

# CHAPTER 4 SYSTEM USERS AND DEVELOPERS



Management Information Systems, 10<sup>th</sup> edition,  
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## Learning Objectives:

- Learn that the organizational context for systems development and use is changing from a physical to a virtual structure.
- Recognize the benefits and disadvantages of the virtual office and the virtual organization.
- Know who the information specialists are and how they can be integrated into an information services organization.
- Be alerted to new directions that the information services organization might take.
- Understand what is meant by end-user computing and why it came about.

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## Learning Objectives (cont.):

- Appreciate that users, especially those with an end-user computing capability, are a valuable information resource.
- Know the benefits and risks of end-user computing.
- Be aware of the types of knowledge and skill that are important to systems development, practiced by both end-users and information specialists.
- Understand knowledge management and the challenges that must be addressed for successful implementation.
- Be aware of the special constraints that face developers of global information systems.

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## Introduction

- The first office automation applications were mostly designed for secretarial and clerical tasks; but soon spread to managerial and professional ranks, leading eventually to the virtual office
- As firms evaluated the advantages and disadvantages of centralized and decentralized IS organizations, three structures were identified: **the partner, platform, and scalable models**
- Systems development is an evolving activity, with the organizational setting and the roles played by the users and information specialists constantly changing

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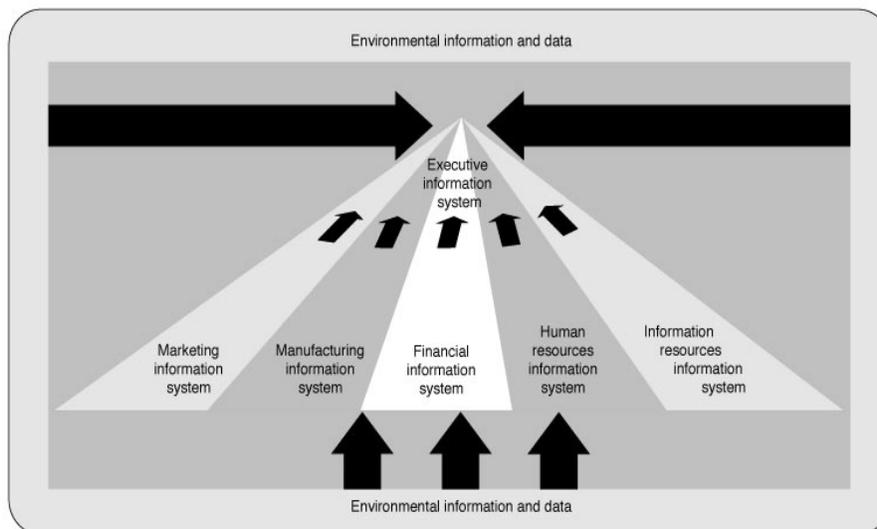
## THE BUSINESS ORGANIZATION

- Information systems have been developed to support all organizational levels (Figure 4.1)
- At the strategic level, executive information systems are used by the firm's top managers
- An MIS is designed to meet the information needs of managers throughout the firm
- At the lowest, operational level systems are designed to meet the firm's day-to-day information needs in those business areas

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**Figure 4.1** Information Systems Are Developed to Support Organizational Levels and Areas



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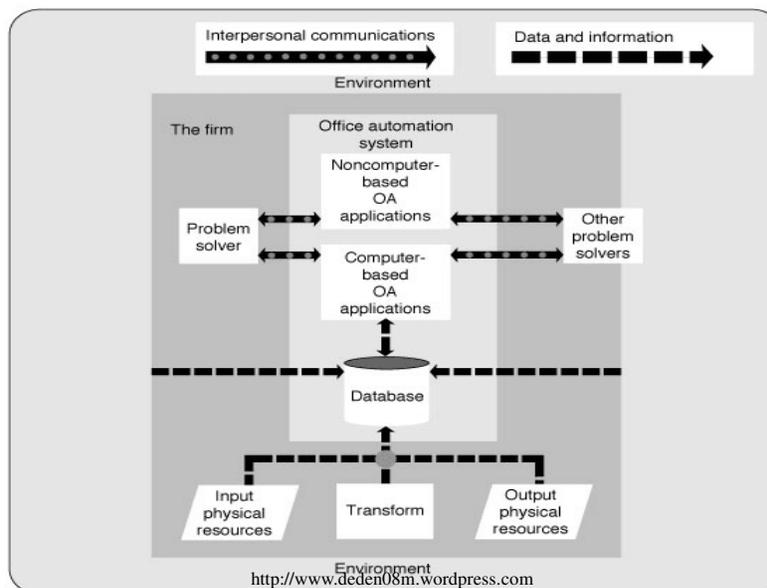
# OFFICE AUTOMATION

- OA includes all of the formal and informal electronic systems primarily concerned with the communication of information to and from persons inside and outside the firm
- Figure 4.2 shows an OA model of computer- and non computer-based applications used by a firm
- Innovations in IT made it possible for many firm activities to be conducted independent of their location
- This is called a **virtual organization**, and evolved out of office automation

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**Figure 4.2** An OA Model



## A Shift from Clerical to Managerial Problem Solving

- The first OA applications supported secretarial and clerical personnel
- As managers and professionals became more computer literate they learned to use the computer applications in problems solving
- They began using e-mail to communicate, electronic calendaring to schedule meetings, video conferencing to link problem solvers over a wide geographical area, and so on
- OA applications have also been extended by such technologies as hand held computers and PDAs

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**Figure 4.3** PDAs Provide a Wireless Communication Ability.



*Source: Photograph of the Palm i705 Handheld printed with permission.*

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## THE VIRTUAL OFFICE

- Evidence of the virtual office began to emerge during the 1970s as low-priced microcomputers and communications equipment made it possible for individuals to work at home
- At the time, the term **teleprocessing** was used, later the term **telecommuting** was introduced to describe how employees could electronically “commute” to work

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## Advantages and Disadvantages of Telecommuting

- **Advantages:**
  - Provides employees with scheduling flexibility so that personal tasks can also be accommodated
  - Firms typically pay more attention to communications needs of telecommuters
- **Disadvantages:**
  - Employees can develop a sense of not belonging
  - Employees can get the idea that they are expendable
  - The division between home and office responsibilities can become blurred

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# Hoteling

- The concept of “hoteling” is for the firm to provide a “sharable” central facility that employees can use as the need for office space and support rises and falls
- The guiding principles for hoteling include:
  - Design the spaces for functional needs
  - Similar sized offices are built
  - Centralized storage space is provided
  - Fewer enclosed office spaces
  - Assigned offices spaces are eliminated

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# Advantages and Disadvantages of Telecommuting

- Advantages:
  - Reduced facility cost
  - Reduced equipment cost
  - Reduced work stoppages
  - Social contribution
- Disadvantages
  - Low morale
  - Fear of security risks
- The virtual office demands cooperation by both the firm and the employees if it is to succeed

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## THE VIRTUAL ORGANIZATION

- In a **virtual organization**, firm operations are designed so they are not tied to physical locations
- Industries that are the most attracted to these concepts are those that add value in the form of: information, ideas and intelligence
- Such as: education, health care, entertainment, travel, sports, and consulting
- Workers in this “**3I Economy**” need to have the knowledge and skills required to succeed as IT and information systems are included in business processes

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## THE INFORMATION SERVICES ORGANIZATION

Require

- The Information Resources
- The Information Specialists
- Systems Analysts
- Database Administrators
- A Webmaster
- Network Specialists
- Programmers
- Operators
- A structure that is typical of a centralized operation is illustrated in Figure 4.4

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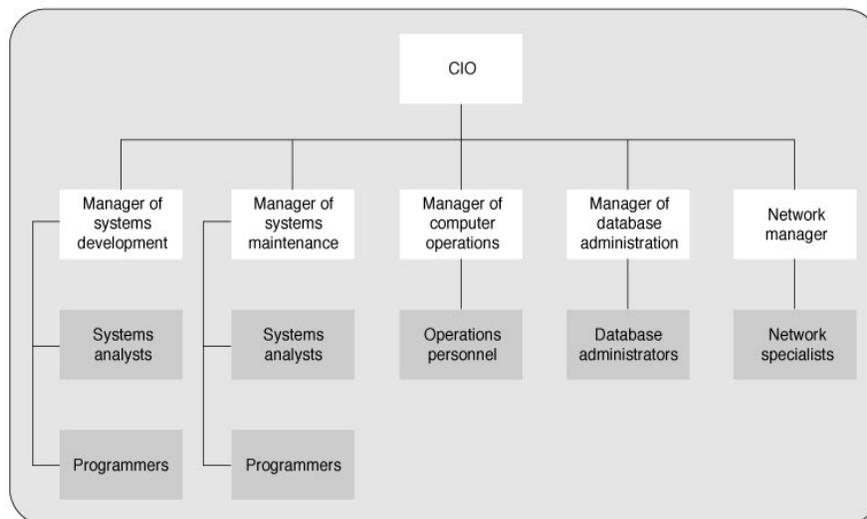
## THE INFORMATION SERVICES ORGANIZATION

- Information services organizations usually require:
  - The Information Resources
  - The Information Specialists
  - Systems Analysts
  - Database Administrators
  - A Webmaster
  - Network Specialists
  - Programmers
  - Operators
- Figure 4.4 shows the structure of a typical information services organization

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**Figure 4.4** An Organizational Structure for a Firm's Centralized Information Services Unit



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## Innovative Organizational Structures

- During the 1990s, large firms sought to achieve a "centrally decentralized" organizational structure
- Three innovative organizational structures that have since been identified are:
  - the **partner model**;
  - the **platform model**; and
  - the **scalable model**
- Whereas the organizational structure in Figure 4.4 illustrates how the *information specialists* are grouped, the innovative structures show how the *IT functions* are grouped

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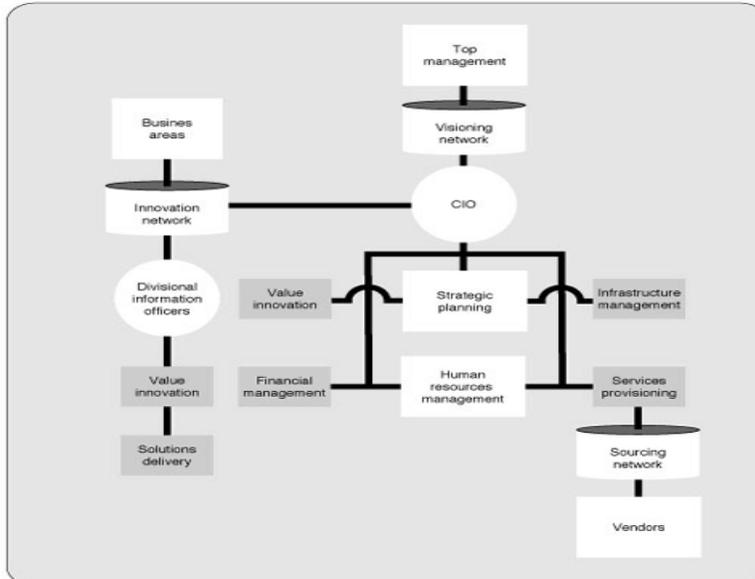
## Three Innovative Structures

- **The Partner Model (Figure 4.5):** IT coordinates business areas to achieve value innovation and accomplish delivery of solutions
- **The Platform Model (Figure 4.6):** IT provides the networks so that innovation can be accomplished by the business areas
- **The Scalable Model (Figure 4.7):** shows that two sourcing networks are utilized to interface with vendors when engaging in infrastructure management and solutions delivery within a flexible structure

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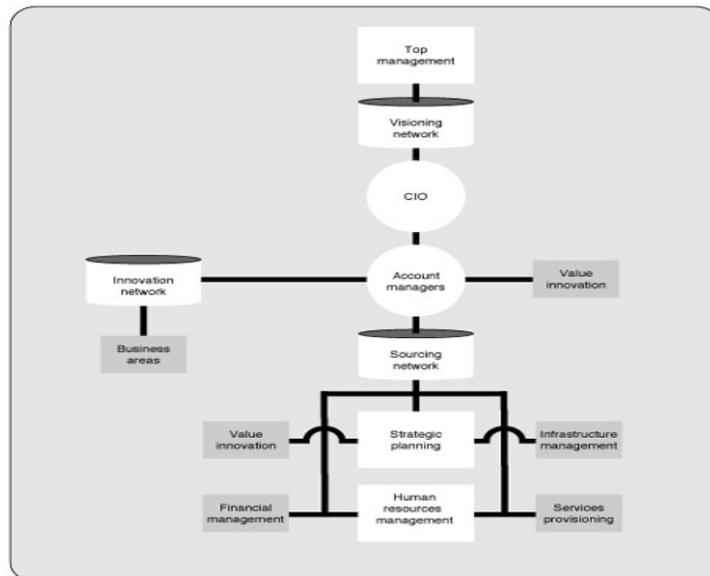
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**Figure 4.5** The Partner Model



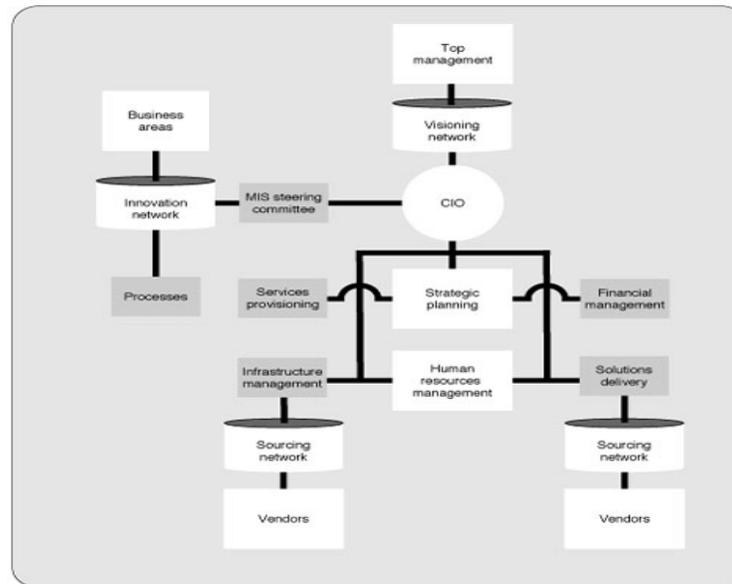
Source: Adapted from Ritu Agarwal and V. Sambamurthy, "Principles and Models for Organizing the IT Function," *MIS Quarterly Executive* Volume 1, Number 1 (March 2002), pp. 1–16.

**Figure 4.6** The Platform Model



Source: Adapted from Ritu Agarwal and V. Sambamurthy, "Principles and Models for Organizing the IT Function," *MIS Quarterly Executive* Volume 1, Number 1 (March 2002), pp. 1–16.

**Figure 4.7** The Scalable Model



Source: Adapted from Ritu Aggarwal, <http://www.deden08m.wordpress.com> and Models for Organizing the IT Function," MIS Quarterly Executive Volume 1, Number 1 (March 2002), pp. 1-16.

## What All Three Models Share

- All three models recognize that the IT function is not a self-contained unit, but interfaces with both users and vendors
- Responsibilities for certain functions must be allocated to specialists such as divisional information officers and account managers
- All three models reflect an effort to make the IT unit a team player in the firm's use of information resources sharing and delegating functions when it is best for the firm

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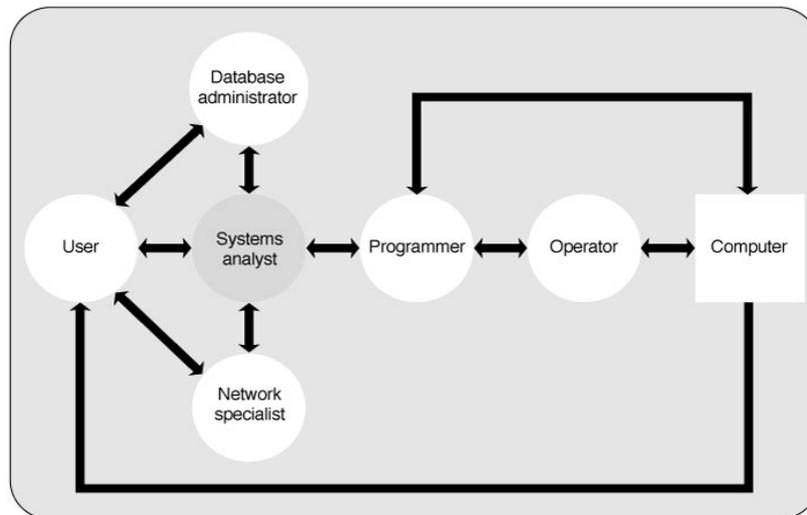
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## END-USER COMPUTING

- The first Information Systems were developed with IT specialists doing all of the work for the users (Figure 4.8)
- In the late 1970s, users began developing their own computer applications
- End-user computing evolved out of four main influences
  1. The impact of computer education
  2. The information services backlog
  3. Low-cost hardware
  4. Prewritten software
- In Figure 4.9 the end-user relies on the information specialists for some degree of support

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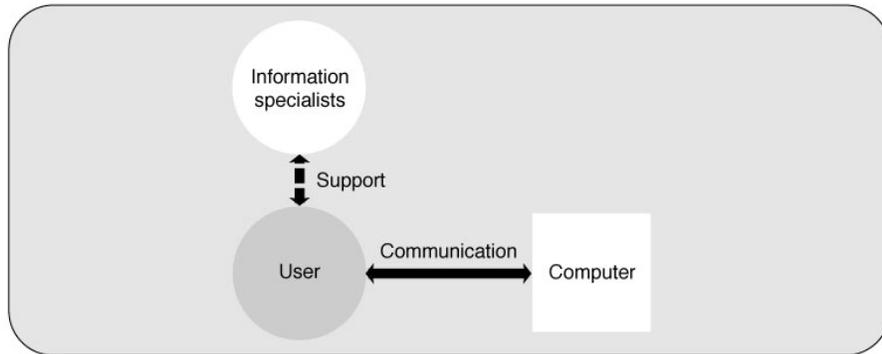
**Figure 4.8** The Traditional Communication Chain (note that Webmaster could be considered a Network specialist in the traditional communication chain)



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**Figure 4.9** The End-User Computing Communication Chain



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## **USERS AS AN INFORMATION RESOURCE**

- In deciding how the firm will use its information resources, management must consider how end-user computing will be conducted, so as to maximize the benefits and minimize the risks

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## Benefits and Risks of End-User Computing

- **Benefits:**
  - Match Capabilities and Challenges
  - Reduce Communications Gap
- **Risks:**
  - Poorly Aimed Systems
  - Poorly Designed and Documented Systems
  - Inefficient Use of Information Resources
  - Loss of Data Integrity
  - Loss of Security
  - Loss of Control

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## SYSTEMS DEVELOPMENT KNOWLEDGE AND SKILL

- The development of information systems requires certain knowledge and skills
- It is possible to identify not only the types of knowledge and skill needed by information specialists and users, but also how users can be divided into general management and their staff
- Table 4.1 identifies the types of knowledge needed and whether they are of major, intermediate, or minor importance
- In the same way, we can identify different types of skills and their relative importance (Table 4.2)

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**Table 4.1**

Knowledge Requirements				
KNOWLEDGE	GENERAL MANAGEMENT	PROFESSIONAL STAFF	CLERICAL STAFF	INFORMATION SPECIALISTS
COMPUTER LITERACY	Minor	Intermediate	Intermediate	Major
INFORMATION LITERACY	Major	Major	Intermediate	Major
BUSINESS FUNDAMENTALS	Major	Major	Minor	Intermediate
SYSTEMS THEORY	Minor	Intermediate	Minor	Major
SYSTEMS DEVELOPMENT	Intermediate	Minor	Minor	Major
SYSTEMS MODELING	Minor	Major	Minor	Major

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**Table 4.2**

Skill Requirements				
SKILL	GENERAL MANAGEMENT	PROFESSIONAL STAFF	CLERICAL STAFF	INFORMATION SPECIALISTS
COMMUNICATIONS	Major	Major	Intermediate	Major
ANALYTICAL ABILITY	Intermediate	Major	Intermediate	Major
CREATIVITY	Intermediate	Major	Intermediate	Intermediate
LEADERSHIP	Major	Minor	Minor	Intermediate

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# Knowledge Management

- This knowledge relates to the firm's processes, technology, management, and interactions with its environmental elements
- Firms are embarking on projects to develop knowledge management systems for the purpose of achieving a competitive advantage
- Firms typically regard KM as another type of system to be developed as an IS that gathers knowledge, stores it and makes it available to users
- Table 4.3 lists the challenges that must be faced by firms in developing KM systems

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**Table 4.3**

Knowledge Management Challenges	
EXECUTIVE/STRATEGIC MANAGEMENT	<p>Senior management must include knowledge management in the firm's strategic plans.</p> <p>Knowledge management is an effort that requires sustained effort in an organizational climate that enhances information sharing.</p> <p>KM should be the foundation for enhancing creativity and innovation in the firm.</p>
COST, BENEFITS, RISKS	<p>KM costs must be evaluated in terms of measurable return to the firm in order to maintain the organization's intellectual wealth.</p> <p>Management must identify appropriate levels of investment in KM.</p>
OPERATIONAL MANAGEMENT	<p>Processes must be put in place for ensuring that knowledge to be incorporated in the KM system is relevant, legitimate, and current.</p> <p>KM system architecture must fit the needs of the organization.</p> <p>Attention must be given to the methodology for developing a KM system to determine whether new or existing IS methodologies should be used.</p>
STANDARDS	<p>Technical standards for the KM data must be established.</p> <p>A clear definition of KM must be formulated and used within the organization that fits within the existing IT infrastructure.</p>

*Source: Adapted from the work of William R. King, Peter V. Marks, Jr., and Scott McCoy, "The Most Important Issues in Knowledge Management," Communications of the ACM Volume 45 Number 9 (September 2002), pp. 93-97.*

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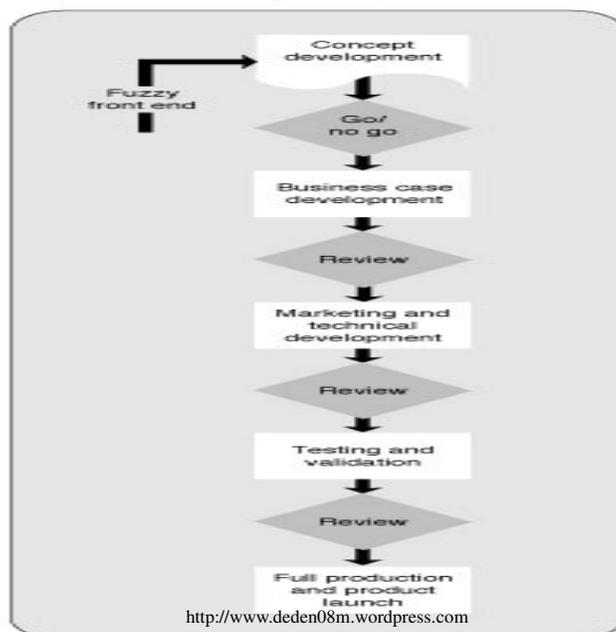
## A Successful KM Development Project at Nortel Networks

- Nortel Networks (using knowledge management software from Excalibur Technologies) credits its pilot KM project with enabling its transformation from a technology-focused company to one that is opportunity/customer-focused
- The old new product development system illustrated in Figure 4.10 consisted of a five-phase process
- The new project involved an NPD system that enabled Nortel to:
  - leverage multidisciplinary NPD knowledge assets;
  - improve NPD decision making; and
  - facilitate learning and knowledge exchange

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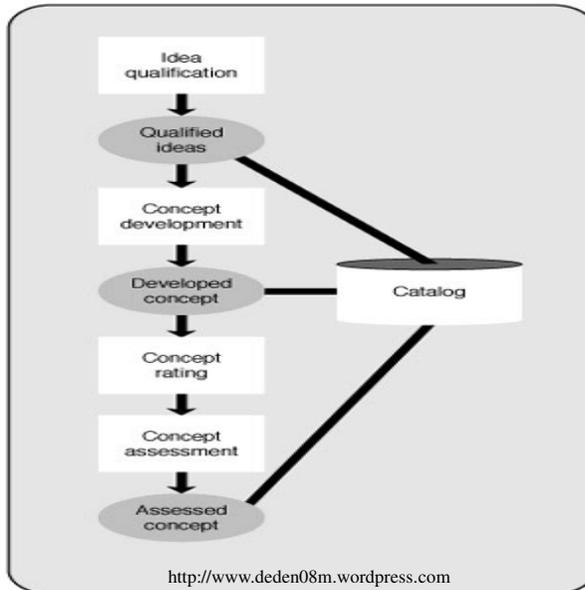
**Figure 4.10** The Original Nortel Networks New Product Development System



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**Figure 4.11** The Nortel Networks New Product Concept Development System Utilizing Knowledge Management



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## CHALLENGES IN DEVELOPING GLOBAL INFORMATION SYSTEMS

- GIS describes the information system used by multinational companies (MNC)
- GIS developers must address the following constraints:
  - Politically Imposed Constraints
  - Cultural and Communications Barriers
  - Restrictions on Hardware Purchases and Imports
  - Restrictions on Data Processing
  - Restrictions on Data Communications
  - Technological Problems
  - Lack of Support from Subsidiary Managers

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## **PUTTING THE SYSTEM USERS AND INFORMATION SPECIALISTS IN PERSPECTIVE**

- Early systems development was accomplished solely by information specialists, but over time the users have played increasingly important roles
- Not only has systems development work changed, but the setting in which the work is performed has changed as well
- Electronic communication networks enable firms to become virtual organizations, so now their development work can be done almost anywhere

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## **END OF CHAPTER 4**

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