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by Stephen Armstrong, Manager

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PLANNING FOR WORLD CLASS MANUFACTURE

*By Stephen C Armstrong CEng MIMechE**

An effective modernization and productivity improvement programme can be initiated only after a plan encompassing all the disciplines of the organization has been drawn up and after a group of people has been assembled and committed to the programme. From initiation through to the implementation phase, a strong leader and a steering committee will be required to direct the planning team's efforts. Participants on the steering committee are senior level management personnel and should include the engineering director, manufacturing director, finance director, manufacturing information systems director, and the human resources director. A three phased approach links business strategy to action plans (Fig 1).

The identification of corporate goals (see panel) should be developed at a three to five day off-site meeting. This avoids day to day distractions allowing management to concentrate on the bigger picture of the company. The goals at minimum must cover a period of five to fifteen years depending upon the specific industry. They will be the result of a strategic business review process (Fig 2). They must include a definition of the business, market objectives, competition, suppliers/customers, strengths and weaknesses, product objectives, growth objectives and other key objectives.

The next step is to develop the functional strategic objectives developed by the planning teams and include information technology, operations, engineering and marketing. A modernization and productivity improvement programme will focus primarily on operations and engineering functions with information systems playing a support role.

The planning team will be made up of various problem solving work groups. Representatives from other disciplines that may affect the process being studied must be included along with a facilitator who is someone completely isolated from

Manufacturing companies today are faced with a battle for survival. During the past 12 years, west European and north American companies have lost huge marketshare to south east Asian companies. This has shaken industrialists in every sector from a complacent posture acquired after the second world war. In the late seventies and early eighties, executives turned their attention to automated technologies to be the saviour of their companies. Productivity improvement was to be achieved through the application of systems and technology but many of these have failed miserably for a variety of reasons.

This article focuses on the need to create a vision of the future and shows how to prepare strategically based implementation plans.

the process under normal circumstances. The aims of the planning team are to:

- Define functional strategic objectives.
- Define the company future vision framework.
- Define management philosophies on which the vision will be built.
- Take a systems approach to defining value added business processes.
- Define gaps in the current environment business processes.
- Define changes to the current environment processes to achieve the vision.
- Define organizational approach.
- Define change management approach.
- Define project portfolio.
- Gain commitment from functional management within the company.
- Define broad implementation plans including the transition plan, the major tasks and incorporating existing initiatives.
- Define detailed implementation plans.

The planning team must create a model of the vision of the future and it

must develop a unique company model. This will represent the future state conceptual framework (Fig 3). It should include the relationship of the business processes and organizational structure, with management philosophies and technologies such as just-in-time, total quality control, total cost management, employee involvement and computer integrated manufacturing, etc. The process of developing this model will require intensive discussions between the functional specialists and first class facilitation by a visionary leader. The outcome of this effort will be a model that will allow company management and employees to share a common vision of the future in the form of a picture. The team must then define the fundamental principles on which the future state will be built. This includes writing narratives on the scope, objectives, mechanics, and benefits of the principles, as well as developing presentation material. The ultimate goal is to gain commitment from functional management.

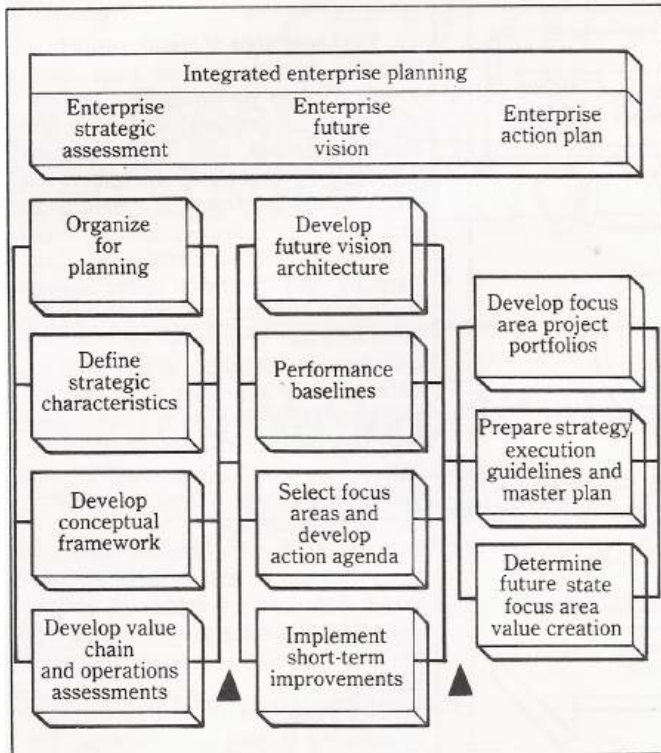


Fig 1. Detailed three-phase approach to enterprise planning

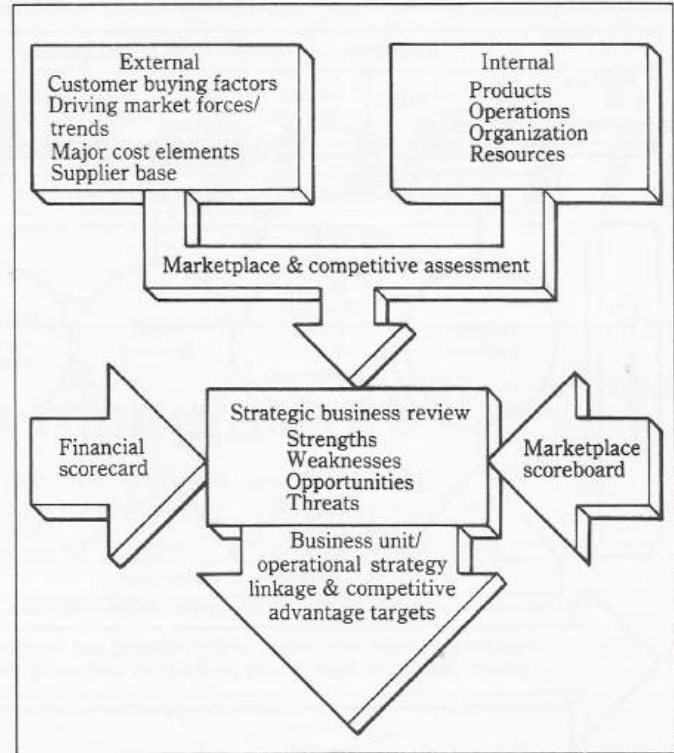


Fig 2. Strategic business review

To improve the quality of a product, the quality of the process must be improved. The next step is to define the value added processes in the company, and identify the gaps that inhibit executing the right process, the right way, the first time.

These major processes need to be broken into sub-processes and at the implementation phase sub-sub-sub-processes need to be developed. This will be the foundation on which the future company architecture will be built. Ultimately these processes will be nodes in a computer-integrated project-oriented environment. But at the vision planning stage, these processes will serve as the structure on which to identify major improvement changes. Members of the team should be prepared to devote substantial amounts of time and dedication to developing these processes. Each department should answer the questions:

- What processes occur in the department?
- What is the function of the process?
- What is the input (information/material) to the process?
- What application or value added activity takes place?
- What is the output information or material?
- Who is the owner of the output information/material?

Once the processes and gaps have been identified, the next step is to identify the changes required to the existing state to achieve the future state vision. This also will require exhaustive discussions between the functional specialists who will see

solutions from their narrow view points. When the changes have been agreed, they must be given some in-depth definition. This will include a narrative defining scope, mechanics of the change, technology adaptation, performance measurement, and improvement indicator.

Take note that the application of technology is a tool to improve the process. By utilizing this systematic plan, the team will determine if a process really adds value *before* automating it. During the entire planning process, the team must make presentations to the functional senior management team to gain commitment. This is the most critical step to a manufacturing modernization programme. The team will need to cost justify the various initiatives and assign priorities to each of them.

The planning team must now define the organizational approach to implement the changes. The team group leaders will most likely be the implementation team leaders. During the vision planning process, they will have developed skills in process consultation which the facilitator practiced. A matrix approach must be taken to implement the changes since future state processes will result in current processes occurring simultaneously. A classic example of this is in the design/manufacturing engineering area. In the future, stress engineers,

The goal led approach

The *goals* of the programme leader are to:

- Define corporate goals of the modernization programme.
- Organize the steering committee.
- Monitor overall progress to goals.
- Report on programme progress to corporate management.
- Communicate requests and approvals for large capital expenditures from corporate management.

The *goals* of the steering committee are to:

- Define the scope of the programme.
- Organize the planning team groups.
- Define objectives of the programme.
- Review/approve planning team's recommendations.
- Dissolve planning team groups.
- Report progress to programme leader.

Typical corporate *goals* are to:

- Capture greater market share.
- Improve product quality.
- Reduce leadtime.
- Improve investment management.
- Be number one in sales in a specific geographic location.

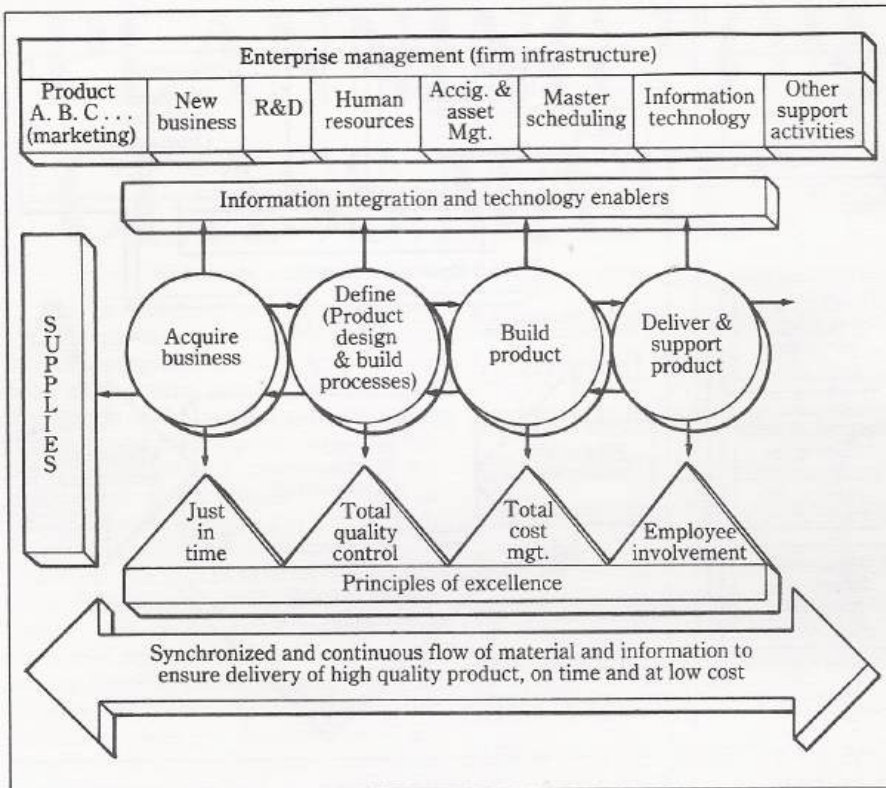


Fig 3. Future state conceptual framework

structural designers, mechanical designers, tool designers, process planners and NC programmers will work on a process at the same time, thus eliminating today's over the wall approach.

Careful consideration must be given to the management of change that will occur in the organization. This will involve a massive amount of education for all employees; at least 30% of the budget should be set aside for this. A systematic plan needs to be developed that covers the approach to managing change. The final stage of the strategic phase of the

modernization programme is to develop the broad implementation plans to achieve the vision. The major changes that have been identified need to be turned into detailed projects. To do this will require a more detailed analysis of the processes. The implementation team needs to develop a phased approach.

The implementation team must create a workplan to achieve the future state vision. The strategic planning phase typically takes about five to seven months and the implementation of the vision from five to ten years. The most impor-

The importance of manufacturing

Countries that have become great powers exhibit superior performance in the production of goods that are sold globally. The wealth generated from these products provided the economic foundation on which to maintain superior armed forces and first class service industries. From 1790-1970, France, Britain, Prussia-Germany, and the United States enjoyed the highest standards of living respectively while they had the greatest percentage of manufacturing exports. Britain with its development of technology in the late 18th and early 19th century (industrial revolution) was unmatched in economic terms. Later, the United States applied and enhanced the same technology to gain a competitive advantage.

In all cases, the superior economic power has had an advantage in manufacturing. Today we are witnessing another great transition in the global economy with the centre of economic power moving to south east Asia.

Major companies are restructuring and modernizing to meet this challenge. The advent of computers and automation provides speed and flexibility to company's operating systems. Those companies that believe in, and plan for, long term growth and success, adopt modernization programs now and do not wait for a tomorrow that may never come. Is your company one of them?

tant message in attempting a modernization programme is that you never get there because of the continuous change in today's technology and society. Because of this, a continuous improvement mentality and approach must be developed and instituted throughout the organization.