UNIVERSITY of WASHINGTON
COLLEGE of ENGINEERING

Industrial Engineering

ORGANIZATIONS and MANAGEMENT

Definition of Organizations

- An organization is a collection of people working together in a coordinated and structured fashion to achieve one or more goals.

Organizations Role in Society

- Organizations exist to allow accomplishment of work that could not be achieved by people alone.

- As long as the goals of an organization are appropriate, society will allow them to exist and they can contribute to society.

Organizations and People

- Organizations are strongly influenced by the people that form part of them.

- Organizations can take in part of the personality of the people within them and their attitudes, perceptions and behaviors affect how an organization will operate.

Organizations Require Management

- Organizations use management to accomplish the work that is required to achieve the goals.

The Nature of the Organizational Environment

- The *external environment is* everything outside an organization that might affect it.

- The *internal environment* consists of conditions and forces within the organization.

The External Environment

- The general environment is the nonspecific dimensions and forces in its surroundings that might affect its activities.

- The task environment consists of specific organizations or groups that are likely to influence an organization.

General Environment (1)

- The *economic dimension* inflation, interest rates, unemployment, and demand.

- The *technological dimension* refers to the methods available for converting resources into products or services.

- The *socio-cultural dimension,* customs, mores, values, and demographic characteristics of the society in which the organization functions.

General Environment (2)

- The *political-legal dimension* refers to government regulation of business and the relationship between business and government.

- The *international dimension* refers to the extent to which an organization is involved in or affected by business in other countries.

Task Environment

- Organizations exist to accomplish one or more tasks

Task Environment Actors

- *Competitors* are other organizations that compete for resources.

- *Customers* are whoever pays money to acquire an organization's product or service.

- *Suppliers* are organizations that provide resources for other organizations.

Task Environment Actors

- *Regulators* are units in the task environment that have the potential to control, regulate, or influence an organization's policies and practices.

Types of Regulators

- *Regulatory agencies* are created by the government to protect the public from certain business practices or to protect organizations from one another. Examples include the Environmental Protection Agency and the Department of Occupational Safety, Health and Welfare.

- *Interest groups* are groups organized by their members to attempt to influence organizations. Examples include the Chamber of Commerce, Sierra Club, and the National Rifle Association.

Task Environment Actors

- Labor includes all workers who provide the service or produce the products. Labor is especially a concern when it is unionized.

- Owners are individuals, groups, or organizations who have a major stake in the organization.

- Strategic allies are two or more companies that work together in joint ventures.

The Internal Environment

- Board of Directors
- Employees
- Culture

Board of Directors

- A board of directors is only required of organizations that are incorporated; however, many other firms have them. The board of directors is elected by the stockholders and is charged with overseeing the general management of the firm to ensure that it is being run in a way that best serves the stockholders' interests.

Employees

- When the organization's employees hold the same values and goals as its management, everyone wins. However, when managers and employees work toward different goals everyone suffers. The composition of the organization's employees is changing, and managers must learn how to deal effectively with these changes.
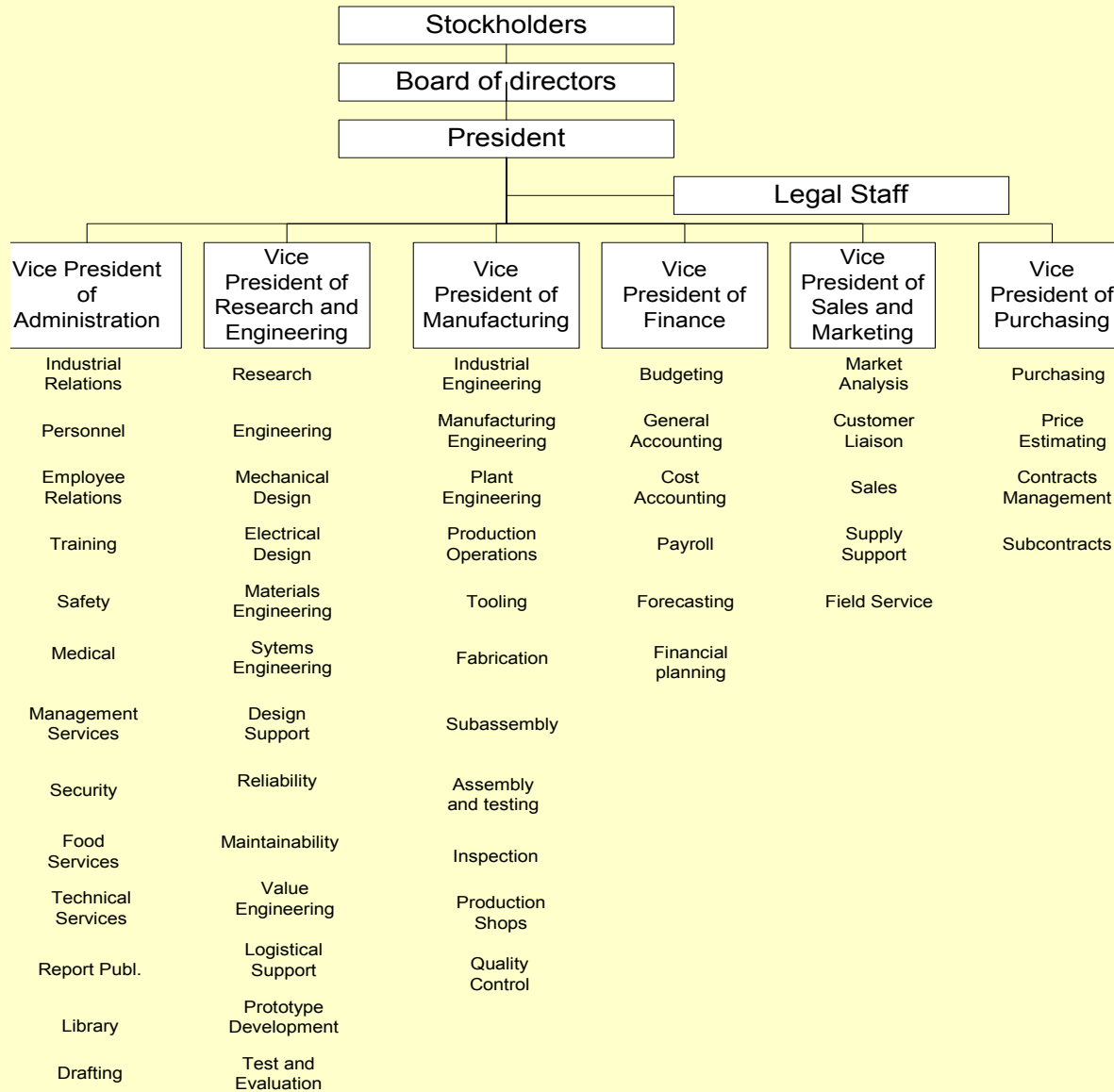
Culture

- The *culture* of an organization is the set of values that helps its members understand what the organization stands for, how it does things, and what it considers important.

- A strong organizational culture can shape the firm's overall effectiveness and long-term success and help employees to be more productive.
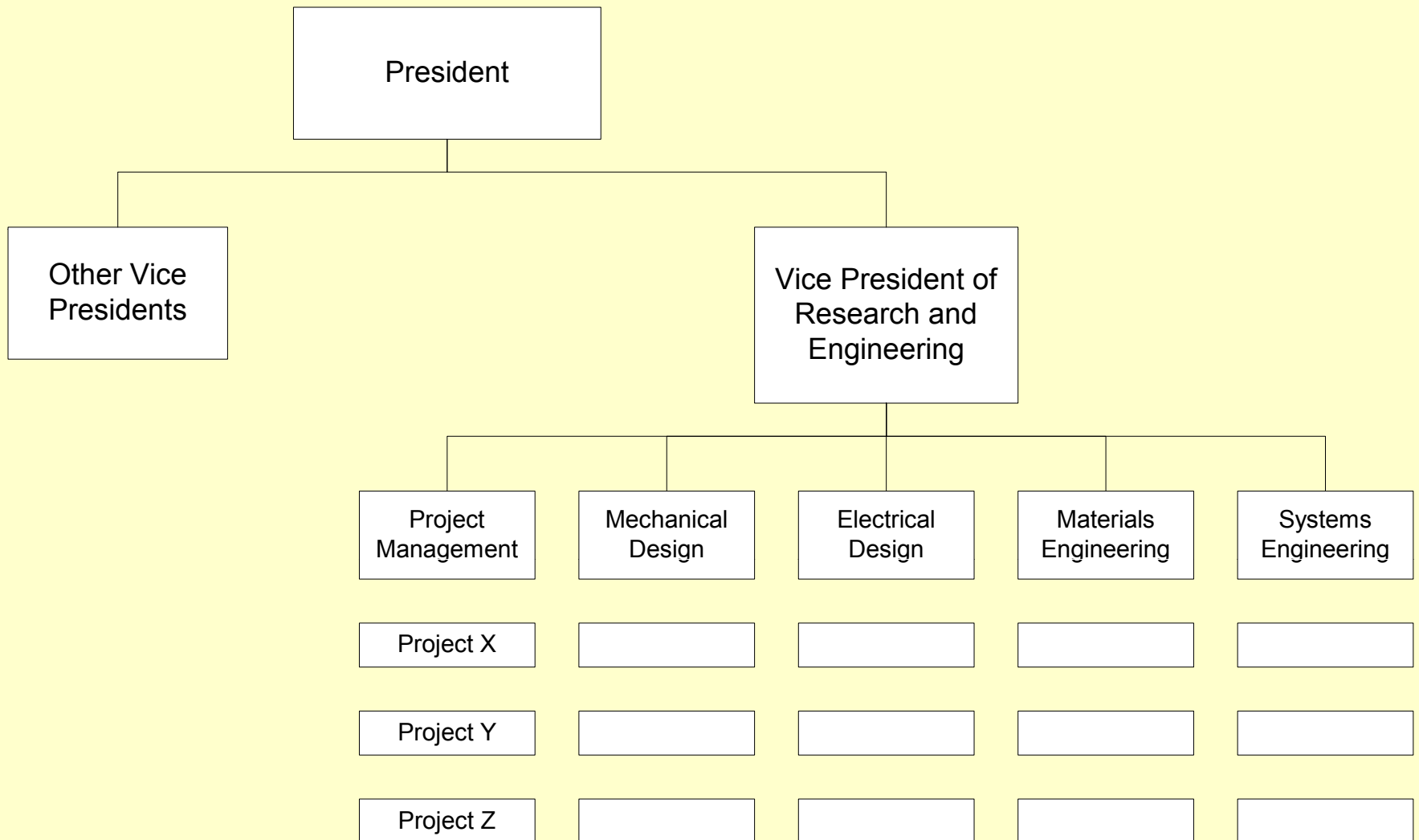
Engineering/Design Organization

- Traditional Organizational Structure
- Project Organizational Structure

Traditional Organizational Structure

Stockholders

Board of directors

President

Legal Staff

Vice President of Administration	Vice President of Research and Engineering	Vice President of Manufacturing	Vice President of Finance	Vice President of Sales and Marketing	Vice President of Purchasing
Industrial Relations	Research	Industrial Engineering	Budgeting	Market Analysis	Purchasing
Personnel	Engineering	Manufacturing Engineering	General Accounting	Customer Liaison	Price Estimating
Employee Relations	Mechanical Design	Plant Engineering	Cost Accounting	Sales	Contracts Management
Training	Electrical Design	Production Operations	Payroll	Supply Support	Subcontracts
Safety	Materials Engineering	Tooling	Forecasting	Field Service	
Medical	Sytems Engineering	Fabrication	Financial planning		
Management Services	Design Support	Subassembly			
Security	Reliability	Assembly and testing			
Food Services	Maintainability	Inspection			
Technical Services	Value Engineering	Production Shops			
Report Publ.	Logistical Support	Quality Control			
Library	Prototype Development				
Drafting	Test and Evaluation				

Project Organizational Structure

Functional Organizations

"Functional organizations, as an organization type, are best when a firm makes only one or a few products and where technology does not change. The traditionalists in shipbuilding look simplistically at the entire as the end product of the shipyard." The product-oriented organization, on the other hand is " . . . a structure based on a Product Work Breakdown Structure and Group Technology which permits diversification . . . aimed at interim products . . . That makes it possible for large firms to cope with technological change and multiple markets."

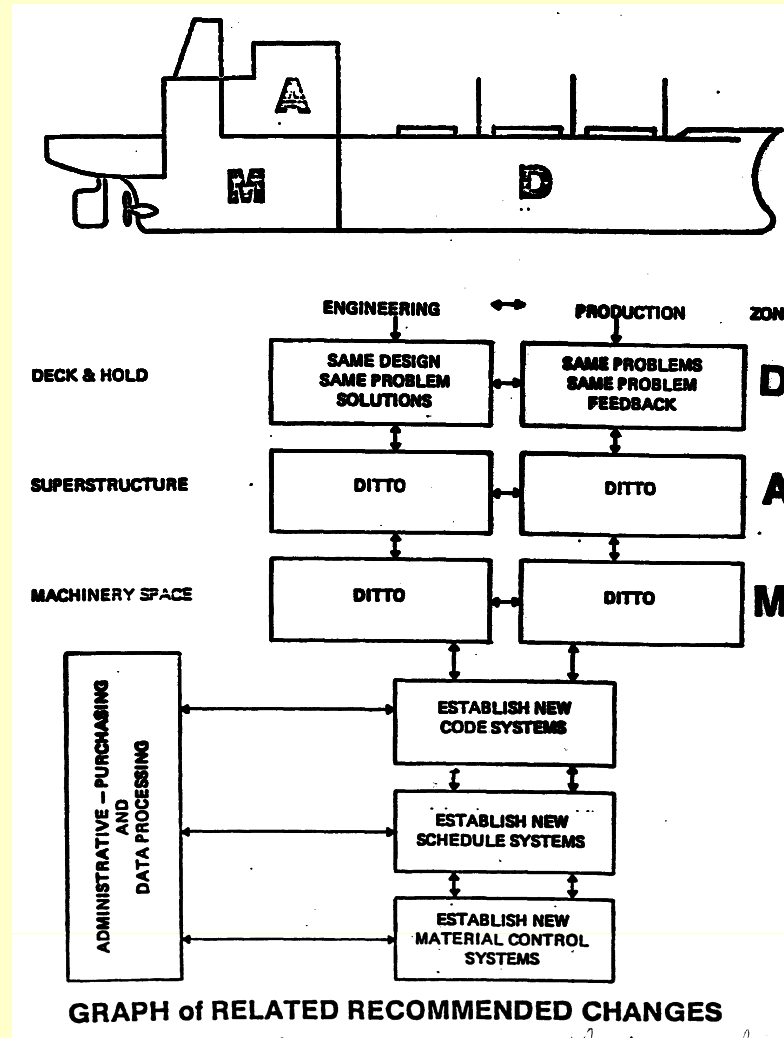# Functional vs. Product Layout
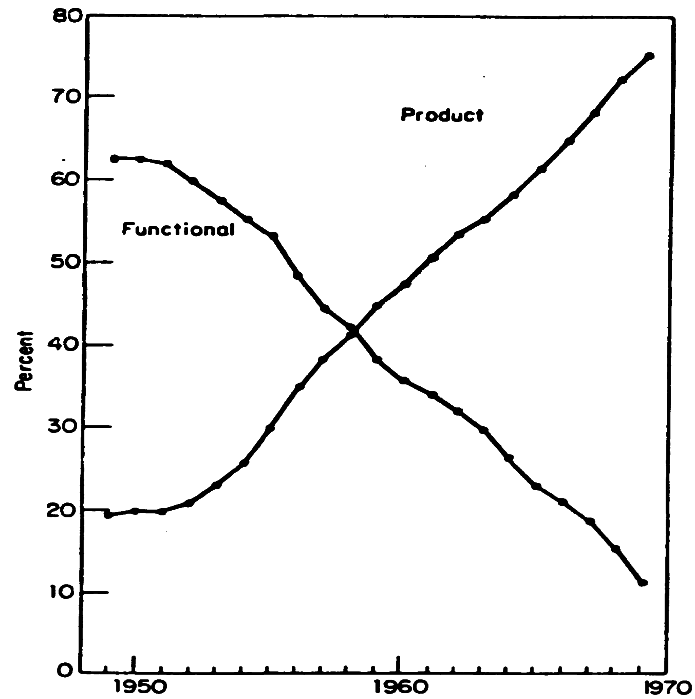
FIGURE 1. Transformation of Fortune 500 companies from functional to product organizations between 1949 and 1969. From Richard P. Rumelt, "Strategy, Structure and Economic Performance," Division of Research, Harvard Business School, Boston, 1974, p. 66.
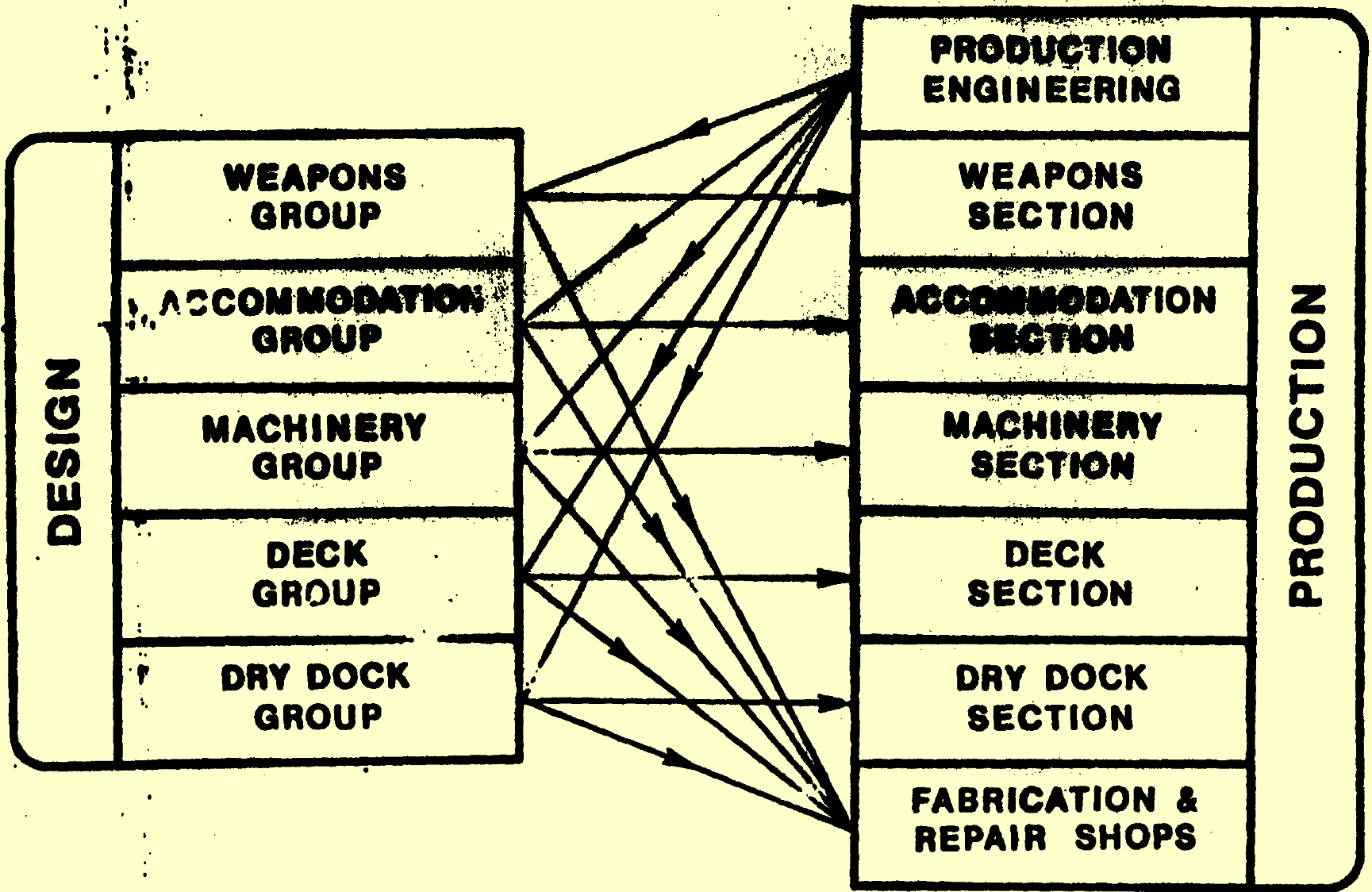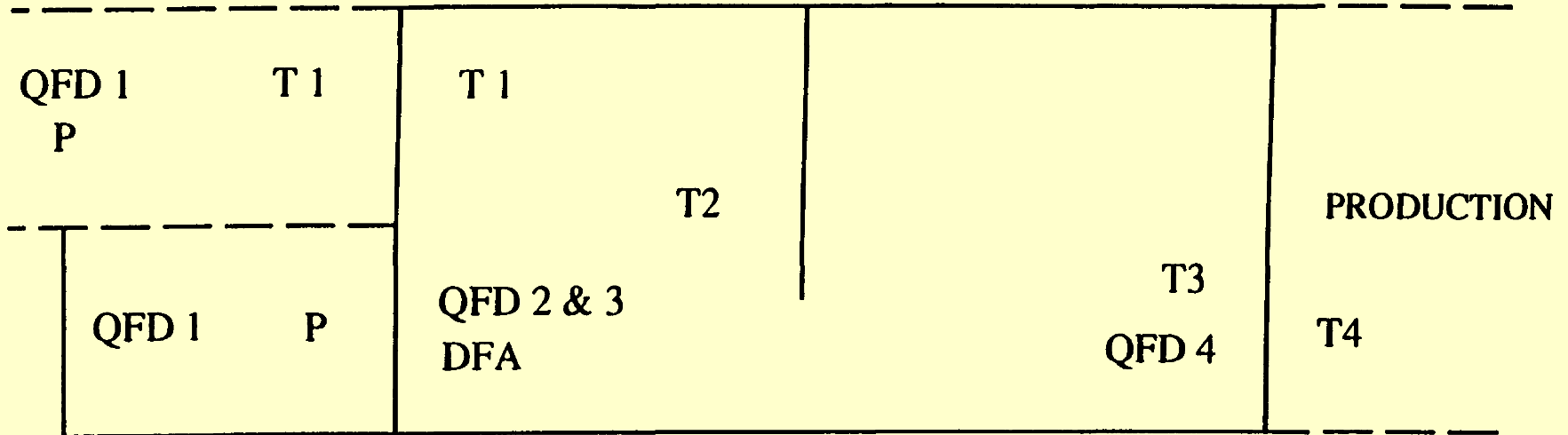
Project Organization Example
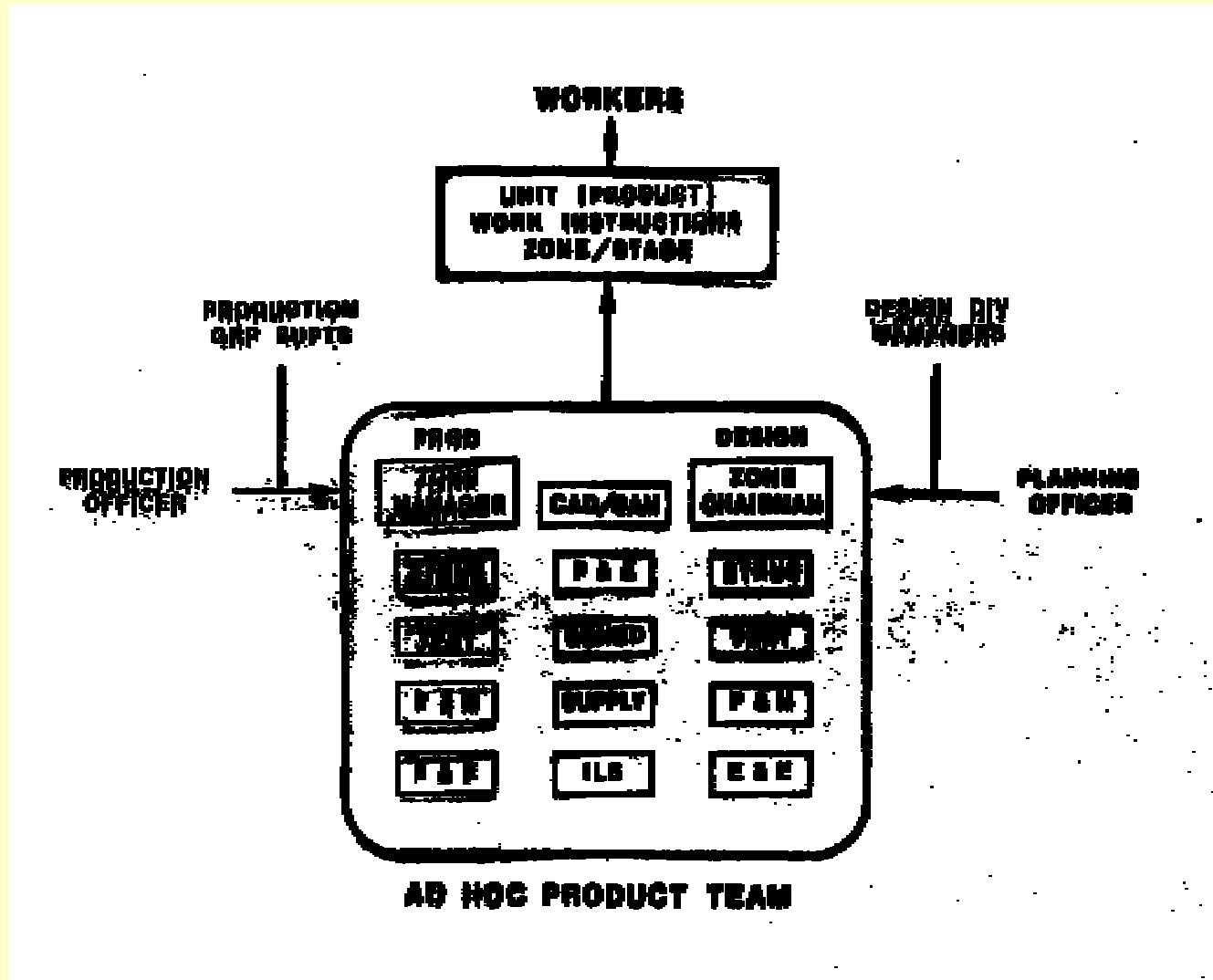
Design/Production Organization

GRAPH of RELATED RECOMMENDED CHANGES

CONCURRENT ENGINEERING TOOLS

QFD 1 T 1	T 1		
P			PRODUCTION
	T2		
QFD 1 P	QFD 2 & 3 DFA	T3 QFD 4	T4

DFA - Design for Assembly
QFD - Quality function deployment
T - Taguchi
P - Pugh (concept selection and static/dynamic status)

|	
QFD 1	House of Quality
QFD 2	Parts deployment
QFD 3	Process deployment
QFD 4	Production planning
T1	Product parameter design
T2	Tolerance design
T3	Process parameter design (clean-sheet processes optimized at T1)
T4	On-line QC

Terminology of Importance
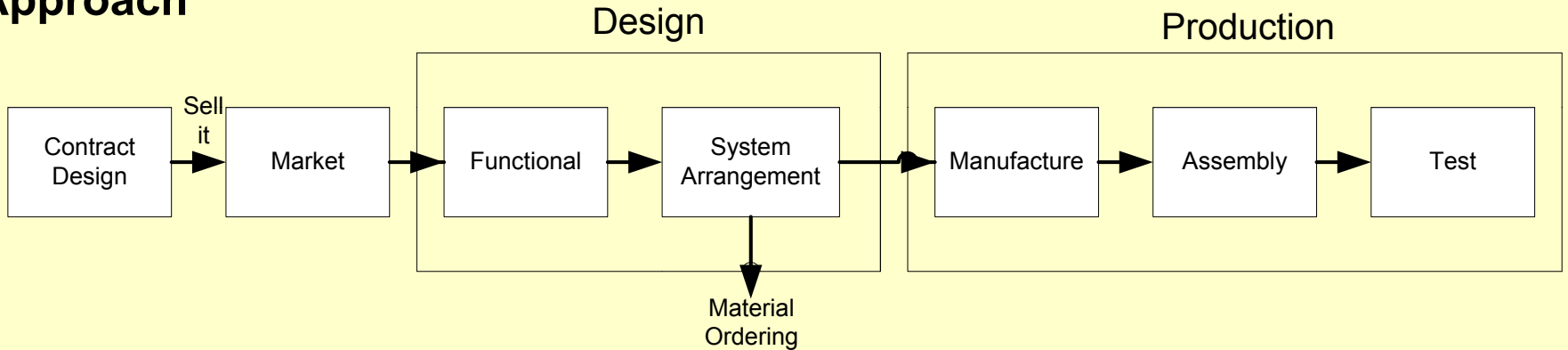
Concurrent Engineering (World-Class Design)

1. Design for Manufacturability (DFM)
    a. Design for Assembly (DFA)
    b. Design for Piece Part Producibility (DFP)
2. QFD—Quality Function Deployment (voice of the customer)
3. Taguchi Quality Engineering by Design (Robust Design)
4. Concept Selection – Prof. Stuart Pugh
5. G.T.
6. FMEA
7. Value Engineering
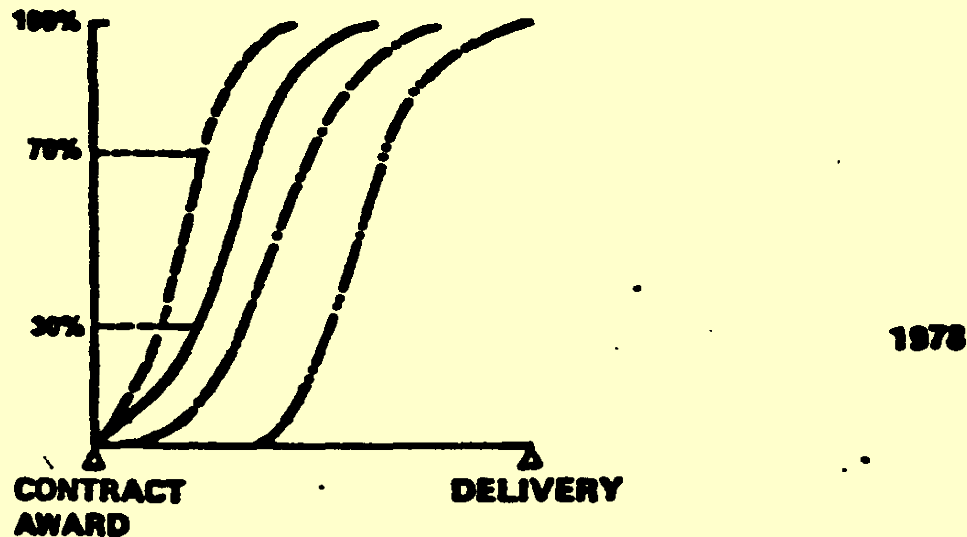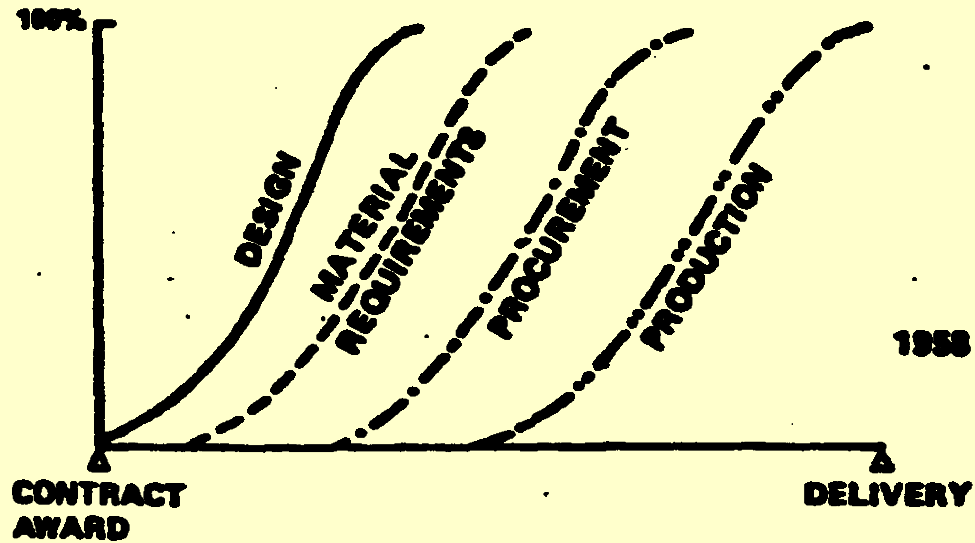
FIGURE 1-1: Overlap of outfit design, material definition, procurement and production which has been achieved by the most competitive shipbuilders. When only 30% of a design is completed, 70% of its required material is defined.
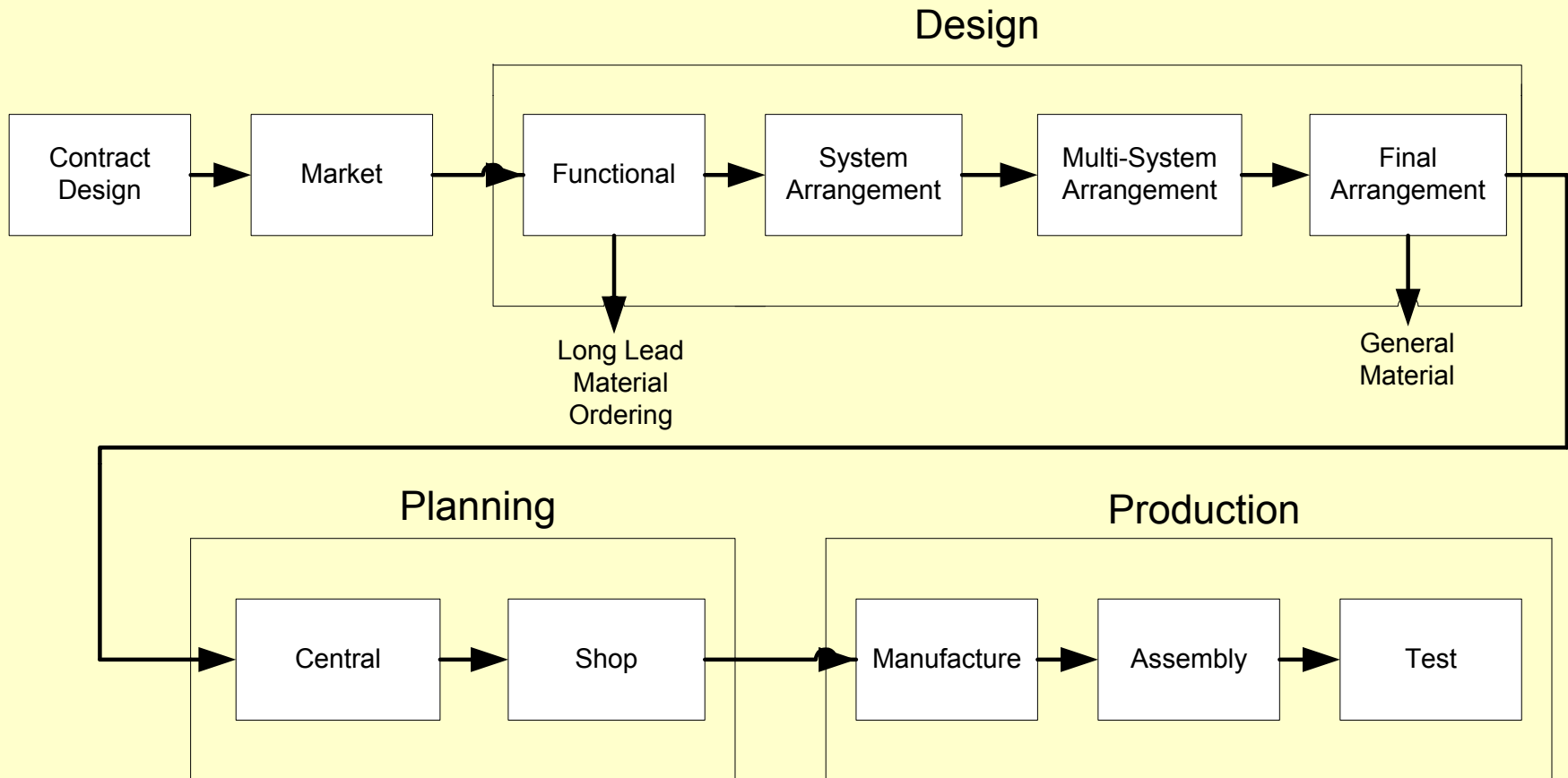
Product Design: Old Approach

Old Approach

Design

Production

Contract Design → Sell it → Market → Functional → System Arrangement → Manufacture → Assembly → Test

System Arrangement → Material Ordering

Product Design: Intermediate Approach

Intermediate Approach

Design

| Contract Design | → | Market | → | Functional | → | System Arrangement | → | Multi-System Arrangement | → | Final Arrangement |

Long Lead Material Ordering

General Material

Planning

| Central | → | Shop |

Production

| Manufacture | → | Assembly | → | Test |

Product Design: New Approach

New Approach

Planning and Design

Production

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Market → Contract → Functional → Zone or Module → Zone/Stage → Zone/Stage → Test
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Functional → Long Lead Material Ordering

Zone/Stage → General Material
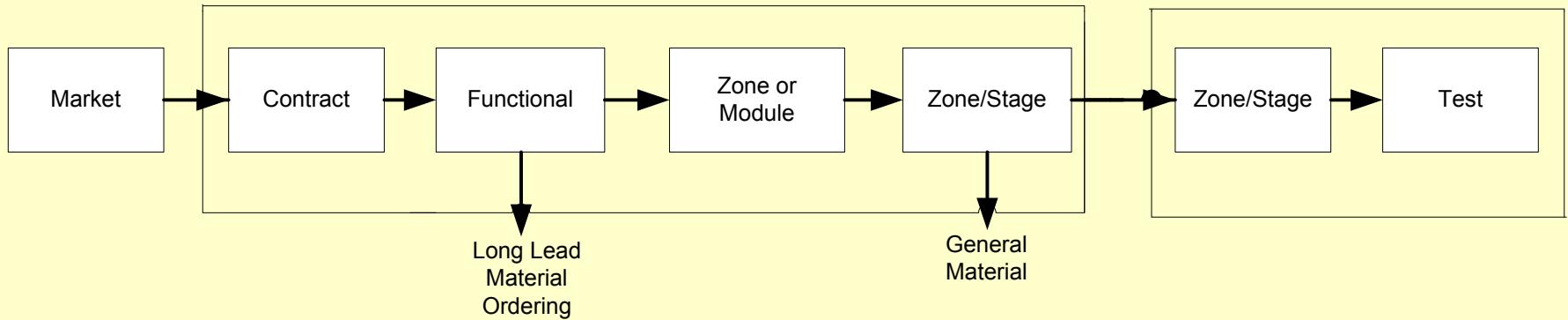
The Nature of Management

- Management is a set of activities directed at an organization's resources with the aim of achieving organizational goals in an efficient and effective manner.

Management Activities

- Planning
- Decision Making
- Organizing
- Leading
- Controlling

Organizations Resources

- Human
- Financial
- Physical
- Information

Efficient and Effective

- Efficient means using resources wisely and without unnecessary waste.
- Effective means doing the right things successfully.

The Management Process (1)

- Planning: Setting an organization's goals and deciding how best to achieve them.

- Decision Making: Selecting a course of action from a set of alternatives.

- Organizing: Grouping activities and resources in a logical fashion.

The Management Process (2)

- Leading: The set of processes used to get people to work together to advance the interests of the organization.

- Controlling: Monitoring the progress of the organization as it works toward its goal to ensure that it is effectively and efficiently achieving them.

Kinds of Managers - Levels

- Top: CEO, VP, etc. – Set organizational goals, overall strategy and operating policies.

- Middle: Plant Manager, Operations Manager, etc. – Put into effect the strategies designed by top managers.

- First Line: Foreman, Supervisor, etc. – Supervise and coordinate the activities of operating employees.

Kinds of Managers – Areas (1)

- Marketing: Find ways to sell the organization's products and services.

- Financial: Deal with accounting, cash management, and investment functions.

- Human Resource: Responsible for hiring and developing employees.

Kinds of Managers – Areas (2)

- Administrative: Generalists who have some basic familiarity with all functional areas of management rather than specialized training in any one area.

- Operations: Concerned with creating and managing the systems that create an organization's products and services. IE's are often in these positions. They achieve their goals through production control, inventory control, quality control, and plant site selection and layout.

Managerial Roles

- Interpersonal: representative, leader, liaison.

- Informational: monitor, disseminator, spokesperson.

- Decisional: entrepreneur, disturbance handler, resource allocator, negotiator

Managerial Skills (1)

- Technical: Ability to understand and accomplish tasks.

- Interpersonal: Ability to communicate with, understand, and motivate individuals and groups.

Managerial Skills (2)

- Conceptual: Ability to think in abstract terms and understand the "big picture" or the overall workings of the organization and its environment.

- Diagnostic and Analytical: Ability to recognize the symptoms of a problem and determine an action plan to fix it.