



Title: The appropriate of Matrix Management in Various Organization Types

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Author(s): S. Chusanathans, A. Sonthinen, V. Puvanunt and N. Tulananda

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**The Appropriateness of Matrix
Management in Various
Organization Types**

**S. Chusanathans, A. Sonthinen, V. Puvanunt,
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P9416

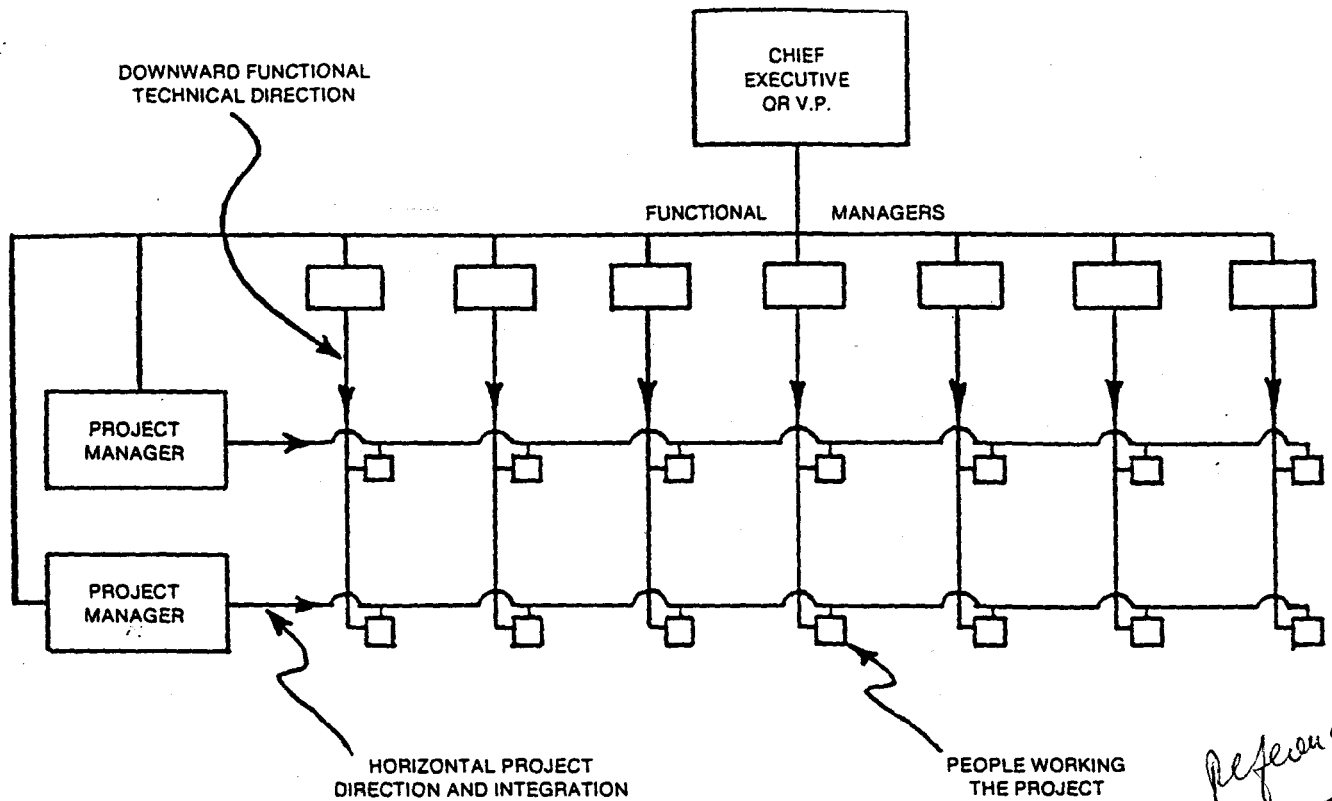
Abstract: The establishment of a matrix approach comes about through an evolutionary process that, in all probability, would not be the same for every organization. Matrix is a complex, difficult and sometimes frustrating form of organization to live with. However, matrix does work in some types of organization. There are some key elements that organizations should consider before deciding on using matrix management. The paper describes key elements necessary for successful use of a matrix approach.

Introduction

"Most engineers are accustomed to working under the single-line-of-command, or one-boss system. But for many engineering organizations, a matrix structure is a lot more effective. Under this set up, each engineer reports to at least two superiors having equal, but different, levels of responsibility and authority." [1]

"The matrix organization is a multidimensional structure that tries to maximize the strengths and minimize the weakness of both the project and the functional structures." [2]

A matrix organization is defined as an organization which there is dual or multiple managerial accountability and responsibility. The matrix are usually two line of command, one from functional manager and another from project manager. There are many alternatives for organize the specific project. The matrix organization was first developed and documented by the United States aerospace industry. The term "matrix" was indicated by Davis and Lawrence, "It probably seemed like a fitting term for mathematically trained engineers in that industry to apply to the gridlike structure that was evolving." [3]



**** figure A ** Simple matrix organization [- -]**

In matrix organization the roles and responsibilities of the project and functional manager must be clarified to ensure that the individual tasks are executed efficiently and effectively.

The project manager determines:

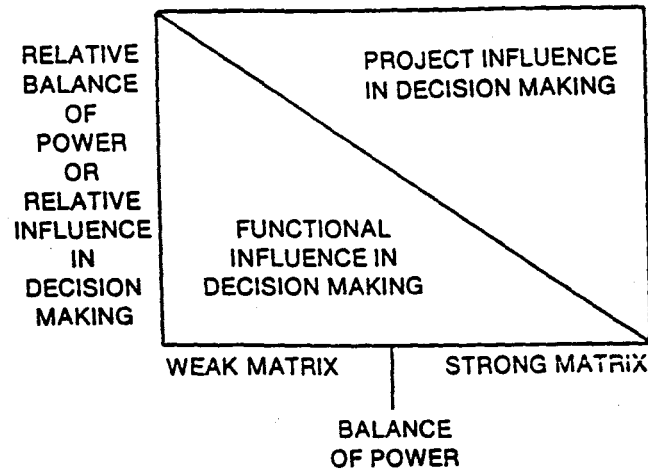
- what is required by the project's scope of work, and
- when the results of that effort are needed to meet the project's desired completion date.

The functional manager determines:

- how the requirement will be fulfilled, and
- who will specifically execute the work.

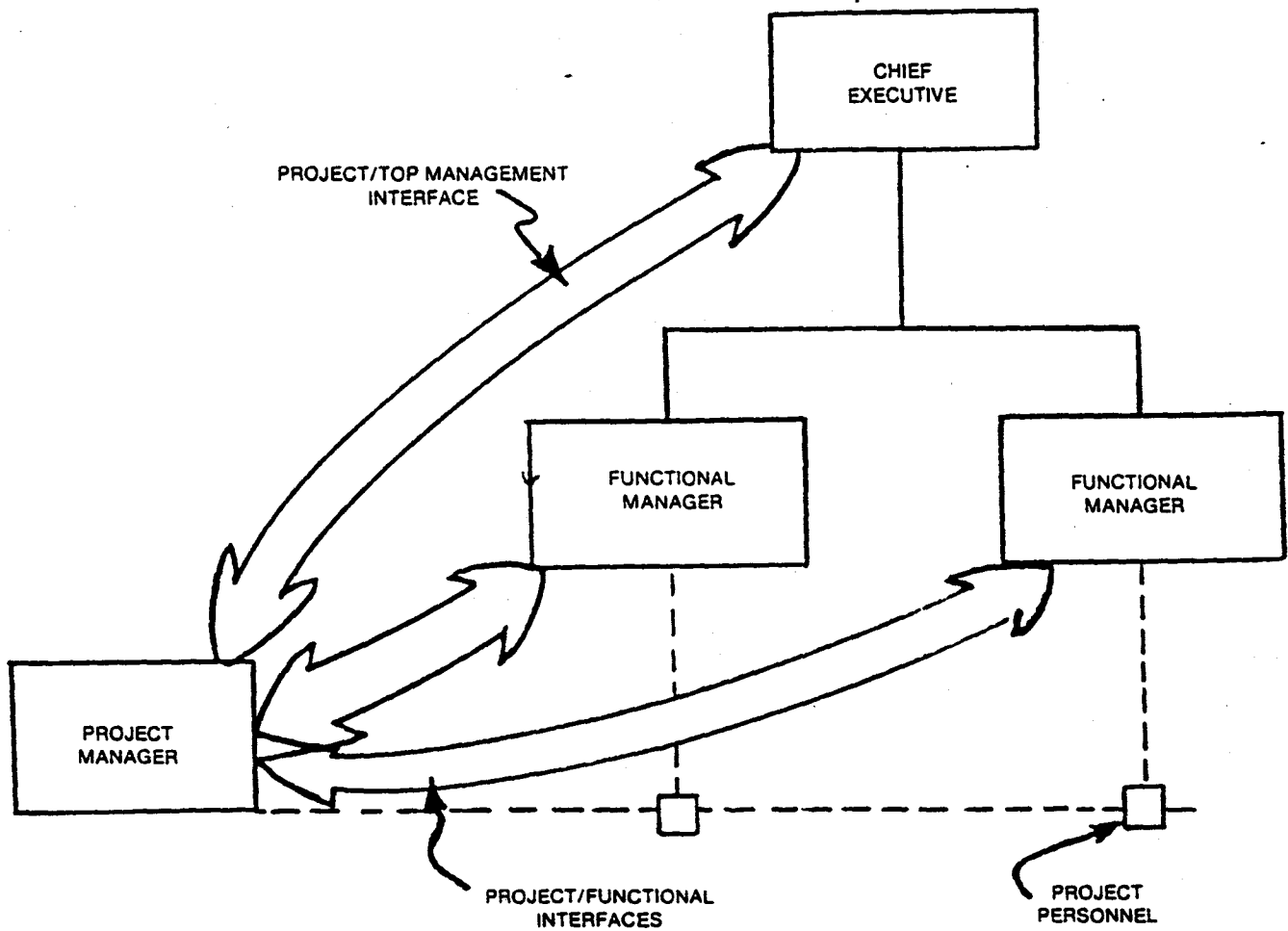
The strong matrix is one which the balance the power lean towards the project manager and functional personnel receive their instructions directly from the project manager.

Conversely, in a weak matrix, the functional manager has the balance of power and he gives the instructions while the project manager acts only as a coordinator."



**** figure B The balance of power in weak and strong matrices****

In the matrix management not only the balance power between project and functional manager but also a function of the type of interface relationships between the project and individual functional managers are required. Every execution in the matrix must be negotiated across this interface. There is a natural conflict situation in this interface because many of the goals and objectives of project and functional management are different. The multiple management interfaces are shown in *figure C*



**** figure C The multiple management interfaces****

The matrix organizational structure has had a great influence on the project management. Matrix management is criticized as a controversial and sometimes maligned of organizational management. Matrix can be confusing and cumbersome considering from its complexity, weak authority structure and bureaucratic tendencies.

Analysis

To show how matrix management can be made to work in a particular situation, the following analysis describes the structure, the reason for using a matrix approach, how matrix works, advantages and key elements for matrix success in three different firms:

1. CH2M Hill[4]
2. Dow Corning[5]
3. Dorr-Oliver[6]

CH2M Hill

Introduction

The CH2M Hill was founded in 1946 by four partners - Cornell, Howland, Hayes and Merryfield. In 1970, the firm merged with Clair Hill and Associates and became officially known as CH2M Hill. The firm provides broad services in the professions of engineering, sciences, planning and economics to public and private clients. CH2M Hill, Ltd., the holding company, consists of six operating subsidiaries which are CH2M Hill, Inc., the principal engineering services corporation; OMI, an operations management company; IDC, an industrial design corporation; IOTECH, a medical products irradiation facility; CH2M Hill Engineering, Ltd. in Canada; and CH2M Hill International, Ltd. The CH2M Hill Co. is structured into five separate geographic districts - northeast, southeast, northwest, southwest, and central.

Why Matrix?

The CH2M Hill is a multidiscipline consulting company with the total staff of 450 in seven regional office. Therefore, the organizational issues was the principal concerns for the firm. The problems of (1) How to control quality; (2) where to locate technical experts; and (3) how to provide employees with multiple career opportunities and how to recognize their contributions, such problems were brought up when expanding staff capability and geographical reach. With all these difficulties, the CH2M Hill used the matrix organization successfully to cope with all these problems and continue using it for at least 20 years.

Structure

The matrix organization structure was selected to help improve quality control when the firm decentralized into multiple regional offices. In the earliest decision, one side of the matrix is the geographical side which is composed of seven regional offices in different locations. The regional management structure consists of divisions and departments that each region is free to organize itself as it sees fits based on its individual marketing and technical needs. These regional offices would provide local services to its clients. The other side of the matrix is a technical discipline which centralized the expertise or specialists in every location to provide the consistent quality of project work. This technical organization structure was laid over the existing regional structure. The technical disciplines corresponded to the firm's major markets or technical services areas.

Under this organizational structure, each employee had at least two bosses - a regional manager through department and division managers and a technical discipline director.

Practically, due to the team concept in executing the project, the employee often had three bosses - the third being a project manager. Today, the CH2M Hill organizational structure consists of 10 disciplines, five districts and four administrative staff groups. All of them report to a president and a board of directors.

How Matrix Works?

When forming a project team, the project manager located in a region, puts together all team members. The project manager and project team can draw additional expertise from a district discipline director as well as a partial or full range of other technical expertise from any other disciplines. The matrix allows a project to function independently at the regional level or interdependently throughout the firm as the project demands. The responsibilities for regional and district within the firm's matrix system include:

1. Business development and client service
2. Project execution
3. Staff management, motivation and evaluation
4. Housing special project teams and specifics per authority/responsibility

matrix.

Initially, regions identify their markets, their clients, and their projects. The regions frequently ask the technical discipline to assist them with respect to

- Meeting with clients.
- Identifying projects.
- Scoping works and costs.
- Assigning staff to project teams.
- Scheduling work.
- Conducting reviews.

- Periodically meeting with the project team and clients.

After a large project is completed, the team is reassigned. After a small project, the team phases into other active projects.

The technical discipline responsibilities are technical excellence and quality assurance procedures. Disciplines are also responsible for special project assignments and evaluation of costs and technical effectiveness. Besides, the technical disciplines assist regions in project staffing, project execution, staff training, staff hiring and staff compensation. In the matrix system, the disciplines act as cost centers. Disciplines accumulate costs nationally to obtain work. To accomplish the work, they measure utilization of staff on client work and record the total volume of business. The regions act as profit centers, preparing an annual profit plan and monitoring profits through monthly operating reports.

The management structure of a district and its relationship to its regions and the disciplines is a microcosm of the firmwide matrix. Each district reports to a district manager and district discipline directors report directly to the discipline director.

Advantages

The advantages for CH2M Hill in using matrix management are as follows:

1. The centralized technical responsibilities provides flexibilities in staff assignments for scarce technical specialists and workload leveling.
2. It provides quick response to marketplace, wins the assignments, provides successful technical projects and cost-effective services.
3. The matrix provides a flexible organizational structure that can easily add new technical groups and service new geographical areas with strong technical products.

4. It expands the likelihood of decisions based on current knowledge, not on position.

5. It allows decisions to be made at the lowest level where the best information and knowledge exist and where quick response is possible.

6. It allows for participative decisions, which broaden the decision base and support consensus management.

7. Expanded career opportunities for employees and expanded project assignment opportunities

8. It allows association with more peers in the entire organization and provides greater job security.

9. It allows employees to become known by more levels of management and at the same time provides identity with a strong technical atmosphere.

Disadvantages

The disadvantages for CH2M Hill in using matrix management are as follows:

1. Because the system deviates from one-boss, single responsibility system, people may resist the change.

2. It focuses on an importance of clear and continuous interpersonal and interorganizational communications and therefore may tend to reward those who communicative effectively.

3. It tends to create higher overheads, at least initially.

4. The significant organizational complexity exists in this system and therefore strains managers and nonmanagers alike.

5. Because the system fosters considerable interdependence of people and tasks, and demands negotiating skills on both sides of the matrix, managers tend to become too absorbed in the internal workings of the system. The system can be very confusing

for new employees coming into the system. It takes time and energy for individuals to understand it.

Key Elements for Matrix Success at CH2M Hill

1. Allow time to define responsibilities/authorities. Time is required to define and work out responsibilities one by one.
2. Commit senior management time. Senior management's time is required to explain the system, sell it to all who are impacted and refine the matrix as the firm evolves to meet changing market conditions
3. Develop people who want the matrix to work. Spend time explaining to younger/newer staff how the matrix works and why it has been effective.
4. Make decisions based on what is good for the client and firm.
5. The matrix system requires continuous open discussions with no secrets or hidden agendas.
6. Eliminate politics at high levels. An organization with internal politics at a high levels of activity can expert problems. In a matrix organization each person must be a team player and be excited about seeing others succeed.
7. Considerable energy is required to evaluate and compensate on a common basis.
8. Consensus management is an important ingredient of matrix management. Impacted parties need to "buy in" to decisions. Consensus management also minimizes a blame and credit atmosphere.
9. Hire top people. Quality is defined by more than technical excellence. Top people are self-motivated, excited by new experiences and challenges . They have integrity and a willingness to place the interests of the client, the firm, and other people before their own interests.
10. Consolidate net income at corporate level and reward everyone in the firm.

Dow Corning

Introduction

In 1967 Dow Corning Corporation, which is jointly owned by the Dow Chemical Company and Corning Glass Works, reorganized from a conventional divisionalized type of organization into a matrix form of organization. As top management continued to experiment and innovate, the matrix form turned into what the company now calls a multidimensional organization. Judging from employees' reactions to the new pattern, as well as from impressive gains in sales, profit, productivity, and exports, the multidimensional organization is a striking success.

Why Matrix?

Although Dow Corning was healthy corporation in 1967, it showed symptoms of difficulty that troubled the top management. These symptoms were, and still are, common ones in US. business. The symptoms took such forms as:

- Executives did not have adequate financial information and control of their operations.
- Cumbersome communications channels existed between key functions, especially manufacturing and marketing.
- The corporation remained too internalized in its thinking and organizational structure. It was insufficiently oriented to the outside world.
- Lack of communication between divisions not only created the antithesis of a corporate team effort but also was wasteful of a precious resource-people.

- Long-range corporate planning was sporadic and superficial; this was leading to overstaffing, duplicated effort, and inefficiency.

To cure these symptoms, the cooperate decided to turn to a matrix concept of organization which they later call the multidimensional organization.

How Matrix Works?

The company modified the matrix organization to the multidimensional organization.

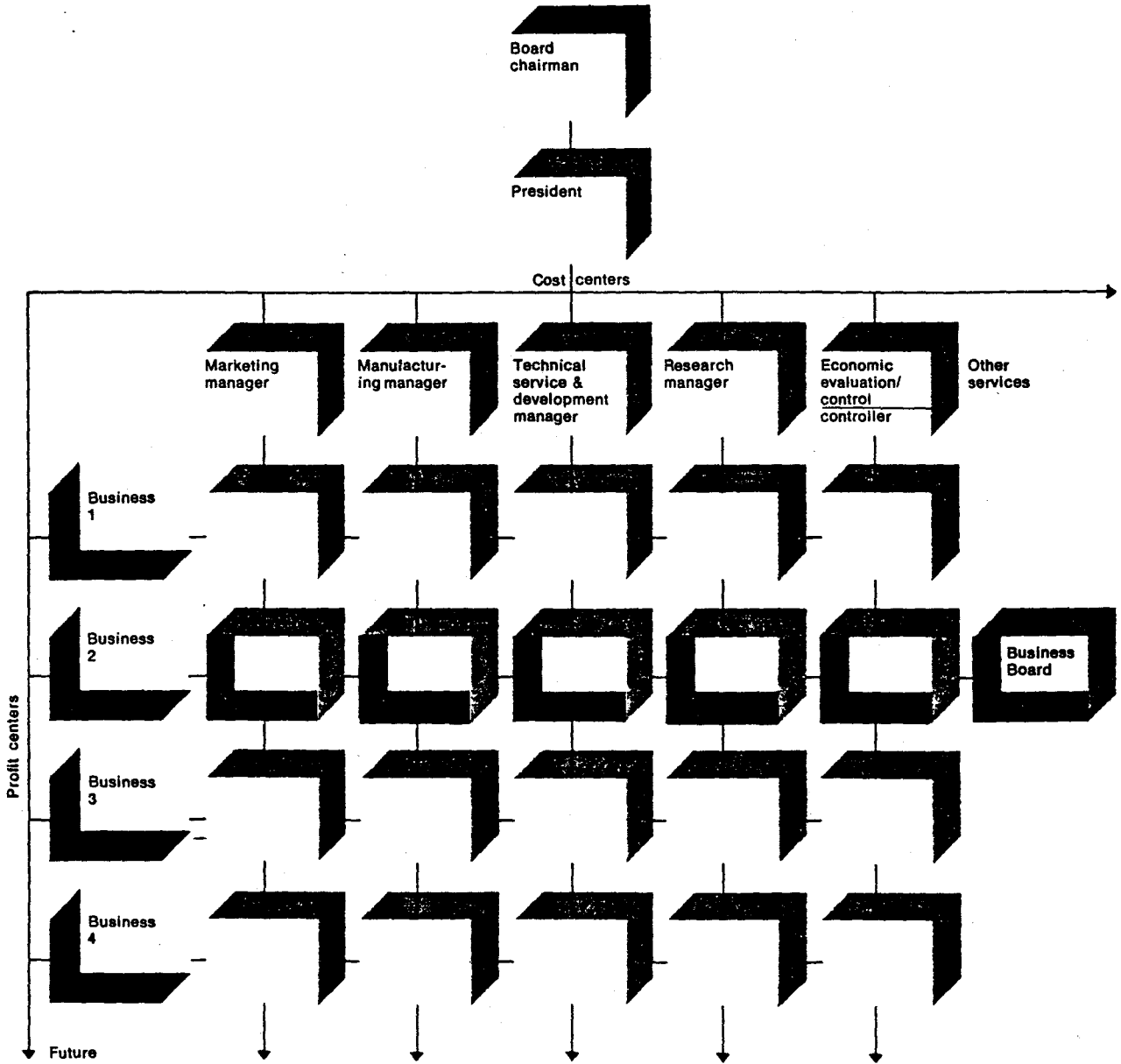
The four dimensions involved in forming the multidimensional organization are:

1. Profit centers-These were the different business the company was in. Businesses were defined along product lines-for instance, rubber, encapsulants and sealants; resin and chemicals; fluids, emulsions, and compounds; specialty lubricants; and consumer, medical, and semi-conductor products, In most of the cases each business's product line served a related group of industries, markets, or customers.

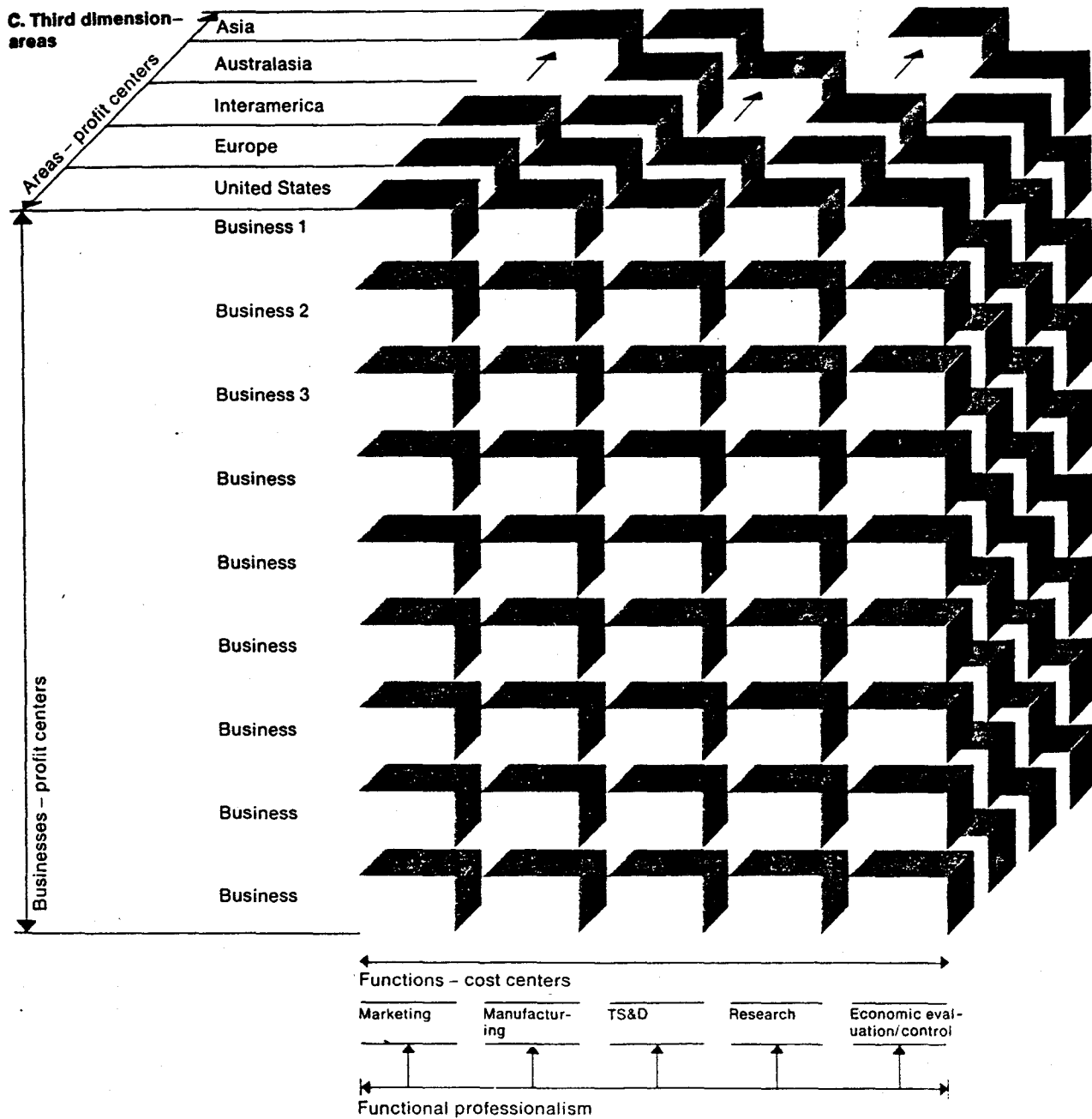
2. Cost centers-These were functional activities and included marketing, manufacturing, technical service and development, and research, as well as a number of supportive activities, such as corporate communications, legal and administrative services, economic evaluation, the controller's office, the treasurer's office and industrial relations.

**** Exhibit 1B Two-dimensional concept- profit and cost centers****

[—]



3. Geographical areas-Business development varied widely from area to area, and the profit-center and cost center dimensions could not be carried out everywhere in the same manner.



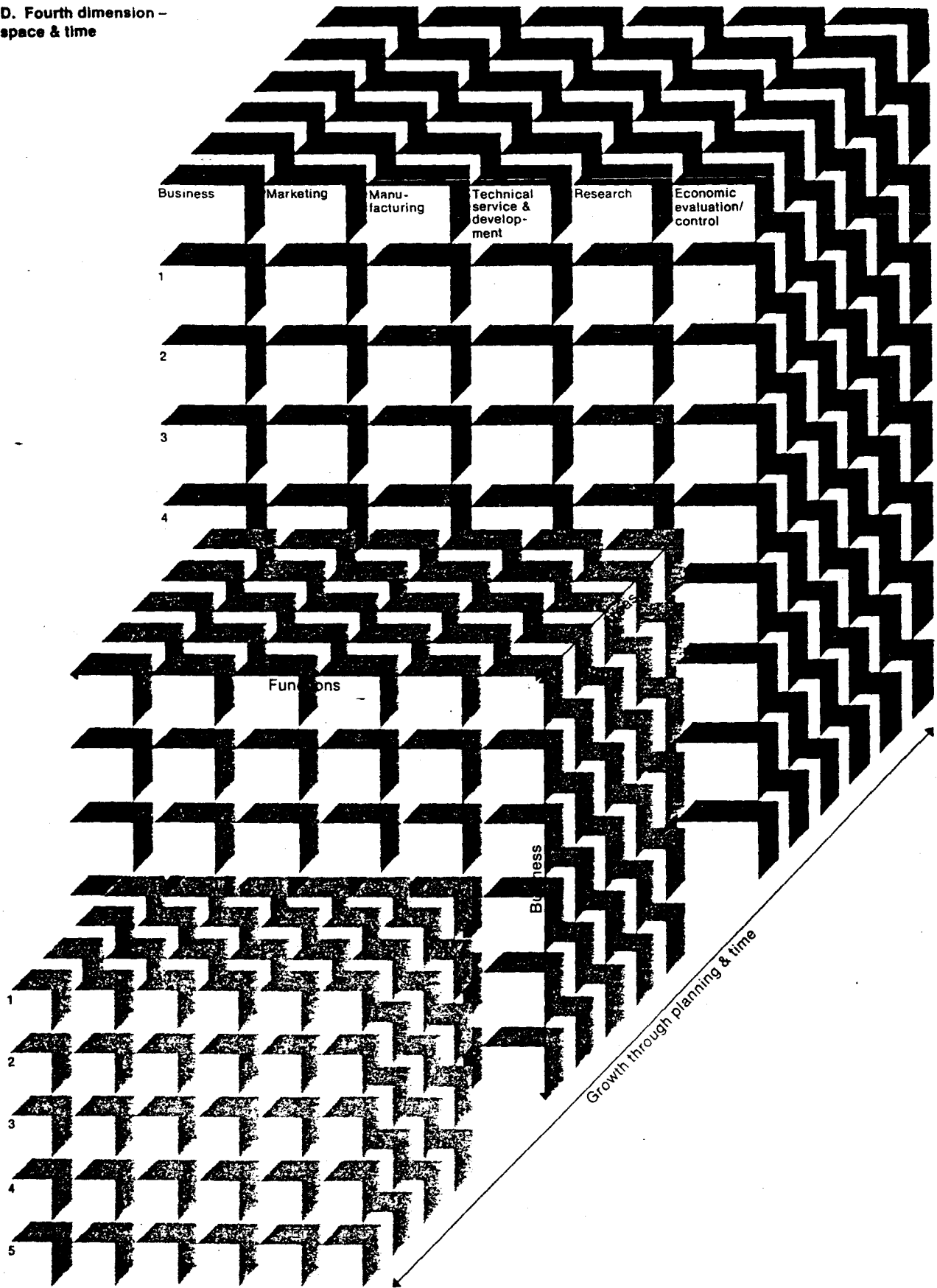
4. Space and time-A fourth dimension of the organization denotes fluidity and movement through time. The multidimensional organization is far from rigid; it is constantly changing. Unlike centralized or decentralized systems that too often are rooted deep in the past, the multidimensional organization is geared toward the future. Long-term planning is an inherent part of its operation.

In the multidimensional organization like this one, decision making is shift from the chief executive or the president to middle management, the intent is to push decision making as far down into the organization as possible and encourage group consensus. There are two requirements to make such system work:

1. The first requirement is that communications within the corporation be thorough and complete. Timely and relevant data must go to all who have need to know.

2. The second requirement is that those in charge of the project be able to understand and use the available data.

D. Fourth dimension - space & time



** Exhibit 1D Fourth dimension space& time**



The multidimensional technique is not a panacea for all organization problems. And the dedication that top management must maintain during the long and hard years of restructuring should not be underestimated. The company that appropriate for multidimensional organization must meet all of these following conditions:

- Developing, manufacturing and marketing many diverse but interrelated technological products and materials.
- Having market interests that span virtually every major industry.
- Becoming multinational with a rapidly expanding global business,
- Working in a business environment of rapid and drastic change, together with strong competition.

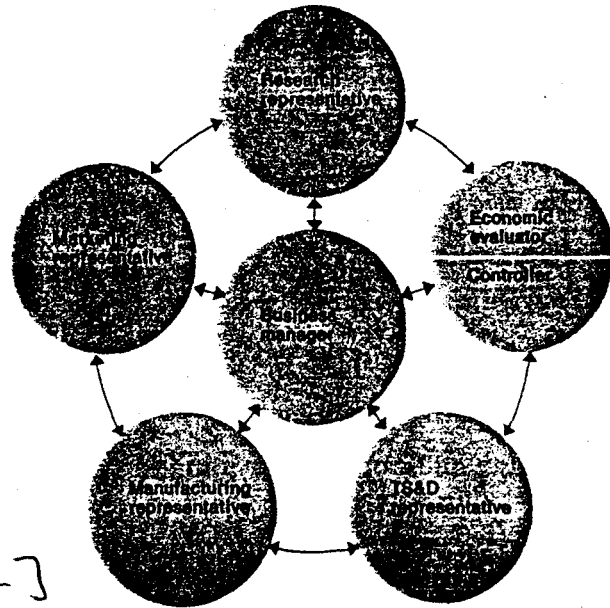
The initiation fee to the multidimensional organization group is very high. Some costs to considered are:

1. Willingness to cope with resistance to change.
2. Top management dedication for years-and this means not one, but essentially all, top executives.
3. A highly intelligent and motivated middle management anxious to see the whole corporation progress-no freeloaders.
4. Determination to minimized internal politics-no empire builders.
5. An abundance of patience in the part of the board of directors, top management, and middle management.

Key Elements for Matrix Success at Dow Corning

In fulfilling the two requirements stated in the How matrix works? section, the key elements that making the matrix success are as follows:

1. Business Board Operation: In Dow Corning, the Business Board consists of representatives from the marketing, technical service and development, research, manufacturing, and economic evaluation/control functions. They report directly to their functional group heads. The operation of each business board produces a healthy and invigorating power balance.



**** Exhibit 2 The business board**** {--}

2. Two-boss system: Making the two-boss system workable depends on the establishment of an environment of trust and confidence. Nurturing and perpetuating this environment must begin at the very top of the organization. Corporate goals and objectives must be seen by every employees as good, proper, potentially achievable, and worthy of strong commitment.

3. Crucial support systems: The basic charter for each function at Dow Corning is clear and unequivocal :

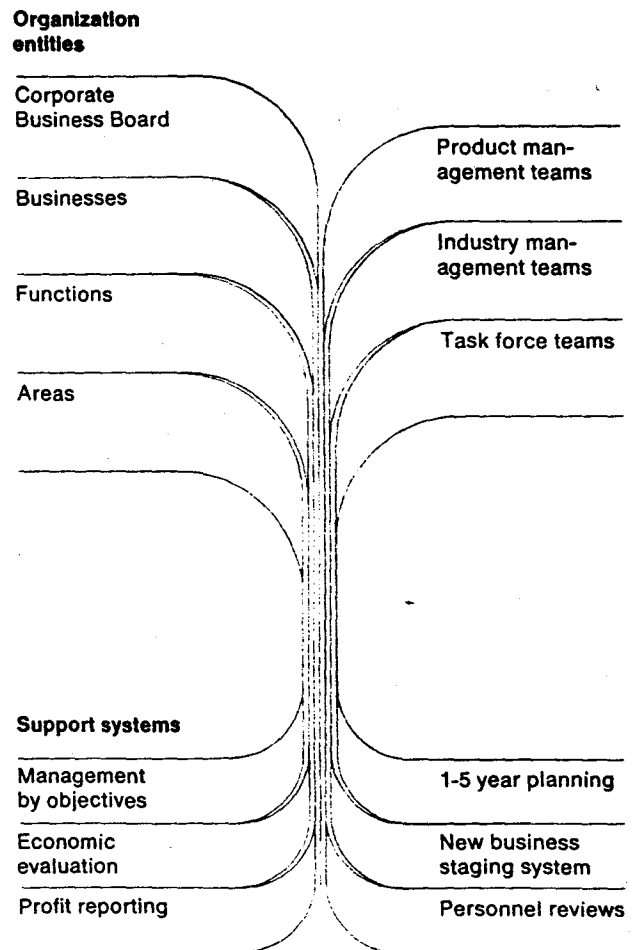
- Marketing- generation of sales volume, with a sharp eye on profitability.
- Technical service and development-new-product commercialization and old-product maintenance.
- Manufacturing-volume and efficiency in production, engineering, and technology.

- Research-assurance of a steady flow of new product that can be commercialized.

- Economic evaluation, control, and planning-development of a common cooperate economic language and a uniform analytical system for evaluating capital expenditures and all strategic program having an economic impact.

In a multidimensional organization these functions are closely related, and it is especially important that they work together smoothly and productively. Consistent and uniform standards are essential. To achieve such coordination the company maintains a number of support systems for example:

- Management by objectives
- Personnel reviews
- Planning process
- Economics evaluation
- Profit reporting
- New business staging



**** Exhibit 4 Role of support systems****

Dorr- Oliver

Introduction

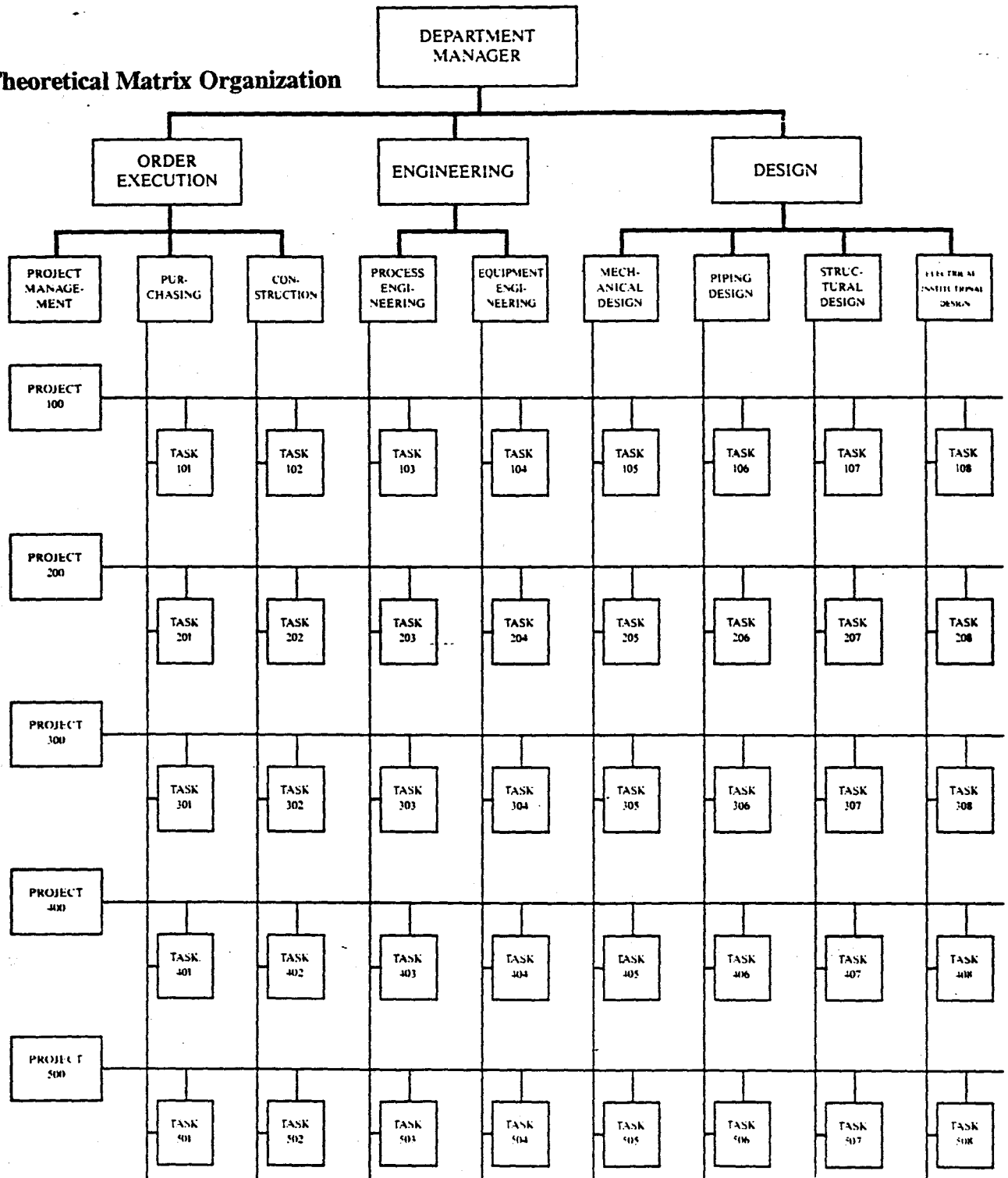
In 1970, the firm installed a theoretical matrix management structure for executing its fluid bed systems projects and the results were negative. In 1976, a management change was made and the department restructured. The benefits of the matrix approach were then recognized. The weaknesses of the existing organization were identified. A modified matrix organizational structure was installed.

Why Matrix?

The purpose of a matrix approach is to retain the benefits of a strong functional organization, which provides the project manager with the desired project execution support.

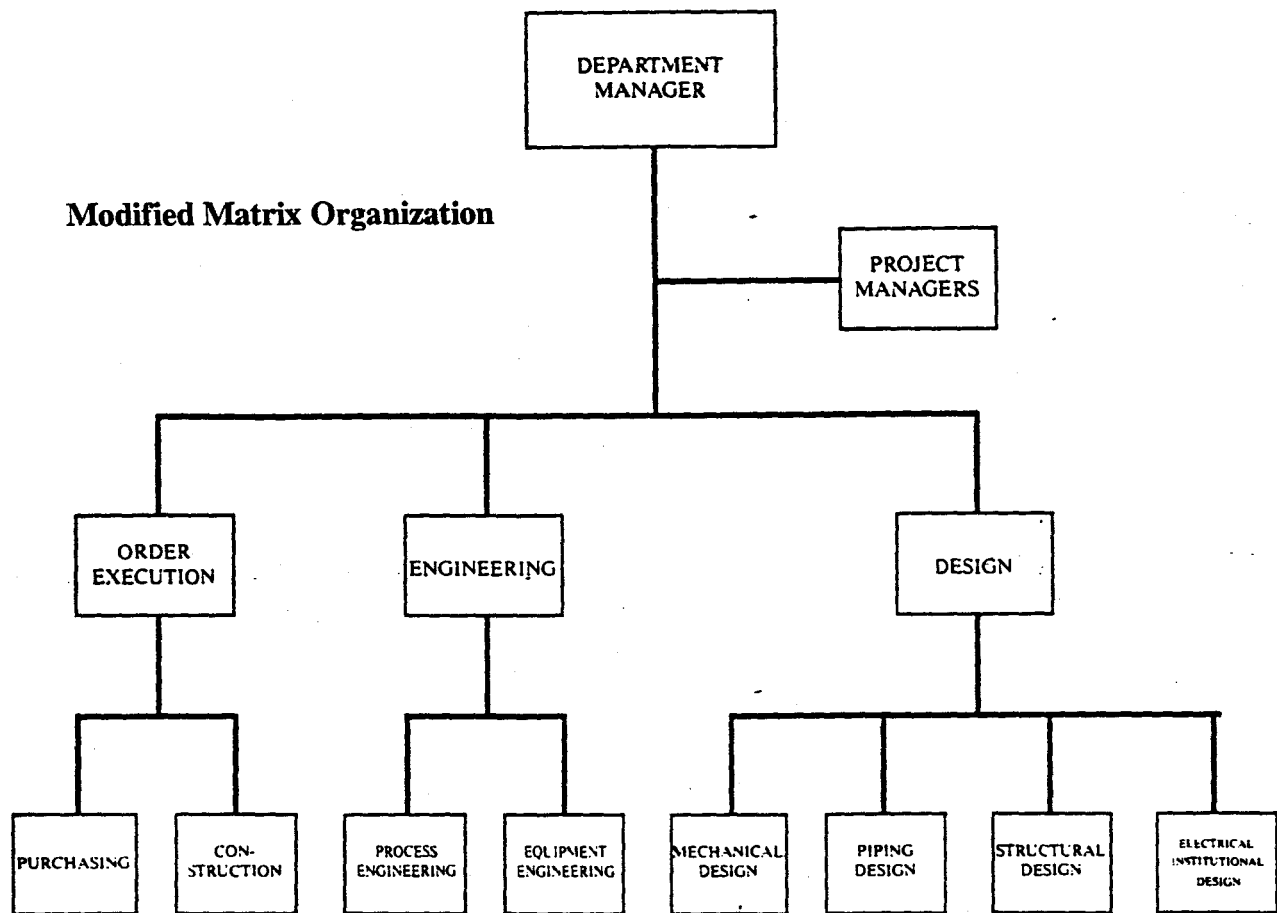
Structure

Theoretical Matrix Organization



****figure 1 Theoretical Matrix Organization****





**** figure 2 Modified Matrix Organization**** [—]

How Matrix Works?

Theoretical matrix organization structure basic flaws:

The theoretical matrix organization approach failed to accomplish the goal at Dorr-Oliver in 1970. The project manager was placed below the functional manager with whom they were expected to negotiate, and the organization did not balance the project and functional managers. This organizational approach made it difficult to view the project manager as having primary responsibility for the project success. As shown in *figure 1*, the role of the project manager was difficult to define and to execute. The operation of Dorr-Oliver's functional groups in the theoretical matrix mode was idle and this confused designers awaiting clarification of conflicting instructions

A Modified Approach

To achieve the benefits of matrix management and avoid the pitfalls encountered in the classical organization structure, the "hybrid" organization was installed at Dorr-Oliver as shown in *figure 2* and has proven to be a successful matrix approach. The project manager was placed in a staff position reporting directly to the department manager. Placement of the project and functional managers directly under the department manager simplifies the process of identifying and resolving conflict. The entire project scope is executed within the department, eliminating the need for project negotiations with other elements of the corporation.

Advantages

The advantages of the matrix organization approach are:

- The project is emphasized by a single individual project manager.
- Manpower is used more effectively.
- The knowledge gained on one project can be shared within departmental colleagues who work on other projects.
- Project personnel have a functional "home".
- Technical consistency is maintained between projects.
- Management consistency is maintained between projects.
- Responsiveness to project needs is generally faster.
- A better balance between time, cost and performance.

Disadvantages

The disadvantages of employing the matrix management approach are:

- The balance of power between project and functional managers must be controlled.
- The balance of time, cost, and performance must be carefully monitored to prevent mischarges and unrealistic time allocations between project.
- Individual loyalties and personal aspirations must never be allowed to conflict with the basic goals to the organization.

Key Elements for Matrix Success at Dorr-Oliver

- The roles and responsibilities of the project members must be precisely defined, fully understood, and acknowledged by the participants themselves.
- The individuals sharing decision making responsibility must be willing and able to negotiate the ultimate direction to be taken.
- Conflicting instructions to the parties execution the work must be minimized, if not completely eliminated.

For the general consideration the theoretical approach can be succeeded with these key elements:

- The project manager must be given the suitable power for his negotiations with the functional managers.
- The project and functional managers must both recognize their respective roles and responsibilities in the work defining negotiation process.

- The personnel in organization need not realize that he is in a matrix organization, receiving all direction from the traditional source, his "boss".
- The project manager must maintain control of the work by holding periodic reviews to insure compliance with the plan.
- Education is imperative, the entire staff must be aware of the goals of the organization.
- The relationship between functional manager, project manager, and the individual expected to resolve conflict, must be considered in organizational structuring.

Results from Analysis

- Staff awareness is a major factor in making the process work.
- Management must ensure complete understanding of the matrix management process, obtaining total commitment to it from the entire staff.
- The project and functional manager must both recognize their respective roles and responsibilities in the work defining negotiation process.
- Management must be prepared to "experiment" with theoretical concept, making changes and adjustments when necessary, in the evolution of the desired organizational structure.
- Communication within the cooperation should be thorough and complete. Timely and relevant data must go to all who have a need to know.
- Corporate goals and objectives must be seen by every employee as good, proper, potentially achievable, and worthy of strong commitment.
- The dedication from top management must be maintained during the long hard years of restructuring.

This section needs strengthening

Matrix Management Works Well in the Organizations with:

- An ongoing development program, where a major, continuing effort goes into the conception, design, construction and testing of each project.
- Sophisticated skills are needed in designing, building and testing the project.
- Multiple projects of varying scope and complexity.
- A number of ongoing projects
- Medium size projects but are complex
- Multidiscipline and limited in technical specialist.

Expand!