The Study on the Impact of Data Storage from Accounting Information Processing Procedure

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Abstract

After the accounting informatization, the original vouchers, ledgers and statements have been translated into varieties of data to be stored in computers; however, the storage strategies of these data will be affected by the accounting information processing procedure, such as temporary storage, translation storage and back-up of the documents data, the generation and output of ledger data and the interfaces of other data transmission system. We should not only take the influences of relationship standardization principle into consideration, but also the influences of accounting information process design. This paper studies the impact of data storage from accounting information processing procedure and points out the problems during informatization.

Keywords: accounting, data processing, data storage

1. Introduction

After the ways of processing accounting data have been transformed from manual operation into informatization, there arises a series of changes for traditional manual accounting, meanwhile, the storage of accounting information after informatization is affected, and this not only includes the data of traditional vouchers, ledgers and statements, but also the system parameters, operation control data and data transferred between different systems[1,2]. These data change in data structures, ways of data processing, contents and forms exchanging with external information and controlling methods in systems, and they are also under the effect of accounting information procedure[3]. This paper is about the study of the impact of data storage from accounting information processing procedure.

Section 2 analyses the change of accounting data processing procedure after informatization. In section 3, we describe the effect of accounting information process on books of accounts storage strategies. In section 4, we propose a solution to the effect of accounting information flow on voucher data under accounting information environment. Section 5 gives a conclusion to the whole paper different information processing flows after informatization and various accounting flows have an enormous effect on accounting data

2. The Change of Accounting Data Processing Procedure after Informatization

We take the processing procedure of accounting voucher for an example; the differences can be seen in Fig. 1. and Fig. 2.

The explanation of data processing procedure for Fig.2. can be detailed as follows:

1)Keyboarders input the accounting vouchers(divided into receipt vouchers, payment vouchers, transfer voucher or cash vouchers, bank vouchers and transfer vouchers) through keyboards(or automatic account transfer); these vouchers are stored in the scrip files[4].

2)Vouchers input are written into accounting voucher files after being detected correctly.

3)We use accounting voucher files to update balance files at all levels at any time, so that we can inquire the present debit happening, credit happening and the final balance of any accounting subject at random.

4) We edit output cash journals, bank deposit journals and other kinds of subsidiary ledgers according to balance files at all levels and accounting voucher files.

5) We edit output general ledgers according to subject balance files and accounting voucher files.

6) We generate report data files and transfer them to accounting statements subsystem according to balance files and accounting voucher files.

The advantage of accounting voucher process flow is that the data flow is simple, which means storing data without repetition, and it is an accounting process flow suitable for computers. Compared with Fig.1, the differences between computerized accounting treatment process and manual accounting treatment process are as follows:

Firstly, in manual systems, although there are different accounting process procedures, the general flow is still proceeding as original voucher→accounting voucher→books of accounts→report forms[5,6]. This is because that the formations of the report forms have to depend on the accounting records of chronological classification rather than sporadic ones. Due to the use of computers, we get rid of the manual limits after computerization and we can obtain accruals and other data according to vouchers, and the flow turns into voucher→report forms.

Secondly, the core of manual system is account checking, but computers emphasize the integrity and truth of the logging data. Under the manual patterns, different people register different books of accounts, and the general ledgers and subsidiary ledgers are registered parallelly(this method is quite similar to the twice entering of data)[7]. In order to validate the correctness of the accounting, parallel registered books of accounts have to be checked regularly, and the result must be corresponding when there is no data malposition, drain logging, missort or accounting repeat. There must be a mistake for one side or both sides when verification of data is not corresponding between subsidiary ledgers and general ledgers[8]. Therefore, it is necessary for manual patterns to check accounts, and it is also an effective method to debugging. After the computerization, computers won't make mistakes for the same source of data, and the result must be corresponding, and the checking job between subsidiary ledgers and general ledgers is not necessary[9]. However, we won't get the right output if the data being input incorrectly or the errors generated during the process not corrected. Therefore, we store the newly input data into temporary voucher files and transfer them into accounting voucher files as formal accounting data only after being checked.
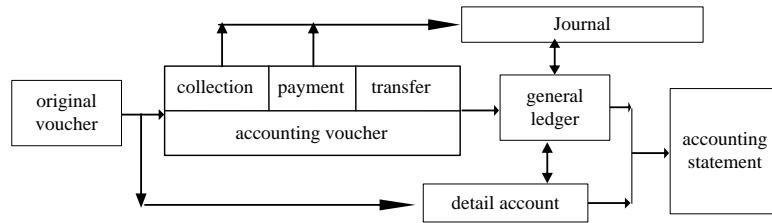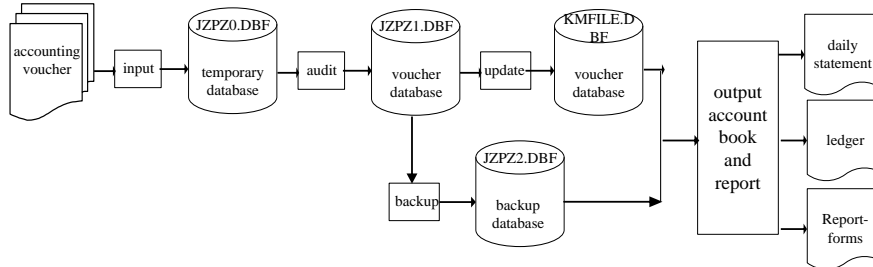
Figure 1. the process flow of accounting voucher

Figure 1. Processing Flow Chart of Accounting Voucher

Thirdly, there exists a mount of data repeat in manual systems, meanwhile computers emphasize its advantages. Accounting voucher is the data source of accounting processing subsystem, in a certain sense, the information content almost equals to the sum of kinds of subsidiary ledgers, general ledgers and accounting statements; that is to say, the latter ones increase nothing than the former ones from the information content's view. But due to subsidiary accounts and general ledgers being set in manual processing, the data on the accounting vouchers is copied more than once, so the data repeat is serious[10]. The mass repeat of same data not only leads to a waste of storage, but also leads to inconsistent data easily and it can generate data collision, what's more, it can cause the disorder of system data. The phenomenon of the discrepancy between the accounting and the voucher, the accounting and the form often exists, and this is directly related to the mass repeat under manual patterns. Therefore, after the computerization, the change of kinds of books of account from single storage to different output of systems makes it easier for the simplification of design and saves sources.

Fourthly, the supply of the original system information is not in time. Accounting statement is the final product of the accounting processing subsystem and it is an important data for investors, enterprise managers with creditor identities commissioned, governmental agencies, workers, trade unions and customers to get to know the business conditions and operating results and it is also a basis for these departments to make decisions[11]. The reconciliation matters always exist because that the mass amount of work for accounting processing and the speed of manual processing being slowly, and it requires a long time to make kinds of accounting statements, which weaken the effect of accounting data. As the computation speed will be higher after computerization, and we can output any accounting information at random, so the timeliness of accounting information is increased largely. When we can't check out timely for the sake of reconciliation matters at the end of a month or a year, we can input the next accounting vouchers into the temporary vouchers. It won't affect the correctness of the accounting data unsettled because that there is a difference between temporary vouchers and accounting voucher files and the accounting data stored is informal; after the last accounting period check-out, we can audit the input vouchers, so it won't lead to the stock of vouchers and won't affect the next accounting period data processing. This settles the problem of

accounting over months and years. And the design of temporary voucher files, accounting voucher files and back-up voucher files make it possible.

3. The Effect of Accounting Information Process on Books of Accounts Storage Strategies

The accounting system data structure，ways of data processing, contents and ways of exchanging with external information and systems and methods of internal controls change a lot after informatization. Under the manual patterns, there is a set of strict control system to insure the correctness of the recording of books of account, such as parallel recording and the segmentation of incompatible duties; and the use of computers makes the original control no longer exist. In a computerized accounting system, once the vouchers are input, they are charged to an account, tabulated and financial analyzed automatically by computers without manual intervention. The Fixed attribute data of books of account is usually encoded; and the properties of bond accounting and columnar accounting change as well, and they are output after temporary computing of computers[12]. The key point of the computer system control lies in the entrance, therefore, its control centre is laid on the detection of the input data without account checking; the magnetic media of the use of computers is easy to modify leaving no trace, and this is different from the dig, rub, scrape, supplement, spread and wipe of manual system. In addition, the characteristics of computers in hardware structures, environmental requirements and document preservation come up with newer requirements for internal controls after computerization. The control range transfers from financial departments into both financial departments and computer processing departments; the ways of control transfer from simple manual control into the overall combination of organizational control, manual control and programmed control; and the requirements of control are much stricter. It includes: organizational control, function division control, system access control, input/output accuracy control, operation process control, system operating environment control, system document management control and so on. At the same time, there is a difference in the storage forms of accounting files[13]. As the storage of accounting files for computer accounting systems gives priority to magnetic media, so we have to not only set up the management systems of paper medium accounting files but also the strict storage systems of data backups, data recoveries and file lending and return related to computer magnetic medium.

From the above, two problems should be taken into consideration when we design new, adapted to computers data processing forms of books of account and the corresponding data flow: on one hand, the data storage should be changed into data flow to reduce the links of data transfer; on the other hand, the decentralized processing should be turned into real-time processing, and we won't take the time of processing data as the main consideration factor. The characteristic of this processing flow is that, we mainly set up accounting voucher files and subjects at all levels and balance files inside systems, and no longer set up cash journal files, bank deposit journal files and subsidiary ledger files; these traditional accounts just become an output of new system; which means that we update balance files at all levels with accounting subject according to the input accounting vouchers, and when we output cash journal systems, cash in bank journals and other subsidiary ledgers, we pick them from accounting voucher files.

The differences between computerized books data and manual books data are as follows:

3.1. There is a Change in the Starting Point of the Data Processing

The original data of accounting processing subsystems derive from journal vouchers(mechanism vouchers included) under the computerization, but the original data is the voucher under manual patterns. Therefore, the step of making journal vouchers according to original vouchers under the computerization condition is still accomplished by hand. The elements for computers using journal vouchers as input data can be detailed in the following two aspects:

1) The original vouchers are not standard to be input. The source of the original vouchers is complicated and the kinds vary a lot. Invoices of each department, bus tickets, steamer tickets, air tickets and receipts for a loan of a business trip are all original vouchers, and the sizes and ways of reflecting economic business of them are not corresponding. But the journal vouchers used for entry account are required clearly classified and the subjects have to be correct, including business date, voucher names, business summaries, accruals and accessories. The original vouchers don't have the above information or the information is not complete, as a result, it can be difficult to use original vouchers as input data. Moreover, the input workload of operation staff will be increased if we don't dispose the mass original vouchers. Therefore, the commercialization of accounting system at home and abroad mainly uses journal vouchers to input data.

2) Original vouchers often have a strong legal effect, for example, there are signatures or the seals of the parties and there are responsibility clauses. There are some formal original vouchers which can't be added other contents in, such as checks and power of attorneys for payment. But the data used for input have to be added with voucher numbers and borrowers subject. Therefore, there is a doubt for original vouchers used as input data to violate rules. What we should do is to settle them as journal vouchers first and then put them into computers.

Of course, not all the original vouchers can't be made as input data, for example, the original vouchers from internal enterprises can be input by strengthening the management of standardization for the reason that they are filled by the departments. And this kind of vouchers is common in special accounting systems.

3.2. No Need for Checking between Accounts

Under manual patterns, different staff is in charge of different books of account, and general ledgers and subsidiary ledgers are registered parallelly (this method is similar to data twice entering). Parallel registered books of account should be checked regularly to verify the correctness of the accounting, and the result should be corresponding when there is no drain logging，missort or repeat accounts.

There must exist an error on account for one side or both sides when the verification of data between detailed accounts and general accounts is not corresponding. Therefore, it is necessary and effective for manual patterns to check accounts. After the computerization, there won't be computing mistakes for the sake of same data source, and the result must be corresponding between accounts, so there is no need to check between detailed accounts and general accounts.

3.3. The Meaning of Accounts is Not the Same

From indirect copy to accumulation (indirect copy means super addition and accumulation means the inalterability of the update and the record number). Under manual patterns, keeping accounts refers to recording subsidiary accounts, daily accounts and general ledgers, by different accounting personnel according to different subjects, under different accounts. Keeping accounts is just a procedure of

data processing after computerization. Through the step of data processing for accounts, we make the input vouchers verified as formal accounting archives, and they are stored from temporary voucher files to accounting voucher files which are not allowed to be modified. At the same time of accounting, we summarize the accruals of subjects and update the balances at all levels[14]. But the real accountings can be separated, randomly displayed or printed from related subjects of economic business of initial balance files and accounting voucher files. As the speed of computer processing data is fast and the output speed is slow, its effect is similar to the accounts of early computer internal storage. Relative to manual accounts, computers finish instantaneously at the output, and because of this, the storage design of books of accounts can be saved by computers.

3.4. The Existence Forms of Accounts Change

Storage materials have magnetic changes after computerization. The change of storage medium makes storage requirements of accounting files and auditing methods of accounting data vary a lot. On the other hand, account forms and contents similar to manual patterns often don't exist permanently in computers but be generated when inquired or printed. This won't affect the speed of obtaining data and it will save storage medium, which is convenient for computers to deal with.

Although accounting files are stored in the magnetic medium after computerization, limited to the conditions of magnetic medium storage and other reasons, ministry of finance still demand that the related accountings be printed regularly, and journals should be printed daily, subsidiary ledgers and general ledgers should be printed at least once a year.

4. A Solution to Voucher Data under Accounting Information Environment

4.1 The Sources and Contents of Accounting Vouchers

The accounting vouchers of manual patterns include the following contents:
  1) date, the date of making accounting vouchers;
  2) voucher numbers, the numbers of vouchers;
  3) abstracts, brief introduction for economic business;
  4) accounting subjects, accounting subjects of borrows and loans, including total classification subjects and classification items;
  5) amount, amount of each accounting subject;
  6) attachment, numbers of original vouchers;
  7) signatures, signs or seals of accountant officers, documents-making workers, re-check workers and accounting staff.

As manual accounts are registered according to accounting voucher and its attachments, so other economic projects can be obtained through the tached original vouchers without being listed on the accounting vouchers, such as quantities, unit costs, check numbers, opponents, product categories, product names and types(or commodity departments, groups and counters).

Under the pattern of computerization, as computers make accounting vouchers as input, and this determines that contents of accounting vouchers in accounting processing system should include the above $(1)-(7)$ as well as contents of the attachments, of course, not each subject is required to keep account according to attachment, which means some of the subject lists can meet the demands based on the input of accounting vouchers, such as cash and accumulated depreciation; and

others should be recorded based on the attachment contents, such as bank deposits, accounts receivable and commodity stocks. Each input content of subjects is decided by its output; different output forms decide that the contents they input are different from manual ones, that is to say, besides manual vouchers(accounting vouchers made from manual ones to original vouchers), accounting vouchers of computerized accounting systems still have other two sources: first, mechanism vouchers, referring to vouchers of each major subsystems(materials, wages and fixed assets subsystems) by means of data interface transferring to accounting systems; second, derived vouchers, referring to new vouchers generated by accounting treatment subsystem, which are accounting vouchers made for transfer business establishment at the end of a month, such as carry-over charges, income profits and vouchers made over profits distribution, and these vouchers are made from existing vouchers records other than the original vouchers.

4.2 Storage Strategies of Accounting Informationization Flow Voucher Data

We make accounting voucher files as examples to explain the design for accounting subsystems. With this kind of checking forms, there are three kinds of files according to attributions of data to design data storage strategies classified:

First: files used for the storage of fixed attribute data——subject dictionary files.

Second: files used for the storage of fixed individual changeable attribute data——account balance files.

Third: files used for the storage of changeable data, which are voucher data. From the above analysis, these are three files——temporary voucher files, accounting voucher files and back-up voucher files; and the structures and storage strategies of them are the same.

4.2.1 Temporary Voucher Files: Also called as temporary voucher databases or voucher input files, and the effect is that to store all the vouchers input but not recorded. When the vouchers are stored in these files, we can modify them because they are informal accounting files. Once kept in account, the vouchers are transferred into the storage of accounting voucher files, so any voucher can't be stored in these files permanently. It is helpful for the management of data, data operation safety control and the sharing of data sources to separate the temporary data and permanent files.

The detailed storage strategies can be seen in the introduction of the following journal vouchers as there is a similarity between the structures and storage strategies of temporary voucher files and journal voucher files.

4.2.2 Journal Voucher Files: Journal voucher files are save files after audited, used for the storage of all vouchers which have been already recorded on accounts. The vouchers stored in journal voucher files are formal accounting files, and they can't be directly modified, but they can be charged as red mark vouchers. Journal voucher files are interface documents between accounting subsystems and other subsystems, and the vouchers related to subsystems which are automatically compiled can be directly transferred into these files.

Contents of journal vouchers to generate detailed accounts, books of account and to meet the check of bank can be seen in tab.1.

The main title (on the first page) should begin 1 3/16 inches (7 picas) from the top edge of the page, centered, and in Times New Roman 14-point, boldface type. Capitalize the first letter of nouns, pronouns, verbs, adjectives, and adverbs; do not capitalize articles, coordinate conjunctions, or prepositions (unless the title begins with such a word). Please initially capitalize only the first word in other titles, including section titles and first,

second, and third-order headings (for example, "Titles and headings" — as in these guidelines). Leave two blank lines after the title.

Table 1. Jzpz1.dbf

number	field-name	f-type	f-wid	field-dec
1	date	D	8	
2	number	C	4	
3	summary	C	30	
4	heading1	C	3	
5	heading2	C	2	
6	heading3	C	2	
7	money	N	12	2
8	direction	N	1	
9	kind	C	10	
10	no	C	4	
11	unit	C	6	
12	amount	N	8	
13	price	N	10	2
14	oper	C	8	
15	audi	C	8	
16	ej	N	3	
	*TOTAL	120		

The contents stored in tab.1 and projects of vouchers under manual patterns are not corresponding. For example, contents described in words under manual patterns should be stored with codes (such as subject codes) after computerization, and they have to be translated into names when printed. We must pay special attention that the vouchers are classified under manual patterns. Some units have bank deposits, cash and transfer, and some have bank collection, bank payment, cash collection and transfer, and some don't have classifications and others have classifications more than ten kinds. In the design, all varieties of vouchers are stored in one voucher file considering generality.

A voucher is stored with a group of records in computers under manual patterns, and the numbers of the records are the line numbers of borrower entries on vouchers. And there is only one voucher for date, number and attachment, but it is not fixed for some subjects. That is to say, it is easy to set a date field, a voucher number field but difficult to set subject fields. Therefore, voucher files are as follows according to relational database theories:

(1)Business content files

Table 2. Voucher Number Files

number	field-name	type	width	field-dec
1	date	D	8	
2	voucher	name	C	4
3	summary	C	32	
4	attachment	N	3	
5	entering	C	8	
6	audit	C	8	
	*TOTAL	64		

The fields of files indicate the state of journal voucher, and they store dates, numbers, abstracts, numbers of attachments, names of keyboarders and audit clerks in proper sequence.

(2)Corresponding files in economic business and accounting subjects

Table 3. Voucher Content Files

number	field-name	type	width	field-dec
1	voucher-number	C	8	
2	subject-code	C	7	
3	amount	N	12	2
4	account-direction	N	1	
	*TOTAL		29	

The fields of the files store numbers, subject codes, debit and credit cash of journal vouchers in proper sequence.

4.2.3 Backup Voucher Files: The structures, storage ways of backup voucher files are exactly the same with journal voucher files, and they are used for storing previous accounting data. We can use backup files to recover when the previous files are lost accidently. Therefore, backup voucher files are new storage forms after accounting computerization, in addition, its storage makes it easier to accumulate and inquire data. Due to all kinds of demands, we usually have to inquire previous accounting business, but under manual patterns, we can only go through accounts one after another, which needs a large amount of work and it is difficult to ensure the veracity and recount some indicators. After the computerization, previous accounting data can be stored in the computers if the computers are told the conditions, and computers will inquire these data soon. In this way, we will lay a good foundation for financial analysis with information accumulated.

4.2.4 Organizational Ways of Journal Voucher Files: The organizational ways between journal voucher files and temporary voucher files are different. The operation of temporary voucher files mainly bases on vouchers, for instance, the query, modification and print of a voucher. Therefore, rapid positioning of a fixed voucher has a great influence on the operation speed, and we should establish an index file based on voucher names to make its positioning become rapid positioning. Journal voucher files should establish index files not only on voucher names but also on subjects codes, because that detailed accounts and daily accounts are a gather of all economic business of one subject, when we generate detailed accounts or daily accounts, we should locate and pick up all the economic business of one subject to organize them as detailed accounts or daily accounts. Only establish index files on subjects codes can we do this, and we don't have to set an account as manual does because of this, what we should do is to generate accounts at any time according to journal voucher files.

4.2.5 The Comparison among Three Voucher Files: From the analysis above, we can know that there is a big similarity in file attributes, structures and organizational ways among temporary voucher files, accounting voucher files and backup voucher files; but there still exists differences in storage contents, effects and process cycles. From the analysis of data processing, it is hard to say which data medium corresponding to the three voucher files because they are designed from new flows. The storage of three voucher files is changeable data, from attribute view, they belong to processing files and their structures are almost the same; their data is organized according to voucher names and subject dates. But there are differences: the data stored in temporary voucher files is informal, and their correctness has no influence on the operation of system, so they can be modified and added; because of this, it is possible to account over months and years. The data is transferred into accounting voucher files and the transferred data is deleted from

the files after it is audited and signed to store next data. The accounting data which is stored in the accounting voucher files is the data audited and signed, and it is formal accounting file which can't be modified directly; we have to use red mark charge to audit when it needs modification. We transfer the data into backup voucher files and clear them up after terminal check. The data stored by backup voucher files is history data, which is used to inquire and output. Generally, backup voucher files store data with an accounting year, and places for different years' data are various so as to avoid conflicts.

5. Conclusion

Generally speaking, the design of database is affected with entity; in accounting information system, different information processing flows after informatization and various accounting flows have an enormous effect on accounting data. The habits, complexities of objects for different designers make the flows vary, and this adds the diversification of data storage which should be paid attention to during system design.

In order to guarantee the availability of historical data, when the current system changes, the content of backup should be revised to ensure the compatibility of data, this is the maintenance of historical data. However，it is not necessary to modify all backup data，how many years backup data we should change depends on the backup's usefulness and preservation conditions. Generally, the first three years data should be made a maintenance.

Acknowledgements

References

[1] L. Jie and Z. Minglai, Commercial Research, vol.2, no.174, **(2010)**.
[2] Z. Huaping and L. Jie, Financial Supervision, vol.24, no.38, **(2010)**.
[3] Z. Huaping, Finance and Accounting Monthly, vol.34, no.6, **(2010)**.
[4] N. Yanfang, Journal of Shanxi Finance and Economics University, vol.3, no.112, **(2010)**.
[5] W. Yanling, Science & Technology Review, vol.1, no.94, **(2012)**.
[6] L. Tianyun, Journal of Jiamusi Education Institute, vol.2, no.387, **(2012)**.
[7] L. Xin, Journal of Jilin Province Economic Management Cadre College, vol.3, no.3, **(2011)**.
[8] Y. Li, Science & Technology Progress and Policy. vol.16, no.84, **(2003)**.
[9] L. Wei and N. Weidong, China Management Informationization, vol.3, no.11, **(2008)**.
[10] M. Huayang and W. Ruihua, China Management Informationization, vol.16, no.20, **(2008)**.
[11] D. Hongcheng and W. Wenxiu, Economic Research Guide, vol.33, no.75, **(2009)**.
[12] C. Xiwu and J. Gang, East China Economic Management, vol.6, no.203, **(2004)**.
[13] W. Zhenwu and J. Sisi, Journal of Dongbel University of Finance and Economics, vol.5, no.28, **(2010)**.
[14] F. Hongjin, Commercial Accounting, vol.12, no.2, **(2009)**.

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