Accounting Information Systems 15th edition Romney Solutions Manual

SKU: 9780135573044-SOLUTIONS

Instructor's Solutions Manual

Accounting Information Systems

15th Edition

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CHAPTER 1

ACCOUNTING INFORMATION SYSTEMS: AN OVERVIEW

SUGGESTED ANSWERS TO DISCUSSION QUESTIONS

1.1 The value of information is the difference between the benefits realized from using that information and the costs of producing it. Would you, or any organization, ever produce information if its expected costs exceeded its benefits? If so, provide some examples. If not, why?

Most organizations produce information only if its value exceeds its cost. However, there are two situations where information may be produced even if its cost exceeds its value.

a. It is often difficult to estimate accurately the value of information and the cost of producing it. Therefore, organizations may produce information that they expect will produce benefits in excess of its costs, only to be disappointed after the fact.
b. Production of the information may be mandated by either a government agency or a private organization. Examples include the tax reports required by the IRS and disclosure requirements for financial reporting.

1.2 Can the characteristics of useful information listed in Table 1-1 be met simultaneously? Or does achieving one mean sacrificing another?

Several of the criteria in Table 1.1 can be met simultaneously. For example, more timely information is also likely to be more relevant. Verifiable information is likely to be more accurate.

However, achieving one objective may require sacrificing another. For example, ensuring that information is more complete may reduce its timeliness. Similarly, increased verifiability and accuracy may reduce its timeliness.

The decision maker must decide which trade-offs are warranted in each situation.

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1.3 You and a few of your classmates decided to become entrepreneurs. You came up with a great idea for a new mobile phone application that you think will make lots of money. Your business plan won second place in a local competition, and you are using the $10,000 prize to support yourselves as you start your company.

a. Identify the key decisions you need to make to be successful entrepreneurs, the information you need to make them, and the business processes you will need to engage in.
b. Your company will need to exchange information with various external parties. Identify the external parties, and specify the information received from and sent to each of them.

The author turns this question into an in-class group activity. Students are divided up in groups, told to close their books, and given 15 minutes to:

a. Think through the business processes, key decisions, and information needs issues in their group.
b. Identify the external users of information and specify the information received from and sent to each of them.

One group is selected to present their answers to the class. The other groups are told to challenge the group's answers, provide alternative answers, and chip in with additional answers not provided by the selected group. Since the group that presents is not selected until after the time has expired, students are motivated to do a good job, as they will be presenting to their peers.

The value of this activity is not in arriving at a "right answer" as there are many right answers and student answers will vary. Instead, it is in thinking through the issues presented in Table 1-2 (business processes, key decisions, and information needs) and Figure 1-1 (interactions with external parties). Student answers should contain many of the things in Table 1-2 and Figure 1-1 as well as others not shown, as a retail operation differs from an application development enterprise.

The author concludes the exercise by having the students turn to Table 1-2 and Figure 1-1 while he emphasizes the need for owners, managers, and employees of organizations to identify the information needed to make key decisions in the company's business processes and the key information interchanges with external parties. All the data needed to produce this information must be entered into the AIS, processed, stored, protected, and made available to the appropriate users.

While this active learning activity takes more time than a lecture does, it drives the point home much better than a lecture would. It also keeps the students more engaged in the material.

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1.4 How do an organization's business processes and lines of business affect the design of its AIS? Give several examples of how differences among organizations are reflected in their AIS.

An organization's AIS must reflect its business processes and its line of business. For example:

- Manufacturing companies will need a set of procedures and documents for the production cycle; non-manufacturing companies do not.
- Government agencies need procedures to track separately all inflows and outflows from various funds, to ensure that legal requirements about the use of specific funds are followed.
- Financial institutions do not need extensive inventory control systems.
- Passenger service companies (e.g., airlines, bus, and trains) generally receive payments in advance of providing services. Therefore, extensive billing and accounts receivable procedures are not needed; instead, they must develop procedures to account for prepaid revenue.
- Construction firms typically receive payments at regular intervals, based on the percentage of work completed. Thus, their revenue cycles must be designed to track carefully all work performed and the amount of work remaining to be done.
- Service companies (e.g., public accounting and law firms) do not sell physical goods and, therefore, do not need inventory control systems. They must develop and maintain detailed records of the work performed for each customer to provide backup for the amounts billed. Tracking individual employee time is especially important for these firms because labor is the major cost component.

1.5 Figure 1-5 shows that organizational culture and the design of an AIS influence one another. What does this imply about the degree to which an innovative system developed by one company can be transferred to another company?

Since people are one of the basic components of any system, it will always be difficult to transfer successfully a specific information systems design intact to another organization. Considering in advance how aspects of the new organizational culture are likely to affect acceptance of the system can increase the chances for successful transfer. Doing so may enable the organization to take steps to mitigate likely causes of resistance. The design of an AIS, however, itself can influence and change an organization's culture and philosophy. Therefore, with adequate top management support, implementation of a new AIS can be used as a vehicle to change an organization. The reciprocal effects of technology and organizational culture on one another, however, mean that it is unrealistic to expect that the introduction of a new AIS will produce the same results observed in another organization.

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1.6 Figure 1-5 shows that developments in IT affect both an organization's strategy and the design of its AIS. How can a company determine whether it is spending too much, too little, or just enough on IT?

There is no easy answer to this question. Although a company can try to identify the benefits of a new IT initiative and compare those benefits to the associated costs, this is often easier said than done. Usually, it is difficult to measure precisely the benefits of new uses of IT. Nevertheless, companies should gather as much data as possible about changes in market share, sales trends, cost reductions, and other results that can plausibly be associated with an IT initiative and that were predicted in the planning process.

1.7 Apply the value chain concept to S&S. Explain how it would perform the various primary and support activities.

The value chain classifies business activities into two categories: primary and support.

The five primary activities at S&S:

a. **Inbound logistics** includes all processes involved in ordering, receiving, and temporarily storing merchandise that is going to be sold to S&S customers.
b. S&S does not manufacture any goods, thus its **operations** activities consists of displaying merchandise for sale and protecting it from theft.
c. **Outbound logistics** includes delivering the products to the customer.
d. **Sales & marketing** includes ringing up and processing all sales transactions and advertising products to increase sales.
e. **Service** includes repairs, periodic maintenance, and all other post-sales services offered to customers.

The four support activities at S&S:

a. **Firm infrastructure** includes the accounting, finance, legal, and general administration functions required to start and maintain a business.
b. **Human resource management** includes recruiting, hiring, training, evaluating, compensating, and dismissing employees.
c. **Technology** includes all investments in computer technology and various input/output devices, such as point-of-sale scanners. It also includes all support activities for the technology.
d. **Purchasing** includes all processes involved in identifying and selecting vendors to supply goods and negotiating the best prices, terms, and support from those suppliers.

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1.8 Information technology enables organizations to easily collect large amounts of information about employees. Discuss the following issues:

These questions involve traditional economic cost/benefit issues and less well-defined ethical issues.

a. **To what extent should management monitor employees' e-mail?**

Generally, the courts have held that organizations have the right to monitor employees' email. Such monitoring can have disastrous effects on employee morale, however. On the other hand, it might provide legitimate information about group members' individual contributions and productivity.

b. **To what extent should management monitor which Web sites employees visit?**

Students are likely to argue whether or not this should be done. One potential benefit that could be argued is the likelihood that if employees are aware that they will be monitored they will be less prone to surf the Web for non-work-related uses.

c. To what extent should management monitor employee performance by, for example, using software to track keystrokes per hour or some other unit of time? If such information is collected, how should it be used?

Arguments pro and con can be generated about the effects of such monitoring on performance and on morale. Clearly, the specifics of any incentive schemes tied to such metrics are important.

d. Should companies use software to electronically "shred" all traces of e-mail?

Arguments can be raised on both sides of this issue. Try to get students to go beyond the legal ramifications of recent news stories and to explore the ethical implications of destroying different kinds of email.

e. Under what circumstances and to whom is it appropriate for a company to distribute information it collects about the people who visit its Web site?

Direct students to the guidelines followed by organizations that certify how various web sites use the information they collect. Students are likely to make the argument that personal information is inherently private and sacrosanct. To challenge that view, ask them about the legitimacy of developing and maintaining a reputation. Doesn't that involve the divulgence and sharing of personal information among strangers? Ask the class if it is feasible (or undesirable) to totally prevent or prohibit such sharing of information.

The instructor should also refer the students to GAPP, as one of its criteria concerns sharing information with 3rd parties. The instructor and the students could read the GAPP criterion about sharing data together, and then discuss what they think. Remind the students that GAPP is not regulatory law – just recommended best practice.

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SUGGESTED ANSWERS TO THE PROBLEMS

1.1 IT is continually changing the nature of accounting and the role of accountants. Write a two-page report describing what you think the nature of the accounting function and the accounting information system in a large company will be like in the year 2030.

Numerous answers are possible. Several articles addressing this topic have appeared in *Strategic Finance* and the *Journal of Accountancy*.

1.2 The annual report is considered by some to be the single most important printed document that companies produce. In recent years, annual reports have become large documents. They now include such sections as letters to the stockholders, descriptions of the business, operating highlights, financial review, management discussion and analysis, a discussion of company internal controls, segment reporting, inflation data, and the basic financial statements. The expansion has been due in part to a general increase in the degree of sophistication and complexity in accounting standards and disclosure requirements for financial reporting.

The expansion also is reflective of the change in the composition and level of sophistication of users. Current users include not only stockholders but also financial and securities analysts, potential investors, lending institutions, stockbrokers, customers, employees, and—whether the reporting company likes it or not—competitors. Thus, a report originally designed as a device for communicating basic financial information now attempts to meet the diverse needs of an ever-expanding audience.

Users hold conflicting views on the value of annual reports. Some argue that they fail to provide enough information, whereas others believe disclosures in annual reports have expanded to the point where they create information overload. Others argue that the future of most companies depends on acceptance by the investing public and by its customers; therefore, companies should take this opportunity to communicate well-defined corporate strategies. Adapted from the CMA Examination

a. **Identify and discuss the basic factors of communication that must be considered in the presentation of the annual report.**

The annual report is a one-way communication device. This requires an emphasis on clarity and conciseness because there is no immediate feedback from the readers as to what messages they are receiving.

The preparer must attempt to identify the users/audience of the report, and to determine their values, beliefs, and needs. Then the preparer can determine the language, i.e., words and phrases that would be appropriate and familiar to the users/audience.

The preparer must also consider the organization of the material in the report. Logical ordering and attractive formatting facilitate the transmission of ideas.

b. **Discuss the communication problems a corporation faces in preparing the annual report that result from the diversity of the users.**

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The different users of annual reports have differing information needs, backgrounds, and abilities. For some users, the annual report may serve as an introduction to the company and/or the only significant information about the company. By using the report to communicate to all users, the problems the corporation faces include the following.

- In an attempt to reach several audiences, a company may include information for each audience. Consequently, the annual report may grow in size and complexity to the point where it contains more information than many users want to receive or are able to comprehend, i.e., information overload. In some cases, technical concepts may be reduced to concepts that are more common; this reduces precision and conciseness thereby leading to more generalizations.

- Care must be taken in the presentation of information. Words and phrases familiar to one user group may not be understood by those in other user groups. Graphic displays that are meaningful to some may be meaningless to others.

c. **Select two types of information found in an annual report, other than the financial statements and accompanying footnotes, and describe how they are helpful to the users of annual reports.**

Other than the financial statements and accompanying footnotes, an annual report provides information concerning

- Management's discussion and analysis of results.
- Organizational objectives, strategies, and management's outlook for the future.
- Board of Directors members and the officers and top management of the organization.
- Segment data and performance information.
- New initiatives and research information.
- Recent stock price history and stock information.

Students will have many and varied answers as to how the information is helpful, which should lead to a rich class discussion. This discussion can be combined with the discussion of part e.

d. **Discuss at least two advantages and two disadvantages of stating well-defined corporate strategies in the annual report.**

Stating well-defined corporate strategies in a company's annual report accomplishes the following:

Advantages:
- Communicates the company's plan for the future and resolves any disparate issues.
- Provides a vehicle for communicating the company's strengths.
- Builds investor confidence and portrays a positive image.

Disadvantages:
- Locks management into fulfilling stated objectives and strategies, causing inflexibility.
- Communicates to unintended users who could put the company at risk (i.e., competitors).

e. **Evaluate the effectiveness of annual reports in fulfilling the information needs of the**

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following current and potential users: shareholders, creditors, employees, customers, and financial analysts

Annual reports fulfill users' information needs as discussed below.

1. Shareholders. Annual reports meet the statutory requirement that publicly held corporations are to report annually to stockholders and report on the stewardship of management to both current and potential stockholders. The annual report gives shareholders financial and operating information such as income from operations, earnings per share, the Balance Sheet, Cash Flow Statement, and related footnote disclosure that potential shareholders need to evaluate the risks of and potential returns on investment. However, the volume of data presented in annual reports can result in information overload that reduces the value of the reports. Confusion can result from reducing technical concepts to common concepts or by the presentation of duplicate messages by different forms of media.

2. Creditors. The annual report of public companies provides financial information as well as trend information. This allows creditors to project financial solvency and to evaluate the company's ability to repay loans.

3. Employees. The annual report gives the employees information such as a description of the company's pension plan and the employee stock incentive plan. This gives employees a base from which to compare their benefits program to those of other companies. Annual reports also provide employees with a year-end review of the results to which they have contributed during the year. In this sense, the annual report provides reinforcement and rewards. The annual report also informs or reminds employees of the organization's values and objectives and sensitizes them to the aspects of the organization with which they are not familiar. On the other hand, the employee already knows how the organization is performing so the annual report does not provide any substantive additional information.

4. Customers. The annual report provides customers with trend information and management performance information. They can use this to assess the company's past and current performance.

5. Financial analysts. The set of audited comparative financial statements provides the basis for analysis done by financial analysts. Notes, which are an integral part of the statements, describe or explain various items in the statements, present additional detail, or summarize significant accounting policies. Financial analysts are the most sophisticated class of users of annual reports. However, some data may be too condensed. Analysts may also need information in addition to that provided in annual reports to facilitate their analyses.

f. Annual reports are public and accessible to anyone, including competitors. Discuss how this affects decisions about what information should be provided in annual reports.

Management may omit information entirely from the annual report or disguise it because competitors have access to annual reports. The objective of reporting should be to reveal as much as possible without giving away proprietary information or a competitive edge.

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1.3 United Services Automotive Association (USAA) is one of the largest diversified financial services companies in the United States, with close to $75 billion in assets under management. One reason for its success is the use of IT to lower costs and improve customer service. USAA operates one of the most advanced and successful information systems in the world. Most of its communication with its widely scattered customers, mostly military officers and their families, is digital. It was the first U.S. bank to implement a remote deposit capture application for the iPhone.

Early on, USAA made a strategic choice to become one of the more technology-intensive companies in the world. It views IT as a strategic weapon and uses it in several ways, including the following:

- **When customers call, USAA personnel greet them personally by name. Unlike many diversified companies, a customer representative can handle inquires and transactions about all of USAA's products using a highly integrated database.**
- **USAA uses its extensive database to keep track of minute details, such as which auto parts are fixed most frequently. It also uses its database to find ways to reduce claims costs. For example, USAA discovered that repair shops would rather charge up to $300 to replace a windshield with punctures than to charge $40 to repair it. USAA began offering to waive the deductible if the owners would repair the windshield rather than replace it.**
- **USAA spent extensively to develop an image-processing system that digitizes all paper documents sent in by claimants. It takes only a few keystrokes for a policy service representative to retrieve pictures of all the documents in a customer's file. The system can sort and prioritize documents so that employees are always working on the most important and urgent tasks.**
- **USAA is a world leader in mobile banking. Customers can use their cell phones and other mobile devices to access and execute banking, investment, stock trading, and insurance applications such as filing claims. More than 70% of USAA's logins are from cell phone users.**
- **USAA was among the first financial institutions to use text and email messaging and notification technologies, person-to-person payment applications, and social networking and personal financial management tools connected to bank accounts.**

a. **Why should USAA collect data on which auto parts are fixed most frequently? What could it do with this data?**

Companies should gather and store data if the benefits received from the data are greater than the cost of collecting it. The data regarding the auto parts that get fixed most frequently is probably not costly to gather. It would probably be part of the claims information submitted by the insured parties. Therefore, the only significant cost would be to store the data and process it.

USAA passes the data on the parts to parts manufacturers, suppliers, and the Big Three automobile manufacturers. These companies use the data to improve their parts. Some use the data to determine which new products to offer. For example, one supplier may see that other suppliers are producing low quality products and determine that they could produce a better product for the same or a lower price.

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b. **Even though USAA offered to waive the deductible, the repair shops still managed to convince 95% of the owners to replace rather than repair their damaged windshields. How could USAA use its AIS to persuade more shop owners to repair rather than replace their windshields?**

USAA began capturing data on the repair records of the various shops that worked for them. They published this information in the newsletter sent to repair shops. The shops noticed how they compared to other shops and began repairing more windshields. Over a four-year period, the number of repaired windshields rose from 5% to 28%.

c. How does the image-processing system at USAA add value to the organization?

The system adds value by streamlining business processes and making them more effective and efficient. Before the image-processing system was installed, policy service representatives had to work with paper documents. Customer files were often missing or incomplete and documents were misfiled. The result was delays, multiple phone calls, and an inability to bring problems to timely closure. Now the documents are never missing or misplaced and service representatives have all the information they need to make a decision on the first phone call.

d. How do the remote deposit capture and mobile banking system at USAA add value to the organization?

USSA's customers are widely scattered and USAA does not have local offices everywhere there are military personnel. In addition, military personnel also are deployed in areas where they have ready access to cell phones but not personal computers. Therefore, USAA needs a way to deposit funds on a timely basis and to interact by phones that are able to access the internet. The new applications meet these needs.

e. Do an Internet search and find out what other advancements USAA has introduced. For example, see if you can find out how USAA is using artificial intelligence, data analytics, blockchain, or so other emerging technology. Write a one-page report on each new application or other newsworthy item you find (maximum limit of three applications or items).

Students should be able to find numerous applications or newsworthy items. The objective is to get the students to do the research necessary to learn more about new technologies and their real world uses. Of particular interest is the use of artificial intelligence, data analytics, and blockchain.

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1.4 Match the description in the right column with the correct information characteristic in the left column.

I 1. Access restricted	a. A report was carefully designed so that its data was easily comprehended by the reader.
E 2. Accurate	b. A manager working on the weekend needed information about a customer's production requests and found it on the company's network.
B 3. Available	c. Before production reports are accepted, two clerks working independently must produce the same information.
H 4. Reputable	d. An accounts receivable aging report included all customer accounts.
D 5.Complete	e. A report was checked by three different people to make sure it was correct.
K 6. Concise	f. An accounts receivable aging report is used in credit-granting decisions.
L 7. Consistent	g. An accounts receivable aging report was received before the credit manager had to decide whether to extend credit to a customer.
M 8. Current	h. Needing help with a decision, a manager sought the opinion of a highly regarded expert.
N 9. Objective	i. To protect intellectual property, a company encrypted the data, stored it in a very secure facility, and limited its use to five people.
F 10. Relevant	j. Tired of keying supplier prices into a database, a purchasing manager insisted the data be sent in machine readable form.
G 11. Timely	k. After a lengthy, rambling presentation, a CEO insisted future presentations contain only pertinent facts and last no more than 30 minutes.
J 12. Useable	l. A new manager insisted that monthly reports look the same so she could compare a new month's results to previous months.
A 13. Understandable	m. After making a decision based on outdated data, a new CFO required all analysis to be conducted with up-to-date data.
C 14. Verifiable	n. Reluctant to rely on his personal feelings about a decision, a manager sought the opinion of an outside expert.

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1.5 Classify each of the following items as belonging in the revenue, expenditure, human resources/payroll, production, or financing cycle.

a. Collect payment on customer accounts. – Revenue cycle
b. Complete a picking ticket for a customer order. – Revenue cycle
c. Decide how many units to make next month. – Production cycle
d. Disburse payroll checks to factory workers. - Human resources/payroll cycle
e. Draw upon line of credit. – Financing cycle
f. Establish a $10,000 credit limit for a new customer. – Revenue cycle
g. Hire a new assistant controller. – Human resources/payroll cycle
h. Obtain a bank loan. – Financing cycle
i. Pay federal payroll taxes. - Human resources/payroll cycle
j. Pay for raw materials. – Expenditure cycle
k. Pay off mortgage on factory. – Financing cycle
l. Pay property taxes on office building. – Expenditure cycle
m. Pay sales commissions. - Human resources/payroll cycle
n. Pay utility bills. – Expenditure cycle
o. Purchase raw materials. – Expenditure cycle
p. Put purchased goods into the warehouse. – Expenditure cycle
q. Record factory employee timecards. - Human resources/payroll cycle
r. Record goods received from vendor. – Expenditure cycle
s. Sell concert tickets. – Revenue cycle
t. Sell DVD player. – Revenue cycle
u. Send an order to a vendor. – Expenditure cycle
v. Send new employees to a business ethics course. - Human resources/payroll cycle
w. Update the allowance for uncollectible accounts. – Revenue cycle

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1.6 This chapter discusses several new technologies that impact accounting information systems: XBRL, artificial intelligence, data analytics, and blockchain. Research and then write a three-page report on one of these four technologies. Be sure to describe the technology's current impact on the AIS and how it is used in actual businesses or how an attempt to implement it failed.

Students should be able to find numerous ways each of these technologies impact an AIS. They should also be able to find how the technologies are being used in actual businesses. They are less likely to find how an attempt to implement the technology failed.

The objective is to get the students to do the research necessary to learn more about the new technologies and their real world uses.

1.7 Match each of the following terms with its definition.

1. _J__ Accounting information system	a. Exceeding the amount of information a human mind can absorb and process
2. _P__ Artificial intelligence	b. Use of software and algorithms to find and solve problems and improve business performance
3. _Y__ Blockchain	c. The benefit provided by information minus the cost of producing it
4. _D__ Business processes	d. A set of activities and tasks that help accomplish a specific organizational goal
5. _R__ Data	e. An agreement to exchange goods or services in exchange for cash
6. _B__ Data analytics	f. Process of capturing, processing, and storing transaction data for later use and for producing information output
7. _U__ Data dashboard	g. Frequent exchanges such as surrendering cash for inventory and paying employees for labor
8. _N__ Expenditure cycle	h. Activities associated with selling goods and services in exchange for cash or a future promise of cash
9. _X__ General ledger and reporting system	i. Value chain activities that produce, market, and deliver products to customers and provide post-delivery support
10. _G__ Give-get exchange	j. A system that collects, records, stores, and processes data to produce information for decision makers
11. _Z_ Goal congruence	k. Linking all the primary and support activities in a business
12. _T__ Information	l. Activities such as firm infrastructure and technology that enable main activities to be performed efficiently and effectively
13. _O__ Machine-readable	m. An organization's value chain as well as its vendors, distributors, and customers
14. _I__ Primary activities	n. Activities associated with purchasing inventory for resale for cash or a promise to pay cash
15. _S_ Production cycle	o. Data in a format that can be processed by a computer
16. _H__ Revenue cycle	p. Computer systems that simulate human intelligence processes such as learning, reasoning, and self-improvement
17. _M__ Supply chain	q. Procedures and routines that carry out specific activities, achieve objectives, or solve problems
18. _L__ Support activities	r. Facts collected, recorded, stored, and processed by an information system
19. _Q__ System	s. Activities associated with using labor, raw materials, and equipment to produce finished goods

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20. _E__ Transaction	t. Organized and processed data that provide meaning and improve decision making
21. _K__ Value chain	u. Display of data points and performance indicators in easily understood charts, tables, or gauges
22. _C__ Value of information	v. Activities associated with hiring, compensating, promoting, and terminating employees
	w. Major give-get exchanges that occur frequently in most companies
	x. Information-processing operations involved in preparing reports for internal and external parties
	y. Individual digital records linked using cryptography in a single list called a chain
	z. A subsystem achieves its goals while contributing to the overall goal

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CHAPTER 1
ACCOUNTING INFORMATION SYSTEMS: AN OVERVIEW

Instructor's Manual

Learning Objectives:

1. Distinguish between data and information, discuss the characteristics of useful information, and explain how to determine the value of information.

2. Explain the decisions an organization makes and the information needed to make them, and the major business processes present in most companies.

3. Explain how an AIS adds value to an organization, how it affects and is affected by corporate strategy, and its role in a value chain.

Learning Objective One

Distinguish data from information, discuss the characteristics of useful information, and explain how to determine the value of information.

Systems, Data, and Information

Systems

A **system** is a set of detailed methods, procedures, and routines that carry out specific activities, perform a duty, achieve goals or objectives, or solve problems.

Systems are almost always composed of smaller subsystems

Each subsystem is designed to achieve one or more organizational goals.

For example, the college of business is a system composed of various subsystems known as departments (e.g., Marketing, Management, Accounting, etc.).

Each subsystem is designed to achieve one or more organizational goals, changes in subsystems cannot be made without considering the effect on other subsystems and the system as a whole.

Goal conflict occurs when a subsystem's goals are inconsistent with the goals of another subsystem or the system as a whole.

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Goal congruence is achieved when a subsystem achieves its goals while contributing to the organization's overall goal.

Data

Data are facts that are collected, recorded, stored, and processed by an information system.

Several kinds of data need to be collected in businesses, such as:

1. Facts about the activities that take place (e.g., date, total amount).
2. The resources affected by the activities (e.g., number of units).
3. The people who participate in the activity (e.g., S&S).

Information

Information is data that have been organized and processed to provide meaning and context that can improve the decision-making process.

If using the example of data provided above—date, number of units, and S&S—would you be able to determine if this is a sales transaction, purchase transaction, or any other type of transaction? No, because it is not organized and contextual, meaning it is not determinable. You would need to know that the context of the transaction is a sales transaction and S&S is a customer (as opposed to a vendor). Number of units are number of units sold.

Data is most useful when it is machine-readable and standardized such that it can be processed by a computer with little human intervention.

For example, digital transaction information such as "IR144, $12.95, Infrared reader, 3, $38.85" might be presented digitally, but the meaning of that data is not clear. This might be a purchase transaction or a sales transaction. IR144 might represent a transaction ID, employee ID, vendor ID, or customer ID. Taxonomies have been created to embed meaning in digital data. XBRL is a taxonomy that structures business information for communication between business systems. Using the XBRL taxonomy is quite complex and embeds a lot of information about the characteristics and constraints of each data field. An XBRL presentation of Cash of 11,000 from a balance sheet for 2022 may be represented in XBRL as

```
<iascf-pfs:CashCashEquivalents numericContext="Group2022AsOf">11000</iascf-pfs:CashCashEquivalents>
```

Note the tag name of CashCashEquivalents. Tag names have to be created in XBRL for all financial statement elements. Also, note the attribute numericContext that has a value of Group2020AsOf. This provides additional context to the value of 11,000. The XBRL taxonomy does not have elements for tagging individual transactions.

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Thus XBRL cannot effectively 'tag' the transaction noted above. The UBL taxonomy, an open source taxonomy for tagging business transactions has a schema for invoices. http://docs.oasis-open.org/ubl/os-UBL-2.2/UBL-2.2.html Below is an example of how the data above might be tagged in that taxonomy.

```
<cac:InvoiceLine>
      <cbc:ID>1</cbc:ID>
      <cbc:InvoicedQuantity>3</cbc:InvoicedQuantity>
      <cbc:LineExtensionAmount currencyID="USD">38.85</cbc:LineExtensionAm
      ount>
      <cac:Item>
            <cbc:Name>Infrared reader</cbc:Name>
            <cac:SellersItemIdentification>
                  <cbc:ID>IR144</cbc:ID>
            </cac:SellersItemIdentification>
      </cac:Item>
      <cac:Price>
            <cbc:PriceAmount currencyID="USD">12.95</cbc:PriceAmount>
      </cac:Price>
</cac:InvoiceLine>
```

Tagging data with agreed upon taxonomies allows data elements and their context to be transmitted between systems. It also improves reliability, relevance, accessibility, understandability, and timeliness.

There are limits to the amount of information the human mind can effectively absorb and process.

Information overload occurs when those limits are passed.

When you get more information than you can effectively assimilate, you suffer from information overload.

- Example: Final exams week!

When you have reached the overload point, the quality of decisions declines while the costs of producing the information increases.

Information Technology (IT) are computers and other electronic devices used to store, retrieve, transmit, and manipulate data to help decision makers more effectively filter and condense information.

The value of information is the benefit produced by the information minus the cost of producing it. Benefits include reduced uncertainty, improved decisions, and improved ability to plan and schedule activities. Costs include the time and resources spent to produce and distribute information.

A good example of the value of information is provided on page 5 for the 7-Eleven stores in Japan. Each store uses information for:

1. Keeping track of the 3,000 items sold in each store and

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determining what products are moving, at what time of the day, and under what weather conditions.

2. Keeping track of customers (what and when they buy). If their best customers are single men, for example, the store makes sure it has the fresh rice dishes they purchase on their lunch hour and at the end of the workday.

3. Ordering sandwiches and rice dishes from suppliers automatically. Orders are placed and filled three times a day so stores can always have fresh food. 7-Eleven allows its suppliers to access sales data in their computers so they can forecast demand.

4. Coordinating deliveries with suppliers. This allows the stores to reduce the number of deliveries from 34 to 12 a day, resulting in less clerical receiving time.

5. Preparing a color graphic display that indicates which store areas contribute the most to sales and profits.

Table 1-1 on **page 4** provides the fourteen characteristics that make information useful and meaningful for decision making.

1. Access Restricted
2. Accurate
3. Available
4. Reputable
5. Complete
6. Concise
7. Consistent
8. Current
9. Objective
10. Relevant
11. Timely
12. Useable
13. Understandable
14. Verifiable

Multiple Choice 1

Data differ from information in which way?
   a. Data are facts about a sale
   b. Information is data organized to provide meaning
   c. Data are meaningful bits of information
   d. There is no difference

Multiple Choice 2

Which of the following is *not* a characteristic that makes information useful?
   a. It is reputable
   b. It is timely
   c. It is inexpensive
   d. It is relevant

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Learning Objective Two

Explain the decisions an organization makes and the information needed to make them, and the major business processes present in most companies.

Key Decisions and Information Needs

Using the S&S case, we can determine what information will be needed to make better decisions. An information system is comprised of the people and technology that produce information. Information in an organization is organized through a set of related, coordinated, and structured activities and tasks, performed by a person, a computer, or a machine that help accomplish a specific organizational goal known as a **business process**. The case will help students to understand that before collecting data and processing it into information, the decisions that management and other external users will be making need to be known first. Only after this is known can we begin designing and using the AIS to capture, collect, and process the correct data as needed by decision makers. These information needs and key decisions are provided in **Table 1-2** on **page 6.**

Multiple Choice 3

What information needs are generally associated with the acquire inventory business process?

a. Market Analysis
b. Vendor Performance
c. Inventory status reports
d. All of the above

Learning Objective Three

Explain how an AIS adds value to an organization, how it affects and is affected by corporate strategy, and its role in a value chain.

Business Processes

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Taking the list of specific business processes from S&S it is easier to group them into related transactions. A **transaction** is an agreement between two entities to exchange goods or services or any other event that can be measured in economic terms by an organization. **Transaction processing** is the process of capturing transaction data, processing it, storing it for later use, and producing information output such as a financial statement. The activities between two entities are pairs of events involved in **give-get exchange** (e.g., give inventory to a customer, get cash from the customer). These frequent give-get exchanges that occur in companies are grouped around **business processes or transaction cycles** and are:

1. The **Revenue Cycle (AKA customer to cash (C2C)**—Activities associated with selling goods and services in exchange for cash or future promise to receive cash (Accounts Receivable).

2. The **Expenditure Cycle**—(AKA purchase to pay (P2P))Purchase of inventory for resale or raw materials for use in production in exchange for cash or a promise to pay cash in the future (Accounts Payable).

3. The Production or Conversion Cycle—Raw materials are converted into finished goods.

4. The Human Resource/Payroll Cycle—Employees are hired, trained, compensated, evaluated, promoted, and terminated.

5. The Financing Cycle—Companies acquire capital by selling shares or borrowing money and where investors are paid dividends or interest.

For each of these processes there is a basic give-get relationship. **Figure 1-2** on **page 7** provides a description of the basic give-get exchanges.

1. Revenue Cycle—Give goods, get cash or A/R.

2. Expenditure Cycle—Give cash or A/P, get goods or raw materials.

3. Production Cycle—Give labor and raw materials, get finished goods.

4. Human Resource—Give cash, get labor.

5. Financing Cycle—Give cash, get cash.

Figure 1-3 on **page** 8 shows the relationship between these cycles and the **general ledger and reporting system** function which is used to generate information for both management and external parties.

Multiple Choice 4

Which transaction cycle includes interactions between an organization and its suppliers?

a. Revenue cycle
b. Expenditure cycle
c. Human resources/payroll cycle

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d. General ledger and reporting system

Multiple Choice 5

In which cycle does a company ship goods to customers?
a. Production cycle
b. Financing cycle
c. Revenue cycle
d. Expenditure cycle

Accounting Information Systems

An **accounting information system (AIS)** is a system that collects, records, stores, and processes data to produce information for decision makers.

This is illustrated in **Figure 1-4 on page 11.**

An AIS can be a pencil and paper manual system or one that involves the latest technology.

Six components of an AIS

1. The **people** who operate the system and perform various functions.

2. The **procedures and instructions**, both manual and automated, involved in collecting, processing, and storing data about the organization's activities.

3. The **data** about the organization and its business processes.

4. The **software** used to process the organization's data.

5. The **information technology infrastructure**, including computers, peripheral devices, and network communications devices used to collect, store, process, and transmit data and information.

6. The **internal controls** and **security measures** that safeguard the data in the AIS.

These six components enable an AIS to fulfill **three important business functions:**

1. **Collect and store data** about organizational activities, resources, and personnel.

2. **Transform data into information** that is useful for making decisions so management can plan, execute, control, and evaluate activities, resources, and personnel.

3. **Provide adequate controls** to safeguard the organization's assets, including its data, to ensure that the assets and data

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are available when needed and the data are accurate and reliable.

Multiple Choice 6

Which of the following is a function of an AIS?
a. Reducing the need to identify a strategy and strategic position.
b. Transforming data into useful information.
c. Allocating organizational resources.
d. Automating all decision making.

How an AIS Can Add Value to an Organization

1. **Improve the quality** and **reduce the costs** of products or services.

2. **Improve efficiency.** A well-designed AIS can make operations more efficient by providing more timely information.

3. **Share knowledge.** A well-designed AIS can make it easier to share knowledge and expertise, perhaps thereby improving operations and even providing a competitive advantage.

4. **Improve** the **efficiency** and **effectiveness** of its supply chain.

5. **Improve** the internal control structure.

6. **Improve** decision making.

Multiple Choice 7

An AIS provides value by:
a. improving products or services through information that increases quality and reduces costs
b. providing timely and reliable information to decision makers
c. creating new products
d. both A and B

An AIS Can Use Artificial Intelligence and Data Analytics to Improve Decision Making

Artificial Intelligence uses computer systems to simulate human intelligence processes such as learning, reasoning, and self-improvement. Within accounting AI may be used to automate parts of the financial reporting process, the audit, and many operational decisions.

Data Analytics is the use of software and algorithms to discover, describe, interpret, communicate, and apply meaningful patterns to improve business performance. Data analytics have long been used to analyze past

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performance. Increasingly data analytics are designed to focus on the future.

A data dashboard is an essential part of most analytic tools. It displays important data points, key metrics, and key performance indicators in the form of graphs, tables, and gauges.

The AIS and Blockchain

Blockchain is appropriately named as it chains blocks of data together through the use of cryptography algorithms that create hashes. The hash of a prior block is included in the latest block, creating the chain. At a high level a blockchain repeatedly executes the following 5 steps:

1. Initiate transaction
2. Validate transaction
3. Create a block
4. Calculate and insert a hash
5. Complete transaction

A detailed discussion of the processes of using and maintaining a blockchain are covered in Chapter 11.

Blockchain advantages include:

1. Accuracy
2. Transparency
3. Data consistency
4. Trust
5. No need for third parties
6. Single set of books
7. Cost
8. Decentralization
9. Efficiency
10. Privacy
11. Security
12. Provenance

Blockchain disadvantages include:

1. Cost
2. Loss of privacy and confidentiality
3. Susceptibility

Cloud Computing, Virtualization, and the Internet of Things

Cloud computing takes advantage of the modern global network to allow individuals to access software (software as a service), hardware (infrastructure as a service), and application environments (platform as a service) remotely. Variations include: public, private, or hybrid clouds, depending on whether the remote resources are owned by the user.

Virtualization is the installation of multiple computing environments in a single physical computer. A corporation might virtualize their database server, email server, and file server (three separate computing environments – each with their own operating system) on a single physical computer. This cuts hardware costs and reduces maintenance costs.

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The Internet of Things (IOT) refers to the embedding of sensors in a multitude of devices that are capable of communicating (sharing data) with the internet. IOT allows for monitoring and control of many common devices such as heating, appliances, and lights from any internet connection in the world. There are significant security implications to the IOT.

The AIS and Corporate Strategy

Figure 1-5 on **page 19** shows three factors that influence the design of an AIS: IT developments, business strategy, and organizational culture.

For example, the growth of the internet has affected the way many value chain activities are performed.

The internet makes a company's products available almost anywhere.

An organization's AIS play an important role in helping it adopt and maintain a strategic position.

The information system can collect financial and nonfinancial data about the organization's activities.

The Role of the AIS in the Value Chain

The role of an AIS in the **value chain** is detailed in **Figure 1-6** on **page 19** showing the linking together of all the primary and support activities in a business. The objective of most organizations is to **provide value** to their **customers.**

Five primary activities that directly provide value to its customers:

1. **Inbound logistics** consists of receiving, storing, and distributing the materials an organization uses to create the services and products it sells.
2. **Operations** activities transform inputs into final products or services.
3. **Outbound logistics** activities distribute finished products or services to customers.
4. **Marketing and sales** activities help customers buy the organization's products or services.
5. **Service** activities provide post-sale support to customers.

Four Categories of Support Activities

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1. **Firm infrastructure** is the accounting, finance, legal, and general administration activities that allow an organization to function.

2. **Human resources** activities include recruiting, hiring, training, and providing employee benefits and compensation.

3. **Technology** activities improve a product or service.

4. **Purchasing** activities procure raw materials, supplies, machinery, and the buildings used to carry out the primary activities.

Supply Chain [Figure 1-7 on Page 20] shows an extended system that includes an organization's value chain (manufacturer) as well as suppliers, distributers, retailers, and customers.

1. Raw Materials Supplier

2. Manufacturer

3. Distributor

4. Retailer

5. Consumer

Multiple Choice 8

The value chain concept is composed of the following two types of activities:
a. Primary and secondary
b. Primary and support
c. Support and value
d. Technology and support

Multiple Choice 9

Which of the following is a primary activity in the value chain?
a. Purchasing
b. Accounting
c. Post-sales service
d. Human resource management

Multiple Choice 10

Which of the following is a support activity in the value chain?
a. Purchasing
b. Manufacturing
c. Post-sales service
d. Receiving materials

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Answers to Multiple Choice Questions:

Multiple Choice Number	Multiple Choice Answer	Multiple Choice Number	Multiple Choice Answer
1	B	6	B
2	C	7	D
3	D	8	B
4	B	9	C
5	C	10	A

References Used:

1. Michael E. Porter and Victor E. Millar, How Information Gives You Competitive Advantage. *Harvard Business Review*, (July–August 1985), pp. 149–160.
2. Michael E. Porter, What Is Strategy? *Harvard Business Review*, November-December 1996), pp. 61-78.

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