

A Comparative Study on the Documentation of an AIS

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ABSTRACT

Documentation encompasses the narratives, flowcharts, diagrams, and other written materials that explain how a system works. There are mainly two types of documentation, the flowcharts and the data flow diagrams. A flowchart is a graphical representation of some part of an information system. Flowcharts are reclassified into the following four types. They are document flowcharts, systems flowcharts, program flowcharts, and hardware flowcharts.

Even though making a flowchart is more an art than a science, certain guidelines make flowcharts including document flowcharts and systems flowcharts, and data flow diagrams to be more valuable. For the document flowcharts, all the departments that create or receive the documents involved in the system should be identified. For the systems flowcharts, a processing symbol should always be located between an input symbol and an output symbol. And for the data flow diagram, in a high-level data flow diagram detail should be avoided, and where appropriate, activities that are performed at the same place or same time or that are logically related should be combined.

Both the flowcharts and the data flow diagrams are similar documentation tools in nature, yet there are many differences between them. One of them is that for the flowcharts, numbers are used for only on- and off-page connectors, and not for processes. However, for the data flow diagrams, processes are numbered in the following formats: level zero, 1.0; level one, 1.1; level two, 1.1.1; and so on.

Key Words : document flowcharts, systems flowcharts, data flow diagram

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I . Introduction

Documentation is a vital part of an accounting information system. The logical and physical flows of accounting data and information cannot be understood without appropriate documentation. Documentation provides accountants a visual method to help understand processes and procedures, identify internal control weaknesses, and improve the efficiency of the company's accounting systems and business operations.

Documentation includes the narratives, flowcharts, diagrams, and other written communications that describe the inputs, processing, and outputs of an accounting system, AIS.

Without documentation, confusion would exist in the firm because of uncertainty and inconsistency in how individual jobs should be done. This confusion would increase the number of mistakes and decrease the timeliness of the accounting transactions, thereby increasing the difficulties of all accountants' jobs.

Documentation also provides institutional memory - the collection of documentation because if the only person who knows how to do the task leaves, the company has to recreate the process from the beginning. Institutional memory is a collective of facts and experiences held by a group of people.¹⁾

This study explains why accountants need to understand documentation and describe some tools for diagramming an accounting information system.

Accountants can use many different types of flowcharts or diagrams to trace the flow of accounting data through an AIS. Document flowcharts describe the physical flow of order forms, requisition slips, and similar hard-copy documents through a AIS. System flowcharts are similar to document flowcharts, except that system flowcharts usually focus on the electronic flow of data in computerized AIS. Other examples of documentation tools include process maps, program flowcharts, and decision tables.

While flowcharts provide documentation for the AIS in terms of a physical

1) What would have happened if a controller left his firm prior to the documentation of the newly implemented policies and procedures? Most likely it would have a significant impact on the new controller as he inefficiently gains a understanding of the operations and cause confusion in operating policies and procedures.

description, other tools are more useful for describing the logical flow of data. A documentation tool frequently used for this purpose is the data flow diagram. Data flow diagrams show logical flows of data and the processes that transform the data.

In the following section, the significance of the documentation is to be discussed.

II. The Significance of Documentation

Accountants do not need to understand exactly how computers process the data of a particular accounting application, but it is important for them to understand the documentation that describes how this processing takes place.

Followings are the reasons why documentation is important to AIS. First, documentation helps employees understand how a system works, assists accountants in designing controls for it, and gives managers confidence that it will meet their information needs.²⁾

Secondly, documentation also includes the user guides, manuals, and similar operating instructions that help people learn how an AIS operates. These documentation aids help train users to operate AIS hardware and software, solve operational problems, and perform their jobs better.

Thirdly, documentation helps system designers develop new systems in much the same way that blueprints help architects design a building. Fourthly, good documentation helps system designers develop object-oriented software, that is, programs that contain modular, reusable code.

Fifthly, documentation tools help describe an existing or proposed system in a common language and help users communicate with one another about these systems. Sixthly, documentation helps auditors determine the strengths and weaknesses of a system's controls, and therefore the scope and complexity of the audit.

Seventhly, documentation can help managers better understand the ways in which

2) Simply observing large AIS in action is an impractical way to learn about them especially for a computerized system because the processing is electronic and invisible.

their businesses operate, and how to improve core business processes. Eighthly, manual signatures on business and government documents allow employees and government agents to execute their responsibilities, create audit trails, and establish accountability for their actions.

III. The Documentation Tools

1. Flowchart

Basically, a flowchart is a graphical representation of some part of an information system. The information system might be focused on accounting, production, human resources, or marketing.³⁾ Flowcharts have been used by information technology professionals for many years to document computer programs and they can also be used to describe the hardware related to a computer information system. Flowcharts are reclassified into the followings. There are basically four types of flowcharts. They are document flowchart, systems flowchart, program flowchart, and hardware flowchart.

Document flowcharts show the various documents involved in a system and they also depict the procedures performed on these documents.⁴⁾ Systems flowcharts give the user a big picture look at an information system. A systems flowchart would combine all of resources with their related business processes.⁵⁾

Program flowcharts show the logic related to a computer program. Hardware flowcharts show the computers, printers, monitors, input devices, and other hardware elements related with an information system or an AIS.

Flowcharts can be designed using a variety of tools. You can draw a flowchart with traditional paper and pencil. You can also use a flowcharting template which includes

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- 3) It might be associated with a particular project such as launching a space shuttle or evaluating employee performance.
 - 4) For example, a document flowchart might show your income tax return from the time you receive a blank form through its eventual disposition with the National Tax Authority.
 - 5) For example, you use a process to register for classes each term. You use certain documents and types of information technology to select and register for classes.

many common flowcharting symbols. Software programs also facilitate the preparation of good flowcharts. The advantage of using a program specifically designed for flowcharting is a wide variety of flowcharting symbols in their libraries than other programs designed for other purpose.

(1) Document Flowcharts

The term document is used in broad sense to include all types of written communications in an organization.⁶⁾ A document flowchart traces the physical flow of documents through a organization from the departments, groups, or individuals who first create them to their final destinations.

Constructing a document flowchart begins by identifying the different departments or groups that handle the documents of a particular system. The flowcharter then uses the symbols to illustrate the document flows.

Document flowcharts concentrate more on the physical flow of reports and similar documents. When constructing them, any movement of physical goods in their document flowcharts, for example, moving inventory from a receiving department to an inventory storeroom, can be included.

Some document flowcharts also illustrate information flows that do not involve documents.⁷⁾ Thus, the term document broadly includes all types of organizational communications and data flows. Unlike other types of flowcharting symbols, document flowcharting symbols are not standardized.

A document flowchart is particularly useful in analyzing the adequacy of control procedures in a system, such as internal checks and segregation of functions.⁸⁾

The document flowchart can reveal weaknesses or inefficiencies in a system, such as inadequate communication flows, unnecessary complexity in document flows, or

6) They include memos from one manager to another, performance reports, purchase orders, and sales invoices.

7) For example, a sales clerk telephoning to check a customer's account balance before approving a credit sale.

8) Document flowcharts that describe and evaluate internal controls are often referred to as internal control flowcharts.

procedures responsible for causing wasteful delays.

There are certain steps that can be followed to draw them. The first step is to identify the participants. The next step is to identify the source documents involved.

The third step in making a document flowchart is to depict how the documents are created, processed, and used. This is the most complex task and the designer must often use considerable creative capability to represent data flows and processing activities accurately. A document's first appearance should be under the department in which it was created. The physical flow of forms is represented by solid arrows. The transmitted document should then be redrawn to indicate its arrival in the receiving department.

The last step in the creation of a document flowchart is to add annotations to explain activities or symbols. These annotations are little notes to the readers that are used for further clarification.

(2) Systems Flowcharts

Systems flowcharts concentrate more on the computerized data flows of an AIS, whereas document flowcharts focus more on tangible documents. Thus, a systems flowchart typically depicts the electronic flow of data and processing steps in an AIS.

Some systems flowcharts are general in nature, and thus, merely provide an overview of the system. These are high-level system flowcharts. The inputs and outputs of the system are specified by the general input and output symbol. In a more detailed systems flowcharts, the specific form of these inputs and outputs would be indicated, for example, by magnetic disk symbols.

A more detailed systems flowchart would describe all the processes performed by an application program and the specific inputs and outputs of each process. At the lowest-level, most detailed level of such documentation are program flowcharts that describe the processing logic of each application program.

The systems flowchart documents the flow of the data through the company's computerized system. Thus, it identifies sources of data, the places where data are temporarily stored, and the outputs on which processed data appear.

Systems flowcharts also indicate processing cycles, hardware needs, and potential bottlenecks in processing. They can also identify the major files of the system and the major reports of the system.

Each processing phase of a systems flowchart usually involves preparing one or more control reports. These reports provide processing-control information for control purpose and exceptions information that help employees correct the errors detected by the system.

Systems flowcharts depict an electronic job stream of data through the various processing phases of an AIS and as a result, also illustrate audit trails. Each time the records of a file are stored or sorted or updated, a systems flowchart should show these activities in a separate processing step.⁹⁾

A systems flowchart begins by identifying both the inputs that enter the system and their origins. The input can be new data entering the system, data stored for future use, or both. The input is followed by the processing portion of the flowchart, that is, the steps performed on the data. The resulting new information is the output component, which can be stored for later use, displayed on a screen, or printed on the paper.

In summary, systems flowcharts are an important systems analysis, design, and evaluation tool. They are universally employed and utilized in systems work, and provide an immediate form of communication among workers. The systems flowchart is an excellent vehicle for describing information flows and procedures within an AIS.

2. Data Flow Diagram

Data flow diagrams are used primarily in the systems development process, for example, as a tool for analyzing an existing system or as a planning aid for developing a new system.

The data flow diagrams are usually drawn in various different levels that show

9) In recognizing the usefulness of systems flowcharts, both the AICPA and the Institute of Management Accountants consistently include test questions in their professional examinations that require a working knowledge of systems flowcharts.

increasing amount of detail. Designers first prepare a high-level data flow diagram, called a context diagram, to provide an overview of a system.

A context diagram shows very little detail. For this reason, system designers elaborate on elements in the data flow diagrams by decomposing them into successively more detailed levels. These subsequent data flow diagrams show more particulars, such as the detailed process of the application and the inputs and outputs associated with each processing step.

The first level of detail is called a physical data flow diagram. A physical data flow diagram closely resembles the document flowcharts; that is, it focuses on physical entities such as the employees involved in the system under study, as well as the tangible documents, reports, and similar hard-copy inputs and outputs that flow through the system.

A physical data flow diagram illustrates which internal and external entities participate in a given system, but does not give a good idea of what these entities actually do. For this reason, we need to have logical data flow diagrams that meet this requirement.

Logical data flow diagrams help designers decide what system resources to acquire, what activities employees must perform to run these systems, and how to protect and control these systems after they are installed.

A data flow diagram is composed of four basic elements: data sources or destinations, data flows, transformation processes, and data stores. Each is represented on a data flow diagram by one of the symbols. These four elements are combined to show how data are processed.

A source or destination on the data flow diagram represents an organization or an individual that sends or receives data that the system uses or produces. An entity can be both a source and a destination.

A data flow represents the flow of data among processes, data stores, and data sources or destinations. Data that pass between data stores and either a data source or destination must go through some form of data processing or through a transformation process.

Transformation processes represent the transforming of data, while a data store is a

temporary or permanent repository of data. Data flow diagrams do not show the physical storage medium used to store the data. A data store is a place for collecting data, that is, a file.

3. Guidelines for the documentation

(1) Document Flowcharts

You can follow certain guidelines to make document flowcharts more valuable, even though making the flowcharts is more an art than a science.

First, all the departments that create or receive the documents involved in the system should be identified. Secondly, the documents and activities of each department should be carefully classified, and they should be drawn under their corresponding department headings.

Thirdly, each copy of an accounting document should be identified with a number. Fourthly, on-page and off-page connectors should be used to avoid diagrams with lines that cross one another.

Fifthly, annotation should be used to explain activities or symbols that may be unclear. Sixthly, each pair of connectors should use the same letter on the number.

Seventhly, the letter "A" for alphabetical, "N" for numeric, or "D" for chronological should be included in the file symbol, if the sequence of records in a file is important. Finally, the distribution of each copy of a document should be accounted.

(2) Systems flowcharts

Followings provide some guidelines, although no strict rules dictate how to construct a systems flowchart.

First, the systems flowchart should read from top to bottom and from left to right. Secondly, because the system flowchart symbols are standardized, we should use these standardized symbols when drawing the flowchart.

Thirdly, a processing symbol should always be located between an input symbol and an output symbol. Fourthly, connector symbols should be used when crossing lines is

unavoidable.

Fifthly, the flowchart should be sketched before designing the final draft. Finally, descriptions and comments in the flowchart should be added to clarify processing elements.

(3) Data Flow Diagram

The data flow diagrams use fewer symbols than the flowcharts discussed previously, and they are therefore easier to prepare and understand. Following guidelines are related to good data flow diagrams to be drawn.

First, in a high-level data flow diagram, detail should be avoided, and wherever appropriate, activities that are performed at the same place or same time or that are logically related should be combined. Secondly, each logical data flow diagram should contain between five and seven processing bubbles.¹⁰⁾ This guideline helps keep things simple and help you avoid showing too much detail in the high-level data flow diagrams.

Thirdly, different data flows should have different names, which avoids confusion about what data are flowing from or to. Fourthly, all data stores should have data flows both into them and out of them unless they are outside the system or used for archiving. Thus, an internal file symbol that lacks both of these data flow lines is usually in error.

Fifthly, it is usually desirable to include a file in a data flow diagram, even if the file is temporary. Sixthly, most of the final recipients of system information should be classified as external entities.

Seventhly, all personnel or departments that process the data of the current system should be classified as internal entities. Eighthly, only normal processing routines should be displayed in the high-level data flow diagram. And you should avoid to show error routines or similar exception tasks in them. Finally, only one representative system entity should be shown, wherever several system entities perform the same task.

10) A circle or bubble in a data flow diagram indicates a system entity or process that changes or transforms data.

4. Comparison between Flowcharts and data Flow Diagram

Flowcharts and data flow diagrams are both documentation tools, yet they are quite different in many following respects.

First, for the flowcharts, many symbols are used such as the rectangle depicting a process, the diamond depicting a decision, the triangle depicting a file, and other symbols. However, for the data flow diagrams, only four symbols are used. They are the circle depicting a process, the line depicting data flow, the rectangle depicting external entity, and the parallel line depicting data stores.

Secondly, for the flowcharts, columns represent areas of responsibility. For the data flow diagram, leveled sets each describe more detail than the last.

Thirdly, for the flowcharts, numbers are used for on-page and off-page connectors, yet not for processes. For the data flow diagram, processes are numbered in the following formats: level zero, 1.0; level one, 1.1; level two, 1.1.1; and so on.

Fourthly, flowcharts are concerned not only with data, but also with documents and processing tools. However, the data flow diagrams focus on data and how they move among business processes, external entities, and data stores.

Lastly, for the flowcharts, lines represent movement between processes, areas of responsibility, and the like; they are not labeled. For the data flow diagram, lines represent data; they are labeled with noun phrases, for example, account balance and customer data.

IV. Conclusion

Documentation provides accountants a visual method to help understand processes and procedures, identify internal control weaknesses, and improve both the efficiency and effectiveness of the company's information systems or more specifically, accounting information systems and business operations.

Without documentation, difficulties would exist in the company because of uncertainty and inconsistency in how individual jobs should be done. This confusion could increase

the number of mistakes and decrease the timeliness of accounting informations to be provided, thereby making all accountants' jobs more difficult.

One of the many benefits from the documentation is that employees could understand how a system works, accountants could design controls for it, and managers could have confidence that it will meet their information needs.

As documentation tools, there are flowcharts and data flow diagrams, and the flowcharts have several different types of them including document flowchart and systems flowcharts.

Both the flowcharts and data flow diagrams are similar documentation tools in nature, yet there are many different features between them. One of them is that flowcharts are concerned not only with data, but also with documents and processing tools, whereas the data flow diagrams focus on data and on how they move among business processes, external entities, and data stores.

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회계정보시스템의 문서화에 관한 비교연구

이 찬 민*

■ 요 약

AIS의 문서화는 기업의 회계정보시스템(AISs) 또는 여러 형태의 정보시스템과 기업활동의 여러 과정들의 각 부분들을 더욱 잘 이해할 수 있게 해준다. 그 결과, 기업의 내부통제시스템에 취약점이 있다면 이를 발견해내어 문제를 해결하고, 나아가 시스템의 효율성을 향상시킬 수가 있는 것이다. 문서화 작업을 통해 기업 각 부서의 구성원들은 회사의 회계정보시스템이 어떻게 운영되고 있는지를 쉽게 파악할 수 있으며, 회계담당자는 기업의 회계정보시스템을 효과적으로 통제할 수 있는 내부통제시스템을 새롭게 구축할 수 있는 토대를 제공해 주며, 아울러 기업의 경영진은 회계정보시스템이 얼마나 효과적으로 그들이 원하는 정보 요구를 충족시키고 있는가를 확인할 수가 있는 것이다.

문서화 작업의 도구로서 크게 흐름도(flowcharts)와 자료흐름도(data flow diagrams)이 있으며, 흐름도는 문서흐름도와 시스템흐름도 등으로 다시 나누어진다. 흐름도와 자료흐름도는 서로 유사한 점이 많은 문서화 도구이나, 몇 가지 특성에서 다른 점을 발견할 수 있다. 그 가운데 중요한 차이 가운데 하나는 흐름도는 자료와 문서 그리고 처리수단을 주로 강조한 반면, 자료흐름도는 자료가 기업의 활동과 기업외부 기관 그리고 자료저장소 간에 어떻게 이동하는 것에 더 큰 관심을 갖고 문서화 작업을 진행한다는 것이다.

핵심주제어 : 문서화, 문서흐름도, 시스템흐름도, 자료흐름도

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