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Tableau de flux de trésorerie : une revue de la littérature

Cash flow statement : A literature review

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Résumé

Les bénéfices ont occupé une place centrale dans la comptabilité en raison de leur utilité pour mesurer la performance d'une entreprise. Cependant, les faillites d'entreprises très médiatisées et les crises de liquidité des années 1970 ont suscité un regain d'intérêt pour le rôle des flux de trésorerie. Aujourd'hui, le tableau des flux de trésorerie est considéré comme un outil essentiel d'évaluation de la performance financière d'une entité. En 1987, le FASB a mandaté les entreprises pour préparer un état des flux de trésorerie dans le cadre des trois composantes des états financiers (Brahmasrene, et al., 2004). Cependant, il n'y a pas eu d'accord sur la méthode la plus appropriée pour préparer l'état des flux de trésorerie. La plupart des normalisateurs préfèrent la méthode directe mais n'exigent pas son utilisation (Hales & Orpurt, 2013). Ainsi, il est nécessaire de poursuivre les recherches sur l'utilité des différentes méthodes de présentation des flux de trésorerie. Cette étude évalue l'utilité du tableau des flux de trésorerie selon la méthode directe. L'étude comprend un rappel de l'origine et de la finalité du tableau des flux de trésorerie, des recherches sur l'articulation des flux de trésorerie, la comparaison entre les méthodes de présentation, les moyens d'améliorer l'enseignement des flux de trésorerie et des recherches sur l'élaboration de tableaux de flux par la méthode matricielle.

Mots clés : « Tableau de flux » ; « méthode directe » ; « méthode indirecte » ; « enseignement » ; « comptabilité matricielle ».

Abstract

Earnings have occupied a central position in accounting due to its usefulness in measuring a firm's performance. However, high-profile corporate failures and liquidity crises of the 1970s led to renewed interest into cash flows. The "cash flow statement" is nowadays also thought of as the most important tool to assess an organisation's financial performance. In 1987, FASB mandated businesses to prepare this statement as a major component in the set of financial statements (Brahmasrene, et al., 2004). However, there has been a lack of agreement over the most suitable way to develop and present the statement showing cash movements and position. Most standard setters prefer the direct method though do not require its use (Hales & Orpurt 2013). Thus, there is a need for continued investigations into the usefulness of different cash flow presentation methods. This study assesses the usability of the direct method for these statements. The research comprises a review of the origin and aim of the "cash flow statement", research on articulation of the cash flows, comparison between presentation methods, ways of improving the teaching of cash flows, and research into the development of flow tables by the matrix method.

Keywords : « Cash flow statement » ; « direct method » ; « indirect method » ; « teaching » ; « matrix accounting ».

Introduction

" The theory and development of cash flows appeared in the 1950's in the United States." (Vitek, 2021). The cash flow statement (CFS) is considered as a an important element for both internal and external company stakeholders. Cash-flow statement's core function is to provide a comprehensive overview of the changes in cash position during the given accounting period (Deo, 2016). It provides users a detailed assessment of the organisation's operational sustenance over both long-term and short-term (Bhandari & Lyer, 2013). The statement divides cash movements into three types of sections, i.e. "from operating activities", "from investing activities", and "from financing activities" (Epstein, et al., 1992). The three sections provide cumulative data about the cash received by a company regarding its operations and investments, and the cash that flows out as payment of investments and business activities.

By assessing the three portions of the "cash flow statement", investors can also have an idea of the organisation's value. Data for the statement is obtained from the other two major statements, i.e. balance sheet mainly, and the statement of comprehensive income (Bradbury & Kojima, 2011). The section related to the operational activities gives an overview of the cash generated when the business sells its goods and services (Arnold, et al., 2018). The investing activities section outlines cash obtained from the purchase and sale of assets. The investing activities section includes cash from physical and non-physical goods such as vehicles, real estate, and patents. Lastly, the financing activities section outlines cash obtained from debt and equity financing.

Earnings have occupied a central position in accounting due to its usefulness in measuring a firm's performance (Abujassar, 2021). For example, it is possible to measure the performance of the company using cash flow ratios and determine the success or failure of a company in the course of its activity (Pompeng et Rambak, 2022). The CFS is really usefull to assess a company's financial performance (Suciani et Setyawan, 2022) and is seen as the most significant tool for performing financial analysis (Mohammed, 2022). Cash flows are therefore well recognized as being the first indicators to identify problems within a company, as well as its economic risks. (Alijonovich et Akhmadjonovich, 2022) However, high-profile corporate failures and liquidity crises of the 1970s led to renewed interest into the role of cash flows. Nowadays, cash flow statement is also thought of as the most important tool to assess an organisation's financial performance. In 1987, FASB mandated businesses to prepare the CFS as a major component in the set of financial statements (Brahmasrene, et al., 2004). However, there has been a lack of agreement over the most suitable most suitable way to develop and

present the statement showing cash movements and position. Most standard setters prefer the direct method though do not require its use (Hales & Orpurt, 2013). Moreover, evidence from literature suggest that the information included within the statement may only be marginally useful. Thus, there is a need for continued investigations into the usefulness of different cash flow presentation methods. This study assesses the functionality and usability of the overly popular "direct method" of showing cash-flow statement. The research includes a review of the origin and purpose of the CFS, a research on its articulation, the comparison between presentation methods, ways of improving the teaching of cash flows, and research into the development of flow tables by the matrix method.

To carry out our literature review, a documentary analysis was carried out over a period covering the years 1970 to 2022. We retained the keyword "cash-flow statement" on google scholar and completed our research in the databases ebso and scopus.

Our problem is as follows : **What are the contributions of the CFS through its different construction logics ?**

Our article is articulated in 4 sections. The first section is to understand the logic of constructing CFS. The second section consists of analyzing the interest of CFS. The purpose of the third section is to research ways to improve the teaching of CFS. The last section aims to deal with the development of the matrix method in the construction of the CFS.

1. Understanding cash flow statement research

1.1. Origin and purpose CFS

1.1.1. The origins of the CFS

Before explaining the origin of the CFS, the concept will be defined using a few authors identified in the academic literature, in Table 1 below:

Table N°1: Few definitions of the CFS

Autor	Year	Definition
Bendikiène	2019	It is a financial statement that shows the inflows and outflows of cash and cash equivalents for the company's reporting period.
Jakstas & Kazakevicius	2018	Financial statement that shows receipts and disbursements of cash and cash equivalents for the company's reporting period.
Hamza & Jaradat	2018	Receipts and disbursements that have taken place in the enterprise during a certain period are presented.

Source : Daugélaité & Kušleikienė, 2022

The practice of preparing and reporting the outflows and as well as inflows of a firm's cash can be traced to the beginning of the last quarter of the 20th century, when the accounting field embraced a substantial shift in focus from 'working capital' to the novel 'cash-flow' reporting. Before that, financial statements focused on reporting the financial situations of firms. Until the late 1960s, emphasis of financial reporting was on the working capital of firms. A positive working capital was deemed to be an indicator of a good financial position (Colasse & Boussard, 1992). Stagflation of 1970, which occurred due to firms overstating earnings and understating cash-flows, further encouraged shift towards cash flow analysis. Faced with challenges of high inflation and economic recession, investors began taking a keen interest on cash flows. Furthermore, the bankruptcy of one of the United States' greatest retailer of the 20th century, W.T. Grant Company, due to lack of operating cash flows heightened investor focus on cash flows. Around this time, financial reporting authorities and regulators began developing guidelines for funds flow accounting. In 1978, for instance, FASB issued the "Statement of Financial Accounting Concepts". The Board asserted the need for firms to report information that would help users evaluate entity's potential to create cash flows. Later on, the firms were required by the U.S's Securities and Exchange Commission to also report on any unordinary issues with the cash-flows in the annual report right from the financial year 1980. In 1981, FASB issued a provisional draft, which prescribed the preparation of funds statement on cash rather than working capital basis (Hales & Orpurt 2013). In France, the financial reporting regulator "*Ordre des experts' cornptables et des comptables agréés (OECCA)*" issued the 1982 Accounting Plan that proposed the reporting of the "funds flow statement" to include origin and allocation of funds, along with the variations in working capital items (Boussard & Colasse, 1992). The statement represented a major shift from a "funds flow statement" to the statement, which is widely used nowadays. In the case of Italy, for example, an amendment was introduced by a legislative decree of 2015 that made the cash flow table mandatory within companies as of January 1, 2016 (Riva, 2022). FASB also issued a provisional draft, namely "SFAS No. 95", which was subsequently passed in 1987 for application from July 1988. Consequently, the SFAS No. 95 mandated the preparation of the new CFS along with some other major financial statements to be prepared by businesses.

1.1.2 The purpose of the statement of the cash flow for companies

Cash flows statement serves diverse functions to companies. First, they help firms to balance between growth and risk of bankruptcy. Cash flows focus on liquidity of the firm and its

capacity to convert operating activities into cash (Arnold, et al., 2018). It ensures that companies balance between growth in income statement and balance sheet metrics with the need for liquidity, hence avoiding risk of financial distress and bankruptcy. It also ensures that a healthy balance is maintained between growth and profit. Profits are the primary measure of firm performance (Dechow, 1994). Profits are derived using the accrual method of accounting, hence allowing the assessment of firm a performance while in continuous operations. However, the growth and success of a firm depends heavily on its ability to generate cash flows. Hence, the cash flow statement helps firms to reach at balance between the need for profits and growth. Cash flow statements are better at assessing the financial performance of a firm compared with the net income because cash flows are less subject to distortion that arise from the application of different accounting practices (Dechow, 1994). Moreover, the cash flow statement (CFS) may also serve the purpose enabling firms to balance between profit and risk. While profits occupy a central position in accounting as the primary metric for measuring firm performance, they may fail to show the risks inherent in a firm's operations. The statement of cash-flows shows business risks by providing insights on its ability to settle obligations as they fall due (Klammer & Reed, 1990). Thus, the cash flow statement is useful in balancing between profits and risks in a company. Furthermore, a cash flow statement may facilitate a balance between growth and financial independence of a firm. It achieves this by allowing firms to balance between investing for future growth and having enough cash resources to maintain operations.

1.2. Research on the articulation of the CFS

1.2.1. Preparing the table according to the SFAS 95 standard

SFAS No. 95 of 1987 requires CFS' construction as one of the main elements in the set of financial information to be prepared by management. The standard applies to entities that present both income statement and a statement of financial position. The objective behind adding the new component was to fulfil users' needs of information related to the cash payments and receipts of an entity. It specifically shows reasons for increase or decrease in "Cash and Cash Equivalents" during a given accounting period. In preparing the cash flow statement, the standard assumes that gross amounts are more relevant than the net cash flow amounts (Klammer & Reed, 1990). SFAS No. 95 further requires the division of the cash flow statement into three sections, listed above. The standard prefers the direct method though it does not expressly mandate firms to use the approach.

1.2.2. Comparison of cash flow statement between countries

Financial reporting and regulatory authorities in countries all over the world require entities to prepare the cash flow statement as a fundamental component in an entity's annual statements. Generally, most countries adopt either the American or the U.K. accounting standards while others have national standards derived from these two. While the objective and nature of cash flow statements are generally the same across jurisdictions, some differences may exist. (Wallace, et al. 1997) compared the accounting requirements for cash flow statements in five countries namely U.S., the United Kingdom, NZ, Canada, and Australia. The comparison revealed major dissimilarities inherent in the composition of cash flow statements and treatment of significant items, although similarities were also noted. For instance, all the jurisdictions categorised the cash flow sources into: operations, investments (into assets), and funding activities. With respect to format, all countries recognised the "direct" and "indirect" methods as the primary techniques to present cash flow information. The direct method is a compulsory requirement in NZ and Australia while it still remains optional in the US and UK. However, direct method is still not a compulsory requirement in the Canada. Additionally, in Canada, New Zealand, and the United States, the dividend receipts are classified under the operating activities; whereas, payments in respect of dividends are classified under the "financing activities" section. In contrast, there is no such classification restriction regarding dividends in Australia. On the other hand, the United Kingdom requires a separate categorization of interests and dividends into "returns on investments and servicing of finance" (Wallace, et al., 1997). Thus, major differences exist in the preparation of CFSs in different jurisdictions.

1.2.3. Building the CFS

A cash flow statement is primarily drawn by deducing the cash movements emanating either of the three categories of activities, discussed earlier. Cash-flows from operations are arrived at by adjusting the net income with elements that lack an effect on cash or those that are not related to operating activities. These include dividends, depreciation and amortization charge, and loss or gain arising on assets' disposals. Net income is also adjusted for movement in current assets directly involved in operations, such as inventories, and balances in respect of debtors and creditors (Kojima, 2012). A cash flow statement also includes a section on "cash flows from investing activities". This section provides details of all **transactions** relating to investing and investments such as purchases and disposals of non-current assets. Finally, the cash flow statement has a section on the "net cash flow from financing activities" that includes changes

in equity capital, issuance or reduction of non-current debts, and any payment for dividends (Colasse & Boussard, 1992). A compilation of the three elements allows an entity to reach at the overall cash-flows for the accounting year.

1.2.4. Alternative methods of Construction of the CFS

"Direct" and "indirect" methods are two alternate methods to tabulate the movement in cash flows for a given period. Former method requires major classes of cash movements under the 'operating' section. It reports transactions directly from the relevant ledgers. For instance, cash payments to employees, payments to suppliers, expenses on operating expenses paid in cash, cash receipts from customers, interest payments and interest received, and tax payments are reported in the cash flow statement as gross inflow or outflow (Farshadfar & Monem, 2013). Alternatively, the amounts may be calculated by adjusting items such as revenues, expenses, inventory, receivables and payables with non-cash transactions. Transactions in financing and investing activities may be adjusted for this purpose. In contrast, the indirect method reports the net operating cash flow arrived at after making adjustments for changes in current accruals and non-cash items. The indirect approach allows preparers of financial statements to incorporate adjustments for the amount of net loss Table, impact of non-cash transactions, and investing and financing transactions integrated within in the profit or loss account (Wallace, 1997). A major difference between the two approaches is that while the former approach involves the reporting of all inflow and outflow components, including cash received from debtors and cash payments to vendors, the later approach reconciles the net profit or loss with cash flows from operations (Bradbury, 2011). Preparers of financial statements may choose to apply either of these methods. Examples of the two statements prepared using the two methods are shown in the tables 2 and 3 below.

Table N°2: Example of a CFS prepared using the Indirect Approach

Statement of Cash Flows For the year-ended 31st December, N		
	N-1	N
Cash flows from operating activities		
Net income	550	650
Adjusting the non-cash items		
Depreciation charge	50	20
Loss/(gain) on disposal of equipment	60	(70)
Additions/(Decrease) in Trade Payables	(170)	(120)
(Additions)/Decrease in Trade Receivables	100	180

Change in inventories	40	30
Net cash-flows from operations	**630**	**690**
Cash flows from investing activities		
Proceeds from sale of equipment	300	150
Acquisition of land	(250)	(270)
Net cash flows from investing activities	**50**	**120**
Cash flows from financing activities		
Long-term borrowing	50	60
Repayment of non-current debt	(120)	(130)
Sale of common stock	70	50
Payment of dividends	(150)	(180)
Net cash flows from financing activities	**(150)**	**(200)**
Change in cash	**530**	**610**

Source: Kojima, 2012

Table N°3: Example of a cash flow statement prepared using the "Direct approach"

Statement of Cash Flows For the year ended 31st December, N		
	N-1	N
Cash flows from Operations		
Collections from customers	1,750	1,910
Payments:		
To suppliers	(450)	(510)
For salaries	(260)	(270)
For taxes	(150)	(160)
For interest	(120)	(150)
For other operating expenses	(140)	(130)
Net cash flows from operating activities	**630**	**690**
Cash flows from investing activities		
Proceeds from sale of equipment	300	150
Acquisition of land	(250)	(270)
Net cash flows from investing activities	**50**	**120**
Cash flows from financing activities		
Long-term borrowing	50	60
Repayment of non-current debt	(120)	(130)
Sale of common stock	70	50
Dividend payments	(150)	(180)
Net cash flows from financing activities	**(150)**	**(200)**
Change in cash	**530**	**610**

Source: Kojima, 2012

2. Research on the interest of cash-flow statement

2.1. Usefulness of the CFS and decision-making

2.1.1. General usability of the CFS

The cash flow statement, a critical component of financial statements, serves multiples purposes to diverse internal and external users of financial statements. One of the basic roles of this statement is to assist the financial statements users in attaining an evaluation of the organisation's ability to derive cash from its operating activities (Hales & Orpurt, 2013). The information contained in the "cash flow statement" may also aid in decision-making. For instance, investors and finance providers may use information from the "cash flow statement" to predict the ability of an entity to honour its obligations such as dividends payments and loan repayments. According to (Klammer & Reed, 1990), income does not repay loans but cash flows do. Lenders may be interested in information presented in a CFS to evaluate a borrower's ability to make repayment. Thus, the cash-flow statement may be used in lending and investing decision-making. In addition to aiding decision-making, cash flow statements may have also predictive value. Due to its focus on liquidity, a cash flow statement may enhance the user's ability to predict predictability (Arnold, et al., 2018). Users may also use financial statements to predict future performance. A study by Farshadfar and Monem has revealed that cash flow information may be useful in estimating subsequent cash flows of a firm. Thus, the cash flow statement has valuable information that serves most users of financial statements.

2.1.2. The influence of presentation format on decision-making

The presentation of financial information may influence user decisions. In respect of cash flows, many researchers investigated the effect of presentation format on users' decision-making. In one of the earliest studies, (Klammer & Reed, 1990) investigated whether cash flow formats influenced decisions of lenders. In the study, a group of bank analysts were presented with sets of financial statements and asked to make decisions on lending. The findings revealed that the size of loans awarded was less variable for statements prepared using the direct approach. The authors concluded that the direct method for cash-flow presentation was more preferable to the indirect format. In another study, (Kojima, 2012) conducted an experimental study to evaluate the usefulness of the formats of these statements for decision-making purposes. In the experiment, 38 accounting students participated in making lending decisions on a hypothetical company whose cash flow statement was presented using both methods. Participants, receiving cash flow presented using the indirect method, had significantly less accurate results compared

with those who reviewed direct method cash flows. The findings of the study concluded that more accuracy can be achieved in managerial decisions using the widely-used "direct" method of CFS preparation.

The functionality of 'direct method' in decision-making may be attributed to the enhanced understandability of accounting information by direct presentation. (Hales & Orpurt, 2013), argue that the direct method has the benefits of simplicity and understandability. However, (Brahmasrene, et al., 2004) have reported low preference of the direct method despite its usefulness in decision-making. Their study investigated the preferences of the formats of cash flow presentations by surveying managers, investors and analysts. The findings revealed that most of the respondents gave preference to the indirect method. About 20% of all respondents and up to 30% of investors showed preference for the former method. They argued that familiarity with format and the need for consistency with previous financial statements were the key drivers of the high preference for the indirect method. Overall, the findings from literature suggest an enhanced usefulness and functionality of the "direct method of CFS presentation" though familiarity with the indirect method may reinforce its popularity among users of financial statements.

2.2. The forecasting capabilities of the CFS

2.2.1. Predicting future flows and results with the direct method

The role of the CFSs in forecasting the future performance of an entity is well-established in literature. For example, (Krishnan & Largay, 2000) evaluated the prognostic value of direct method using data obtained from a sample of American firms from diverse sectors. Their findings revealed that the direct method had higher predictive ability compared with the indirect method. Direct method cash flow statements were found to provide relatively better predictions of the firms' short-term operational cash flows, compared to the later method. However, the findings of this study could be limited by the unavailability of firms utilizing the direct method at the time. Later studies have confirmed the predictive value of indirect cash flows. (Orpurt & Zang, 2009), for instance, investigated the role of cash flows in forecasting the cash position and earnings of a sample of American 119 firms over the period 1989 to 2002. The study findings established a significant predictive value of the "direct method of cash flow" presentation. It demonstrated an incrementally informative role of direct line items in predicting future firm performance. They established that the direct method was of more use to investors in anticipating future income and inflows.

In another study, (Farshadfar & Monem, 2013) examined the usefulness of the three categories of cash flows in estimating short-term future cash-flows for a sample of Australian Securities Exchange listed entities. The results revealed that the tendency of the operational cash flows to forecast subsequent cash flows can be enhanced by disaggregating it into individual elements. On their part, (Khansalar & Namazi, 2017) examined data from the United States and UK-listed firms for the period 1995-2009 to assess the predictive value of the disaggregating operating cash flows. Their results revealed a strong illustrative evidence and the predictive-ability of disaggregated cash flows of up to 60%, hence suggesting a beneficial role of the direct method of cash flow presentation. Thus, the existing literature suggest that information obtained from the "direct cash flow statement" has relatively greater predictive value than the other method for the purposes of forecasting future earnings and cash-flows.

2.2.2. Predicting the risk of bankruptcy

The CFSs, especially when constructed via the direct approach, have been found to have a role in predicting the risk of bankruptcy of a firm. In one of the earliest studies, (Aziz & Lawson, 1989)demonstrated the value of cash flows in predicting business failure. In India, (Murty & Misra, 2004)revealed that cash flow ratios are the important metrics to gauge and assess corporate failures. In another study, (Sharma & Iselin, 2003) conducted a study into the the behaviour and relevant significance of the information obtained from cash flow presentation in predicting the solvency risks. They established that the cash flow model is more preferable for making solvency predictions, compared to the accrual method of accounting. On their part, (Bhandari & Lyer, 2013) established the ability of cash flows in predicting the risk of business failure. They specifically singled out the quick ratio, cash flow margin, and interest cash coverage ratio as key predictors of business failure. Equally important were the ratios of "operating cash flows to current liabilities", "cash flow from operations to total assets", "operating cash flows to net earnings ratio", and the three year vertical sales trends year-on-year. (Arnold, et al., 2018) argue that the relative potential of an organisation's cash flows to give predictions about expected business failures arise from the fact that CFS focus mainly on financial liquidity, which enhances bankruptcy predictability. Hence, cash flows are useful in predicting the risk of bankruptcy.

2.3. Performing the comparison

2.3.1. Comparison between "direct" and "indirect" method

Both types of methods of cash flow preparation differ in several ways. The primary difference between the two approaches is that one calculates operating cash flows by compiling all cash movements, including all receipts and payments, to reach at the net CFS. In contract, the indirect method involves the adjustment of the net income with non-cash items and current accruals changes (Farshadfar & Monem, 2013). Second, the "direct method" only uses cash transactions while the indirect method considers non-cash transactions such as depreciation, non-cash gains etc. Moreover, the direct cash flow is prepared using information obtained directly from an entity's cash book or bank statements. On the other hand, the indirect approach requires the preparation of the CFS directly from the data shown by the two primary financial statements (Bradbury, 2011). Proponents of the direct method argue that it reveals more information on a firm's potential to generate sufficient liquid cash from operations (Brahmasrene, et al., 2004). According to (Krishnan & Largay, 2000), the direct method has a number of benefits, including the ability to compare cash receipts and payments that are similar in nature, a more user-friendly format, a more clear representation of a company's cash cycle, and the disclosure of the true sources of cash flows. On the other hand, the indirect technique takes the lead in acquiring insights into the disparities between net income and net cash flows. This method represents the changes in current assets that do not involve cash, and it has a significantly lower cost of implementation (Krishnan & Largay, 2000). Despite these differences, the direct and indirect method are similar in that both have three components, namely "cash flows from operating activities", "cash flows from investing activities", and "cash flows from financing activities". Furthermore, the presentation and calculations of cash flows from financing and investing cash flows are same in both methods. Thus, the direct and indirect methods only differ in their approaches to presentation of cash flows arising from operations. There are, however, advantages and disadvantages in both methods as shown in Table 4 below:

Table N°4: Advantages and disadvantages of the direct and indirect method

	Direct method	**Indirect method**
Advantages	Possible modification for flows of various means of payment.	Money management oriented. Linked to the balance sheet, calculated through a change in balance sheet items.
Disadvantages	Debts are not visible.	

Source : Vitek, 2021

2.3.2. Information value between profit and cash flows

There is a huge plethora of research comparing the information value between cash basis and accrual basis. (Dechow, 1994) compared the value of accounting accruals and cash flows in measuring firm performance. Accruals were found to have greater abilities to reflect performance. In contrast, cash flows suffered timing and matching issues that lower their value. The role of accruals in measuring firm performance was attributed to three main factors namely the short duration of measurement, the long operating cycle, and the high volatility of the firms' working capital needs. Similarly, (Dechow, et al., 1998) have compared earnings and cash flows in terms of their predictive value. They reported better predictive performance of earnings compared with current operating cash flows. Such findings are in line with those of (Laswad & Baskerville, 2007), who examined the value of cash flows on pension schemes in New Zealand. After a thorough analysis of over 160 benefit schemes from 1998, they concluded that reporting of cash flow information do not provide further information to the users, as unrealised earnings do. Furthermore, cash flows may be incapable of incorporating information on abnormal accruals anomaly. (Sloan, 1996) hypothesize that investors constantly overemphasize the persistence of accruals, which results in negative relationships between accruals and future abnormal returns. To this end, (Cheng & Thomas, 2006) tested the hypothesis that operating cash flows incorporate information on abnormal accrual anomaly. Their findings reveal that operating cash flow ratios has no incremental value on abnormal accruals and future performance. However, breaking-down earnings into its component parts may improve the relevant worth of accruals and cash flow bases (Clacher, et al., 2013). Overall, evidence suggest a greater value relevance of accruals and fair-value compared with cash flows.

3. Research on ways to improve teaching cash flow statement

3.1. Weaknesses observed in teaching of flow tables

The ability to develop and analyse a CFS is critical for students of business, but learners often fail to develop this skill due to weaknesses in teaching of flow tables. One of the notable weaknesses in teaching of CFS is the delegation of the topic to advanced courses due to the perception that learners must first comprehend accounting basics before cash flow construction. Second, most of the students have limited exposure to accounting classes, which might not be appropriate for enhancing their understanding of cash flow statements (Eesley, 2013). Besides the minimal exposure to accounting concepts, another challenge that the academic system face is the orientation of learning to the rules of accounting. This creates an approach of learning

that results in memorization, failure to appreciate real-world application of accounting concepts, lack of analytical and conceptual thinking, and inability to engage in problem solving (Dugan, et al., 1991). Moreover, the CFS has received lesser classroom focus, and attention from the accounting textbooks' authors, compared to other major financial statements (Donelan, 1993). The complexity of the statement may further increase the cognitive burden for the learners (Eesley, 2013). Thus, there is a need for research into ways of improving the teaching of the CFS to both financial accounting and business students.

3.2. Methods and tools implemented to improve teaching

The process of instructing students how to build accounts of cash flows can be enhanced in a few different ways. A cash flow statement can be taught effectively through the use of an integrative manner, which is one of the more effective techniques. (Donelan, 1993) has proposed the use of an integrated approach in teaching cash flow statements. The approach requires the inclusion of the CFSs earlier in the course or textbook chapters. In addition, cash flow concepts should be integrated throughout the term to enhance continuous reinforcement (Donelan, 1993). In addition, the use of real-world financial statements may improve cash flow statement teaching because it allows learners to bridge the potential variations that exist between textbook examples and statements encountered in practice (Wilkins & Loudder, 2000). (Wilkins & Loudder, 2000) further propose the selection of real-world companies that adopt articulation of their cash flows. Finally, simplifying the teaching of financial statements may enhance the ability of learners to understand the concepts, particularly the non-accounting student. (Eesley, 2013) has proposed a simplified method of teaching the CFSs whose primary goal is to reduce the cognitive load of learners. This method involves presenting all data in a single screen, provision of minimal instructions, use of visual tricks to allow learners identify related items on the cash flow, and use of only two formulas for the conversion of balance sheet accruals to cash basis (Eesley, 2013). The simplified method reduces the complexity of constructing the CFS.

4. Research on the development of CFS using matrix approach

The matrix approach relies on the mathematical concept of matrices to define and express items appearing in the traditional CFS. Interest in the use of matrices in accounting can be traced earlier to the period between 1960s and 1970s. Accounting experts have historically used the technique to create accounting applications and systems. Extant studies show that the need for

computerized accounting systems necessitated research in matrices (Mepham, et al., 1988). As a technique, the use of matrices provides a simplistic and manipulate-able method for organizing accounting data.

In preparing the CFS, the matrix approach organizes key accounting items in vector forms. All operational accounting activities are generated from vectors that represent accounting items. The vectors contain basic account elements. The matrix multiplication of the vectors generates accounting operators which are then incorporated into the cash flow statement (Mattessich, et al., 2007). The statement is therefore prepared in the form of tables (matrices). The table format is ideal for computer processing (Ijiri, et al., 2009).

The matrix approach is straightforward in application, especially in computer processes. However, it is not widely applied as expected (Demski, 1969). Going by the number of papers available on the topic, the use of the matrices method has also not received research interest in recent years. Because of the potential of the technique, the current research performs an extensive analysis of the application of the matrix approach in preparation of CFSs.

4.1. Double entry versus matrix approach

The double entry accounting system has dominated the practice of financial transactions recording since the thirteenth century. The system is based on the duality principle that is based on the understanding that each transaction has a value that may be assigned to two accounts (Leech, 1983). These double entries have been accounted using the T accounts. However, opponents of the manual T accounts argue that the method is technical, time consuming, and prone to errors. Thus, new approaches have been proposed for recording the dual transactions. The duality of financial transactions motivated the development of the matrix approach. (Leech, 1986)argues that the matrix method has several advantages over the T accounts system. First, the matrix approach allows the presentation of financial records in a more mathematical and scientific way. Second, the approach facilitates easier manipulation of financial records by computers when stored in a matrix or table format. Moreover, the approach is less technical compared with the T-accounting system (Leech, 1986). Thus, matrix accounting gained traction in the late 20th century as it represented an innovative approach to presentation of financial data.

4.2. How the matrix approach works

The use of the matrix approach is premised on enhancing the clarity and concision of complicated data. A matrix refers to a rectangular array of real numbers that are assigned into rows and columns. The numbers inside the matrix are known as elements and are denoted with lowercase letters (Kucic & Battaglia, 1981). Typically, the letters *i* and *j* are used to denote row and column locations, respectively. The process of preparing the funds flow using the matrix method involves presenting financial records in tabular form. One of the earliest proponents of the matrix approach to accounting was (Mattessich, 1957). He demonstrated that economic transactions could be not only be presented in journal format but also in form of equations, vectors, and matrices. The method is concise and clear to the users of financial statements.

(Shank, 1972) published a book on matrix-based accounting that was meant to supplement traditional accounting instructional materials with the matrix methods. He developed a matrix bookkeeping approach for computer systems. According to (Shank, 1972), the duality principle of general accounting suggests that each transaction that affect the funds flow may be entered into a funds-flow matrix and at the same time in the general ledger matrix. Subsequently, it would be possible to have a four-dimensional array that combined the general ledger and funds flow matrix. In case of a two-dimensional matrix for funds flow only, each transaction would be entered on the rows and columns of the items affected. For instance, the payment for a general expense would be recorded as a reduction to the working capital and a use of funds for operations. All entries are posted to the funds flow matrix depending on the impact on individual categories of transactions. An example of the funds flow matrix according to (Shank, 1972) is shown in Table N°5 below.

Table N°5: Example of a funds-flow matrix

	Operations	Working capital	Long-term debt	Owners' equity	Investment in fixtures
Operations	0	0	0	0	0
Working capital	2,400	3,500	0	0	4,800
Long-term debt	0	0	0	0	0
Owners' equity	0	22,000	0	0	0
Investment in fixtures	0	0	0	0	0

Source: Shank, 1972

4.3. Establish a CFS using the matrix approach

(Kucic & Battaglia, 1981) developed a more advanced accounting matrix for presenting the "Statement of Changes in Financial Position". They argued that the approach had the benefits of allowing data manipulation, facilitating a one-time set-up process, and enabling the adaptation to a computer system. The approach involved the extraction of transactions directly from the original sets of data inputs in preparation of the accounting system matrix and the financial statements. Kucic and Battaglia employed the trial balance (T) matrix and the general ledger (L) matrix. The method commenced by entering the beginning account balances into a trial balance matrix. The cells in the *i*th row were used to represent all debits to the *i*th account while those in the *j*th column represented the credits to the *j*th column. On the general ledger matrix, each transaction would be recorded using a credit and debit entry. At the financial period end, accounts in the T matrix will get updated by the corresponding accounts in the L matrix to arrive at the organisation's other two major statements. However, funds flow statement will be developed using the general ledger matrix and adjusting the amounts with changes in the beginning and ending values of the trial balance or the debits and credits made to assets and liabilities. An example of a CFS prepared using matrix method is illustrated in Table N°6 below.

Table N°6: A matrix showing sources of funds in column 1 and uses of funds in column[2]

$$\begin{bmatrix} 19 & 22 \\ 16 & 30 \\ 10 & 14 \\ 0 & 0 \\ 0 & 0 \\ 0 & 0 \\ 9 & 15 \\ 7 & 20 \\ 0 & 0 \\ 0 & 0 \end{bmatrix}$$

Source: Shank, 1972

The popularity of the matrix method and its development was slowed down towards the 1990s and the 2000s. (J. G. Degos & Leclère, 1990) published a volume on the application of "matrix accounting method" in advanced accounting. (J. G. Degos & Leclère, 1990) further proposed the inclusion of other dimensions such as time to the accounting matrix. Most of the earlier scholars premised the usefulness of the matrix accounting approach to its elegance and relevance to computerized accounting. However, the accounting practitioners and scholars

started moving away from the matrix approach at the turn of the 21st century because a large number of tasks expected to be performed by the traditional accounting were performed by the computerised spreadsheets instead (Mattessich, 2007). (JG. Degos, 2015) notes that the decline on the use of matrices was further accelerated by the separation between accounting, economics, and mathematics in teaching and research. Today, the matrix approach is rarely used for accounting purposes.

4.4. Research and illustration of CFS Preparation using the Matrix Approach

Like any other statement drawn for users, the preparation of the CFS using the matrix approach starts with the trial balance. The opening and closing balances of all accounts in the company are first used to create the trial balance. The transactions are entered in the form of a matrix where debit numbers are positive and credit numbers are negatives. The major goal of CFS is to analyse the inflows and outflows during a given accounting period. The transactions highlighted within the CFS are assessed using journal entries. The transactions are entered in the form of a 2X2 matrix where the ith row and jth column are the total credits and debits of the period under assessment.

The trial balance is used to update the general ledger balances. To construct the CFS, the general ledger is partitioned as cash rows and columns. The partitioning allows the extraction of all transactions that affect CFS are generated by using the aforementioned transactions. Another way to get the statement ready is to merge the ledger matrix with the cash flow matrix. Because of the double-entry principle in every transaction, every transaction entered in the cash flow statement is also entered in the general ledger matrix.

Transactions in the statement are arranged according to the sections of the cash statement. These are “operating activities”, “investment activities”, and “financing activities”. Preparation of the matrix further includes items from the ledger matrix. The general ledger items facilitate the balancing of transactions. The result of the combination is a 5X5 matrix which is presented in Table N°7 below.

Table N°7: 5X5 Cash Flow Matrix

	1.Operating Activities	2.Investing Activities (working capital)	3.Long-term debt	4.Financing Activities (Owners' Equity)	5.Investment (Inventory)
1.Operating Activities					
2.Investing Activities (working capital)					
3.Long-term debt					
4.Financing Activities (Owners' Equity)					
5.Investment (Inventory)					

Source: Shank, 1972

In the 5X5 matrix, the rows and columns show the use and sources of cash in the company. The matrix approach is further illustrated using the below example.

Transaction 1

Transaction: A business purchases 4 000 worth of stock

Cash Flow Entry: CF_{51}*+ 4 000*

The above transaction is entered in the first column and first row of the matrix. The transaction appears as a cash outflow in row 5 – investment in inventory. A similar transaction reduces the cash available for transactions under operating activities.

Transaction 2

Transaction: A business purchases an equipment worth 5 000

Cash Flow Entry: CF_{52}*+ 5 000*

This transaction appears as a cash outflow under cash flow from investing activities. The transaction goes into row 2. A corresponding transaction appears under working capital.

Transaction 3

Transaction: A business writes-off equipment worth 1 000

Cash Flow Entry: No entry is made to the cash flow matrix

When an asset is written off by a company, there is no cash going in or coming out of the business. It is only during the buying and selling of assets or inventories that there is any movement in cash flow. The cash on hand and other liquid assets of a company are unaffected

by the writing off of an asset. In a similar vein, non-cash activities, such as devaluation and credit sales, amongst other things, do not influence the CFS in any way, shape, or form.

For illustration purposes, a sample CFS has been generated from Transactions 1 to 3. The information from the matrix is transferred to a 5-element row vector. The entry is determined by the net value of the sums. A positive sum shows cash inflow. A negative sum shows cash outflow. In the above example, which is presented in Table N°8 below, the transactions prompt the following adjustments.

Table N°8: Cash Flow Matrix entries

	1.Operating Activities	2.Investing Activities (working capital)	3.Long-term debt	4.Financing Activities (Owners' Equity)	5.Investment (Inventory)
1.Operating Activities					
2.Investing Activities (working capital)					
3.Long-term debt					
4.Financing Activities (Owners' Equity)					
5.Investment (Inventory)	*(4 000)*	*(5 000)*			

Source: Shank, 1972

An excerpt of the CFS would be as shown in Table N°9 below :

Table N°9 : Excerpt of CFS

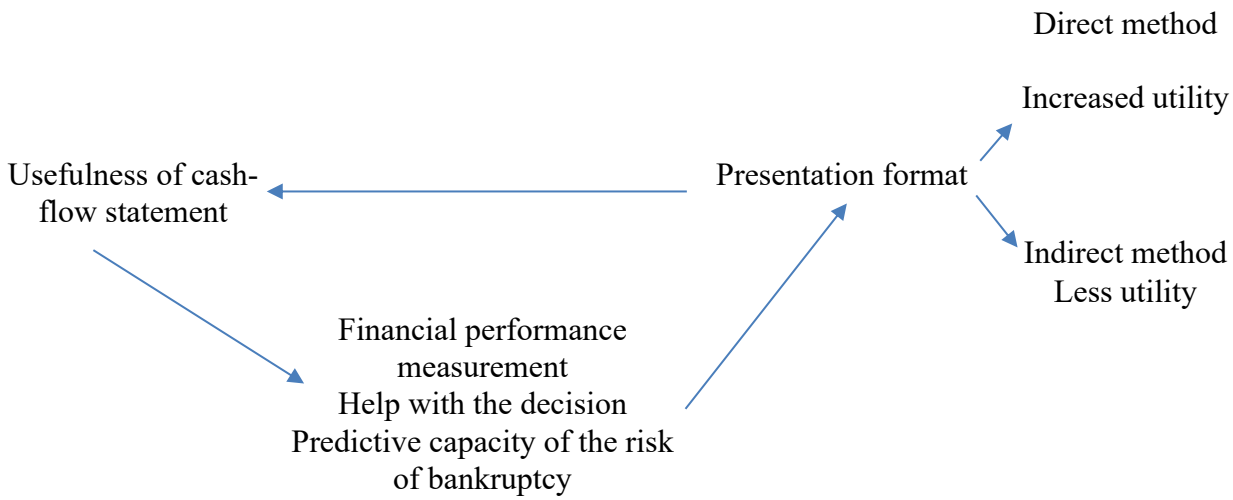
	Source of Funds	*Use of Funds*	
Owners' Equity	4000	Investments in Inventory	4000
Operating Activities	5000	Investment in Equipment	5000
Total	9000	Total	9000

Source: Shank, 1972

Overall, the applications and construction of the statement depend on the matrix operators that the organization uses. Matrix operators used by one company may differ from that of another company. The use of the matrix approach is currently not standardized. For effective auditing, organizations should strive to use the same operators consistently. Consistent use of operators provides an ideal audit trail of transactions. Apart from simplifying the work of auditors, an effective audit trail reduces the occurrence of errors.

Table 10 shows the conceptual model of our analysis within the framework of the literature review carried out:

Table N°10 : Conceptual model



Source: According to the author

Conclusion

The CFS is an essential element of the basic financial statements mandated by the accounting standards and prepared by the organisations. They provide incremental information that may not only aid in managerial decision-making but could also influence investment decisions. Users' ability to forecast their future financial performance is significantly improved by the inclusion of cash flow statements. However, the presentation formats that are used can have an impact on the information that is included in cash flow statements, both in terms of its usefulness and its instrumentality. The evidence that has been gathered so far from published works consistently points to an advantage that the most common direct method has over the indirect approach in terms of “value relevance” Therefore, those responsible for preparing financial statements ought to place a high priority on the presentation of information regarding direct cash flow.

The preparation of the CFS using the matrix method has both an educational and operational advantage. The conceptualization of the method makes it easy for users to understand the complex relationship between different data inputs. The matrix method is also applicable in computer programs since two arrays are operated. The flexibility associated with the use of matrices simplifies the reconciliation process between accounting reports. The audit effort is reduced to only auditing the transaction bases and the procedural matrices in the event of

changes. Little research specifically addresses the applicability of CFSs. The same applies to the teaching of these tables. Future research could be oriented in this direction.

This literature review has scientific and managerial implications that can give rise to potential future research. It could be interesting, within the framework of an empirical study, to measure the impact of the change of presentation of a CFS on the decision-making of investors. This would make it possible to know which format (direct or indirect, with or without a matrix method) makes it possible to make the best decision. Another research perspective this time concerns the teaching of CFS. Indeed, it could be interesting to test the development of the three modes of presentation of the CFS with a sample of students to determine a classification of the level of understanding by them. This would pave the way for the emergence of innovative teaching methods among students.

REFERENCES

Alijonovich, M., & Akhmadjonovich, N. (2022). Importance of Cash-Flow Statement in Transition to International Standards of Financial Reporting. *Central Asian Journal of Innovations on Tourism Management and Finance*, Volume 3 : numéro 11, pp : 103-106.

Abujassar, M. (2021). *The Impact of Capital Structure on Accrual-Based and Real Earnings Management: Evidence from Jordan, Phd Thesis, Istanbul University, pp : 1-134*.

Alijonovich, M. et Akhmadjonovich, N. (2022). Importance of Cash Flow Statement in Transition to International Standards of Financial Reporting. *Central Asian Journal of Innovations on Tourism Management and Finance*, Volume *3 : numéro* 11, pp : 103-107.

Arnold, A. G., Ellis, R. B. et Krishnan, V. S. (2018). Toward effective use of the statement of cash flows. *Journal of Business and Behavioral Sciences*, Volume *30, numéro* 2, pp : 46-62.

Aziz, A. et Lawson, G. (1989). Cash flow reporting and financial distress models: Testing of hypotheses. *Financial Management*, Volume 18 : numéro 1, pp : 55-63.

Bhandari, S. et Lyer, R. (2013). Predicting business failure using cash flow statement based measures. *Managerial Finance*. Volume 39 : numéro 7, pp : 1-7.

Brahmasrene, T., Strupeck, C. D. et Whitten, D. (2004). Examining preferences in cash flow statement format. *CPA Journal*, Volume *74, numéro* 10, pp : 58-60.

Cheng, C. S. et Thomas, W. B. (2006). Evidence of the abnormal accrual anomaly incremental to operating cash flows. *The Accounting Review*, Volume 81: numéro 5, pp : 1151-1167.

Dechow, P. (1994). Accounting earnings and cash flows as measures of firm performance: The role of accounting accruals. *Journal of Accounting and Economics*, Volume 18 : numéro1, pp : 3-42.

Dechow, P., Kothari, S. et Watts, R. (1998). The relation between earnings and cash flows. *Journal of Accounting and Economics*, Volume *25 : numéro* 2, pp : 133-168.

Degos, J. G. et Leclère, D. (1990). *Méthodes matricielles de gestion comptable approfondie*. Eyrolles.

Degos, JG. (2015). Brief History of Matrices, As a Tool of Consolidated Financial Statements. *Muhasebe ve Finans Tarihi Araştırmaları Dergisi*, numéro *8*, pp : 51-78.

Deo, P. (2016). Evaluating a cash flow statement. *International Journal of Business, Accounting and Finance*, Volume 10 : numéro 1, pp : 22-43.

Donelan, J. (1993). An integrated approach to teaching the statement of cash flows. *Journal of Education for Business*, Volume 68 : numéro 4, pp : 234-236.

Eesley, D. (2013). Simplified Method For Teaching Cash Flow Statement Construction To Entrepreneurship And Non-Accounting Majors. *Mountain Plains Journal of Business and Technology*, Volume 14 : numéro 1, pp : 35-53.

Farshadfar, S. et Monem, R. (2013). Further evidence on the usefulness of direct method cash flow components for forecasting future cash flows. *The International Journal of Accounting*, Volume 48, numéro 1, pp : 111-133.

Hales, J. et Orpurt, S. (2013). A review of academic research on the reporting of cash flows from operations. *Accounting Horizons*, Volume 27, numéro 3, pp : 539-578.

Khansalar, E. et Namazi, M. (2017). Cash flow disaggregation and prediction of cash flow. *Journal of Applied Accounting Research*, Volume 18 : numéro 4, pp : 464-479.

Kojima, K. (2012). Decision usefulness of cash flow information format: An experimental study. *International Review of Business*, Volume *12*, pp : 23-44.

Krishnan, G. V. et Largay, J. A. (2000). The predictive ability of direct method cash flow information. *Journal of Business Finance & Accounting*, Volume 27 : numéro 1-2, pp : 215-245.

Kucic, A. R. et Battaglia, S. T. (1981). Matrix accounting for statement of changes in financial position. *Management Accounting*, Volume *4*, pp : 27-32.

Laswad, F. et Baskerville, R. (2007). An analysis of the value of cash flow statements of New Zealand pension schemes. *The British Accounting Review*, Volume 39 : numéro 4, pp : 347-355.

Leech, S. A. (1986). The theory and development of a matrix-based accounting system. *Accounting and Business Research*, Volume 16 : numéro 64, pp : 327-341.

Mattessich, R. (1957). *Towards a General and Axiomatic Foundation of Accountancy: with an introduction to the matrix formulation of accounting systems*. Cambridge University Press. London, pp : 328-355

Mohammed, R. (2022). Accrual accounting basis and cash flow future predictions. *Journal of Global Economics and Business*, Volume 3 : numéro 10, pp : 121-133.

Murty, A. V. N. et Misra, D. P. (2004). Cash flow ratios as indicators of corporate failure. *Finance India*, Volume *18 : numéro 3*, pp : 1315-1325.

Orpurt, S. et Zang, Y. (2009). Do direct cash flow disclosures help predict future operating cash flows and earnings? The Accounting Review, Volume 84 : numéro 3, pp : 893-935.

Pompeng, O. et Rambak, J. (2022). Cash Flow Ratio Analysis as a Measuring Tool for The Company's Financial Performance at PT. Astra International Tbk. *Proceeding of The International Conference on Economics and Business*, Volume 1 : numéro 2, pp : 01-08.

Riva, P. (2022). *Structure and Contents of (Italian) Financial Statements*.

Shank, J. K. (1972). *Matrix methods in Accounting*. Addison-Wesley.

Sharma, D. et Iselin, E. (2003). The Relative Relevance of Cash Flow and Accrual Information for Solvency Assessments: A Multi-Method Approach. *Journal of Business Finance & Accounting*, Volume 30 : numéro 7-8, pp : 1115-1140.

Sloan, R. G. (1996). Do Stock Prices Fully Reflect Information in Accruals and Cash Flows about Future Earnings? *The Accounting Review*, Volume 71 : numéro 3, pp : 289-315.

Suciani, T. Y. et Setyawan, S. (2022). Analysis of Cash Flow Statement To Assess The Company's Financial Performance AT PT Astra International TBK. *Current Advanced Research On Sharia Finance and Economic Worldwide*, Volume *1 : numéro 4, pp : 1-12*.

Vitek, J. (2021). *Cash Flow Statement*. Faculty of economic studies.

Wilkins, M. et Loudder, M. (2000). Articulation in cash flow statements: a resource for financial accounting courses. *Journal of Accounting Education*, Volume 18 : numéro 2, pp : 115-126.