

The Need of Management Accounting for Problem-Finding to develop Management Accounting for Sustainability

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Abstract

Conventional management accounting can be said to be problem-solving accounting methods, in which the problems and issues facing a company are decided upon in advance. Material flow cost accounting (MFCA), on the other hand, has been used in the same way as a traditional problem-solving management accounting method, but it can be strongly argued that it is fundamentally a problem-finding method of management accounting. This paper uses case studies to discuss the usefulness of MFCA as a problem-finding management accounting technique and examine the need for further research in the development of sustainable management accounting techniques.

Keywords: problem-finding management accounting, problem-solving management accounting, material flow cost accounting (MFCA), sustainability

1. Introduction

What is the Purpose of Management Accounting?

To give an example, Yamamoto et al (2018, 181)¹⁾ contends that “the purpose of management accounting is to provide information that is useful to the business management of companies,” and that the areas and systems of management

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1) According to those authors, this book also covers the scope of questions for the Certified Public Accountant Examination in Japan.

accounting are classified according to “the aspects of business management that they are intended to capture.” Accordingly, actual management accounting can be understood by clarifying the nature of business management, and this makes it clear that specific management accounting information can be divided into financial and non-financial types. Furthermore, as per Figure 1 (Yamamoto et al. 2018, 183), management accounting systems can be broadly divided into those used for “decision-making” and “performance management” accounting.

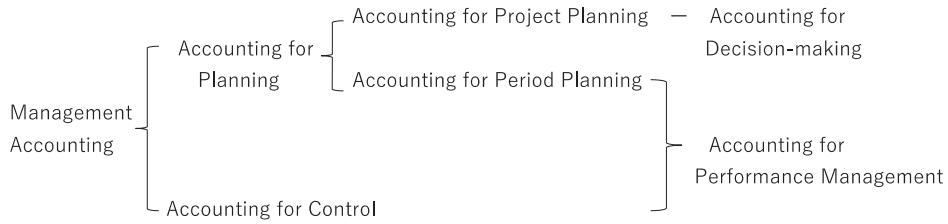


Figure 1: Traditional management accounting systems (Yamamoto et al. 2018, 183)

According to Yamamoto et al. (2018, 183), examples of specific areas of accounting for decision-making include economic calculations in capital investment planning, differential cost-revenue analysis in in-house decision making, and the traditional management accounting methods, based on budgets and standard costs, that are representative of performance management accounting. Furthermore, they claim that in these kinds of traditional management accounting systems, it cannot be argued that strategic management accounting is sufficiently well-positioned to enable it to be used in response to changes in the corporate environment. They go on to explain that strategic management accounting techniques include Balanced Scorecard (BSC), Target Costing, Activity-Based Costing (ABC) and Activity-Based Management (ABM), Quality Costing, Life Cycle Costing (LCC), and Throughput Accounting (TA).

Can this kind of management accounting provide solutions to the problems and challenges that companies face?

According to Johnson and Kaplan (1991), it is apparent that management accounting, represented by traditional methods such as product costing and budget control, has become incompatible with corporate objectives and has begun to form a misleading basis for making corporate decisions. This has been a major reason driving the study of management accounting techniques, such as the above-mentioned strategic management accounting techniques that have been developed or discovered in advanced enterprise applications, which are useful for companies and that can be used to solve business problems. Although they state

that they are not universally suitable for solving the challenges faced by every company, they give successful examples from industry so that the practical utility of each method and approach can be understood and evaluated.²⁾

That said, is management accounting only significant in terms of solving problems and issues facing companies? If we think of Material Flow Cost Accounting (MFCA) as a corporate project that has lasted nearly 20 years from 2001, perhaps we miss the importance of management accounting by looking only at its systematic application to date. In this study, we demonstrate that by using MFCA as a management accounting method, it is possible to visualize issues that are not normally recognized by companies, and we discuss the need for problem-finding management accounting to develop into new management accounting for sustainability.

2. The current management accounting system and its problem points

2.1. Management accounting for problem solving

If the so-called standard approach to management accounting outlined in the previous section is traditional management accounting in a narrow sense, including the various techniques of strategic management accounting in the definition can be referred to as traditional management accounting in a broad sense for the purposes of this paper.

This is because traditional management accounting methods are solutions to problems that have been set in advance, and they are purpose-driven even if they do not provide solutions to the problem at hand. Companies position management accounting methods as necessary in order to perform daily tasks such as the performance monitoring and decision making described in Figure 1, and introduce other appropriate management accounting methods when problems are recognized.

Standard management accounting texts include example problems and exercises to demonstrate the techniques they are describing. Many of these problems, of course, have a set of primary issues that a company is likely to face, methods to obtain additional information that will aid the decision-making process, and ways to ascertain whether certain (financial) goals have been achieved. In this

2) Kaplan and Norton (1996) is part of a wide range of literature and examples surrounding BSC. In terms of Target Costing, Toyota is famous for developing and implementing this new method, and there are many examples and references available if one searches for "Target Costing." There is also much documentation available and examples that can be found by searching for each method in turn.

way, management accounting methods are introduced as methods for evaluating performance. This has the effect of emphasizing and explaining the reasonable accuracy of the figures derived through management accounting methods.³⁾

However, is management accounting just a method for solving problems in the expected manner? Does management accounting really have such limitations and constraints?⁴⁾

Even if a company's purpose is only to maximize its profits, various types of management accounting can be developed to help it achieve this goal, such as dividing accounting periods into short- and medium-term profits, and dividing accounting methods and information into calculations that are focussed on targets such as projects and products. Then, as an example, budget management and BSC that is based on medium- to long-term business plans can be researched and developed as a way of countering the detrimental effects of planning for only short-term corporate performance (as pointed out in Johnson and Kaplan 1991, for example). In BSC as well, financial perspectives and financial performance are indispensable objectives of any company, and in any case, it can be argued that the question of from which viewpoint (time period) profits should be obtained and maximized remains a fundamental question in these new forms of management accounting (or, management accounting in a broad sense, to use the terms of this paper).⁵⁾

2.2. Conventional management accounting that neglects problem discovery

As previously discussed, conventional management accounting in both the narrow and broad senses is intended to support the acquisition and maximization of corporate profits. With this in mind, we have discussed MFCA's relationship and positioning as a management accounting method, while pointing out the differences between MFCA approach and traditional cost and management accounting

3) Johnson and Kaplan (1991) points out that this is not only reasonable accuracy for the purpose, but also highlight the lack of timeliness in traditional management accounting:
 “distorted product costs, delayed and overly aggregated process control information and short-term performance measures that do not reflect the increases or decreases in the organization's economic position”
 (Johnson and Kaplan 1991, 13)

4) Looking at the historical development of management accounting (Tsuji 1988), it can be understood that cost management and budget control, which are basic management accounting methods in practice, were developed to solve problems in US industry in the early 20th century. And Hiromoto (1993) analyzes the establishment of the American Accounting Association in the early 20th century and look at accounting education through a historical analysis of the systematization of management accounting.

5) Asada (2015) analyzes changes in the wide-ranging circumstances surrounding current accounting, and summarizes this development in research that incorporates results from various other fields. Additionally, Kazusa and Sawabe (2015) envisage further expansion of traditional management accounting in a broad sense.

(for examples of this, see Nakajima 2004, 2005, and 2006). To summarize, although management accounting methods that can be used for the purpose of cost reduction have always existed, it is worth paying close attention to the question of why MFCA has provided new perspectives on cost reduction and how these can be realized in practice. In this way, MFCA can be utilized as a method of so-called problem-solving management accounting.

However, as analysis of MFCA developments, new applications will spontaneously come about, such as being used to apply management accounting methods to supply chains (for examples of this, see Nakajima and Kokubu 2008, Nakajima, Kimura and Wagner 2015). Using MFCA to process data will lead to the discovery of issues in corporate resource productivity.⁶⁾ As an example, in Japanese companies, the consumption of clean and industrial water, in terms of the amount consumed and the cost of wastewater treatment, is not often regarded as an important management target. However, as shown in Nakajima (2020), material inputs and outputs in a certain unit of production can be viewed as a material balance using MFCA principles⁷⁾, based on the physical quantity data in the MFCA information. When viewed in this way, assuming the total amount of material input is 100, it is not uncommon for 90% or more to become waste (discharge) instead of being utilized in the product. Furthermore, wasting global resources through low resource productivity is understood to be a widespread corporate issue. It can be said that the recognition of the importance of water in sustainability in recent years (ISO 2014) predates MFCA (Nakajima and Kokubu 2002, METI Japan 2002, and 2010).

So, how does MFCA incorporate aspects of both problem-solving and problem-finding management accounting? This is dependent on whether MFCA is used as an environmentally conscious cost accounting method or as a method of performing material flow analysis; as a problem-finding management accounting tool, or for problem-solving management accounting. Its function and utility differ depending on the application. Furthermore, MFCA is used in problem-solving and more traditional management accounting, and it can be said that because of this,

6) Materials in MFCA basically refer to natural resources and energy. In an MFCA professional project in a company, materials are specifically the substances and energy that are to be measured and evaluated for the purposes of the MFCA. In simple terms, resources other than materials that are valued by the company can also be measured during the MFCA project but the decision to do so is made in consideration of the difficulty of MFCA data measurement and the resulting data's usefulness as information for management accounting purposes.

7) In MFCA, the analysis range (for example, the manufacturing process of a given product) is determined and the material (for example, water) input into the analysis range. The quantity of each material (in this case, inputted water) contained in the emissions is measured based on mass balance. (For examples on this, see Nakajima and Kokubu (2008) and ISO (2011))

its inherent usefulness in problem-finding management accounting is not widely understood.

A reason for this can be found on theory of “visibility” and “invisibility” in accounting, mentioned by Okano (2002). The idea of accounting “invisibility” is explained below:

“‘Invisibility’ in accounting refers to using accounting techniques to hide that which was previously explicit and has its roots in accounting as a technique for number management. In other words, the four arithmetic operations can be applied to convert the monetary amount that is shown, and a new meaning is attached to the total, but it is difficult to directly see the original attributes of the target object. This has the positive effect of allowing even objects that are completely unlike to be reduced to the same level, but the process means that the attributes of the original objects are lost.” (Okano 2002, 8).

As MFCA has traditionally been positioned as a cost accounting method, its invisibility has only just emerged, and it can be argued that the functions and usefulness of MFCA as a problem-finding management accounting system have been lost.

3. What is problem-finding management accounting?

Until now, MFCA has been conceptually explained as the visualization of material inefficiency (so-called ‘material losses’ on MFCA approach) to find new cost reduction opportunities, and it has featured in many published company case studies internationally⁸⁾. By looking at these case studies, we can see that MFCA tends to be implemented in special analysis projects, such as special cost studies for environmental management accounting, and it is not used as a daily management system. In addition, we can also see that analysis of management accounting information from this sort of unusual perspective can lead to the discovery of new profit-making opportunities.

Additionally, the relationship between MFCA, existing management accounting, and environmental management, and the potential for the development of MFCA as a method for environmental management accounting, as described by Nakajima (2005), is shown in Figure 2 and quoted below.⁹⁾

8) For examples, APO (2014), Chattinnawat (2018), May and Günther (2020), METI Japan (2010), MPC (2012), Nakajima (2020), Nakajima and Kokubu (2008), Rungchat et al. (2015), Schmidt et al. (2019), Wagner and Enzler (2015), Yap (2017).

9) Nakajima and Kokubu (2008, 209–221) also discuss the relationship between existing management accounting and environmental management accounting, especially with regards to MFCA. Additionally,

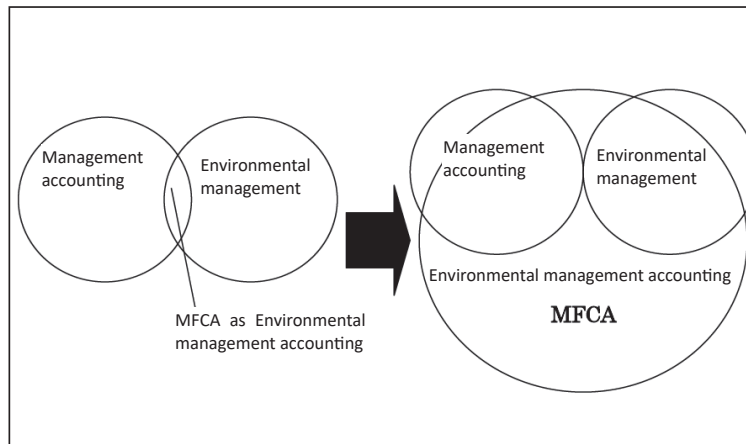


Figure 2: Changes in the position of MFCA in Environmental management accounting (Nakajima 2005, 77 onwards)

“Until now, environmental management accounting (EMA) has been positioned at the point of intersection between existing management accounting and environmental management as shown on the left side of Figure 2, and MFCA has proven to be a useful tool in this context. However, EMA, and especially MFCA, can easily go beyond the limits of traditional management accounting and create new opportunities for profit in multi-company groups and supply chains. Furthermore, as MFCA can be introduced in the material flow range, it can be used to provide management accounting information that takes into account the consumer at the time of use and any social costs to society (including, in theory, the international community). Environmental management accounting is the key to greater development of management accounting, and as such, MFCA can be used to form a broader and more sophisticated form of management accounting. However, it goes without saying that this new form of management accounting also has the function of reducing the environmental load in environmental management accounting.” (Nakajima 2005, 77; please note that this excerpt has been edited for this paper).

However, as shown in the previous section, placing MFCA solely within the category of traditional management accounting not only fails to realize its full usefulness but also impairs the further development of management accounting using MFCA.

Nakajima and Kokubu (2008, 50) discuss the basic information involved in environmental management accounting (in both MFCA and LCC) and existing management accounting methods that have been developed to be environmentally conscious, such as environmentally-friendly Target Costing.

4. Introductory procedures for MFCA and its contribution to problem-finding management accounting.

As it is represented in ISO14051 (ISO 2011), the basic concept of MFCA is already standardized and generalized, but this is not always true of procedures for introducing MFCA into corporate practice. However, the author has been overseeing MFCA projects at various companies since 2001,¹⁰⁾ and Figure 3 shows an example of the typical procedure and schedule of MFCA implementation.

In past projects, it has been possible to implement MFCA as shown in Figure 3 in as little as six months, but it is generally implemented over the course of a year to take factory operations and company work schedules into consideration. Most terms and definitions used in MFCA are standardized, as in ISO (2011).¹¹⁾

An important point to be made about Figure 3 is that MFCA is not primarily intended as a method for cost evaluation, but as a method for creating a material flow model through process analysis and for collecting and aggregating physical quantity data based on material balances. It is the analysis of inputs and outputs for each material at each quantity center.

In an actual MFCA project, improvements in material loss can be implemented without waiting for the completion of the full MFCA analysis, even if only the physical quantity data of the material flow in the first half of the analysis has been collected. Furthermore, by simply examining the causes of material loss (examples of this can be found in Nakajima and Kimura 2012), the causes and limiting conditions behind problems with the company, suppliers, society and the world can be identified. As an example, in an actual project, it may be discovered that the constraints of physics mean that material loss cannot be reduced. If these physical constraints can be overcome by technological development, the resulting technology would not only provide economic benefits for companies, but also contribute to the sustainability of the earth as a whole.

To use the example of the lens manufacturing process at Canon (see Nakajima and Kokubu 2008), sludges were generated when raw glass purchased from a supplier was polished into lens form in the manufacturing process. Judging by the

10) As can be seen in the MFCA reports highlighted by METI Japan (2002) and Nakajima and Kokubu (2008), it goes without saying that the reports created during MFCA projects at companies are added to, revised, and enhanced as a result of subsequent developments.

11) In Figure 3, the term “negative product” in “negative product cost evaluation”, originally from “material loss” was translated by the author, in order to make convincing understanding of MFCA approach for manufacturing staffs in Japanese companies, and so, this term is commonly used by MFCA users. But after international standardization discussion, it was termed back to “material loss” in ISO14051, which was issued later.

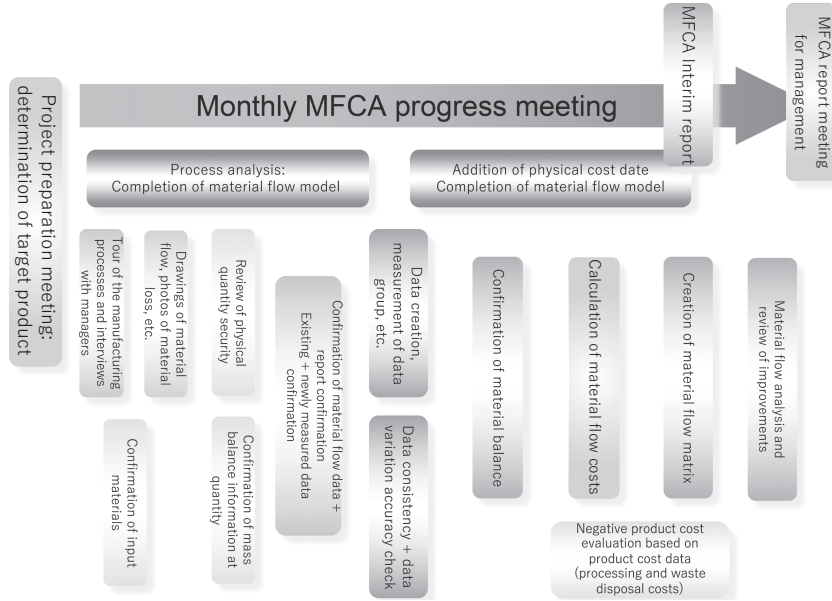


Figure 3: An example of an MFCA project schedule (created by the author)

material loss cost, it seemed that about 30% of the inputted glass material became sludge during the processes. This was a case where the manufacturing cost could be successfully reduced by lowering the material loss cost.

In fact, there were other incentives for the company to reduce its material loss. At the time, lead glass was commonly used for optical lenses and glass waste containing lead became subject to the Basel Convention, which limited its international import and export, and this meant it was necessary to reduce or eliminate the generation of the glass waste itself as part of corporate and environmental management efforts.

Presently, it can be seen that MFCA provides management information that contributes to sustainability. This is just one example, and MFCA's overseas cases provide much management information that also contributes to sustainability efforts (for further examples, see Nakajima 2020).

5. Conclusion

The fundamental challenge for a company, even if we take the need to gain and maximize profit as a given, is examining whether or not its value creation contributes to the sustainability of society. An example of this from a corporate perspec-

tive is whether or not the firm is taking steps towards creating shared value (CSV) through SDG (Sustainable Development Goal) initiatives.¹²⁾ So, for example, the criteria by which a company is evaluated for ESG (Environment, Society and Governance) investment are not only those represented by the quantitative economic value shown in accounting information, but also those which assess their impact on ESG.

Isn't this new type of perspective essentially arising from management accounting itself? The sustainability that is lauded by ESG and the SDGs has arisen because of, and is monitored by, social needs and increased awareness of issues. However, the development of problem-finding management accounting systems that can sense changes in the global ecosystem and society that are referred to in this paper is still in its infancy, and should be the focus of future research. Furthermore, it should be noted that management accounting methods that are useful for solving the problems and issues that surround this topic have already been developed, even if they are not yet sufficient.

In Figure 4, as problem-finding management accounting develops, a new system will be established as shown below, that can be developed and expanded into management accounting systems that contribute to sustainability.

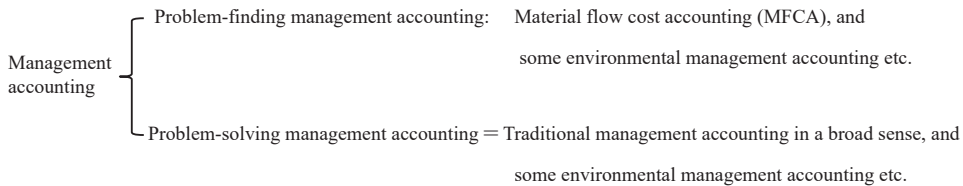


Figure 4: A new classification of management accounting

At present, MFCA can be cited as a specific method that can be used for problem-finding management accounting, and it is thought that Life Cycle Assessment (LCA), together with Life Cycle Costing (LCC), can be used in this manner. Furthermore, in light of the fact that problem-solving management accounting is becoming more substantial, we can state that “problem-solving management accounting = traditional management accounting in a broad sense, with other elements including environmental management accounting.”¹³⁾

12) Apart from CSV, there is also the example of accounting for natural capital, advocated for by the International Integrated Reporting Council (IIRC), which is made up of six types of capital that are needed for investment in corporate value creation. This type of accounting has been introduced on a trial basis by companies so its impact can be measured. (Oka and Nakajima 2017)

13) Refer to the environmental management accounting methods detailed in METI Japan (2002). On the other hand, for example, Imai (2020) developed to make an integration between MFCA approach and Toyota Production System.

Until now, environmental management accounting has been defined as a management accounting method that achieves both reductions in environmental impact and increases in corporate profits. With the advent of management accounting methods that discover problems in order to achieve corporate sustainability and solve problems based on the priority of the identified issues, it can be argued that existing methods for management accounting can also be useful in this regard, and that a simple management accounting method is one which also contributes to sustainability.

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