『学習院大学　経済論集』第52巻　第３号（2015年10月）

Individual and Dynamic Capital in Cost Accounting

Clemence Garcia

1. Introduction

Within the field of management research, Torao Nakanishi (1896-1975) is recognized as the founder of the Japanese Critical Management School (Kataoka, 2013, p. 136). In his first book, *Managerial Economics* (1931), he introduced his theory of individual capital (*kobetsu shihonron*); this theory, which has a basis in the Marxian notion of capital accumulation, views individual businesses as units of global social capital.

Compared with the works of contemporary scholars like Ota, Kurosawa, Aoki or Hasegawa[1)], Nakanishi's contributions to the development of cost accounting are not as well known. His second monograph, the *Theory of Managerial Cost Accounting* (1936) takes a transdisciplinary approach to management accounting techniques, similar to the German managerial economics school (*Betriebswirtschaftslehre*), from which Eugen Schmalenbach was a leading author.

Although accounting historians (Chiba, 1994; Okano, 2002; Okano & Suzuki, 2007) credit Nakanishi for his chairmanship of the wartime Uniform Financial Regulations Committee of the Planning Council, and for his role in standard setting for postwar cost accounting, only Kurosawa (1980), a contemporary author who had been involved in the same organizations as Nakanishi, mentions his academic contributions.

The *Theory of Managerial Cost Accounting* was Nakanishi's transitional work between his early theory of "individual capital" and his later contributions to cost accounting. Kurosawa (1980) described this monograph as "a paradigm shift" from a Marxian world view (*Weltanschauung*) to the "dynamic" managerial approach of Schmalenbach.

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 research from the 1930s to World War II. Due to the prolific development of theories and standards, this marked a particularly rich period for cost accounting. Japan is unique in this regard because the first scholars in the field of cost accounting also created its standards.

Torao Nakanishi was one of these pioneers, and his book, the *Theory of Managerial Cost Accounting,*

1) In the review by Sato (2012, p. 21), Kurosawa (1933), Hasegawa (1937), and Aoki (1936) are mentioned as major contributors to management accounting research in Japan; however, no mention is made of Nakanishi (1936).

reflects some of the latent changes that would surface during or after World War II. The purpose of this paper is to analyze the academic contribution of Nakanishi in the context of the propagation of managerial economics (*Betriebswirtschaftslehre*) in Japan.

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

2. German influences on the development of cost accounting: 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 in the Department of Commerce at Tokyo Imperial University. After entering graduate school, in 1921, he began working as an assistant, and in 1923, he became an associate professor.

From 1923 to 1926, Nakanishi was sent by the Ministry of Education to study commercial management in the United Kingdom, Germany, and the United States. He spent the majority of this time in Germany focusing on the Managerial Economics School (*Betriebswirtschaftslehre*). Even after war World II, when American literature dominated Japanese management research, authors from the Managerial Economics School remained the major influence on Nakanishi's work.

It is also worth noting that Nakanishi was in Germany during the hyperinflation period (1923). From the viewpoint of management research, inflation introduces some bias into the assessment of profit and inventory. Nakanishi's experiences during this time may be one reason why he decided to place his focus on management accounting rather than the formation of market prices or other aspects of business administration[3].

After his travels, Nakanishi returned to Tokyo Imperial University and started teaching an entirely new subject within economics education at the time, managerial economics, for which he was a pioneer. His first book, *Managerial Economics* (1931), was the basis of the foundation of a new school of thought referred to as "Critical Management," a Marxian approach to management research based on the concept of individual capital (*kobetsu shihon*).

In 1936, Nakanishi published his second book, the *Theory of Managerial Cost Accounting,* in which he developed a framework to use cost accounting from a managerial viewpoint, with the theory of individual capital as a base. This work, in addition to Schmalenbach's dynamic balance sheet theory, was also based on advances in microeconomics and accounting research at the time.

In 1939, Nakanishi's colleagues Seibi Tsujikata (1890-1975) and Eijiro Kawai (1891-1943) were

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2) Based on Torao Nakanishi's biographical details in Kurosawa and Yanagikawa (1980, pp. 1–3.)

3) In line with other belligerent parties, monetary instability was a serious concern in Japan both during and after World War I. Those same inflation issues were seen after World War II when Nakanishi was working on the preparation of Cost Accounting Standards. As explained by Okano & Suzuki (2007), the use of *gentan'i* (physical units) rather than conventional monetary costs in management was one answer to the assessment problems induced by inflation.

suspended from Tokyo Imperial University. Kawai had been prosecuted by the military regime for advocating liberalism and anti-militarism, while Tsujikata had received a disciplinary sanction for publicly arguing against Kawai and his liberal theses. In response to these actions and in protest against this perceived attack on their freedom of expression, 13 professors, associate professors, and assistants resigned from the Faculty of Economics at Tokyo Imperial University. Although Nakanishi was part of this group, his resignation did not mark the end his career.

After leaving Tokyo Imperial University, Nakanishi continued to work on 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 standards for cost calculation and price regulation in the wartime economy.

After World War II, he served as chairman of the committee that prepared the Cost Accounting Standards issued in 1947. Starting in 1952, he returned to academia as a professor at Osaka University.

Nakanishi played a major role in the development of management accounting in the post-war period. Because he devoted his life to the standardization of cost accounting and the development of costing practices in more than 100 different industries, he lacked the time needed to make any further academic contributions (Kurosawa, 1980, p. xxii), and thus the *Theory of Managerial Cost Accounting* (1936) was his first and only academic contribution to cost accounting.

Kurosawa (1980, p. xxii) noted that the meager academic work of Nakanishi did not accurately reflect his actual contribution to the development of cost accounting in Japan. Nakanishi always insisted on developing Japan's own cost accounting standards, never accepting the easier solution of translating German, American, or British standards or definitions (Kurosawa, 1980, p. xxiv).

In 1954, Nakanishi earned a doctorate degree 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, an updated version of the *Theory of Managerial Cost Accounting* was published under the supervision of Kurosawa. In 1975, Nakanishi passed away in Tokyo.

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

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

In the *Theory of Managerial Cost Accounting* (1936), Nakanishi explored the relationship between cost accounting, profit measurement, and management decisions. For Nakanishi, the final objective of cost accounting was to assess business performance through a comparison of profits[4]. For this purpose, cost accounting techniques are a necessary measurement tool; however, they must be carried out using production planning techniques such as analyzing the optimal activity level.

Due to its transdisciplinary approach, it remains questionable whether this work should be classified as being in the field of cost accounting, financial accounting, management or microeconomics. In my paper the focus is placed on aspects of cost accounting as opposed to economic theory.

4) In the conclusion (p. 329), Nakanishi refers to Schmalenbach's concept of "comparable profit" and Schmidt's concept of "managerial profit"; both of these concepts express a managerial focus in accounting.

Kurosawa (1980, p. iv) referred to the *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 works in accounting history.

Although not the first book on cost accounting, the *Theory of Managerial Cost Accounting* (1936) was the first to incorporate the term "managerial" in its title. Nakanishi's transdisciplinary approach and view on the role of cost accounting were in stark contrast to contemporary authors of the time.

For example, while the *Theory of Managerial Cost Accounting* is basically a book on quantitative techniques for management, Hasegawa (1937), who is often referred to as a pioneer in cost accounting history, adopted a pure accounting approach. Even within the *Managerial Economics* School, authors that provide transdisciplinary analyses, such as like Sugimoto (1933) and Kurosawa (1933), still fail to provide an approach comparable to Nakanishi's.

As stated above, the starting point of the *Theory of Managerial Cost Accounting* (Chapter 1) is the theory of individual capital, which defines expenses, revenue, and profit as tools that allow the capital accumulation process within a company to be measured.

In Chapter 2, the relationships between the level of activity, expenses, and profit are explored using a management approach somewhat similar to production planning. However, the analysis is based on quantitative techniques and microeconomic concepts such as marginal cost.

In Chapter 3, Nakanishi compares several theories of net income from the German managerial economics school (*Betriebswirtschaftslehre*), including those of 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.

In Chapter 4, Nakanishi presents quantitative techniques for cost calculation and their application to the issue of profit maximization. In this chapter, he adopts the concept of "managerial profit," which is similar to the dynamic "comparable profit."

The final chapter (Chapter 5) provides guidance regarding how cost accounting information should be used for the purpose of business analysis. These uses primarily include cost management and the comparison of managerial profits.

3.2. Expenses and activity level

In Chapter 2 of the *Theory of Managerial Cost Accounting,* Nakanishi explores the relationships between the activity level and expenses. This microeconomic analysis is based partly on the work of economists and accountants such as Von Stackelberg and Kosiol.

Nakanishi defines the quantitative expression of activity level as a function of possible production time and possible units of production per time units (p. 64). This concept is paired with the activity rate, which is defined as activity level divided by maximum production capacity.

The relationship between expenses and activity level is not linear (p. 65). The following four categories of expenses are defined depending on how they vary in accordance with activity level: fixed expenses; proportional expenses; degressive expenses; and progressive expenses (p. 65). Based on these categories, Nakanishi describes how unit production costs depend on the activity level of a business.

Next, Nakanishi suggests that the various production scenarios necessitate investigation: 1) the optimal activity level; 2) the minimum activity level; and 3) the most profitable activity level.

The difference between the "optimal" and "most profitable" activity levels is that the "optimal" activity level is the level of production that minimizes production costs, while the "most profitable" activity level is the level that maximizes profit. Using this microeconomic approach, which is based on the function of production and an analysis of marginal production costs, the ideal activity level for each management objective can be calculated.

Nakanishi continues his economic analysis of expenses with the theory of the economy of large scale production and some quantitative examples (p. 107). In his explanation, he clearly distinguishes the influence of the level of activity and that of quantities produced as separate concepts.

3.3. Theories of net income calculation

In Chapter 3, Nakanishi relies on financial accounting theories like the dynamic balance sheet theory or a variety of issues regarding asset assessment, but always with a managerial approach.

The first issue regarding 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; this is used to compare management techniques and assess the relative success or failure of the business during a specific period.

Another distinction is the difference between long- (regular one-year period) and short-term calculation of partial accounts prepared during the accounting period for the needs of management (p. 121). Nakanishi explains that the accounting period can be divided into 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, calculating the difference between the cost of goods sold and the cost of goods purchased during the accounting period (p. 127).

Another important principle is the difference between cash inflows/outflows and revenues/expenses. Based on the accruals principle, the 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 deferred expenses or revenues (p. 132).

This development is based on Schmalenbach's dynamic balance sheet theory, in which the balance sheet is only a complement to information for profit calculation (p. 137). This can be viewed as the theoretical framework for Nakanishi's subsequent developments on cost accounting described in Chapter 4.

Chapter 3 concludes by providing a synthesis of Schmalenbach, Geldmacher, Schmidt, Walb, and Mahlberg's theories for the calculation of net income; this synthesis includes the purpose and range of expenses and the assessment of assets. While Schmalenbach emphasized the importance of comparability in net income calculation, Geldmacher stressed the conservation of substantial capital. Schmidt distinguished between the calculation of profit from transactions and the maintenance of the relative value of a business. This dual view of profit also provides a distinction between managerial profit (*keiei rieki*) and conjuncture profit (*keiki rieki*). Combined, managerial and conjuncture profit form the integral income (*zentai rieki*) (p. 208). Walb and Mahlberg argue that the role of profit calculation is to measure real past profits for the purpose of nominal capital maintenance (p. 203). 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" (p. 203).

3.4. A new theory of cost accounting

Regarding the calculation of profits, Nakanishi stresses the plurality of the objectives of cost calculation. Cost accounting is necessary to ensure the setting of consistent prices and the disclosure of financial information, and provides the necessary information for management control (p. 213). He provides the definition of cost (*genka*), a concept in management accounting equivalent to that of "expense (*hiyo*)" in financial accounting.

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

According to Lehman, the cost of human factors includes both the salaries paid to employees and the cost of the entrepreneur's own work.

Consumable goods and usable goods represent the costs for various physical factors. Consumable goods such as raw materials disappear in the production process; therefore, they can be used only once. Conversely, usable goods such as machines can be used several times during the production process (p. 217).

In addition to production factors, two categories of costs that need to be included in cost accounting are the use of capital (interests paid) and the composite cost of external services (p. 218).

The problem with these categories is that they do not fit well in bookkeeping or financial accounting practices. For example, the entrepreneur's own work is not accounted for in the same manner as employee salaries.

For this reason, Nakanishi (p. 218) proposed a competing classification based on the (unpublished) draft of Cost Accounting Standards (Table 1).[5]

Table 1. Nakanishi's proposal of a competing classification

Category	Contents
Cost of Goods (*buppinhi*)	Raw materials and other complementary components used in the production process
Cost of Labor (*rodohi*)	Employee salaries
Expenses (*hiyo*)	Expenses not included in the two other categories Amortization of fixed assets, repair costs, rent, taxes, insurance, transport, communication, travel and other fees.

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

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

Two points are remarkable regarding this classification. First, the salary of the owner is not included in the 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 bookkeeping categories (p. 219). In this regard, Nakanishi chooses a practical rather than a conceptual approach to simplify cost accounting for managers.

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

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

In the second part of Chapter 4, Nakanishi analyzes the role of cost accounting, including the relevant scope and use of quantitative techniques based on marginal cost (similar to Chapter 2). He also discusses the use of different types of information to support managerial decisions.

At the end of Chapter 4, he concludes that "there is no need to explain that the assessment of acquisition cost is necessary to calculate real profits" (p. 276). This statement clearly shows that, as far as profit calculation is concerned, Nakanishi chose to adopt the dynamic framework.

3.5. Business comparisons

In the final chapter (Chapter 5), Nakanishi outlines his theory regarding the uses of cost accounting from a management perspective. To summarize, cost accounting is a helpful management technique for assessing business situations. For example, comparing cost structure is useful for understanding profit formation. Diversified companies have an interest in comparing divisional profitability, and this comparison is relevant to managerial profits (p. 306).

4. Paradigm shift towards dynamic accounting

4.1. Comparison with contemporary work

During the pre-war period, Kurosawa and Nakanishi shared the same *episteme* derived from the German managerial economics school (*Betriebswirtschaftslehre*). Both adopted Schmalenbach's dynamic balance sheet theory, and both were part of the same standard-setting commissions and scholarly associations; however, their concepts of the role of accounting were 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 that could be used to observe the business cycle and measure individual increases in capital.

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 made the distinction between representation techniques (the capital account) and their object (individual capital = business).

Another important difference between the two is that Kurosawa focused on the social while Nakanishi focused on the managerial function of accounting.

In the *Theory of Managerial Cost Accounting* (1936), cost accounting is examined as a management tool in accordance with Schmalenbach's transdisciplinary approach. This is because, as evidence by the following passage, Nakanishi believed that the main purpose of a business was to make a profit: "the issue of expenses, or more precisely expenses, revenues, and profit, is a central and fundamental one in managerial economics" (1936, p. 1).

On the contrary, "for Kurosawa, accounting was a means for creating order in civil society" (Chiba, p. 187). Accordingly, Kurosawa's academic contribution focused on financial accounting, which can be seen as a means of social regulation, as opposed to management accounting. Regarding cost accounting, the issue of cost calculation can be seen in Kurosawa's work through the objective of accurately calculating income for the purposes of financial reporting.

In the post-war period, financial accounting research gradually grew separate from management accounting, possibly 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 theory as a means of social regulation.

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

Kurosawa (1980) argued that Nakanishi's paradigm changed between *Managerial Economics* (1931) and *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, while the latter formed the basis of Nakanishi's management theory, including his views on cost accounting, net income calculation, and business comparisons.

Since the *Theory of Managerial Cost Accounting* (1936) is partially based on the individual capital theory, it is necessary to introduce this theory as the starting point of the book. Nakanishi's original framework, managerial economics, is defined as the study of individual capital (Nakanishi, 1936, p. 1) as follows: "In this regard, individual capital is a constitutive element of global social capital that contributes to the cycle of capital accumulation as an independent unit separated from global social capital, like a cell endowed with life" (Nakanishi, 1936, p. 6).

The theory of individual capital is derived from the Marxian capital accumulation cycle. Table 2 below shows the way in which Kurosawa (1980, p. ix) summarized this research paradigm. He noted that many accounting researchers, including himself, adopted the same notation as Nakanishi ("GW-W' G") after the publication of his first book.

Table 2. First Paradigm: the individual capital approach in *Managerial Economics* (1931)

Codification system	Hypothetico-deductive system
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	Individual capital cycle hypothesis
Selection principle (value judgments) Collective economic productivity	Research paradigm Theory of management as a pure science

Source: Adapted from Kurosawa (1980, p. ix)
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.

As reflected in the summary by Kurosawa (1980, p. ix), management science in individual capital theory was simply the application of economics to individual businesses; therefore, the representation of business activities was assumed to be possible based on the Marxian framework, and this model would thus provide a basis for assessing productivity.

In Chapter 2 of the *Theory of Managerial Cost Accounting,* the focus gradually transitions from individual capital assessment to Schmalenbach's practical, managerial view.

In Chapter 2 and thereafter, sections based on Marxian economic theory or microeconomics are developed separately from those based on accounting. Conceptually, management science starts to be recognized as a different subject from economics, both in its object (a 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 contentious issue, and this makes his contribution all the more interesting. However, it is remarkable that the *Theory of Managerial Cost Accounting* begins with the individual capital theory and finishes with the viewpoint that it is necessary 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.

Table 3. Second Paradigm: Dynamic Cost Accounting

Codification system	Hypothetico-deductive system
No specific codification. Capital cycles are expressed by the means of changes in the dynamic balance sheet.	Flows of expenses and revenues in the organizational value cycle New business model
Selection principle (value judgments) Profit as an indicator of collective economic productivity	Research paradigm Management as a scientific technique

Source: adapted from Kurosawa (1980, p. xiv)

The *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 to dynamic cost accounting.

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

5. Conclusion

The *Theory of Managerial Cost Accounting* (1936) provides an interdisciplinary approach to cost accounting, similar to the German managerial economics school (*Betriebswirtschaftslehre*). The scope of theories addressed in this work includes microeconomics, Marxian economics, and management in general. Its main contribution was to provide a synthesis of new developments in cost accounting, as well as an examination of several related underlying theories. This work also revealed Nakanishi's own views on the role of cost accounting.

In addition to cost calculation, Nakanishi focused on managerial accounting; therefore, he believed that cost calculation must a convenient technique for accountants and managers. Compared with contemporary authors from the time, Nakanishi's focus on management issues and the way in which they can be addressed using cost accounting appeared thoroughly modern.

After this work, Nakanishi stopped writing academic articles and books so that he could devote his time to standard-setting. Nonetheless, although his contributions were strongly associated with "critical management," the Marxian theory of his first monograph, he remained a leading figure in the Japanese Management Association.

This assessment stands in contrast to his rich contributions to the development of cost accounting in Japan. Nakanishi's work had a decisive influence on the post-war standardization of practices. The *Theory of Managerial Cost Accounting* (1936) provided the dynamic theoretical foundation of Nakanishi's post-war activities; therefore, it seems fair to reassess this work as his second masterpiece.

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