James A. Hall
Accounting Information Systems, 4th. Ed.

Chapter *1*
The Information System

CHAPTER 1

THE INFORMATION SYSTEM: AN ACCOUNTANT'S PERSPECTIVE

Many readers are exploring these study notes as part of a college or university course named "accounting information systems." There is often a misconception that AIS is just a course about computers for accounting majors. And although the AIS course does involve computers and is designed for accountants in training, it is more appropriate to regard it as a course about *information* and about *systems*, computerized or manual, that process *accounting* information. In business, the accounting information system is an integral part of the accounting function.

This first chapter is designed to provide a perspective on the role of AIS in organizations. It relates information to the normal activities of a business and interested parties. Accounting and the AIS are put in their proper positions within the organizational structure. After placing the accounting function in its place, the roles of the accountant, in relation to the AIS, are discussed as *user*, *designer*, and *auditor*.

The objectives of this chapter are:

● to understand the primary information flows within the business environment;

● to understand the difference between accounting information systems and management information systems;

● to be able to distinguish between information and data;

● to know the three fundamental objectives of all information systems;

● to know the principal features of a general model for information systems;

● to understand the difference between a financial transaction and a non-financial transaction;

● to be familiar with the functional areas of a business and their principal activities;

● to recognize the need for functional independence between accounting and other business areas;

● to know the basic differences between the centralized and distributed approaches to data processing;

● to understand the stages in the evolution of information systems; and

● to understand the relationship between external auditing, internal auditing, and IS auditing.

James A. Hall
Accounting Information Systems, 4th. Ed.

Chapter *1*
The Information System

I.   The Information Environment

Although it does not appear on a Balance Sheet, **information** is one of the most valuable assets most organizations possess. Without good, accurate, and timely information, good decisions cannot be made. **Fig. 1-1, on page 3,** represents the decisions levels, internal and external constituencies, and vertical and horizontal information flows in a typical business organization.

We can expand on these ideas by noting that as information moves **up** the pyramid, it is usually increasingly summarized or aggregated. The higher in the organization that the information is used, the broader, more aggregated, and less timely it typically is. For example, operating personnel require very timely, detailed information for immediate decisions, but upper management usually focuses more on summary information for longer time periods in making long-term decisions. It is also worth noting that external users, such as creditors and shareholders, have different information needs from internal users.

A.   What Is a System?

The term *system* has been so overused since the personal computer has become popular that many people assume that all systems must include a computer. But what about the *heating system* in your home or the *skeletal system* in your body? The correct use of the word "system" merely implies two or more related components working together to achieve a common purpose. Follow closely the discussion in the text of the significant elements:

- *multiple components* -- more than one,
- *related* in some way, and
- *a common purpose*.

Also of importance are the concepts of a **subsystem** and **subsystem interdependency**. Your book presents a schematic of an automobile in terms of its subsystems. The illustration is a typical organizational chart. We can represent a typical College of Business Administration as both a subsystem of a larger system (a whole university) and also as comprised of subsystems, or departments, itself. See below.

A particular concern for us as we move on to study accounting systems is the reality that a system is only as strong as its weakest link (subsystem). [The *theory of constraints* is an approach to improving a system

James A. Hall
Accounting Information Systems, 4th. Ed.

Chapter *1*
The Information System

Notes
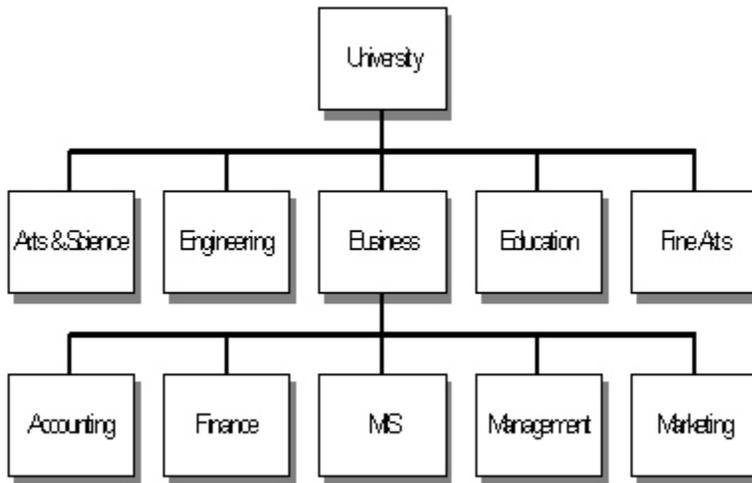
by identifying and then strengthening its weakest elements. See E. Goldratt, <u>The Theory of Constraints</u>, North River Press, 1990.]

B.   A Framework for Information Systems

After discussing the basic elements of *systems* in general, the ideas are applied to the concept of an *information system.*

Fig. 1-3, on page 8, presents a framework for visualizing information systems. This figure also identifies the different chapters which discuss the individual elements, to show how the pieces fit together. There are two key classes of systems: *accounting information systems (AIS)* and *management information systems (MIS)*. Note especially the components (or subsystems) of the AIS. Much time in the course will be devoted to these components. Notice that this does not suggest that no other users of information technology exist in organizations. Big users include engineering and research and development people.

This section includes several important definitions. Study them carefully. Your understanding of the concepts to be presented depends on your clear grasp of the meaning of the terms:

* *information system,*
* *transaction, financial, and nonfinancial,*
* *accounting information system (AIS),* and
* *management information system (MIS).*

James A. Hall
Accounting Information Systems, 4th. Ed.

Chapter *1*
The Information System

<u>Notes</u>

The distinction between an AIS and an MIS is important. Professional and legal standards play an important role in the operation of an AIS. This is a notable distinction between an AIS and a more general MIS. In addition, read carefully the discussion of the changing role of accounting information.

C.   AIS Subsystems

There are several key components to the AIS:

- the transaction processing system,
- the general ledger/financial reporting system, and
- the management reporting system.

Each of these is introduced here in Chapter 1, and each will receive extensive coverage later in the book.

D.   A General Model for AIS

Fig. 1-5, on page 12, is a diagram or model of an AIS. This is an expansion of the simpler diagram of a system shown below. It identifies four basic elements of an information system: *input, processing, storage,* and *output*, all within a *control* framework. Figure 1-5 is more specific in describing these elements/activities.
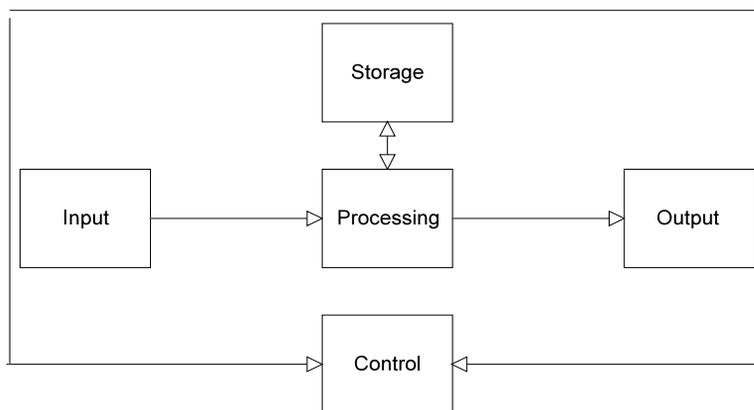
Again there are terms you should understand fully:

- *end users, both internal and external,*
- *data* versus *information,*
- *data sources, both internal and external,*
- *data collection,*

James A. Hall
Accounting Information Systems, 4th. Ed.

Chapter *1*
The Information System

<u>Notes</u>

- *data processing,*
- *database management,*
- *information generation*, and
- *feedback*.

The section on data base management introduces some of the terminology used to describe data elements: *data attributes or fields, records,* and *files*.

E.   Information System Objectives

Organizations do not devote sizeable resources and effort to develop their accounting information system for the fun of it or to employ accountants. In order to pass the cost/benefit test, information systems must satisfy the three objectives discussed:

- *to support the stewardship function of management,*
- *to support management decision making*, and
- *to support the day-to-day operations of the firm*.

F.   Acquisition of Information Systems

This section just hints at the complexity involved in creating an information system. Two chapters of the text tackle this very important task.

II.   Organizational Structure

The second major section of Chapter 1 is a review of organizational structure. **Fig. 1-7, on page 18,** shows the flows of responsibility, authority, and accountability between units of the organization. The role of information is closely related. This section discusses the ways in which an organization can be segmented or structured.

A.   Business Segments

The three most common ways in which businesses are segmented are by *geography, product line,* or *business function*.

B.   Functional Segmentation

Table 1-2, on page 19, relates the basic resources of a business, materials, labor, capital, and information, to the traditional business functions. **Fig. 1-8, on page 20,** is a representation of the business segmented by function. Use this material to organize your thinking about the various functional areas.

James A. Hall
Accounting Information Systems, 4th. Ed.

Chapter *1*
The Information System

Notes

Having the functions well defined will make it easier to grasp the activities within the various transaction cycles.

Special attention is given to the two functions which deal with the information resource: accounting and computer services.

C.   The Accounting Function

Look again at the sub-areas of the accounting function as represented in Fig. 1-10. Note also what falls under the finance function. These different tasks are *segregated* for a reason.

This brief introduction to the accounting *function* is intended to look at the two key activities of *recording* and *reporting*. The success of the accounting function in meeting the objectives discussed above are dependent on the information reported having **value** for decision making and being **reliable**. The brevity of the discussion of the importance of **accounting independence** should not be misinterpreted.

D.   The Computer Services Function

The other information-related function is computer services. The two basic approaches to organizing this function, centralized data processing and *distributed data processing*, are introduced here.

III.   Distributed Data Processing

When organizations first automated their accounting systems, they had little choice but to acquire a large computer. These were housed in centralized data processing departments. Although these physical systems were centralized, most of the programs run on them were application specific. The trend today is toward distributing the data processing function. Note the word is *distributing*, not *decentralizing*.

A.   DDP Is Not Decentralization

Note in particular the distinction that is made between simply **decentralizing** computer services and integrating the pieces of a **distributed data processing** system. How this is accomplished is discussed later in the chapter under the topic *network architectures*.

This section focuses on the *disadvantages* and *advantages* of DDP. There is never an "always right choice." The factors of cost, control, etc., must be traded against one another in making the choice.

James A. Hall
Accounting Information Systems, 4th. Ed.

Chapter *1*
The Information System

Notes

These relevant factors are important issues that you should be aware of. As your text mentioned, newer is not always better.

IV.　The Evolution of Information Systems Models

Over time, accounting systems have changed and grown both in response to limitations and the availability of new technologies. The evolution is often slow, and various generations coexist. This text considers five *information system models*. These are introduced here and further developed later in the text.

A.　The Manual Process Model

As the name implies, this is the old manual approach to recording accounting transactions. Because it is easier to visualize the flow of accounting information in a manual system, it is very beneficial to study such systems, although few exist in practice. The discussion of parts of the accounting system that will occur in Chapters 4 through 8 will always begin with presentation of what happens in a manual system. You will find it easier to follow the discussion of automated systems after "seeing" the manual processes.

B.　The Flat-File Model

When accounting applications were first computerized, different applications were developed separately with files created for individual applications – even if other parts of the organization had use for the same information. The department that developed the application **owned** the data and typically did not **share** it with other units. **Fig. 1-12, on page 30,** shows the situation that could occur if three user groups collect and use customer sales information. Note carefully the problems that result in this situation because of the **data redundancy** that results: *data storage issues, data updating issues, currency of information* and *task-data dependency.*

You will often hear such established systems referred to as **legacy systems**. One of the key concerns relates to the difficulty in integrating data in flat-file systems.

C.　The Database Model

Many of the weaknesses of a flat-file system are overcome by a **database model**. As shown in **Fig. 1-13, on page 32,**, this model centralized an organization's data so that it can be *shared* by other users. Because all data should not be accessible by

James A. Hall
Accounting Information Systems, 4th. Ed.

Chapter *1*
The Information System

all users, the **database management system (DBMS)** serves as a gatekeeper, limiting access to particular data sets to users who are authorized.

The database model can solve many of the problems described above for the flat-file system through *elimination of data redundancy, single updates,* and *maintenance of current values.* In theory, the database model can do this; however, many early database systems came up short. These systems, which along with flat files systems are referred to as **traditional systems**, still had limitations. The development of the **relational database model** has led to significant improvements. Two examples follow.

D.   The REA Model

The REA model is based on the premise that data can be represented with a framework that identifies the organization's *resources, events,* and *agents.* With this approach to organizing accounting and non-accounting data, user views can be developed as needed to support all decision-making. Follow carefully the example developed in the text. It is simple, but complete. The next section provides a discussion of the application of REA in a group of systems referred to as Enterprise Resource Planning (ERP) systems.

E.   ERP Systems

ERP systems permit an organization to fully integrate its key business processes – thus eliminating some of the so-called silos. Data sharing and information flows can facilitate common business practices across the organization.

Adopting an ERP system is a major endeavor for an organization, often taking several years.

V.   The Role of the Accountant

The last section of Chapter 1 talks about the different roles that accountants play with regard to the information system.

A.   Accountants as **users** must decide what information must be collected, how it must be processed, and how it must be reported.

B.   Accountants as systems **designers** must work with computer professionals in designing the *conceptual system* while the computer professionals handle the *physical system*. Keep in mind that the AIS is the

James A. Hall
Accounting Information Systems, 4th. Ed.

Chapter *1*
The Information System

Notes

custodian of the accountant's data and the *processor* of his or her information. The AIS cannot be ignored.

C.   Accountants as **auditors** must form opinions of the fairness of a company's financial statements. In recent years the profession has broadened this attest function. Assurance services include traditional auditing but are also concerned with the quality of information used by decision makers. Formation of that opinion is dependent on the auditor's ability to evaluate the accounting system and have confidence that its output is reliable. IT auditing is performed as part of the financial audit to determine the integrity of the organization's information system. Internal auditors are employees of the organization.

Review Questions for Chapter 1: 5-12, 14, 16, 18, 19, 21, 22, 25-36

Discussion Questions for Chapter 1: 3, 6, 9, 10, 17, 19, 20