Chapter-02

Overview of Accounting Information System

2. Overview of Accounting Information System:

2.1. Accounting Information System (AIS):

A system is a set of two or more interrelated components that interact to achieve a goal. Systems are almost composed of smaller subsystems, each performing a specific function important to and supportive of the ledger system of which it is a part. For example, the college of business is a system composed of various departments, each of which is a subsystem. Yet the college itself is a subsystem of the university.

An AIS consists of five components:

1. The people who operate the system and perform various functions.
2. The procedures, both manual and automated, involved in collecting, processing, and storing data about the organization's activities.
3. The data about the organization's business processes.
4. The software used to process the organization's data.
5. The information technology infrastructure, including computers, peripheral devices, and network communication devices.

These five components enable AIS to fulfill three important functions in any organization:

1. Collecting and storing data about the activities performed by the organization, the resources affected by those events, and the agents who participate in the various activities so that management, employees, and interested outsiders can review what has happened.

2. Transforming data into information that is useful for making decisions that enables management to plan execute and control activities.

3. Providing adequate control to safeguard the organizations assets, including its data, to ensure that the data are available when needed and are accurate and reliable.

2.2. Ten most important work activities performed by accountants:

1. Accounting system and financial reporting.
2. Long term strategic planning.
3. Managing the accounting and finance function.
4. Internal consulting.
5. Short term budgeting.
6. Financial and economic analysis.
7. Process improvement.
8. Computer system and operations.
9. Performance evaluation.
10. Customer and product profitability analysis.

2.3. Factor influencing design of the AIS:
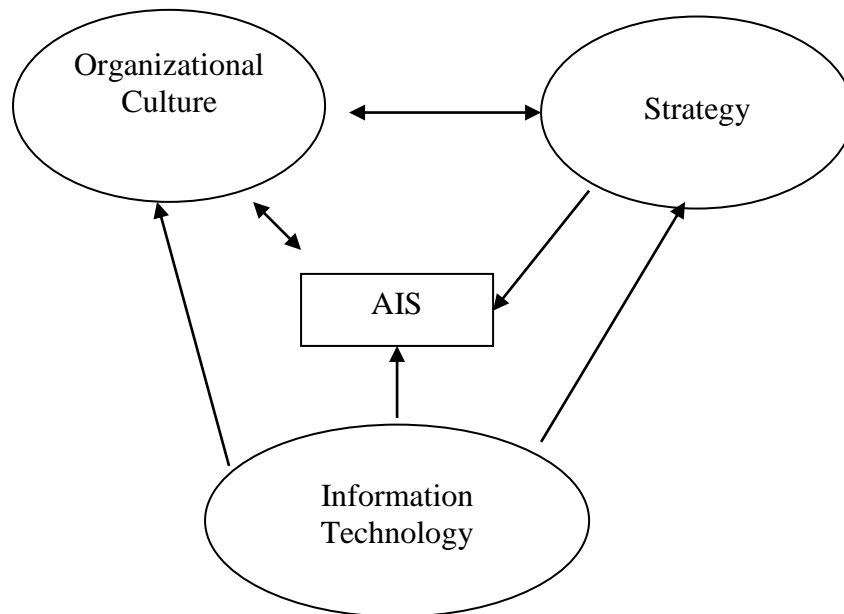
In the top of the figure we shows that the organization culture influences the design of the AIS. The arrow between organization culture and the AIS bi-directional. Although the organizational culture should influence the design of its AIS, it is important to recognize that the design of the AIS can also influencer the organization's culture by controlling the flow of information within the organization. For example, AIS that make information easily accessible and widely available is likely to increase pressures for more decentralization and autonomy. Throughout this text, therefore, we discuss the potential behavioral ramifications of making changes to a company's AIS.
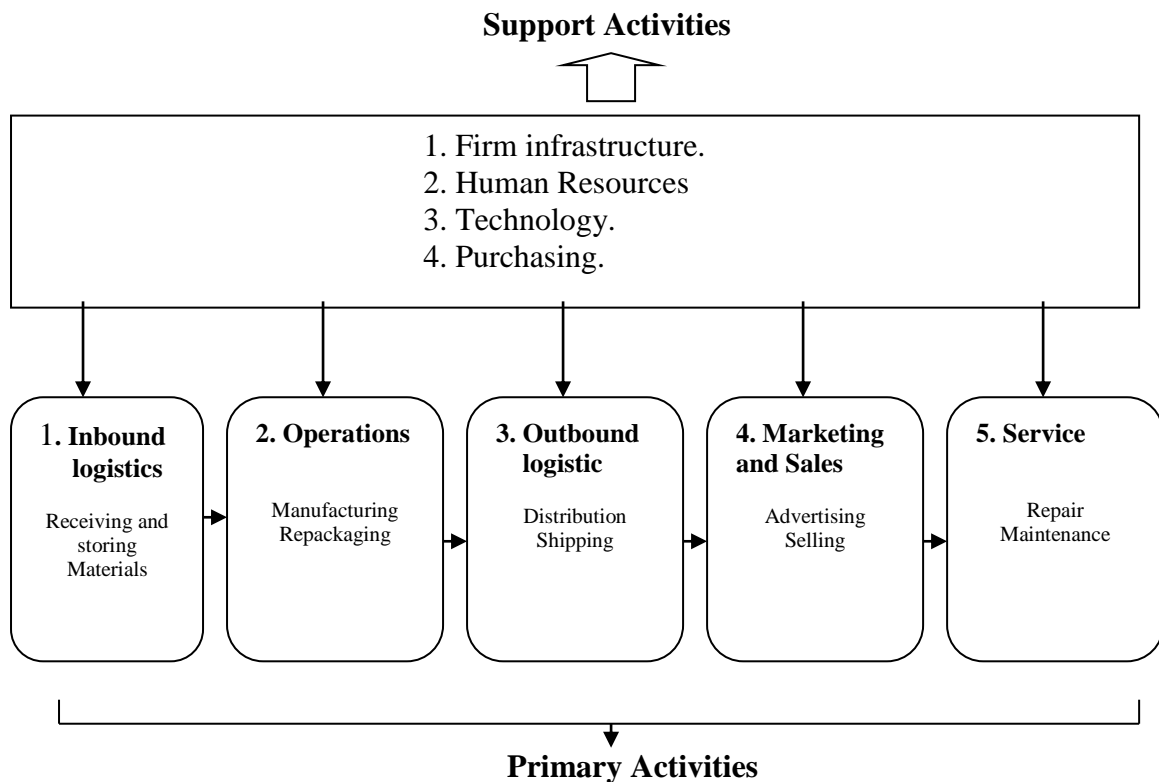
2.4. The role of the AIS in the Value Chain:

The objective of the most organization is to provide value to provide value to their customer.

An organization's value chain consists of two activities. They are

A. Primary Activities.
B. Support Activities.

Support Activities

| 1. Firm infrastructure. |
| 2. Human Resources |
| 3. Technology. |
| 4. Purchasing. |

| 1. **Inbound logistics**

Receiving and storing Materials | 2. **Operations**

Manufacturing Repackaging | 3. **Outbound logistic**

Distribution Shipping | 4. **Marketing and Sales**

Advertising Selling | 5. **Service**

Repair Maintenance |

Primary Activities

Figure: The Value chain

A. Primary Activities:

An organizational value chain consists of five primary activities that directly provide value to its customer:

1. Inbound logistic: Inbound logistic consists of receiving, storing, and distributing the materials that are used by the organization to create the services and products that it sells. For example the activities of receiving, handling, and storing the steel, glass, and rubber comprise the inbound logistic activities for an automobile manufacturer.

8

2. Operations: Operations activities transform inputs into final products or services. For example the assembly line activities in an activities in an automobile company convert raw materials into a finished car.

3. Outbound logistic: Outbound logistic are the activities involved in distributing finished products or services for customer. For example, shipping automobiles to car dealers in an outbound logistics activity.

4. Marketing and Sales: Marketing and Sales refers to the activities involved in helping customer to buy the organization's product or services. Advertising is an example of a marketing and sales activity.

5. Repairs and Maintenance: Service activity provides post-sale support to customers. Example includes repair and maintenance services.

B. Support Activities:

Organizations also perform a number of other support activities that enables the five primary activities to be performed efficiently and effectively. Those support activities can be grouped into four categories:
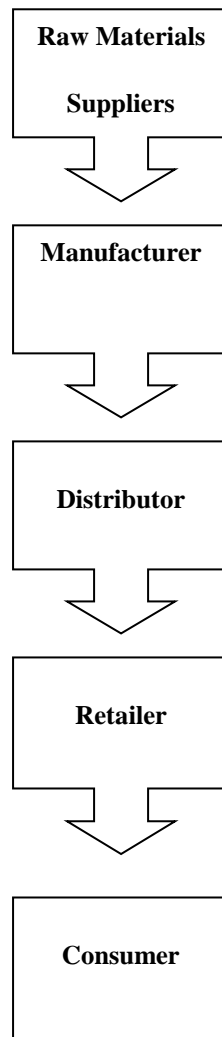
1. Firms infrastructure: Firms infrastructure refers to accounting, finance, legal support and general administration activities that are necessary for any organization to function. The AIS is part of the3 firm infrastructure.

2. Human Resources: Human resources include recruiting, hiring, training, and providing employee benefits and compensation.

3. Technology: Technology activities improve product and services. Example includes research and development, investments in new information technology, web site development, and product design.

4. Purchasing: Purchasing includes all the activities all the activities involved in procuring raw materials, sup-plies machinery, and buildings used to carry out the primary activities.

2.5. Supply Chain:

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        ┌─────────────────┐
        │  Raw Materials  │
        │                 │
        │    Suppliers    │
        └────────┐ ┌──────┘
             ┌───┘ └───┐
             └──┐   ┌──┘
                ▼   ▼
        ┌─────────────────┐
        │  Manufacturer   │
        └────────┐ ┌──────┘
             ┌───┘ └───┐
             └──┐   ┌──┘
                ▼   ▼
        ┌─────────────────┐
        │   Distributor   │
        └────────┐ ┌──────┘
             ┌───┘ └───┐
             └──┐   ┌──┘
                ▼   ▼
        ┌─────────────────┐
        │    Retailer     │
        └────────┐ ┌──────┘
             ┌───┘ └───┐
             └──┐   ┌──┘
                ▼   ▼
        ┌─────────────────┐
        │    Consumer     │
        └─────────────────┘
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Figure: The supply chain

In the top of the figure we show that system are often composed of sets of subsystems. This extended system forms a supply chain.

By paying attention to the interorganizations linkages in its supply chain, a company can help itself by helping the order organizations in the supply chain to improve their performance. In our opening case, for example, S&S can improve its purchasing and inbound logistics activity by implementing a just in time inventory management system. S&S costs are reduce because its purchasing and inbound logistics activities are performed are more efficiently and because less of its capital is tied up in inventory.

S&S can reap additional benefits if it links its new system with its suppliers to help them perform some of their primary value chain activities more efficiently and effectively.

For example by providing more detailed and timely information about its inventory needs, S& S can help its suppliers more efficiently plan their production schedule to meet S&S needs. This reduces their costs, and part of their reduction is likely to be passed on to S&S in the form of lower product costs.

2.6. AIS can add value to an Organization:

The value chain model shows that the AIS is a support activity. Thus, the activity can add value to an organization by providing accurate and timely information so that the five primary value chain activities can be performed more effectively and efficiently. Well-designed AIS can do this by:

1. **Improving the quality and reducing the costs of products or services.** For example, AIS can monitor machinery so that operators are notified immediately when the process falls outside acceptable quality limits. This not only helps maintain product quality but also reduces the amount of wasted materials and costs of having to rework anything.

2. **Improving efficiency**. Well-designed AIS can help improve the efficiency of operation by providing more timely information. For example a just in time manufacturing approach requires constant, accurate, up to date information about new raw materials inventories and their location.

3. **Improved decision-making**. AIS can improve decision making by providing accurate information in a timely manner. For example, Wal-Mart has created an enormous database that contains detailed information to optimize the amount of each product carried at each store. It also analyze the data to discovers patterns of items that seem to the purchased together and uses such information to improve the layout of merchandise so as to encourage additional sales of related items. Similarly Amazon com uses its database of sales activities to suggest additional books that customer want to purchase.
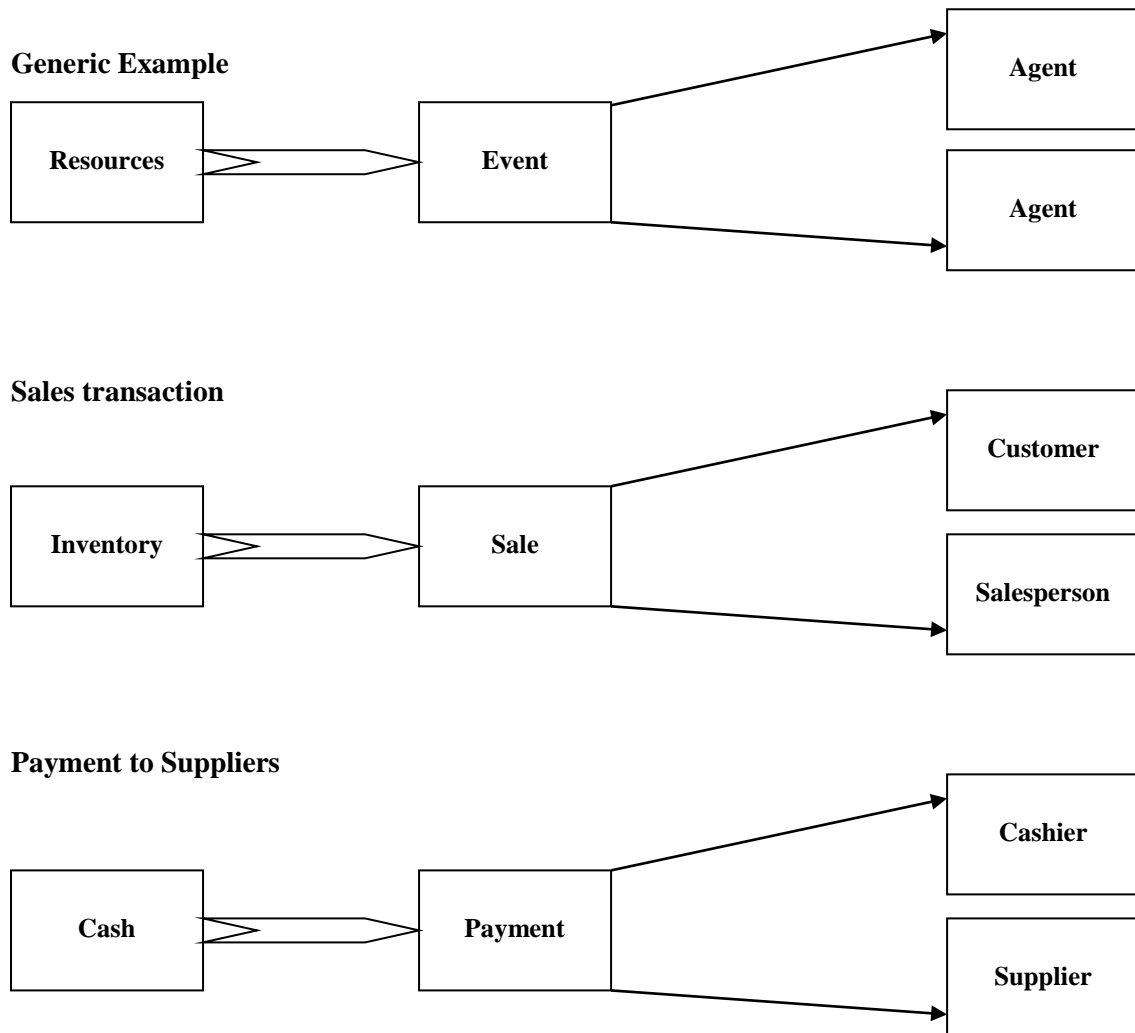
4. **Sharing of knowledge**. Well-design AIS can make it easier to share knowledge and expertise, perhaps thereby improving operations and even providing a competitive advantage. For example, the large public accounting firms all use their information system to share best practice and to support communication between people located at different officers. Employees can search the corporate database to identify the relevant experts to provide assistance for a particular client; thus, all of public accounting firms accumulated international expertise can be made available to service any local client.

Well-designed AIS can also help an organizational profit by improving the efficiency and effectiveness of its supply chain.

2.7. Data and Information:

Data:

Data refers to any and all of the facts that are collected, stored, and processed by an information system below figures shows that three kinds of data need to be collected for any activity; facts about the event itself, the resources affected by that event and agents who participated in that event.

Generic Example

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┌───────────┐        ┌───────────┐        ┌───────────┐
│           │        │           │        │   Agent   │
│ Resources │ ═════▷ │   Event   │        └───────────┘
│           │        │           │        ┌───────────┐
└───────────┘        └───────────┘        │   Agent   │
                                          └───────────┘
```

Sales transaction

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┌───────────┐        ┌───────────┐        ┌───────────┐
│           │        │           │        │ Customer  │
│ Inventory │ ═════▷ │   Sale    │        └───────────┘
│           │        │           │        ┌───────────┐
└───────────┘        └───────────┘        │Salesperson│
                                          └───────────┘
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Payment to Suppliers

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┌───────────┐        ┌───────────┐        ┌───────────┐
│           │        │           │        │  Cashier  │
│   Cash    │ ═════▷ │  Payment  │        └───────────┘
│           │        │           │        ┌───────────┐
└───────────┘        └───────────┘        │ Supplier  │
                                          └───────────┘
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Consider, for example, the primary value chain activity of selling. Data need to be collected about the sale event itself (e.g. the date of the sale, total amount). Data also need to be collected about the resource being sold (e.g. the identify of the goods or services, the quantity sold, unit price). Finally data need to be collected about the agents who participated in the sale event (e.g. the identity of the customer and the salesperson).

Once data have been collected, it is job of the AIS to transform the facts so they can be used to make decision.

Information:

Information is data that have been organized and processed to provide meaning. The value chain presents six characteristics that make information useful and meaningful for decision-making.

2.8. Characteristics of Useful Information:

Relevant:
Information is relevant if it reduce uncertainty, improve decision makers' ability to make predictions, or confirms or corrects their prior expectations.

Reliable:
Information is reliable if it is free from error or bias and accurately represents the events or activities of the organization.

Complete:
Information is complete if it does not omit important aspects of the underlying events or activities that it measures.

Timely:
Information is timely if it is provided in time to enable decision makers to use it to make decisions.

Understandable:
Information is understandable if it is presented in a useful and intelligibl format.

Verifiable:
Information is verifiable if two knowledgeable people acting independently would each produce the same information.

2.9. Decision Making:

Researchers have developed many models of decision-making and problem solving process. All those models depict decision making as a complex, multistep activity. First, the problem has to be identified. Then the decision maker must select a method for solving the problem. Next, the decision maker must collect the data needed to execute the decision model, and then interpret the output of the model and evaluate the merits each alternative. Finally, the decision maker chooses and executes the preferred solution.

The AIS can provide assistance in all phases of decision-making. Reports can help to identify potential problems.

Different decision models and analytical tools can be provided to users. Query languages can facilitate the gathering of relevant data upon which to make the decision. Various tools, such as graphical interfaces, can help the decision maker interpret the results of a decision model and evaluate and choose among alternative sources and action. Finally the AIS can provide feedback on the result of action.

The degree to which an AIS can support decision-making depends, however on the type of decision being made. Decisions can be categorized either in terms of the degree of structure of structure that exists or by their scope.

2.10. Decision Structure:

Decisions vary in terms of the degree to which they are structured.

2.10.1. Structured Decisions:

Structured decisions are repetitive, routine and understood well enough that that can be delegated to lower-level employees in the organization. For example, the decision about expending credit to established customers requires only knowledge about the customer's credit limit and current balance. Structure decisions can often be automated.

2.10.2. Semi structured:

Semi structured decision are characterized by incomplete rules of making the decision and the need for subjective assessment and judgments to supplement formal data analysis. Setting a marketing budget for a new product is an example of a semi structured decisions. Although such decision usually cannot be fully automated. They are often supported by computer based decision aids.

2.10.3. Unstructured decisions:

Unstructured decision is nonrecurring and non-routine. Example includes choosing the cover for a magazine, hiring senior management, and selecting basic research projects to undertake. No framework or model exits to solve such problems Instead. They require considerable judgment and intuition. Nevertheless, unstructured decisions can be supported by computer based decision aids that facilitate gathering information from diverse sources.

2.11. Decision scope:

Decisions vary in terms of the scope of their effect.

2.11.1. Operational Control:

Operational control concerns the effective and efficient performance of specific tasks. Decision relating to inventory management and extending credit are examples of operational control activities.

2.11.2. Management Control:

Management control concerns the effective and efficient use of resources for accomplishing organizational objective. Budgeting, developing human resources practices and deciding on research projects and product improvement are example of management control activities.

2.11.3. Strategic Planning:

Strategic concerns the establishing of organizational objectives and policies for accomplishing those objectives. Setting financial and accounting policies, developing new product lines, and accruing new business are example of strategic planning decisions.

A corresponding produced exists between a manager's level in an organization and his or her decision making responsibilities. Top management faces unstructured and semi structured decisions involving strategic planning issues. Middle manager deal with semi structured decision involving management control. Lower level supervisors and employees face semi structured or structured decision involving operational control.

2.12. ENTERPRISE RESOURCE PLANNING (ERP)

ERP systems are large-scale information systems that impact an organization's AIS. These systems permeate all aspects of the organization and require technologies such as client/server and relational databases. Other system types that currently impact AISs are supply chain management (SCM) and customer relationship management (CRM).

Traditional AISs recorded financial information and produced financial statements on a periodic basis according to GAAP pronouncements. Modern ERP systems provide a broader view of organizational information, enabling the use of advanced accounting techniques, such as activity-based costing (ABC) and improved managerial reporting using a variety of analytical techniques.

2.13. AIS TECHNOLOGY

2.13.1. Input:

The input device commonly associated with AIS includes: standard personal computers or workstations running applications; scanning devices for standardized data entry; electronic communication devices for electronic data interchange (EDI) and e-commerce. In addition, many financial systems come "Web-enabled" to allow devices to connect to the World Wide Web.

2.13.2. Process:

Basic processing is achieved through computer systems ranging from individual personal computers to large-scale enterprise servers. However, conceptually, the underlying processing model is still the "double-entry" accounting system initially introduced in the fifteenth century.

15

2.13.3. Output:
Output devices used include computer displays, impact and nonimpact printers, and electronic communication devices for EDI and e-commerce. The output content may encompass almost any type of financial reports from budgets and tax reports to multinational financial statements.

2.14. MANAGEMENT INFORMATION SYSTEMS (MIS)

MISs are interactive human/machine systems that support decision making for users both in and out of traditional organizational boundaries. These systems are used to support an organization's daily operational activities; current and future tactical decisions; and overall strategic direction. MISs are made up of several major applications including, but not limited to, the financial and human resources systems.

2.14.1. Financial applications make up the heart of AIS in practice. Modules commonly implemented include: general ledger, payables, procurement/purchasing, receivables, billing, inventory, assets, projects, and budgeting.

2.14.2. Human resource applications make up another major part of modern information systems. Modules commonly integrated with the AIS include: human resources, benefits administration, pension administration, payroll, and time and labor reporting.

2.15. AIS—INFORMATION SYSTEMS IN CONTEXT:

AISs cover all business functions from backbone accounting transaction processing systems to sophisticated financial management planning and processing systems.

2.15.1. Financial reporting starts at the operational levels of the organization, where the transaction processing systems capture important business events such as normal production, purchasing, and selling activities. These events (transactions) are classified and summarized for internal decision-making and for external financial reporting.

2.15.2. Cost accounting systems are used in manufacturing and service environments. These allow organizations to track the costs associated with the production of goods and/or performance of services. In addition, the AIS can provide advanced analyses for improved resource allocation and performance tracking.

2.15.3. Management accounting systems are used to allow organizational planning, monitoring, and control for a variety of activities. This allows managerial-level employees to have access to advanced reporting and statistical analysis. The systems can be used to gather information, to develop various scenarios, and to choose an optimal answer among alternative scenarios.

2.16. DEVELOPMENT:

The development of AIS includes five basic phases: planning, analysis, design, implementation, and support. The time period associated with each of these phases can be as short as a few weeks or as long as several years.

2.16.1. Planning-project management objectives and techniques The first phase of systems development is the planning of the project. This entails determination of the scope and objectives of the project, the definition of project responsibilities, control requirements, project phases, project budgets, and project deliverables.

2.16.2. Analysis The analysis phase is used to both determine and document the accounting and business processes used by the organization. Such processes are redesigned to take advantage of best practices or of the operating characteristics of modern system solutions.

2.16.2.1. Data analysis is a thorough review of the accounting information that is currently being collected by an organization. Current data are then compared to the data that the organization should be using for managerial purposes. This method is used primarily when designing accounting transaction processing systems.

2.16.2.2. Decision analysis is a thorough review of the decisions a manager is responsible for making. The primary decisions that managers are responsible for are identified on an individual basis. Then models are created to support the manager in gathering financial and related information to develop and design alternatives, and to make actionable choices. This method is valuable when decision support is the system's primary objective.

2.16.2.3. Process analysis is a thorough review of the organization's business processes. Organizational processes are identified and segmented into a series of events that either add or change data. These processes can then be modified or reengineered to improve the organization's operations in terms of lowering cost, improving service, improving quality, or improving management information. This method is appropriate when automation or reengineering is the system's primary objective.

2.16.3. Design

The design phase takes the conceptual results of the analysis phase and develops detailed, specific designs that can be implemented in subsequent phases. It involves the detailed design of all inputs, processing, storage, and outputs of the proposed accounting system. Inputs may be defined using screen layout tools and application generators. Processing can be shown through the use of flowcharts or business process maps that define the system logic, operations, and work flow. Modeling the relationships among the organization's resources, events, and agents through diagrams identifies logical data storage designs. Also, entity relationship diagram (ERD) modeling is used to document large-scale database relationships.

Output designs are documented through the use of a variety of reporting tools such as report writers, data extraction tools, query tools, and on-line analytical processing tools. In addition, all aspects of the design phase can be performed with software tool sets provided by specific software manufacturers.

2.16.4. Reporting is the driving force behind an AIS development. If the system analysis and design are successful, the reporting process provides the information that helps drive management decision-making. Accounting systems make use of a variety of scheduled and on-demand reports. The reports can be tabular, showing data in a table or tables; graphic, using images to convey information in a picture format; or matrices, to show complex relationships in multiple dimensions.

There are numerous characteristics to consider when defining reporting requirements. The reports must be accessible through the system's interface. They should convey information in a proactive manner. They must be relevant. Accuracy must be maintained. Lastly, reports must meet the information processing (cognitive) style of the audience they are to inform.

Reports are of three basic types:

A *filter reports* that separates select data from a database, such as a monthly check register;

A *responsibility report* to meet the needs of a specific user, such as a weekly sales report for a regional sales manager;

A *comparative report* to show period differences, percentage breakdowns and variances between actual and budgeted expenditures. An example would be the financial statement analytics showing the expenses from the current year and prior year as a percentage of sales.

Screen designs and system interfaces are the primary *data capture devices* of AISs and are developed through a variety of tools. *Storage* is achieved through the use of normalized databases that assure functionality and flexibility.

Business process maps **and** *flowcharts* are used to document the operations of the systems. Modern AISs use specialized databases and processing designed specifically for accounting operations. This means that much of the base processing capabilities come delivered with the accounting or enterprise software.

2.17. Implementation

The implementation phase consists of two primary parts: construction and delivery. Construction includes the selection of hardware, software and vendors for the implementation; building and testing the network communication systems; building and testing the databases; writing and testing the new program modifications; and installing and testing the total system from a technical standpoint. Delivery is the process of conducting final system and user acceptance testing; preparing the conversion plan; installing the production database; training the users; and converting all operations to the new system.

Tool sets are a variety of application development aids that are vendor-specific and used for customization of delivered systems. They allow the addition of fields and tables to the database, along with ability to create screen and other interfaces for data capture. In addition, they help set accessibility and security levels for adequate internal control within the accounting applications.

Security exists in several forms. Physical security of the system must be addressed. In typical AISs the equipment is located in a locked room with access granted only to technicians. Software access controls are set at several levels, depending on the size of the AIS. The first level of security occurs at the network level, which protects the organization's communication systems. Next is the operating system level security, which protects the computing environment. Then, database security is enabled to protect organizational data from theft, corruption, or other forms of damage. Lastly, application security is used to keep unauthorized persons from performing operations within the AIS.

Testing is performed at four levels. Stub or unit testing is used to insure the proper operation of individual modifications. Program testing involves the interaction between the individual modification and the program it enhances. System testing is used to determine that the program modifications work within the AIS as a whole. Acceptance testing ensures that the modifications meet user expectations and that the entire AIS performs as designed.

Conversion entails the method used to change from an old AIS to a new AIS. There are several methods for achieving this goal. One is to run the new and old systems in parallel for a specified period. A second method is to directly cut over to the new system at a specified point. A third is to phase in the system, either by location or system function. A fourth is to pilot the new system at a specific site before converting the rest of the organization.

Support
The *support* phase has two objectives. The first is to update and maintain the AIS. This includes fixing problems and updating the system for business and environmental changes.

For example, changes in generally accepted accounting principles (GAAP) or tax laws might necessitate changes to conversion or reference tables used for financial reporting. The second objective of support is to continue development by continuously improving the business through adjustments to the AIS caused by business and environmental changes. These changes might result in future problems, new opportunities, or management or governmental directives requiring additional system modifications.

2.18. ATTESTATION

AISs change the way internal controls are implemented and the type of audit trails that exist within a modern organization. The lack of traditional forensic evidence, such as paper, necessitates the involvement of accounting professionals in the design of such systems. Periodic involvement of public auditing firms can be used to make sure the AIS is in compliance with current internal control and financial reporting standards.
After implementation, the focus of attestation is the review and verification of system operation. This requires adherence to standards such as ISO 9000-3 for software design and development as well as standards for control of information technology.

Periodic functional business reviews should be conducted to be sure the AIS remains in compliance with the intended business functions. Quality standards dictate that this review should be done according to a periodic schedule.