

October 1993

TECHNOLOGY STRATEGIES

**Board of Editorial
Advisors**

Thomas T. Bamford
Vice-President Research & Development, FMC Corporation

Dr W.J. Beek
Managing Director, Unilever Research Laboratories

Joel S. Birnbaum
General Manager, Information Architecture Group, Hewlett Packard Company

Dr K. Bulthuis
Senior Managing Director, Philips Research Laboratories

Robert J. Calcaterra
Director of Research & Development, Adolph Coors Company

Jay W. Carson
Consultant, Vanguard Plastics, Vancouver

Dr David A. Duke
Vice-Chairman Technology, Corning Glass Works

James L. Dwyer
Senior Vice-President, Millipore Corporation

John S. Foster
Vice-President Science & Technology, TRW Inc.

Jan Friberg
Executive Vice-President, Alfa-Laval AB

Karl Henrik Hübinette
Volvo Senior Advisory Group, AB Volvo

Paul Jorgensen
Executive Vice-President, SRI International and Chief Operating Officer

Dr Makoto Kikuchi
Professor, Tokai University Hiratsuka, Japan,
Executive Technical Advisor, Sony Corporation

John V. Luck
Senior Vice-President & Technical Director, General Mills Inc.

Edward A. Mason
Vice-President Research, Standard Oil Company, Indiana

Dr Arnaldo Pasini
Vice-President Corporate Research, Olivetti SpA

Brian M. Rushton
Senior Vice-President Research & Development, Air Products & Chemicals Inc.

Dr Renato Ugo
Director of Research & Innovation, Montedison SpA

Dr Mohamed Zairi
The European Centre for Total Quality Management

**Board of
Contributors**

Arthur D. Little Inc.
A.T. Kearney Ltd
Business Environment Risk Information (BERI)
Center for Strategic & International Studies
Conference Board Europe
Coopers & Lybrand
Corporate Renewal Associates
Crosby Associates
Deloitte & Touche Management Consultants
DRI Europe
Ernst & Young
Forum Corporation
Four Elements Ltd
Gemini Consulting
Harbridge Consulting Group
Hay Group Inc.
IESA, Instituto de Estudios Superiores de la Empresa
IMD International Institute for Management Development
Industrial Research Institute Inc.

Innotech
INSEAD, European Institute of Business Administration
KPMG Peat Marwick
Learning International
Management Centre Europe
Mercer Management Consulting
Pacer Group
PA Consulting Group
PE International
PIMS Associates
Planning Forum
Pugh Roberts Associates Inc.
Southern Marketing Association
SRI International
Stockholm School of Economics, Institute of International Business
Strategic Horizons Inc.
Strategic Planning Institute
Strategic Planning Society
TARP
TQM International

**Statement of
Mission**

To provide the executive responsible for the management and strategic use of technology with concise, action-oriented advice and insight on achieving competitive advantage through technology.

Editor-in-Chief: Eric Sandelands

Executive Editor: Seona Hallawell

Publisher: Marjorie Brown

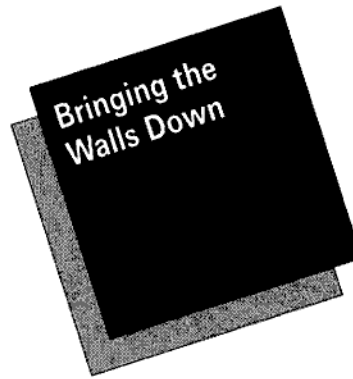
Customer Service: Sue Bose

The role of the Board of Editorial Advisors and Board of Contributors is consultative. The publisher is solely responsible for all contents.

The contents of *Technology Strategies* are confidential to subscribers. No part of this publication may be reproduced or used in any form or by any means – graphic, electronic or mechanical including photocopying, recording, taping or information storage and retrieval systems – without the permission in writing of the publisher.

Technology Strategies is published monthly by MCB Business Strategy Publications, 60/62 Toller Lane, Bradford, England BD8 9BY
Tel: +44 274 499821; Fax: +44 274 547143
© MCB Business Strategy Publications 1993
ISSN 0258-0551

Printed by Smiths Colour Printers, Bradford.



Challenge for manufacturers

Change is not smooth, nor seamless. Technological advances provide a challenge for manufacturers, in that they have to balance current investment decisions with information about what may happen in the future to the technology they are purchasing. Will a decision to invest thousands of dollars in hardware be proved right, or will incompatible, but essential, software come onto the market that will necessitate further investment in yet more hardware?

The argument put forward by **Bradford L. Goldense of Goldense Group, Inc.** a specialist in manufacturing and materials, is that the only viable long-term solution is to integrate the engineering and manufacturing processes, thus bringing down the barriers that currently exist in so many manufacturing firms.

He contends that concurrent engineering (CE) and computer-integrated-manufacturing (CIM) initiatives should be tackled together right from the beginning. The results of such an integrated approach will be to reduce time-to-market of manufactured products and thus bring benefits throughout the organization.

Traditional approach

Concurrent engineering is also known as simultaneous engineering and defines a systematic, simultaneous approach to accomplishing the engineering activities associated with the development of a product. Many companies are now contemplating CE concepts and practices, and several have instigated prototype projects. But few companies have products or product lines that were developed using CE techniques and tools. Not surprisingly, perhaps, most companies still use a traditional approach to engineering.

Computer-integrated-manufacturing is at a more advanced stage than CE on the factory floor, although it has still got a long way to go before a company as a whole adapts CIM as a way of operating. Although CIM is a fairly self-explanatory concept it is all too easy to confuse real integration with mere interfacing. And true integration is still a long way off, even in the more advanced manufacturing organizations.

This is good news, however. The fact that both processes are still immature means that their integration can be contemplated without massive dislocation and reinvestment.

Integrated approach

Key to the future of the manufacturing industry is information and its use and dissemination. The success of both CE and CIM and their integration is impossible to contemplate without the efficient and shared use of information. Similarly, significant improvements in time-to-market are unlikely without a more integrated approach to the whole design and manufacturing process, as outlined in Figure 1. The benefits of an integrated approach include:

- the cost, quality and time spent at the prototype design phase will be reduced or even eliminated;
- the closer linkages between engineering and manufacturing will improve the ability of both to function effectively;
- knowledge acquired in manufacturing, servicing and support functions will be assessed and used to greater effect earlier on in the design phase;
- a decrease in time-to-market, as the whole engineering and manufacturing process assumes less the nature of a series of steps and more the look two integrated steps carrying the weight of the project collectively, as is illustrated in Figure 2;
- quality will be improved as information is shared and improvements implemented more quickly; and
- reputation, competitive position and self-esteem will be enhanced as time-to-market and quality improve.

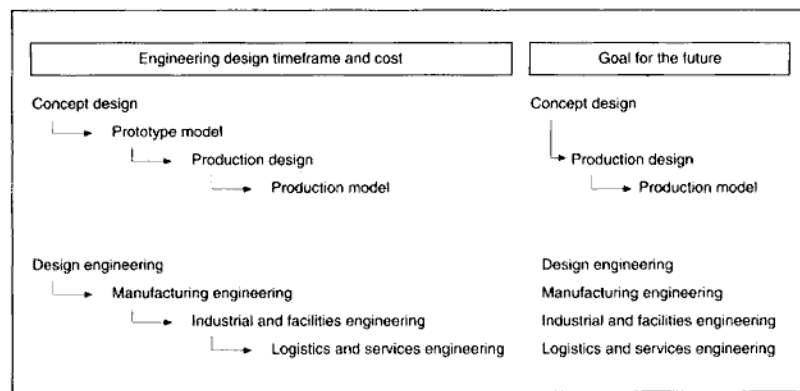


Figure 1. Concurrent Engineering: Current Situation and Future Goals

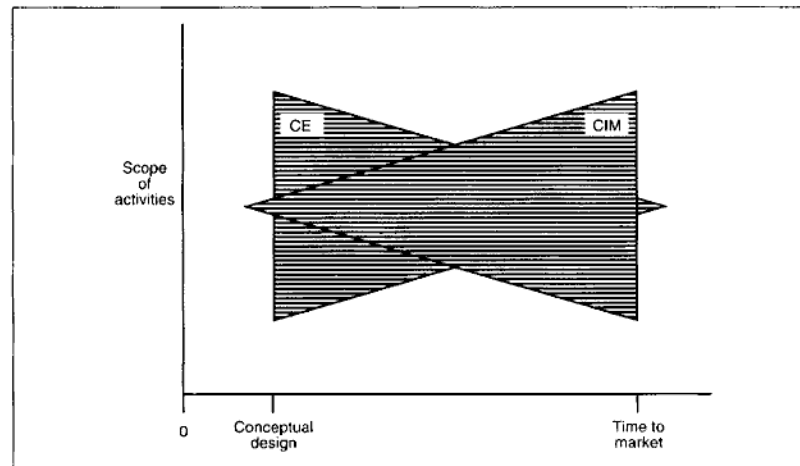


Figure 2. Relationship: CE and CIM

**Considerable
potential**

As Bradford L. Goldense observes, although the potential to increase time-to-market is considerable, few companies have been able to proceed very far along the road to CE and CIM integration. The reason for this is that for true integration to take place a number of factors have to be in place, and many of these factors are still in the process of development.

In his research he concentrates on development in technology and data analysis, and their impact on time-to-market, acknowledging that it is often the organization and management process, i.e. the human element, which is the most difficult to address.

Technology resources within an organization should, on the one hand, be distributed so as to put the right tools in the hands of the users, and, on the other hand, be centralized. The centralized components of the technology architecture allow the organization to achieve leverage across departments and across the company.

Clearly, putting the right tools in the right hands makes for increased efficiency, while centralizing certain required elements of information allows management to make informed strategic decisions about the future shape of the company.

So, how is time-to-market reduced by advances in technology and data management?:

- Improved data exchange will allow engineering departments to understand the capabilities of the manufacturing department better, thus making sure that a product is of a consistently high quality.
- A major advance that would reduce time-to-market would be a set of applications that generate in a common and standard form, so that engineering information could be fed forward and manufacturing information backwards without necessitating data re-engineering, which is both costly and time-consuming and information-inefficient.
- Spatial integration is a concept that is still at the prototype stage, but one that promises to reduce time-to-market considerably. Spatial integration maintains a 3-D model of a product and each of its sections and sub-sections. Any changes made are automatically forwarded on to all the relevant workstations.

Yet another development would pinpoint any potential problems that could be resolved on screen rather than on the factory floor, thus decreasing time-to-market and reducing development costs.

Goldense has twitched aside the curtain to take a glimpse into the future to see how the integration of the engineering and manufacturing functions will cut the time spent on product development and manufacture and thus time-to-market. Clearly, an integrated approach is required with information readily shared by all those who need access to it.

There are many obstacles to the achievement of this ideal state of integration and the two that have to be seriously taken into account are the investment required and the readiness of those involved to integrate their empires. Those companies prepared to integrate will benefit by speeding up all their processes, thus getting products to markets that much quicker than their competitors.

**Major
advance**