

The Structure and Implications of the Three Dimensional Double Entry Accounting System

Michimasa Satoh

1. Introduction

Before 1971, when the APB issued Opinion No. 19, *Reporting Changes in Financial Position*, basic financial statements consisted of the Balance sheet and the Income statement. These two statements were accepted as “basic,” because they portray the important aspects of the business, and because, they come through the traditional double entry accounting (bookkeeping) process. Indeed, the usefulness of these two statements and their close connection to the accounting process seemed to be the main features of the basic financial statements.

However, after 1971, and even after the issuance of the FASB Statement No. 95, *Statement of Cash Flows* in 1987, some correction is needed concerning the definition of basic financial statements. Although the usefulness of the Statement of cash flows has been widely recognized, the other aspect of the definition has been almost neglected. That is the possibility of producing the third statement, using the formal bookkeeping process.

The purpose of this paper is to demonstrate that the traditional definitions of the basic financial statements still hold under the newly triangulated financial reporting system. In order to do this, I will show

the double entry accounting system that produces the Balance sheet, the Income statement, and the Statement of cash flows at the same time. This accounting system can be called the three dimensional double entry accounting system (satoh 1994). The characteristic of this new accounting system is that it can integrate the Statement of cash flows of both the direct and indirect approaches.

2. Background

2.1 Early effort

The history of the third statement, which is generally called the “funds statement,” can be traced back to the end of 19 th century.¹ During this one hundred–year history, however, little was explored about the accounting system that can produce the funds statement. The funds statement had been thought to be prepared through a process called “funds flow analysis,” which starts with analyzing the increase and the decrease of two successive balance sheet figures. This is an indirect method of preparing the funds statement.

The exception was the device made by K. Someya.² He illustrated that the accounting system can directly produce the Balance sheet, the Income statement and the Statement of cash receipts and disbursements at the same time.

Someya broke down the cash account into (1) beginning cash balance

1. About the early history of the funds statement, see Rosen and DeCoster (1969) and Moonitz (1978).

2. See Someya (1996). His original idea was published in 1956.

account, (2) cash receipts and cash disbursement account, and (3) ending cash balance account. The cash receipts and cash disbursement account is further appropriately broken down in order to record cash transactions that occurred during a certain period of time. In this system, cash summary account is opened to summarize all cash receipts and cash disbursement accounts, in the same way as the income summary account. From the cash summary account, we can prepare the statement of cash receipts and disbursements.

What should be noted here is that, although the name “Statement of cash receipts and disbursement” is similar to the Statement of cash flows, it is significantly different from the Statement of cash flows required by FASB. According to the FASB’s Statement No.95, the reconciling statement of net income and cash from operating activities should be disclosed at least either in the main body or the footnote of the Statement of cash flows. In this sense, the Statement of cash flows by FASB has succeeded, in part, the Statement of changes in financial position that was required by APB in 1971. Therefore, what we need now is an accounting system that can produce the Balance sheet, the Income statement, the Statement of cash receipts and disbursements, and the Reconciling statement of net income and cash from operating activities. With such an accounting system, the theoretical framework of financial accounting after 1987 will become more stable, because all three basic financial statements are able to have a common attribute. That is, all triangulated statements can be derived from one integrated accounting system.

2.2 Arguments in Japan

Even after the issuance of the APB No. 19, which had changed the set of basic financial statements in the United States, little attention was paid to its influence on the conceptual framework of financial accounting, either in the United States or in Japan. In the United States, the newly formed FASB was searching the new conceptual framework based on the so-called asset and liability view. With this view, it is easy to put emphasis on the Balance sheet and easy to neglect the third statement.³

In Japan, most of both the accounting professionals and academicians were deeply committed into the old traditional accounting framework, which is now called the revenue and expense view. This view put the first priority on income determination and that in turn tended to neglect the cash flow aspect of financial accounting.⁴

During the 1980s, the Japanese accounting community gradually started to get pressure from the international harmonization of accounting. There were pros and cons about whether the Statement of changes in financial position should be introduced as the basic financial statements, as the U. S. had done already.

The resistance to the change was very strong in Japan regarding this issue. It was mainly because of the Japanese financial market. Especially in 1980', Japanese companies were able to get funds abundantly from their main banks. All the more, Japanese Ministry of Finance then

3. According to the asset and liability view, the Statement of cash flows can be seen as a schedule of cash account.

4. According to the revenue and expense view, the Statement of cash flows tends to be neglected. At most, it is a supplementary financial statement. For example, see Paton and Littleton (1940).

allowed Japanese companies to hold their stocks mutually, especially between industrial companies and financial institutions, including banks. In such circumstances, companies tend to lobby not to prompt their disclosure. Therefore, even after getting international pressures to harmonize Japanese accounting standards, the Japanese authoritative body of accounting had long been reluctant to incorporate the third financial statement. However, it decided at last in March 1998, that the Statement of cash flows should be disclosed as a basic financial statement, from the accounting period that ends in March 2000.⁵

Other reasons for resistance to change in Japan were theoretical or conceptual. As stated before, the resistance to change came from the group that holds traditional accounting view, that is, the revenue and expense view. According to this view, the Income statement should be the most important statement, and any change that might threaten its superiority is not welcome. Of course, this is not an acceptable argument, because the old view or theory of accounting should be mended or changed or even replaced when it become impossible to explain actual accounting practices.

Another challenge to this change was raised from the accounting system viewpoint. It was around 1986, just before FASB issued the Statement No. 95, that the following question was posed in Japan. "So

5. At this time, basically, all listed companies should disclose the consolidated balance sheet, the consolidated income statement and the consolidated statement of cash flows as the main financial statements. They also have to disclose the balance sheet and the income statement of the parent companies. However, the consolidated statement of cash flows of the parent companies is exemplified. Companies that do not prepare the consolidated financial statements should disclose their individual statement of cash flows as well as the balance sheets and the income statements.

long as the Statement of changes in financial position is prepared indirectly by analyzing the two successive Balance sheets, isn't it plausible to say that the Statement of changes in financial position can not be a basic financial statement?"⁶

This is a strong argument against the new statement. This argument seemed to be welcomed by the most of accounting researchers at that time in Japan. To consider the usefulness of the Statement of changes in financial position was out of the question at that time, because the main objective of financial statements in Japan at that time was to make a fiduciary reports to shareholders meeting. Although it is true that the size of the Japanese Stock Exchange was steadily expanding, because of the expanding Japanese economy (and had once exceeded the New York Exchanges), most of the stocks were held by institutional investors, and the notorious mutual holding of the stocks between industrial companies and banks had made the concept of fair disclosure meaningless.

Contrary to the above Japanese situations, in the United States, it was apparent that the driving force to disclose the Statement of changes in financial position as the basic financial statement was the decision usefulness. No argument was made to keep the consistency with the relationship between basic financial statements and accounting system. This kind of argument could have appeared in the United States as well as in Japan.

In order to respond to the above argument, it is necessary to demonstrate that the Statement of changes in financial position, not the

6. This argument was publicly made at the annual meeting of Japan Accounting Association in 1986.

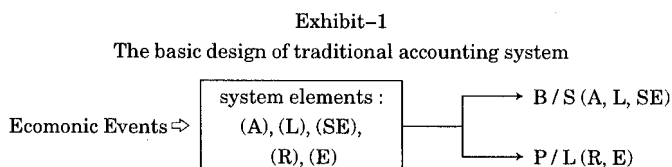
Statement of cash receipts and disbursements can be derived from some formal accounting system. It should be noted here that the APB could not narrow down to one single concept of funds, which is used in the Statement of changes in financial position. In such a situation, it was pretty difficult to create a new accounting system, which can directly produce the Balance sheet, the Income statement, and the Statement changes in financial position at the same time. However, after the issuance of FASB No. 95 in 1987, it became easier to solve this problem, because FASB succeeded in restricting the form of the Statement of cash flows.

3. The Structure of the Three Dimensional Double Entry Accounting System

3.1 System Design

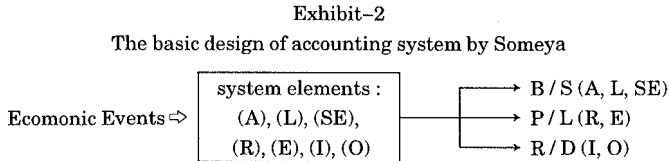
In order to make it easy to understand the new concept, the basic design of the three dimensional double entry accounting system should be shown in comparison with traditional accounting system.

It should be noted here that the traditional accounting system is designed to produce the Balance sheet and the Income statement. This system uses five basic elements to achieve its objectives. They are asset (A), liability (L), shareholders equity (SE), revenue (R), and expense (E). The image of this system is as follows.



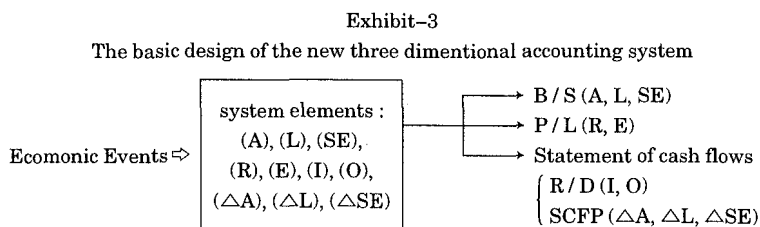
So long as we rely on this type of system, we can not prepare the Statement of cash flows directly from this system. It is simply because this type of system does not make work the elements which process the flows of cash. Therefore, the conceptual framework of financial accounting which is based on the Asset and Liability view or the Revenue and Expense view can not integrate the Statement of cash flows, because these two views are deeply rooted on traditional accounting system.

Someya opened the way to a new direction. He wanted to show the accounting system, which includes cash inflows (I) and cash outflows (O) as its basic elements. The basic design of his accounting system can be drawn as follows.



As the element (I) and (O) are integrated and made them work in this system, the Statement of cash receipts and disbursements (R/D) can be prepared through this system. However, the Statement of cash flows of indirect method can not be produced through this system, and the reconciliation statement of net income and cash flow from operating activities can not be induced from this system. This reconciliation information is at least required by FASB No. 95. The reason that this system can not induce the information which is required by FASB is because that does not includes, as its basic elements, the changes in assets (ΔA), the changes in liabilities (ΔL), and the changes in shareholders equity (ΔSE).

Therefore, the accounting system that can produce the Balance sheet, the Income statement and the Statement of cash flows at the same time should be structured according to the following basic design.



This system includes all the necessary elements that are required to prepare the contemporary three basic financial statements. Namely, the Balance sheet is prepared using the elements (A), (L), and (SE); the Income statement is prepared using the elements (R) and (E); and the Statement of cash flows is prepared using the elements (I), (O), (ΔA), (ΔL), (ΔSE). We should note here that the Statement of cash flows required by FASB is fundamentally the Statement of changes in financial position (SCFP) with the cash as the concept of funds.

3.2 Illustration

(1) The Structure of Accounts

In order to record the economic event that happened in a certain economic entity, appropriate accounts must be opened. In the three dimensional (3 D) accounting system, the accounts that are opened will be classified into the following accounts group.

A) balance sheet accounts :

They are called stock account.

Summary account of these are created in the closing entry, from

which the Balance sheet is prepared.

B) Income statement accounts :

They are revenue and expense accounts, from which the Income statement is prepared.

C) Funds statement accounts :

C-1, receipts and disbursement accounts, from which the Statement of cash receipts and disbursement is prepared.

C-2, stock change accounts, from which the Statement of changes in financial position is prepared.

One of the characteristics of my 3 D accounting system is to open the C-2 accounts as well as C-1 accounts. Whereas, professor Someya opened only C-1 accounts.

Exhibit-4
Structure of accounts under the 3 D accounting system

Accounts group	Summary accounts	Financial statement
A. Income statement accounts	— profit & loss summary account	⇒ Income statement
B. Balance sheet accounts	— balance summary account	⇒ Balance sheet
C. Funds statement accounts	— C-1 cash flow summary account	⇒ Statement of cash receipts and disbursements
	— C-2 balance change summary account	⇒ Statement of changes in financial position

(2) Transactions and Journal Entry

As the illustration, it is assumed that the following transaction occurred.

1. Issued common stock for \$300 in cash.
2. Borrowed \$200 in cash from the bank.
3. Paid \$350 in cash to acquire a building.
4. Purchased inventory for \$260 on credit.

5. Sold inventory for \$380 on credit.
6. Paid \$100 in cash for the account payable.
7. Collected \$180 account receivable in cash.
8. Paid \$50 cash for operating expenses.
9. Recorded the depreciation of \$35 for the building.
10. \$60 inventory was left at the end of the period.

According to the traditional accounting system, above transactions are at first journalized using the traditional A and B accounts. Then they are posted and summarized to prepare the Balance sheet and the Income statement. However, according to the 3 D accounting system, additional journalizing and posting should be made using the C-1 and C-2 accounts as follows.

(1)	Receipt from the issuance of common stock	300
	Increase of the stockholders equity	300
(2)	Receipt from the borrowing	200
	Increase of the borrowing	200
(3)	Increase of building	350
	Disbursement for building	350
(4)	Increase of the inventory	260
	Increase of the account payable	260
(5)	Increase of the account receivable	380
	Profit and loss	380
(6)	Decrease of the account payable	100
	Disbursement for account payable	100
(7)	Receipt from collecting account receivable	180

Decrease of account receivable	180
(8) Profit and loss	50
Disbursement for expenses	50
(9) Profit and loss	35
Increase of accumulated depreciation	35
(10) Profit and loss	200
Decrease of inventory	200

(3) Closing Entry and the Summary Accounts

There are several methods in closing the accounts, which are opened for the 3 D accounting system. Following method can be recommended, because it can show the reconciliation between profit and cash flow from operations (CFO).

- (a) At first, each account which reflect cash inflow is transferred to the Cash flow summary account :

Cash flow summary	680
Receipt from issuance of stock	300
Receipt from borrowing	200
Receipt from accounts receivable	180

- (b) Then, each account which represent cash outflow is transferred to the Cash flow summary account :

Payment for building	330
Payment for accounts payable	100
Payment for expenses	50
Cash flow summary	500

- (c) The balance of the Cash flow summary account is transferred to the Balance change summary for Investing and Financing activities (BCS for I & F) :

BCS for I & F	180
Cash flow summary	180

- (d) The balance of the account which shows changes in fixed asset is transfer to the BCS for I & F :

BCS for I & F	350
Increase of building	350

- (e) The balances of accounts which reflect changes in long term liabilities and paid-in capital are transferred to BCS for I & F :

Increase of Paid-in Capital	300
Increase of Borrowing	200
BCS for I & F	500

- (f) At this point, we should notice that the balance of BCS for I & F shows the amount of cash generated by operating activities (CFO). Transfer this amount to Balance change summary account for operating activities (BCS for Op) :

BCS for Op	30
BCS for I & F	30

- (g) Transfer the debit balances resulted from operating activities to BCS for Op.

BCS for Op	260
Increase of account receivable	200
Increase of inventory	60

- (h) Transfer the credit balances resulted from operating activities to BCS for Op.

Increase of account payable	160
Increase of accumulated depreciation	35
BCS for Op	195
(i) At this point, the balance of BCS for Op shows the net income during the period. This amount should be transfer to Profit and loss summary account to balance and to close the BCS for OP account.	
Profit and loss	95
BCS for Op	95

After these journalizing are posted, main accounts will be shown as the following Exhibit-5. Especially, we can see that the net income (\$95) is determined in the BCS for OP account as well as in Profit and loss account. The income determination in BCS for OP account will become more clear and understandable when it is rearranged in the form as Exhibit-6. This income determination method can be called the “Funds Flow approach”, which is contrasted with the Balance sheet approach and the Income statement approach. We can see the vital relationships between articulated numbers. The arithmetical accuracy of the net income figure is confirmed through these organized process.

We should notice that the reconciliation statement of net income and CFO, which is mandated by FASB, can be derived from BCS for Op. Exhibit-6 is the reversed format (up-side-down format) of the usual reconciliation statement.

7. Concerning the Funds flow approach to income determination, please see Satoh (1995).

Exhibit-5
Articulation of Funds Flow Accounts

Cash flow summary			
(a) receipt from stock issue	300	(b) payment for building	350
(a) receipt from borrowing	200	(b) payment for account payable	100
(a) receipts from account receivable	180	(b) payment for expenses	50
	<u>680</u>	(c) BCS for IMF	<u>180</u>
			<u>680</u>
BCS for I & F			
(c) cash flow summary	180	(e) increase of capable	300
(d) increase of building	350	(e) increase of borrowing	200
	<u>530</u>	(f) BCS for Op	<u>30</u>
			<u>530</u>
BCS for Op			
(f) BCS for I & F	30	(h) increase of account payable	160
(g) increase of account receivable	200	(h) increase of accumulated depreciation	35
(g) increase of inventory	60	(i) net income	<u>95</u>
	<u>290</u>		<u>290</u>
Profit & Loss			
(8) payment for expenses	50	(5) increase of account receivable	380
(9) increase of accumulated depreciation	35		
(10) decrease of inventory	200		
(i) BCS for Op	<u>95</u>		
	<u>380</u>		<u>380</u>

Exhibit-6
The reconciliation statement of net income and CFO

CFO	\$30
Increase of accounts receivable	200
Increase of inventory	60
Increase of accounts payable	(160)
Depreciation	(35)
Net income	<u>\$95</u>

4. Implications

It has been demonstrated that the Statement of cash flows required by FASB can be produced through one accounting system, which can be called the 3 D accounting system. Therefore, it still holds that the basic financial statements are produced through one accounting system. Because of the cost constraints, it is still plausible that the Statement of cash flows is prepared by analyzing two successive Balance sheets. However, the philosophy of the 3 D accounting system is still thought to be working even when the Statement of cash flows is prepared through the indirect approach.

Another implication of the 3 D accounting system is that it might necessitate FASB to reconsider the “elements of financial statements.” So far, FASB has admitted, in its Statement of Concepts No. 6, only 10 elements those relate to the Balance sheet and the Income Statement, as the elements of financial statements. Basic elements or concepts relating to the Statement of cash flows, such as cash flow, operating activities, investing activities, and financing activities, are still outside of the basic elements! However, according to the 3 D accounting system philosophy, cash flow is definitely one of the basic elements, as are asset and liability and so on.

Concerning the above point, it should be noted that in 1985, when FASB finished its conceptual framework project, FASB could not seriously consider the Statement of cash flows, because the Statement of changes in financial position was the third basic financial statement. The situation has changed since 1987. All the more, when FASB was choosing the accounting views, little was known about the cash flow thought as is

shown in this paper.⁸

The last but not least implication at this point should be directed to accounting education in the new era. As the structure of the basic financial statements has changed, new approach to accounting education which incorporate the Statement of cash flows into its framework, such as Tracy (1999) and Shane and Bruce (1990), will become important. When the concept of the 3D accounting system is integrated with these approaches, accounting educations in the new era would become more efficient.

5. Conclusions

In general, when we encounter the new reality, there are two possibilities that we can choose. One is to make an effort to find out a new theory or new conceptual framework to incorporate the new reality. The other is to neglect the new reality and feel security, as a result, by sticking to the old theory or framework. The appearance of the third statement and its integration to the basic financial statements is an actual new reality that we have created. Therefore, we have to face this new reality. The idea of the three dimensional double entry accounting system can be a clue made toward this direction.

The concept of the three dimensional accounting system supports the FASB's decision to include the Statement of cash flows into the basic set of financial statements. However, it also urges FASB to reconsider the elements of financial statements and to explore again the selecting

8. Concerning the choice from different accounting views, please see Satoh (1995).

process of basic accounting views.

References

- APB, Opinion No. 3, *The Statement of Source and Application of Funds*, October 1963.
- , Opinion No. 19, *Reporting Changes in Financial Position*, March 1971.
- FASB, Discussion Memorandum, *An Analysis of Issues relating to Conceptual Framework for Financial Accounting and Reporting: Elements of Financial Statements and their Measurement*, December 1976.
- , Statement of Financial Accounting Concepts No. 6, *Elements of Financial Statements*, December 1985.
- , Statement of Financial Accounting Standards, No. 95, *Statement of Cash Flows*, November 1987.
- Heath, Loyd C., *Financial Reporting and the Evaluation of Solvency*, AICPA, 1978.
- Kamata, Nobuo, *A Theory and Practice of Funds Flow Reporting*, Hakuto Publishing, 1994.
- Moonitz, Maurice, *Three Contributions to the Development of Accounting Thoughts*, Arno Press, 1978.
- Paton, W. A. and A. C. Littleton, *An Introduction of Corporate Financial Accounting*, AAA, 1940.
- Rosen, L. S. and Don T. DeCoster, "Funds' Statements : A Historical Perspective," *The Accounting Review*, January 1969, pp. 124–136.
- Shane, Philip B, Bruce P. Budge, "A Cash-Based Approach to Introductory Accounting," *The Accounting Educators' Journal*, Summer 1990.
- Satoh, Michimasa, *A Theory of Accounting for the Flow of Funds*, Hakuto Publishing, 1993.
- , "Structure of Accounts for Funds Flow Accounting," *Kaikei*, January 1994.
- , "Funds Flow View : An Alternative Approach to Financial Accounting," *Okayama Economic Review*, Vol. 26, No. 3 / 4, March 1995.
- Someya, Kyojiro, "Preparation of the Cash Flow Statement," *Japanese Accounting : A Historical Approach*, Clarendon Press, Oxford, 1996.
- Tracy, John A., *How to Read a Financial Report*, John Willy & Sons, 5 th ed., 1999.

The Structure and Implications of the Three Dimensional Double Entry Accounting System

Michimasa Satoh

The essence of the Statement of cash flows required by FASB's Statement of financial accounting standards No. 95 in 1987 is the cash basis statement of changes in a financial position, because it must show the reconciliation between net income and CFO (Cash flow from operations) in the main body or in the footnote of the statement. The year 1987 when the new basic financial statement appeared was the starting point from which the effort should be made to formulate new conceptual framework of financial accounting that accommodates three basic financial statements: the Balance sheet, Income statement, and the Statement of cash flows.

However, little argument has been aroused toward this direction in the U. S. It is mainly because the traditional and conventional double entry bookkeeping system that is designed to prepare only the Balance sheet and the Income statements are deeply rooted to the conventional accounting philosophy. This system can be called "two dimensional accounting system", one dimension for the Balance sheet and another dimension for the Income statement.

What we need now is to construct an accounting system that can produce all three basic financial statement at the same time. Such a system can be called "three dimensional double entry accounting system", and will be demonstrated in this paper. This 3 D accounting system can provide underlying basis for the Statement of cash flows as the basic financial statement, in terms of the system of accounts as well as the conceptual structure.