Individual and Dynamic Capital in Cost Accounting

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1. Introduction

In the field of management research, Torao Nakanishi (1896-1975) is referred as the founder of the Japanese *critical management* school (Kataoka, 2013, p136). His theory of *individual capital* (kobetsu shihonron) appeared in his first book *Managerial Economics* (1931). Based on the Marxian theory of capital accumulation, the "individual capital" theory assumes that each business is a unit of the global social capital.

His academic contribution to the development of cost accounting is less emphasized than the work of contemporary scholars like Ota, Kurosawa, Aoki or Hasegawa[1]. *Theory of Managerial Cost Accounting* (1936), his second monograph, adopts a transdisciplinary approach to management accounting techniques similar with the German *Betriebswirtschaftslehre (Managerial Economics school),* from which Schmalenbach was a leading Author.

Historians of Accounting (Chiba, 1994, Okano, 2002, Okano & Suzuki, 2007) mention Nakanishi for his chairmanship of the wartime Uniform Financial Regulations Committee of the Planning Council, and later in postwar cost accounting standard setting. None of them mentions the academic work of Nakanishi except Kurosawa (1980), a contemporary author who had been involved in the same organizations as Nakanishi.

Theory of Managerial Cost Accounting was Nakanishi's transitional work between his early theory of "individual capital" and his later contribution to cost accounting. Kurosawa (1980) described this monograph as "a paradigm switch" from a Marxian *weltanschauung* towards Schmalenbach's dynamic, managerial approach.

This evolution is emblematic of the birth of management science in Japan as a new discipline independent from economics. It also reflects some of the changes in accounting

[1] In the review by Sato, 2012, p21, Kurosawa (1933), Hasegawa (1937) and Aoki (1936) are mentioned as major contributors to management accounting research in Japan, but Nakanishi (1936) is not.

research from the 1930s to World War II. In the case of cost accounting, this period was particularly rich because of the common development of theories and standards. The Japanese case is unique in this regard, because the first scholars were also the same who created cost accounting standards.

Torao Nakanishi was one of these pioneers, and his book *Theory of Managerial Cost Accounting* reflects some of the latent changes that would surface during World War II or in the following years. The purpose of this paper is to analyze the academic contribution of Nakanishi in the context of the propagation of *Betriebswirtschaftslehre (managerial economics)* in Japan.

The remainder of this paper is organized as follows. Part 2 introduces the German influences in the work of Nakanishi. Part 3 provides an overview of the new theory of cost accounting developed in *Theory of Managerial Cost accounting* (1936). Part 4 compares Nakanishi and Kurosawa's concepts of cost accounting and analyzes Nakanishi's paradigm switch towards the dynamic school.

2. The German Influences in cost accounting development through the work of Torao Nakanishi

Nakanishi was born in 1896 in Wakayama prefecture, and moved several times during his childhood[2]. From 1917 to 1920, he studied at Tokyo Imperial University in the department of commerce. After entering the Graduate school, he was hired as an assistant in 1921 and he became an associate professor in 1923.

From 1923 to 1926, Nakanishi was sent by the Ministry of Education to Great Britain, Germany and the United States to study commercial management. He spent most of this journey in Germany and focused on the managerial economics school (*Betriebswirtschaftslehre*). In the work of Nakanishi, these authors remained the major influence even after war World II, when American literature became dominant in Japanese management research.

It is also remarkable that Nakanishi visited Germany during the hyperinflation period (1923). In the viewpoint of management research, inflation induces some bias in the assessment of profits and inventory. This experience may be one reason for which Nakanishi decided to focus on management accounting rather than the formation of market prices or other aspects of business administration[3].

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[2] This paragraph is based on Torao Nakanishi's biographical details in Kurosawa and Yanagikawa (1980, pp.1-3.)

[3] In Japan, as for other belligerent parties in World War I, monetary instability during and after the war was a serious concern. Those same inflation issues repeated after

After his travel to Germany, Nakanishi came back to Tokyo Imperial University and started teaching "managerial economics". At that time, the subject was completely new, and Nakanishi was one of pioneers of management education. His first book, *Managerial Economics* (1931) was the foundation of a new school of thought called "Critical Management", a Marxian approach to management research based on the concept of individual capital (kobetsu shihon).

In 1936, Nakanishi published his second book *Theory of Managerial Cost Accounting*. Starting from the "individual capital" theory, this research develops the use of cost accounting from a managerial viewpoint. This work is partly based on Eugen Schmalenbach's dynamic balance sheet and it also comprises some developments from microeconomics or contemporary accounting researchers.

In 1939, Nakanishi resigned from Tokyo Imperial University after the suspension of his colleagues Seibi Tsujikata (1890-1975) and Eijiro Kawai (1891-1943). On one side, Kawai was prosecuted by the military regime for advocating liberalism and antimilitarism, and on the other side, Tsujikata publicly argued against Kawai and his liberal theses, which earned him a disciplinary sanction. As a response, thirteen professors, associate professors and assistants resigned from the faculty of economics of Tokyo Imperial University as a protest against this constraint to their freedom of expression. Nakanishi was one of them, but it did not mean the end of his career.

After leaving Tokyo Imperial University, Nakanishi continued his work for the development of cost accounting in the arena of standard-setting. From 1939 to 1945, he was a member of several ministerial commissions in charge of setting some standards for cost calculation and of the regulation of prices in wartime economy.

After World War II, he was the chairman of the committee that prepared the Cost Accounting Standard issued in 1947. From 1952, he returned to academic career as a professor at Osaka University.

Nakanishi played a major role in the development of management accounting in the postwar period. Because he devoted his life to the standardization of cost accounting and the development of costing practices in more than a hundred different industries, Nakanishi had no time to leave any further academic contribution (Kurosawa, 1980, xxii). *Theory of Managerial Cost Accounting* (1936) was his last book, his first and last academic contribution to cost accounting.

Kurosawa (1980, xxii) regrets than the academic work of Nakanishi did not reflect his

World War II when Nakanishi was working on the preparation of the Cost accounting standard. As Okano &Suzuki (2007) explained, the use of Gentan'i (physical units) rather than conventional monetary costs in management was also one answer to the assessment problems induced by inflation.

actual contribution to the development of cost accounting in Japan. In the development of cost accounting standards, he insisted on developing Japan's own standards, and never accepted the easy solution of translating German, American or British existing standards or definitions (Kurosawa, 1980, xxiv).

In 1954, Nakanishi received a doctorate from Tokyo University. He worked as a professor at Keio University from 1959 to 1969, and after his retirement at Takushoku University from 1969 to 1975. In 1973, a revised version of *Theory of Managerial Cost Accounting* was published under the supervision of Kurosawa. He died in Tokyo in 1975.

3. A New theory of cost accounting based on German managerial economics

3.1. *Theory of Managerial Cost Accounting* (1936)

In *Theory of Managerial Cost Accounting* (1936) Nakanishi explores the relationships between cost accounting, profit measurement and management decisions. For Nakanishi, the final objective of cost accounting is to compare profits[4] in order to assess the performance of businesses. In this purpose, cost accounting techniques are necessary as a measurement tool, but they must be completed with production planning techniques like analyzing the optimal activity level.

Because of its transdisciplinary approach, it may be questionable whether this work should be classified in the field of cost accounting, financial accounting, management or microeconomics. In this paper, I focus on the cost accounting aspects rather than economic theory.

Kurosawa (1980, iv) referred to *Theory of Managerial Cost Accounting* as "an epoch-making contribution in the field of management research". In his *Chronology of Accounting*, Sato (1969) also included it in the list of major events in accounting history for the year 1936.

Theory of Managerial Cost Accounting (1936) was maybe not the first book on cost accounting, but it was the first one to adopt the title "managerial" cost accounting. His viewpoints on the role of cost accounting and his transdisciplinary approach to the subject contrast with contemporary authors.

For example, Hasegawa (1937), often referred to as a reference in cost accounting history, adopts a pure accounting approach, while Nakanishi (1936) is rather a book on quantitative techniques for management. Even within the *Managerial Economics* School,

[4] In the conclusion, p. 329, Nakanishi refers to the concepts of "comparable profit" of Schmalenbach and "managerial profit" of Schmidt, which are both expressions of a management focus on accounting.

authors like Sugimoto (1933) and Kurosawa (1933) do not provide a comparable approach with Nakanishi (1936) even if their analyses are transdisciplinary as well.

As stated above, the starting point of this book is the theory of "individual capital" (chapter one). At that point, expenses, revenue, profit are defined as some tools to measure the capital accumulation process within the company.

Then a second chapter explores the relationships between the level of activity, expenses and profit. This development adopts a management approach somewhat similar with production planning, but the analysis is based on quantitative techniques and microeconomic concepts like the marginal cost.

In the third chapter, Nakanishi compares several theories of net income from the German *Managerial Economics* school: Schmalenbach, Geldmacher, Schmidt, Walb and Mahlberg. The variations of their views on net income are due to different perceptions of management objectives and the role of accounting in the achievement of these objectives.

Next, the fourth chapter presents quantitative techniques of cost calculation and their application to the issue of profit maximization. In this chapter, Nakanishi adopts the concept of "managerial profit", similar with the dynamic "comparable profit".

The last chapter concludes about how cost accounting information should be used for the purpose of business analysis. These uses include mainly the management of costs and the comparison of managerial profits.

3.2. Expenses and Activity level

In this second chapter of *Theory of Managerial Cost Accounting*, he explores the relationship between the activity level and expenses. This microeconomic analysis is partly based on the work of economists like Von Stackelberg, and accountants like Kosiol.

The quantitative expression of activity level is a function of possible production time and possible units of production per time units (p64). This concept is completed with activity rate, defined as the activity level divided by the maximum production capacity.

The relationship between expenses and the activity level is not linear (p. 65). Four categories of expenses are defined depending on how they vary with the activity level: fixed expenses, proportional expenses, degressive expenses and progressive expenses (p65). Based on these categories, Nakanishi shows how the unit production cost depends on the activity level of the business.

After that, Nakanishi defines different scenarios of production, resulting in the necessity to research: 1) the optimal activity level, 2) the minimum activity level and 3) the most profitable activity level.

The difference between "optimal" and "most profitable" activity levels is that the "optimal" activity level is the level of production that minimizes the production cost, while the "most profitable" activity level is the level of production that maximizes profit. Using a function of production and the analysis of marginal production cost, the best activity level for each management objective can be calculated with this microeconomic approach.

Next, Nakanishi continues his economic analysis of expenses with the theory of the economy of large scale production and some quantitative examples (p107). In his explanation, Nakanishi distinguishes clearly the influence of the level of activity and that of the quantities produced, as two different concepts.

3.3. Theories of net income calculation

In this chapter, Nakanishi relies on financial accounting theories like the dynamic balance sheet or some issues about the assessment of assets, but always with a managerial approach.

A first issue about the measurement of net income is whether the calculation is prospective (ex-ante) or retrospective (ex-post) (p.113). Prospective calculation of net income is part of budgetary management, and the accounts that may be associated with these budgets can only be "speculative accounts" because the transactions are unrealized. Retrospective calculation measures realized profits. It is used for the purpose of management comparison, in order to assess the relative success or failure of the business during the period.

One more distinction is the difference between long-term calculation (regular one year period) and short term, partial accounts prepared during the accounting period for managers' needs (p 121). Nakanishi explains that the accounting period can be divided in shorter periods depending on management styles and information needs

An important principle of net income calculation is the matching of revenue and expenses. For example, the calculation of the cost of goods sold during the accounting period that differs from the cost of goods purchased during the period (p127).

One more important principle is the difference between cash inflows/outflows and revenues and expenses. Because of the accruals principle, net income for an accounting period usually differs from the increase or decrease in cash. In this regard, all items on the balance sheet can be considered as deferred expenses or revenues (p132).

This development is based on the dynamic balance sheet view of Schmalenbach, in which the balance sheet is only a complement of information for profit calculation (p137). In the book, this part can be seen as a theoretical framework for Nakanishi's subsequent developments on cost accounting (chapter four).

The conclusion of this chapter is a synthesis of several theories of net income calculation: Schmalenbach, Geldmacher, Schmidt, Walb, and Mahlberg, including the purpose, range of expenses and assessment issues about assets. While Schmalenbach emphasized the importance of comparability in net income calculation, Geldmacher stresses the conservation of substantial capital.

Schmidt distinguishes the calculation of profit from transactions from the maintenance of the relative value of the business. Schmidt's dual view of profit induces a distinction between managerial profit (keiei rieki) and conjuncture profit (keiki rieki). Together, managerial profit and conjuncture profit form the integral income (zentai rieki) (p.208).

Last, Walb and Mahlberg argue that the role of profit calculation is to measure real past profits for the purpose of nominal capital maintenance (p203). According to Nakanishi, "the role of profit calculation for management control is to show the situation of all production conditions based on managerial profit computation." (p203)

3.4. A new theory of cost accounting

As for profit calculation, Nakanishi stresses the plurality of the objectives of cost calculation. Cost accounting is necessary to set consistent prices, for the disclosure of financial information, and provides the necessary information for management control (p213). He goes on with the definition of costs (genka), the concept used in management accounting, equivalent to the financial accounting concept of "expense"(hiyo).

Based on a classification by Lehman (1925), Nakanishi defines five types of costs: human factor, usable goods, consumable goods, capital cost and composite cost (p. 218).

In Lehman, the cost of the human factor includes the salaries paid to employees and also the cost of the entrepreneur's own work.

Consumable goods and usable goods are both the costs for some physical factors. Consumable goods, like for example raw materials, disappear in the production process. Therefore, they can be used only once. On the contrary, usable goods are those that can be used several times in the production process, like machines for example. (p217).

Apart from production factors, two more categories of costs to include in cost accounting are the use of capital (interests paid) and the composite cost of external services (p218).

The problem of these categories is that they do not fit the practices in bookkeeping and financial accounting. For example, entrepreneur's own work is not accounted for the same way as employees' salaries.

For this reason, Nakanishi (p218) proposed a competing classification based on the (unpublished) draft of cost accounting standard.[5]

Category	Contents
Cost of Goods (buppinhi)	Raw materials and other complementary ingredients that are consumed in the production process
Cost of Labor (rodohi)	Cost of employees' labor consumed
Expenses (hiyo)	Expenses not included in the two other categories Amortization of fixed assets, repairs cost, rent, tax, insurance, transport, communication, travel and other fees.

Source: adapted from Nakanishi, 1936, p. 218.

Two points are remarkable in this classification. First, the salary of the owner is not included in cost calculation, "because the nature of this element is similar to the cost of capital, which is normally excluded" (p.219).

The second important point is that "other expenses" are not gathered based on theoretical criteria, but for practical reasons. It is easier for companies to aggregate costs in a way that does not affect the bookkeeping categories (p.219). In this regard, Nakanishi chooses a practical approach rather than a conceptual one in order to simplify cost accounting for managers.

One more aspect of cost accounting is the classification of direct and indirect costs. Direct cost are the costs that can be allocated directly to a product, while indirect costs are incurred in common processes for several products, and therefore cannot be allocated directly to one particular product.

Nakanishi reviews several methods of indirect cost allocation, like the prime cost method, the direct labor hour method, the machine hour method, and the production centers method.

The second part of the fourth chapter is an analysis of the role of cost accounting, including the relevant scope and use of quantitative techniques based on the marginal cost (similarly to chapter 2 described supra). He also discusses the use of different types of information in order to support managerial decisions.

At the end of the chapter, Nakanishi concludes that "there is no need to explain that

[5] As Nakanishi was one of the leaders of the standard-setting project, this classification may be regarded as part of Nakanishi's work. The ternary classification can already be found in Hasegawa (1933) who was also involved in cost accounting standard setting at the same period.

the assessment of acquisition cost is necessary to calculate real profits."(p276) This statement clearly shows that Nakanishi adopted the dynamic framework as far as profit calculation is concerned.

3.5. Business Comparisons

In the last chapter, Nakanishi concludes about the uses of cost accounting in a management perspective. To summarize, cost accounting is helpful as a management technique when assessing business situations. For example, comparing the structure of costs is useful to understand the formation of profit. Besides, diversified companies have an interest in comparing divisional profitability, and this comparison is relevant with managerial profits (p306).

4. Paradigm Switch towards "dynamic" accounting

4.1. Comparison with contemporary work

In the prewar period, Kurosawa and Nakanishi shared the same *episteme* derived from German *Betriebswirtschaftslehre* (managerial economics). Both of them adopted the dynamic balance sheet theory by Schmalenbach, both of them were part of the same standard-setting commissions and scholarly associations. Yet, their concept of the role of accounting is fundamentally different.

According to Chiba (2007, p.186), Nakanishi, in his original Marxian approach, stressed that "accounting is a methodology for critically assessing the logic or the value-law of individual capital in modern capitalism". In other words, accounting was seen as a tool to observe the business cycle and measure individual capital increase.

Kurosawa (1934) stressed that "the central object of accounting was not the individual capital of the enterprise itself, but the individual capital which is recognized by the capital account". Thus, Kurosawa makes the distinction between the representation techniques (the capital account) and their object (individual capital = business).

One more important difference between Kurosawa and Nakanishi is that Kurosawa focused on the social function of accounting, while Nakanishi stressed its managerial function.

In *Theory of Managerial Cost Accounting* (1936), cost accounting is studied as a management tool accordingly with Eugen Schmalenbach's transdisciplinary approach. Nakanishi (1936, p1) considered that because the main purpose of businesses is to make profit, "the issue of expenses, or more precisely expenses, revenues and profit, is a central a fundamental one in managerial economics".

On the contrary, "for Kurosawa, accounting was a means for making order in the civil society" (Chiba, p187). Accordingly, his academic contribution focused on financial accounting, which can be seen as a means of social regulation, rather than management accounting. Concerning cost accounting, the issue of cost calculation is seen in Kurosawa through the objective of correct calculation of income for the purpose of financial reporting.

In the postwar period, financial accounting research gradually separated from management accounting, maybe because reporting requirements grew more complex. While Nakanishi contributed to the development of cost accounting with his research at the Japanese Productivity Research Center (Nakanishi, 1955), Kurosawa focused on accounting regulation and accounting theory as a means of social regulation.

4.2. *Theory of Managerial Cost Accounting*: a transitional work

Kurosawa (1980) argues that Nakanishi's paradigm changed from *Managerial Economics* (1931) to *Theory of Managerial Cost Accounting* (1936). The former belongs to the Marxian tradition, and is the foundation of the Japanese critical management school of thought. The latter formed the basis of Nakanishi's management theory, including his views on cost accounting, net income calculation and business comparison.

Since *Theory of Managerial Cost Accounting* (1936) is partly based on the "individual capital" theory, it is necessary to introduce this theory as the starting point of the book. The original framework of Nakanishi, managerial economics, is defined as the study of individual capital (Nakanishi, 1936, p1).

"In this regard, the individual capital is a constitutive element of the global social capital that contributes to the cycle of capital accumulation as an independent unit that was separated from this global social capital, like a cell endowed with life." (Nakanishi, 1936, p6.)

The theory of "individual capital" is derived from the Marxian capital accumulation cycle. Kurosawa (1980, p. ix) summarized this research paradigm in the following chart, and commented that many accounting researchers, including himself, adopted the same notation "GW-W'G'" as Nakanishi after the publication of his first book.

First Paradigm: the individual capital approach in *Managerial Economics* (1931)

Codification system[6] Individual capital cycle: G−W ....W'—G' W'= c+v+m Expenses c+v=k W'=k+m W'-G'(c+v+m) reflected as W-G' (c+v+p) for the entrepreneur	Hypothetico-deductive system Individual capital cycle hypothesis
Selection principle (Value Judgements) Collective Economic Productivity	Research paradigm Theory of management as a Pure Science

Source: adapted from Kurosawa (1980, ix)

As the summary by Kurosawa (1980, ix) reflects, management science in the "individual capital" theory was only an application of economics to individual business. Therefore, the representation of business activities was assumed to be possible based on the Marxian framework, and this model would provide a basis to assess productivity.

From the second chapter of *Theory of Managerial Cost Accounting,* the focus gradually slides from individual capital assessment towards the practical, managerial view of Schmalenbach.

In chapter two and subsequent developments, parts based on economic theory like Marx or microeconomics, and parts based on accounting are developed separately. Conceptually, management science starts to be recognized as a different subject from economics, both in its object (microeconomic view of individual businesses) and its methodology as an applied science.

The fact that management and economics are interrelated in Nakanishi's work is not a questionable issue, and this makes the contribution even more interesting. Yet, it is remarkable that *Theory of Managerial Cost Accounting* starts with the "individual capital" theory, and finishes with the necessity to compare "managerial profit" for the correct allocation of resources in diversified businesses.

This conclusion is a modern corporate finance issue, and the solution proposed by Nakanishi is based on the dynamic framework of accounting.

[6] G: initial monetary capital, W : physical input W': production output G': ending monetary capital. C: fixed capital v: variable capital k: expenses m: surplus value p: profit.

Second Paradigm: Dynamic Cost Accounting

Codification system No specific codification. Capital cycles are expressed by the means of changes in the dynamic balance sheet.	Hypothetico-deductive system Flows of expenses and revenues in the organizational value cycle New business model
Selection principle (Value Judgements) Profit as an indicator of Collective Economic Productivity	Research paradigm Management as a Scientific Technique

Source: adapted from Kurosawa (1980, xiv)

Theory of Managerial Cost Accounting is a transitional work between these two paradigms. It would be false to say that Nakanishi does not refer to the capital accumulation cycle in the book, but at the same time, his main focus switches from critical management towards dynamic cost accounting.

Later, Nakanishi's standard-setting activities continued the transformation of the original paradigm. "From this experience, I realized that the social expectation towards management was not to make it a theoretical science, but a technical science" (Nakanishi, 1980). Dynamic accounting provided the framework for his postwar contribution to the development of cost accounting.

5. Conclusion

Theory of Managerial Cost Accounting (1936) provides an interdisciplinary approach to cost accounting similar with the German managerial economics school. The scope of theories addressed includes micro-economics, Marxian economics, and management in general. One of the contributions of the book was to make a synthesis of, and discuss several theories underlying the new cost accounting developments. Besides, this work also reveals Nakanishi's own views of the role of cost accounting.

For Nakanishi, cost calculation must be a convenient technique for accountants and managers, since his main focus is not just calculation, but managerial accounting. Compared with contemporary authors, this focus on management issues and how cost accounting can help solving them appears extremely modern.

After this work, Nakanishi stopped writing academic articles and books in order to devote his time to standard-setting. Still, he remained a leading figure in the Japanese Management Association, but his contribution was strongly associated with "critical management", the Marxian theory of his first monograph.

This assessment contrasts with his rich contribution to the development of cost accounting in Japan. Nakanishi's work had a decisive influence in the postwar standardization of practices. Since *Theory of Managerial Cost Accounting* (1936) provided the dynamic theoretical groundings of his postwar activities, it is fair to reassess this work as the second masterpiece of Nakanishi.

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