterns and the current status of process utilization by competing firms using literature searches and *Monitoring* procedures.
- Projecting future process adoption patterns of each competitor using *Fisher-Pry Substitution Analysis*.
- Identifying and evaluating possible trends, events, or decisions that could affect adoption patterns using *Nominal Group Conferencing*.

- Developing three feasible scenarios outlining how the transition to new processes might take place in the division and in competing organizations using *Alternate Scenario* techniques.
- Developing strategic plans for adopting new processes using *Innovation by Design* techniques.
- Testing these strategies for unexpected or unintended implications using *Impact Analysis* and *Stakeholder Analysis*.

Project Results

The analysis described above established that there were three basic processes that had to be considered. *Process A* was the relatively mature technology currently employed for most manufacturing operations in the client division. *Process B* was a relatively new process that showed attractive promise but had not been fully developed. However, the division had already begun to replace some Process A operations with Process B. *Process C*, in theory, offered attributes that were markedly superior to those of either of the other two processes. However, the client division believed that it would be a number of years before Process C could be used in practical manufacturing operations.

TFI and the manufacturing division staff concluded that the division was at least two years behind most of its competitors in adopting Process B. Moreover, if current trends continued, it was projected that most competitors would have completely replaced Process A by Process B within two years, while more than half of all of the client's manufacturing facilities would still be using Process A. This would result in serious disadvantage to the client's competitive position.

It was also concluded that Process C was much closer to practical introduction than division executives originally believed. Specifically, it was forecast that at least one major manufacturer would begin adoption of Process C within 18 months. (In actuality, adoption of the new process was announced by a Japanese manufacturer 12 months after this projection was offered.)

Actions Taken

Division executives elected to materially speed up the adoption of Process B. They also adopted some of the project's suggestions on how Process A could be improved during the transition period. Although consideration was given to leap-frogging Process B and going directly to Process C, the idea was rejected. However, the effort to develop

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Process C internally was materially expanded, and the division was able to begin adoption shortly after the announcement by the Japanese company and before any of its major U.S. competitors.

Relevance to Your Organization

For more than two decades, Technology Futures has been assisting its clients in analyzing manufacturing processes and in developing strategies to take full advantage of emerging advances in manufacturing technology. During this period, TFI has developed a toolkit of more than 20 techniques and methods that it uses to assist its clients in performing the technology/market forecasts necessary for gaining continuing market leverage through manufacturing excellence. A project of the type described above typically can be conducted for between \$30,000 and \$45,000 (not including the in-house workshop). Such projects are normally completed in two to four months, with preliminary results available in about one month.

If you believe that TFI could be of assistance to your organization in identifying and evaluating new manufacturing processes and in developing strategies for taking full advantage of advances in manufacturing technology, please contact John Vanston, Larry Vanston, David Smith, or any other member of the TFI consulting staff.