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Utilisation of Management Accounting in Major Product Changes : An Analysis of SUWADA Co. Ltd.

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Abstract: This study explores the role of management accounting in achieving business transformation, especially when undertaking major product changes. It applies semi-structural analysis using a case-study approach. The subject of the case study, Suwada Co. Ltd., is a small to medium-sized manufacturer with worldwide sales. This study explores Suwada's unique style of managing major product changes, which jointly considers both the costs involved and employee motivation for upskilling. It ultimately provides a guideline for human resource development by considering management accounting practices from the viewpoint of incentive systems.

Keywords: Business structure transformation, Major product change, Management accounting, Performance-based pay, Semi-structural approach

1. Introduction

Why does business structure transformation occur? When revenue is stagnant or decreasing, companies opt for a more profitable business structure by reducing labour or manufacturing costs, thereby resulting in overall cost reduction. According to product lifecycle theory, it is necessary to transform business structures because

businesses are not indefinitely sustainable (Hirsch, 1967).

This study clarifies the specific use and contribution of accounting to achieve business structure transformation. It is based on a case study involving SUWADA Blacksmith Works, Inc. (hereafter Suwada), headquartered in Sanjo city, Niigata Prefecture. Suwada is a small to medium-sized enterprise with capital of around ¥10 million and 50 employees. The company is known for the manufacture and sale of 120 varieties of high-end nail clippers. The business began as a producer of kitchen supplies, becoming a producer of high-end nail clippers when the business was inherited by the current owners around 20 years ago. At the start of reform 20 years ago, the company was in crisis of bankruptcy. To drive transformation and results, Suwada implemented a performance-based pay structure. In addition, cost management tied to cost reduction was introduced in the manufacturing stage, focusing on hand processing.

2. Literature Review and Methods

As mention the above, Suwada changed their major product with usage to accounting data even though they face to bankruptcy. This case study covers the following aspects: 1) Transformation of business structure and management accounting, and 2) Performance-based pay at the manufacturing stage (performance management system), which is tied to costing.

2.1. The transformation of the business structure

Previous literature regarding the transformation of the business structure discusses the creation of and diversification into new businesses to achieve synergy with the existing business. For example, General Electric (GE) attempted to establish a balance in its business portfolio using a proprietary business screen to achieve synergistic effects (Kagono, 1981). Companies use their core technologies and competencies as a method of managing core business transformation (Takai et al., 2011). Conversely, it is argued that many companies that have achieved long-term survival and development have given up hope of such synergistic effects and have implemented ‘tenchi’ (a change of air), using new projects to prompt transformation in the core business (Mishina, 2007). From the perspectives of strategy and philosophy, Isobe (1998) recommends diversification without adhering to the existing business structure. Takeuchi (2015) focuses on talent as a business resource,

discussing business transformation in the textile industry while focusing on managers' roles as entrepreneurs in leading the transformation of the core business. This study focuses on an important question, how is management accounting involved in the transformation of the business structure? They were identified factors for closure by focusing on marginal revenue. This is one example of the use of accounting data in the transformation of core business and highlights the potential contribution of management accounting (Fujiwara & Aoshima, 2016). Hiki (1992) analysed cases in which business managers' performance measurement indicators were managed multi-dimensionally to motivate them to fulfil the goals and mission of each strategic business unit (SBU) within the company. However, apart from these two examples, there is very little research on the use of management accounting when implementing business transformation.

2.2. Costing tied to performance-based pay at the manufacturing stage

In terms of cost control at the manufacturing stage, conventional standard costing is considered the 'cost calculation most useful to control costs' (Okamoto, 1969, p. 1). However, as Factory Automation (FA) enabling high-mix low-volume production become mainstream, the following has been suggested: (1) 'standard costing has already withdrawn from the main role of cost control at the manufacturing stage' (Kato, 1993, p. 44), '(2) about 70% of the manageability of product cost lies in the product's planning and development stages, and (3) manageability decreases at the manufacturing stage' (Miura et al., 1987, p. 24). As such, negative views concerning the utility of standard costing have been expressed. Since the 1990s, achieving cost reductions at the manufacturing stage has been central to discussions of cost planning (e.g. Kato, 1993; Tanaka, 1995; Tanaka & Kobayashi, 1995), and standard costing has been discussed mainly as a method of cost maintenance.

Regarding performance-based compensation systems, Yokota (2004) highlights the importance of context in combining personnel management and performance evaluation systems. There is debate over whether linking results-based principles and performance management systems has an impact on improvements in work motivation (Genda et al., 2001; Otake & Karato, 2003). However little papers mentioned performance-based compensation systems refer to costing system.

2.3. Research Method

We use a semi-structural analysis as our research method. Information and data

were obtained from interviews with two key management-level employees of Suwada. First, we interviewed Tomoyuki Kobayashi, the Chief Executive Officer and the head of business structure transformation. Second, we interviewed Kanako Kobayashi, who is the Chief Financial Officer and is responsible for the preparation and use of accounting data during any business structure transformation. We also make use of archived data, such as internal company documents, and so on, and public documents such as papers and magazines.

Five interviews were conducted between 16 January 2015 and 15 September 2017, totalling 15 hours, confirming the content of interviews via email (Table Figure 1).

	Date	Place	Interview resporonder	Position	Time
1st	2015.1.16	SUWADA Co. Ltd. ,	Mr.Tomoyuki Kobayashi	CEO	2PM – 5:30PM
2nd	2016.7.5	SUWADA Co. Ltd. ,	Mr.Tomoyuki Kobayashi	CEO	2PM – 5:30PM
3rd	2016.7.29	SUWADA Co. Ltd. ,	Mr.Tomoyuki Kobayashi	CEO	2PM – 5:40PM
4th	2016.8.9	SUWADA Co. Ltd. ,	Mr.Tomoyuki Kobayashi	CEO	10:30AM – 0:30PM
			Mis.Kanako Kobayashi	CFO	11:30AM – 1:30PM
5th	2016.9.15	SUWADA Co. Ltd. ,	Mis.Kanako Kobayashi	CFO	11:30AM – 2:30PM

Table 1: Interview details

3. The Case Study

3.1. Overview of Suwada

Suwada's main product is a high-quality nail clipper under the ‘SUWADA’ brand. It was developed by improving carpentry nippers and sells for over ¥7,000 apiece. Not limited to the Japanese, customers also include foreign celebrities, such as former British Prime Minister David Cameron and football player David Beckham (Nikkei Business, 2016). Although there are nail clipper products that can be found in hundred-yen stores, back orders average two months for these high-quality clippers, and popular products have an approximately 2-year wait (Echigo Journal, 2016). The company is also taking over the original design manufacturing (ODM), which is the design and manufacture of a product under a consignor’s brand, of nail clippers from Zwilling Henkels GmbH, a luxury cutlery manufacturer (Buildings Monthly, Editorial Office, 2012). Although small-scale, the brand is known globally as a high-quality brand and continues to produce high-quality products.

3.2. Suwada's History and Business Crisis

Suwada was founded by Mr. Shukusaboro Kobayashi to manufacture cutting nippers for carpentry tools, and mainly produced nipper-type blades in 1926. In 1950, after the decrease in demand for cutting nippers, they began producing nail clippers by taking advantage of nail clipper production technology (Home Living, 2010).

The current Suwada Company was established in 1974 by Yuichi Kobayashi, the eldest son of Shukusaburo, with capital of ¥10 million. Riding the bonsai boom of the 1970s, Suwada grew by selling bonsai clippers. Later, in 1989, Suwada developed and sold 'Kuri kuri bozu', a peeler able to peel chestnuts. Sales rapidly increased, and earnings grew quickly. Because of this growth, the company made large capital investments such as a large-scale forging facility and the construction of a company building. In addition, a large amount of money was invested in the research and development of prototypes directed at the next big product. When the business was taken over from Syukuaburo, the number of employees increased from 10 to 27. However, the sluggish Japanese economy following the collapse of the bubble economy, caused sales to drop sharply.

Despite the deterioration of the business environment, the company failed to reduce costs or negotiate with wholesalers to raise sales prices, and salaries for employees remained unchanged. Thus, the company began operating at a deficit from the early 1990s. 'A major cause of this deficit was labour costs' (Office J&B, 2012, p. 16). According to third-generation CEO Tomoyuki Kobayashi, 'Through the support of banks, and thanks to our successful products of past years, we somehow avoided collapse; however, thinking back, particularly high interest rates were set'. Tomoyuki Kobayashi, who inherited the business during a time of decline, described the situation as follows for responding to the magazine interview, 'Despite annual sales of about ¥300 million, there was a deficit of ¥60 million in a single period', and 'furthermore, at the time of inheriting the business, a previously undisclosed debt of several hundred million yen came to light' (Design & Business Forum, 2007, pp. 103-104).

3.3. The Decision to Transform the Business Structure

When Tomoyuki Kobayashi (hereafter, Mr Tomoyuki) took over the family business in 1997, the primary products were kitchen products (Kuri Kuri Bozu), bonsai clippers, and nail clippers. Only kitchen products were producing a surplus, accounting for over 60% of sales. According to Suwada internal documents, the other

two product lines were in the red. To overcome the deficit, radical business reforms began soon after Mr Tomoyuki became CEO (Design & Business Forum, 2007). It was necessary to grow sales or reduce costs, such as labour costs, to avoid bankruptcy,

Mr Tomoyuki had a business policy of ‘not even a single redundancy’; therefore, it was necessary to increase sales. Before taking over the business, he was a regular exhibitor at one of the world's leading consumer goods trade fairs, the Ambient Messe Frankfurt, in Germany. Here, he saw nail clippers of the same quality as those produced by his company being sold for around ¥10,000. He also learned that only a few global companies were able to manufacture clippers of the same quality. Therefore, he predicted that of the three businesses, the high-quality nail clippers had the highest potential for sales growth.

Since that time, orders for nail clippers have increased. The company believed that ‘if production of back orders is increased, this will be directly connected to sales’ (Office J & B, 2012, p. 16).

Although there was potential to increase the sales of high-quality clippers, sales of high-profit kitchen items were decreasing by several percent per annum amidst a trend that saw ‘peeling chestnuts’ vanish from the list of household chores (First interview). According to Mr. Tomoyuki, who was familiar with these market trends, ‘the production of high-quality nail clippers requires long-term, skilled craftsmen, and since it takes time to train skilled workers, the manufacture of high-quality clippers could not be imitated by other companies’ (Kanto Bureau of Economy, Trade and Industry, 2004, p. 36). That is, because high-quality nail clippers can only be manufactured using a manual process, barriers to entry are high. It was determined that it would be possible to increase market share and generate high profits if Suwada could manufacture the right amount of products for this market (First interview).

3.4. Barriers to business structure transformation

‘To begin with, we published the financial statements and said, “We now have a deficit. If we continue as we are, we will be crushed.”... I explained how to read the statement to the craftsmen... however, the craftsmen gave no reaction’ (Office J&B, 2012, p. 16). When we asked them to increase the output from approximately 100 high-quality nail clippers each month to 1,000 clippers, the craftsmen said, “that's impossible”; they had no will to do so’ (Office J&B, 2012, p. 17).

When the company decided to make nail clippers their main business, they realized that three issues stood in the way. First, due to the requirement of a high

level of skill, the number of employees able to manufacture clippers is limited. Second, they could only be sold to wholesalers at low prices. Third, high production costs were an issue. Concerning production costs, Mr. Tomoyuki's predecessor felt that the production of the clippers 'takes time and effort and is comparatively unprofitable'. However, a cost analysis of the business was not performed.

To calculate the correct process cost per hour, Mr Tomoyuki and the plant manager wrote out the entire process relating to production activities. Then, a database was created in which each craftsman entered the production time for each process for each lot (100 units). Referring to the salary and working hours of a typically-skilled craftsman, and setting a standard process cost such that it equalled the work time to complete one process for one lot (100 units) multiplied by labour costs per hour, the manufacturing costs for each of the three types of nail clipper products were calculated. It was found that there was significant variation in costs across the products (Fourth interview). There are many manufacturing processes that require skill in the production of nail clippers. Despite the majority of manufacturing costs being labour costs, the wholesaler requires fewer nail clippers than other products, and the cost was therefore low and the selling price was also set as fairly cheap.

3.4. Business reform using cost analysis

3.4.1. Achieving the suggested retail price

It became clear that sales prices thus far had not exceeded costs. Taking the opportunity for a model change, and based on the new product cost, a new manufacturer recommended a price of ¥8,000 + tax (Japan Chamber of Commerce, 2015). However, pricing rights were not obtained so easily.

'When the suggested retail price was presented to the wholesalers, they were shocked by the bullish pricing, and no one purchased them' (Shinkin 2012, p. 7). 'There were no nodding heads, some laughed and asked, "what joke is this?"' (Japan Chamber of Commerce 2015, p. 36). Although in trouble, 'I switched promotions from a push strategy to a pull strategy and appealed (to end users) with the ¥8,000 value at exhibitions within Japan and overseas. Upon using the clippers, it was clear that their sharpness was considerably superior to (other) existing products'. For this reason, 'the number of users saying, "I want to buy these even though they're ¥8,000" gradually increased, and users began to seek out our products, and orders came in from wholesalers once again' (Shinkin, 2012). 'Because we were able to only produce an exceedingly small quantity compared to the rapidly increasing demand,

we sold preferentially to wholesalers who would comply with our suggested retail pricing. Furthermore, hearing they were popular among nail technicians, we maintained the suggested retail price by branding them as a professional product under the SUWADA brand' (First interview).

3.4.2. Process review to increase output and reduce costs

Increasing the output was a priority. To do so, it was necessary to increase the number of craftsmen, which would also increase labour costs. Because it took over 10 years to train craftsmen capable of handling the difficult process, craftsmen were a bottleneck to increasing output. CEO Kobayashi stated that, 'In the past, it was about...100 nail clippers per month. I plan to make that 1,000. However, the craftsmen said, "that's impossible" and showed no enthusiasm whatsoever' (Office J&B, 2012, p. 17). Thus, by reviewing the processes, 'splitting the processes into 50 stages, and letting craftsmen with different proficiencies take charge of each process, with more difficult work for skilled craftsmen and work according to other levels of mastery for apprentice craftsmen, optimisation of the process began, and output was increased while preserving the same quality as before' (Daiichi Life Insurance Co, 2014, p. 2). That is, rather than having a single craftsman in charge of all processes, placing them in charge of only two processes that require highly skilled machining (the blade joining and edging processes), the amount of production will increase by the amount of time previously spent on other processes. Because labour costs are fixed, all things being equal, an increase in output leads directly to reduction in production costs.

However, 'the process itself did not change at all. All I did was organise the processes for efficiency and assign roles. It's rather like reengineering, no?' (Office J&B, 2012, p. 17). Explained more definitively, 'processes were thoroughly reviewed, the slack tradition in the conventional work of craftsmen was abolished, a process manual codified, and concrete numerical targets were set. The factory was not arranged for flowing work, but rather "stacked work" in which processes were carried out at the touch of a button, and we changed the mind-set to one where each process operated with responsibility' (Sanjo Chamber of Commerce and Industry, 2012, p. 46).

By using the database of costs per-process and per-craftsman, an optimal process plan was created to fit the production plan, resulting in increased output and cost reductions (Fifth interview).

3.4.3. The introduction of a performance-based pay system

In addition to increased production through the aforementioned process modification, the acquisition of semi-skilled workers and new talent significantly increased production.

A standard process was defined as 50–80 processes per product, and each process was classified by its degree of difficulty. Further, the sales price was calculated less a certain multiplier to correspond to the level of difficulty present in each process and it was determined that ‘what the product should cost = process cost’ (third and fourth interviews). To create a motivation to acquire skills, the degree of difficulty was set and indexed for each process, and ‘process unit prices’ set such that the greater the difficulty, the higher the unit cost.

For example, as outlined in Figure 2, ¥2,000, which is the ¥4,000 sales price of the product less indirect costs of ¥1,000 and material costs of ¥1,000, was allocated to each process according to the difficulty. Where the total process unit price is ¥2,000, by adding a ¥200-unit price for one level of difficulty, a process with a difficulty level of 4 has a unit price of ¥800. Although the craftsmen are aware of which processes are difficult, by visualising this numerically and setting a unit price for each process, the value of performing a certain process was made obvious (Fourth and fifth interviews).

Product A	Process 1	Process 2	Process 3	Process 4	Total
Difficulty level	1	2	3	4	
Process unit price	¥200	¥400	¥600	¥800	¥2,000

Table 2 Degree of Difficulty of Product A and Per-Process Unit Cost

With this new system, the number of processes handled by employees in a month multiplied by the unit cost of the process they led was expected to be greater than one month’s salary.

Since the performance-based pay was set according to the degree of difficulty of the manufacturing process and the number of processes handled, if one acquired the skills to complete more difficult manufacturing processes, the more one will be paid under performance-based pay (Shoko Research Institute, 2011; Building Materials Monthly - Editorial Office, 2012). To increase performance-based salaries, it is necessary to either increase production volume to improve productivity, or to acquire skills so that high-difficulty processes can be completed. Since these are limited to

how dramatically production can increase in a short space of time, this provided motivation to acquire higher unit-price skills and be promoted by passing on technologies (First interview).

As a result, 'there was the possibility that even veteran employees' wages could stagnate due to slower technical improvements ' (Japan Organization for Employment of the Elderly, Persons with Disabilities and Job Seekers 2012, p. 29). Thus, this became the salary system and productivity improved (Second interview).

3.2.4. Towards personnel evaluations balancing productivity improvements and skill inheritance

The visualisation of added value and introduction of performance-based pay through the setting of process unit prices improved productivity and employee motivation to acquire skills. However, comprehensive efficiency wages created discord among craftsmen. As the system became more pervasive, this became more of a motivation for employees to push forward with their own work rather than carefully teaching the increasing number of new employees, gradually resulting in an increase in work-in-process between processes. When a craftsman individually improves productivity in isolation, work-in-process increases between processes, and skill inheritance does not take place. The atmosphere in the workplace deteriorates, resulting in a decrease in productivity and giving rise to safety issues.

Therefore, as an assessment of performance-based pay, 'in order to create a measure with which to judge ability, after flushing out all the processes of all products, tasks that had thus far been taken lightly at the production site, such as cleaning and tidying, were also counted as processes and made a target for wages. A mechanism was also created allowing individuals to record, using a computer, details of the work they did that day' (Design & Business Forum, 2007, p. 105). In the latter half of the 2000s, a system was established to not only improve the productivity and skills of each employee, but also to enhance their contribution to human resources development and skills training. The system encourages skills acquisition by pairing seasoned employees with young staff (Second interview). In addition to a performance-based salary derived from calculating the costs of the manufacturing processes, it is also able to evaluate time spent on talent development.

In the annual employee appraisals conducted by management, those being evaluated are first asked to evaluate themselves. Management creates a checklist based on that self-assessment table and conducts individual appraisals while keeping process cost x number of cycle times = added value at hand, which can also be said to be an individual's results sheets. However, regarding the manufacture of custom-

order products, the time for training and development is eliminated, and a production system has been established, which is optimal only for skilled workers and tailored to delivery date and cost (Third interview).

3.2.5. Achieving business structure transformation

As a result of the series of efforts described above, Suwada has escaped from operating at a deficit, and the high-end nail clipper business has overcome the three problems of 1) selling at a low price on the market, 2) producing in small quantities, and 3) incurring high production costs.

Figure 1 shows changes in the sales and business structures, assuming 100 sales in 1997. It reveals that the nail clipper business has grown to equal 60% of the company's sales composition, that is, the achievement of transforming a business structure to a business that focuses on high-quality nail clippers as its main business.

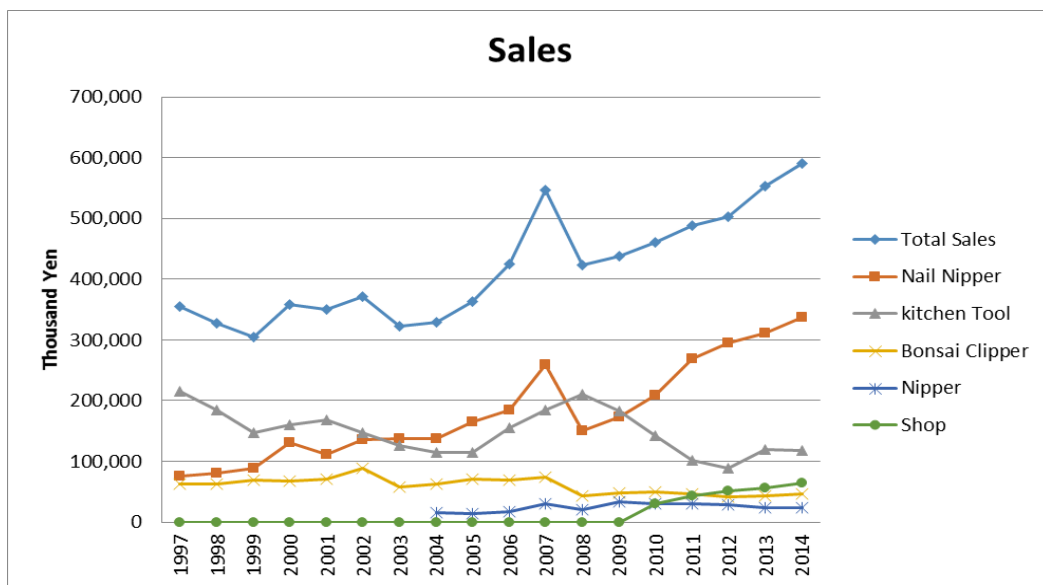


Figure 1. Sales Distribution Ratio*

4. Discussion

As we have seen thus far, in 1997, it was necessary to choose whether to increase sales ($S1 \rightarrow S0$) or reduce costs ($C1 \rightarrow C0$) to avoid bankruptcy (See Figure 2).

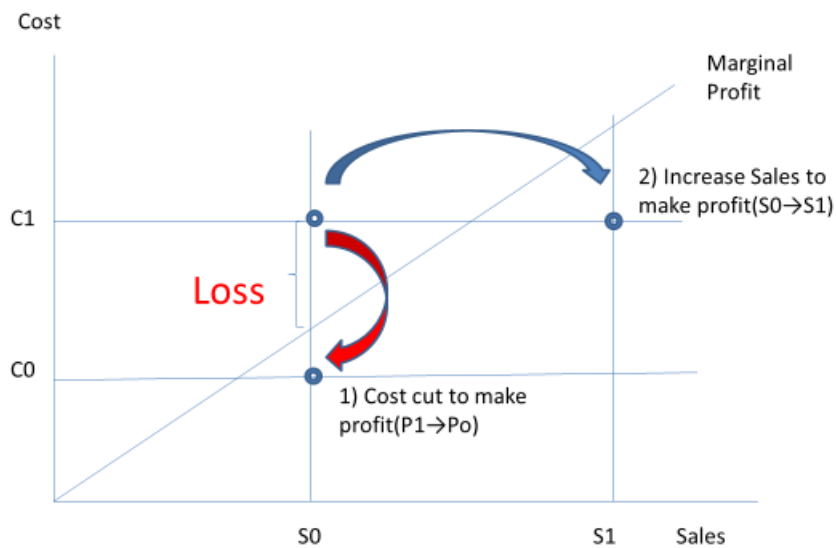


Figure 2. Net sales and marginal profit


Mr Kobayashi, who sought to increase sales rather than cost reductions directly linked to personnel reductions, predicted that luxury nail clippers could become the next major business based on information from overseas markets. However, as described above, there were three problems: 1) they could only be sold at low prices on the market, 2) only a small number could be produced, and 3) production costs would be high. To overcome these issues, standard costs were calculated based on the process cost of each product as follows:


- Standard cost for each product = Σ materials costs + Σ standard process cost + overhead costs

The aims of calculating the standard cost of each product are as follows:

- 1) Determine the profit-yielding price: standard product cost + profit = suggested retail price.
- 2) Cost reduction: understand the process operating time and process cost for each worker during the manufacturing process as well as examine and create an optimal process plan.
- 3) Identify the three points necessary to provide basic data quantifying the degree of process difficulty.

By displaying the process cost calculations for each product together with individual performance evaluations directly linked to performance-based pay in a table (see Table.3), process costing was successful in motivating skills acquisition and productivity improvements.

Process cost calculation 

Personal Evaluation 

Product A	Process 1	Process 2	Process 3	Process 4	Total ¥
Difficulty level	1	2	3	4	
Process price : ¥	@200	@400	@600	@800	2,000
Craftsman a	0	0	0	80 cycle- time	64,000
Craftsman b	0	0	80 cycle- time	0	48,000
Craftsman c	80 cycle- time	80 cycle -time	0	0	48,000
Accumulation of process price	¥16,000 (200 × 80)	¥32,000 (400 × 80)	¥48,000 (600 × 80)	¥64,000 (80 × 800)	

Table.3 Process cost calculation with personal evaluation (Conceptual diagram)

Although the improvement of productivity and the training of skilled workers is an important core competency for the company, when the performance-based pay was strictly applied, the balance between the two broke down and the working environment deteriorated. Furthermore, each process optimally advanced processing only at an individual level, and a large volume of in-process inventory was generated. Therefore, in addition to the system of performance-based pay through productivity improvements and skill acquisition, a system evaluating the ability of employees to train new employees was also established.

Furthermore, because Suwada's production process centred on manual processing,

that is, the processes were hardly mechanised, flexible recombination of processes could be achieved. Conversely, since the product is characterised by a small number of parts, cost reduction during the design and planning stage is difficult, and cost reduction was therefore performed at the manufacturing stage.

Figure 3 shows the cost reduction mechanism for the manufacturing stage at Suwada.

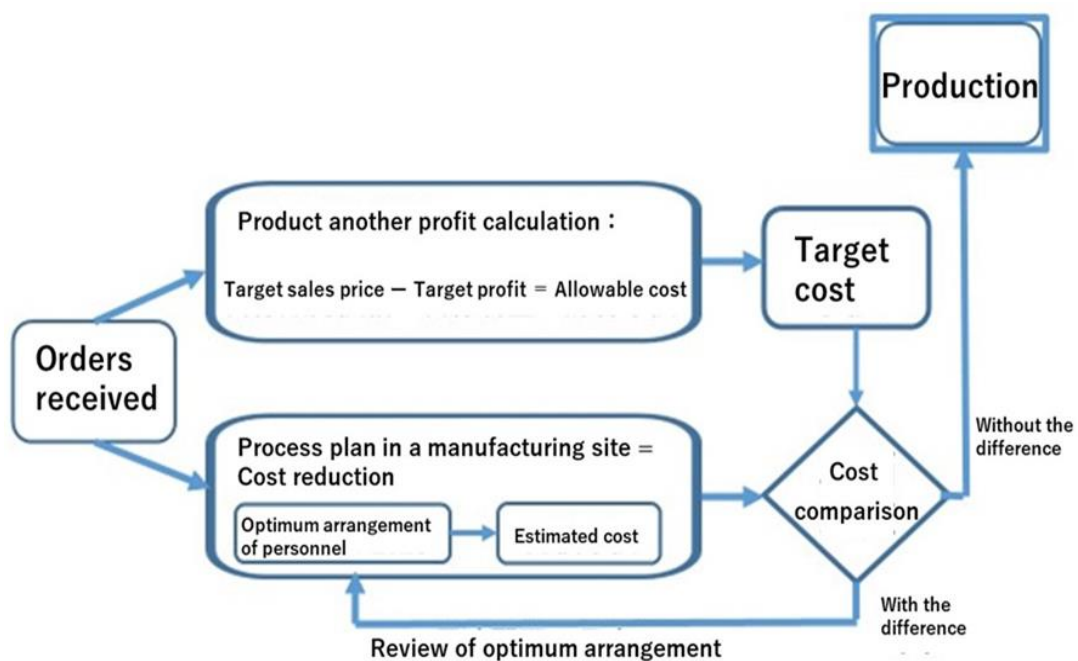


Figure 3. The cost reduction mechanism at the manufacturing stage

Thus, the process cost calculation adopted by Suwada also has an individual performance evaluation aspect. Combining with performance-based pay, 1) a function that motivates productivity increases and skill acquisition, and 2) recombining of flexible manufacturing processes, have made it possible to reduce costs at the manufacturing stage. Thus, transformation of the business structure was achieved.

5. Summary and Remaining Issues

To make high-quality nail clippers the primary business at Suwada, it was

necessary to train and develop craftsmen and increase output while reducing the manufacturing cost. By using the manufacturing cost of each process, calculated by sub-dividing the manufacturing process, as unit prices constituting performance-based pay, the value of skills could be visualised and shown to employees. It was clarified that the mechanism closely linking process cost and performance-based pay, namely, the adoption of costing with a built-in motivation toward productivity increases, and skill contributed to achieving the transformation of the business structure. This is also concrete proof that management accounting can positively impact a business (Itami & Aoki, 2016).

The case study firm systematically manufactures labour-intensive products and has a high value-added created by its craftsmen. By clarifying concretely how they have used management accounting when transforming the business structure, we have been able to explain one element of the use and contribution of management accounting in the transformation of business structure. Furthermore, it was also understood that negative effects from performance-based pay could be mitigated through a new appraisal system and through the promotion of skill transfer.

The method described above can be applied when analysing the transformation of companies with a similar business structure, manufacturing process, and market characteristics as Suwada. Examples include luxury watches, lens polishing, and large-scale radio telescopes.

However, there are challenges in generalising the function and utility of management accounting in the Suwada case to the transformation of business structure. To acquire further knowledge, it is recommended to expand research sites to perform empirical research on companies with characteristics different from those of Suwada.

Moreover, more than 20 years after Suwada began its reforms, it continues to seek additional business structure transformations. Since facing near bankruptcy almost twenty years ago, attempts to disclose statements of accounts to employees and sharing detailed business information about the company continues, and management accounting changes can still be seen. In recent years, further diversification of the revenue base has been promoted, such as attracting customers to an open factory and opening an on-site retail shop. (Fourth interview). The generalisation of the contribution of management accounting to the transformation of business structure described above, and an explanation of the change in Suwada's calendar year are to be reviewed as future issues.

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