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: A case study of a large construction machinery manufacturer

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Abstract

This study examines the role of accountants in the process of building enabling control, based on a Japanese construction machinery manufacturer that recovered from a financial crisis through management reform. In implementing the new control system, accountants were found to function as accounting engineers who mediated between top management and employee perspectives. Accountants were able to play this role as front-line employees had a high level of KAIZEN capability and did not require excessive front-line intervention from accountants. The second reason is that accountants had metaroutines for autonomously changing existing accounting routines. Regarding the control system used coercively during management reform, the metaroutines of the accountant who autonomously modified the usability of the front-line employees became an engineering work that mediated between top management and employee perspectives.

Keywords:
Enabling control, Roles of accountants, Transparency, Management accounting change, Control system

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Case study of a large construction machinery manufacturer

1. Changing roles of accountants

This study aims to identify the role of accountants in developing enabling control (Ahren and Chapman, 2004). The development of a control system emphasising employee usability rather than the simple command-and-control type control system has been discussed from various perspectives (Ahrens and Chapman, 2004; Chapman and Kihn, 2009; Englund and Gerdin, 2015; Free, 2007; Goretzki et al., 2018; Jordan and Messner, 2012; Jørgensen and Messner, 2009; Wouters, 2009; Wouters and Wilderom, 2008). However, in this context, knowledge on the role of accountants who are central in developing accounting control systems is scarce. We argue that in building an enabling control system emphasising employee usability, accountants need to be accounting engineers so they can build a framework enabling employees to understand and analyse accounting information on their own.

Much of the research work that has accumulated in recent years on the role of accountants has shown that their role is changing from bean counters to business partners (Burns and Baldvinsdottir, 2005; Burns and Vaivio, 2001; Goretzki et al., 2013; Granlund and Lukka, 1998; Järvenpää, 2007). While following these major trends, the role played by accountants can be understood to have different aspects context-dependent aspects. Particularly, in an approach emphasising the usability of accounting information for employees, the role accountants play may be considered non-traditional. Front-line managers will assume the role of accountants as experts in interpreting and analysing accounting information, while accounting staff will be instrumental in developing systems that produce easily comprehensible information on analysis methods.

This study examines the role of accountants in this process, using a case study of a company that introduced a new management control system when it faced financial crisis and underwent management reform. Hence, we will focus on the process by which the control system of the case company became an enabling control system through the active work of the accountants and discuss the role accountants played in this process.

We contribute to the literature on enabling control (e.g. Ahren and Chapman, 2004; Englund and Gerdin, 2015; Jordan and Messner, 2012; Wouters and Wilderom, 2008) by highlighting the roles of accountants who mediate top manager and middle manager perspectives. Particularly, we show how accountants improved transparency in the development process of an enabling control system. Additionally, this study will contribute to the debate on the role of accountants, which is often

portrayed as a linear change from bean counters to business partners, by highlighting the existence of different roles in different contexts.

The remainder of this paper is structured as follows. First, we review the framework of enabling control and the findings of previous studies on the development process. We then explain the notion of mutual transparency and connect it with the enabling control framework. In Section 3, we briefly summarise the research conducted to clarify this issue. In Section 4, we describe the case of a construction machinery manufacturer based on the enabling control framework and the notion of mutual transparency. In the last section, we discuss the contributions of this study.

2. Accountants' roles in managing the tension between usability and effectiveness

2.1 Enabling formalisation and enabling control

Adler and Borys (1996) argue that even though formalisation—the extent of written rules, procedures, and instructions—is a central feature of Weber's bureaucratic ideal type and an extensively researched dimension of organisational structure, conflicting theoretical premises and conflicting empirical findings about it exist (ibid., p.62). Basically, this is an awareness of the question of why a conflict exists between various studies emphasising the negative aspects of bureaucracy, such as those considering rules, procedures, and directives as inhibiting employees' creative activities and those emphasising the positive aspects, such as those considering them as enhancing performance and increasing employees' pride. They then highlight that these ideas cannot be resolved by a contingency theory-based analysis.

They then argue for the need to correct the simple dichotomy of mechanistic versus organic organisation. As a framework for this, they proposed the idea of ""enabling formalisation." This was devised based on the discussions on machine design. They used Xerox's design philosophy for copiers as an example. According to them, increased functionality of photocopiers in the 1970s led to increased task complexity and difficulty in recovering from everyday problems. Hence, the solution was to build a complete machine that would not require the user's intellect or rely on specialised workers with longer education and training. However, the method chosen was intended for utilising the user's intellect. The structure and colour of the machine were designed so that the user could effectively operate the machine and easily resolve issues. The design of the machine was not to be ""deskilling"" but to improve the ""usability"" of the machine for the user.

They proposed four characteristics distinguishing the two-directional approach of deskilling and

usability from such studies. The first involves repairability, such as usable computer systems having ““undo”“ commands and online help functions. He also highlights that at NUMMI, a US company established as a joint venture between Toyota Motor Corporation and GM, workers (users) can conduct repair themselves, highlighting that workers determine the most effective work method and task allocation and analyse their own work process. Secondly, internal transparency processes, ““provide users with visibility into the processes they regulate by explicating its key components and by codifying best-practice routines”“ as if visualising the internal workings of a device to the users (ibid., p.72). It also ““provides users with an understanding of the underlying theory of this process by clarifying the rationale of the rules”“ (ibid.). Third, global transparency is said to mean ““the intelligibility for employees of the broader system within which they are working”” (ibid., pp.72–73). This refers to a structure in contrast to the panopticon, where ““(w)orkers' understanding of the entire process is considered a valuable resource both in their efforts to optimize the performance of the part for which they are directly responsible and in their contributions to identifying local and systemwide opportunities for improvement”“ (ibid., p.73). On whole-organisation transparency, they cite the proposal system in NUMMI, which provides detailed information on proposal procedures and evaluation criteria. The fourth is flexibility, highlighting that it ““encourages users to modify the interface and add functionality to suit their specific work demands”“ (ibid., p.74) and that the shortcut key feature allows for easy customisation as an example.

While Adler and Borys (1996) addressed flexibility and efficiency in parts of an organisation, Adler et al. (1999) considered whether an entire organisation can achieve flexibility and efficiency simultaneously. They focused on the agility of major model changes in NUMMI. According to them, ““(t)he ability of a manufacturing plant to introduce new models —the time and cost required to ‘“ramp up”’ production of the new model to targeted quality and efficiency levels— thus represented a form of flexibility that had considerable and growing strategic significance”“ (ibid., p.48). They use this case to present four mechanisms (meta-routine, job enrichment, switching, and compartmentalisation) supporting the combination of flexibility and efficiency.

Ahrens and Chapman (2004) proposed the concept of ““enabling control”“ by applying the argument of Adler and Borys (1996) to the context of control systems in management accounting. Hence, it is not merely an encouragement to allow employee autonomy, but it is a control. They believe this ““highlights the limitations of the stereotypical view of management control systems as divorced from operations without ignoring that, in most organizations, they are bureaucratic and highly formalized and not, as some would have it, a source of operational creativity and innovation” (Ahrens and Chapman, 2004, p. 297). This framework aims to better understand practices addressing the occasionally conflicting demands of efficiency and flexibility.

They then present the four characteristics highlighted by Adler and Borys (1996) as design principles for enabling controls. They emphasise that a system with these design principles ““enable

workers and operational management to pursue the objectives of efficiency and flexibility simultaneously”“ (Ahrens and Chapman, 2004, p.281). Notably, these four design principles refer only to the nature of the information produced by the control system from the employee perspective (the user of the information) and not from the top management perspective.

2.2 Accountants' role in developing an enabling control system

Regarding the construction of enabling control, studies have mainly focused on design principles (Ahrens & Chapman, 2004; Chapman & Kihn, 2009; Free, 2007; Jordan & Messner, 2012; Jørgensen & Messner, 2009) and those examining it from the construction process perspective (Englund and Gerdin, 2015; Goretzki, Strauss and Wiegmann, 2018; Wouters, 2009; Wouters and Wilderom, 2008).

Wouters and Wilderom (2008), through a study combining qualitative and quantitative methods (action research) on the logistics department of a beverage manufacturing company, investigated what features of the PMS development process enhance PMS effectiveness, based on the framework by Adler and Borys (1996). As a result, the characteristics of “experience-based,” “allowing experimentation,” and “building on employees' professionalism” are considered related to the construction of an autonomous creative PMS.

Wouters (2009) proposes a development approach for building autonomous creative PMS using a case study similar to Wouters and Wilderom (2008). The following five principles are presented in this study: ““experience-based,”“ ““allowing for experimentation,”“ ““building on employees' professionalism,”“ ““transparency and employee ownership,”“ and ““and external facilitators.”

Wouters and Roijmans (2011) proposed three characteristics for promoting effective experimentation: “Experimentation with contextualized data,” “Joint ownership of experimentation” and “User reporting.” According to them, “This process of experimentation was made even more intense because from very early on the experimentation was conducted with actual data taken from actual information systems, which highlighted key differences in understanding that needed be understood and resolved.” (ibid., p.729). This highlights the importance of using actual data for effective trial and error. He also highlights the importance of the joint and proactive involvement of the accountant and field employees, stating, “ the experimentation resulted in effective knowledge exchange because it was clear from the start that employees from the controller's office and the transportation department needed to agree on the PMS design.” Furthermore, the transportation manager was going to work with the new PMS, not only as a user but also as a future preparer of the information.” (ibid.), asserting that effective trial and error requires users of information being involved in the creation of information themselves.

Despite the pivotal role of accountants as accounting professionals in the construction of MCS, much of the literature is silent on this point. Only Wouters and Roijmans (2011) highlight the importance of joint ownership of front-line employees with accountants. This study aims to contribute

to the literature by clarifying the role of the accountant in the construction of enabling control systems.

2.3 Transparency from the perspective of top managers and employees

In examining the role of accountants in the process of building enabling controls, we focus on transparency. As already mentioned, when discussing enabling control, transparency refers to that from the employee perspective. This is because the framework of enabling control is concerned with the usability of the control system for employees.

In contrast, transparency from the top management perspective, who are primary designers and users of control systems, is also important. The control system is an important information source for both top management and employees. Moreover, it balances efficiency and flexibility by meeting the information needs of both groups.

It has been highlighted in the past that the discrepancy between the central and local field perspectives is important in understanding changes in management accounting (Lukka, 2007). As highlighted, "MCS are used to exert control over the attainment of organisational goals and also to enable employees to search for opportunities and solve problems'" (Mundy, 2010, p.499). Based on this duality, the control system must be understood from both top management and employee perspectives.

In management control research, management intentions and employee perceptions of the purpose of control are different (Tessier and Otley, 2012). Basically, there is a discrepancy between "what managers are trying to achieve by implementing a control" (ibid., p.175) and "employees' interpretation of what the control is for" (ibid.). This implies that a misalignment between management knowledge and employee knowledge exists.

Nevertheless, an important link exists between top management intentions and employee perceptions. Given that "everyone watches what the boss watches" (Simons, 2000, p.70) and that "in using the accounting system, managers are influenced by their knowledge of how top management draws upon the system for control purposes" (Jordan and Messner, 2012, p.547), simply considering the usability of the system from the employee's perspective will not lead to the employee's perception of the system as an enabling control. Rather, focusing on how managers can understand the intentions of top management is necessary as this aspect has not been sufficiently examined.

The (internal/global) transparency as a design principle presented by Ahrens and Chapman (2004) was transparency from the employee perspective. This can be called "upward transparency" in the sense that it is transparent toward the upper direction of the organisation from the perspective of employees located at the lower level of the organisation. In contrast, transparency from the top management perspective can be called "downward transparency." This explicit division of transparency allows for a discussion on the role of the accountant in mediating the perspectives of top management and employees. In the process of building an enabling control system, accountants play

a role in mediating two-way transparency and ensuring that top management and employees perceive the same object. The accountants design the control system to synthesise the problems faced by employees and what top management sees in an appropriate way.

3. Research design

This study is part of a larger research project with this company, which spanned around 3 years (January 2014 to December 2016). This research project examines the characteristics of a control system at high-performing manufacturing companies in Japan. Focusing on the construction process of the control system at the company, we conducted 16 formal interviews with managers in various departments (see Table 1. All job titles provided were current.

Table 1　List of interviews

No.	Date	Locatin	Interviewee (All positions listed are current at the time of the survey.)	Duration
1	01/22/14	Head Office (Tokyo)	Executive Officer, Information Strategy Division General Manager, Controlling Department etc.	1.5h
2	05/26/14	Head Office (Tokyo)	Executive Officer, Information Strategy Division General Manager, Controlling Department etc.	1.0h
3	07/07/14	Head Office (Tokyo)	Vice President, Chief Financial Officer; Executive Officer, Information Strategy Division; General Manager, Controlling Department	3.0h
4	08/27/14	Oyama Plant	General Manager , Administration Department; Senior Manager, Accounting Section, Admin. Department; Manager, Accounting Section, Admin. Department; Manager, Accounting Section, Admin. Department; Senior Manager, Admin. Department; Manager, Production Support Section, Admin. Department; Senior Manager, Quality Control Department Manager, Quality Control Department etc.	4.0h
5	08/28/14	Reserch Division	Group Leader, Accounting Section, Admin. Department; Staff, Administration Department	2.0h
6	10/27/14	Osaka Plant	General Manager, Administration Department; Deputy General Manager, Accounting Section, Admin. Dep.; Senior Manager, Manufacturing Department; Manager, Manufacturing Department; Manager, Administration Department; Manager, Quality Control Department	4.0h
7	12/17/14	Osaka Plant	General Manager, Administration Department; Deputy General Manager, Accounting section, Admin. Dep.; Manager, Administration Department	2.5h
8	02/23/15	Bangkok Plant	Vice President (Subsidiary) Managing Director & Chief Financial Officer (Subsidiary)	4.0h
9	09/17/15	Head Office (Tokyo)	General Manager, Controlling Department Staff, Controlling Department	2.0h
10	11/09/15	Head Office (Tokyo)	Manager, Controlling Department Manager, Controlling Department	2.0h
11	12/03/15	Head Office (Tokyo)	Executive Officer, Information Strategy Division	2.0h
12	12/24/15	Head Office (Tokyo)	The former CEO, CEO1 Executive Officer, Information Strategy Division	1.5h
13	05/23/16	Awazu Plant	General Manager , Administration Department; Manager, Accounting Section, Admin. Department; Senior Manager, Prodduction Department Senior Manager, Prodduction Technology Department Senior Manager, Quality Control Department Manager, Prodduction Department Manager, Admin. Department; Manager, Admin. Department;	4.5h
14	06/28/16	Head Office (Tokyo)	Staff, Controlling Department Staff, Controlling Department	2.0h
15	08/26/16	Head Office (Tokyo)	Senior manager, Information Strategy Division Staff, Controlling Department	2.0h
16	12/07/16	Head Office (Tokyo)	The Chairman of the boad, CEO2 Senior manager, Information Strategy Division Senior manager, Information Strategy Division	2.0h
17	02/26/19	Head Office (Tokyo)	Corporate Auditor (The former Senior manager, Information Strategy Division)	2.0h
18	05/14/19	Head Office (Tokyo)	Corporate Auditor (The former Senior manager, Information Strategy Division)	2.0h
				44.0h

(source: prepared by authors)

The case organisation, hereafter called Komatsu, operates production, sales, and research and development organisations worldwide and is the second largest company in construction machinery. The firm manufactures and sells construction and mining equipment, utilities, forest machines, and industrial machinery, and it is headquartered in Japan. It employs 61,564 people and generates annual revenues of 2,190 billion yen as of the fiscal year ending 31 March 2021. This was established in 1921 as a manufacturer of machine tools and mining equipment for in-house use. Komatsu has acquired a reputation not only for high performance but also for highly sophisticated KAIZEN practices. The company won the Deming Prize in 1964 from the Union of Japanese Scientists and Engineers. This is awarded to organisations that have implemented total quality management (TQM).

The multinational manufacturer offers the potential to contribute to our understanding of using control systems. Moreover, considering its scale, it can operate a mature formal control system. This enables us to gather data from various departments concerning control practices and represent the views of both top and operational managers. Moreover, as the company has faced global environmental uncertainty, we could analyse how the company changed the use of its control system in a changing environment. The company experiencing two large managerial reforms, beginning in 2001 and 2009 that allowed us to analyse recurrent patterns of organisational activities within the reform process.

Data were collected through a literature review and interviews. Before beginning our interview research, we investigated literature concerning management practices at Komatsu. We found dozens of studies, written by people both inside and outside the firm, concerning total quality control (TQC) practices at Komatsu. Some of those studies were written by past CEOs, who were key players in the implementation of new control systems. The data were confirmed through interviews with CEOs and other managers.

Our fieldwork began in January 2014, when we visited the case company to conduct interviews. We proposed a list of question items before the interviews and conducted 18 semi-structured interviews with various interview partners between January 2014 and May 2019. Our open-ended interview questions aimed at retrospectively exploring the management accounting change in the case firm. Most interviews were tape-recorded and transcribed. Where this procedure was not possible, detailed notes were taken both during and after the interviews with multiple researchers. These interviews were conducted in the form of group meetings with several interviewees simultaneously.

To avoid response bias, we conducted interviews with people in various positions such as the (former) CEO, CFO, senior managers, managers, and staff in the accounting, information, research and development, and manufacturing departments. Moreover, we conducted interviews at various locations, including head office and some plants in and outside of Japan. At some plants, we conducted onsite observations, which lasted approximately 1 hour on average. This enhanced our understanding of control practices at the shop floor level. To protect confidential information and avoid factual errors,

we presented information to the company before revealing it to the public.

4. Case description

In 2001, owing to a shrinking construction machinery market, Komatsu experienced a financial crisis where operational margins fell into deficit. The new CEO1 took office in June of 2001. He analysed reasons for this deficit by examining variable and fixed costs and concluded that a high level of fixed costs was the cause. Simultaneously, he analysed the difference in the company's profitability compared to the market leader. He found that the difference stemmed from the level of fixed costs (Sakane, 2011, p.77). He also concluded that the reason for the approximately 6% difference in operating income margin originated with the difference in the ratio of selling, general, and administrative costs to sales (ibid., p.79).

To improve the situation, the CEO conducted drastic reform initiatives. For example, he implemented a reduction in product variety. He also embraced the "Dantotsu Strategy," which concentrates company resources on machines considered vastly superior to those of competitors. He decided to install KOMTRAX as standard equipment to visualise capacity utilisation. He also laid off and transferred the company employees. According to a press release on 10 February 2001 the company planned to "achieve a capacity cost reduction effect equivalent to about ¥30 billion annually by fiscal 2004."

The CEO then decided to introduce a new management accounting technique known as "standard variable margin (SVM) management" to improve the situation. He learned this direct costing perspective when he worked at a subsidiary in the United States. In the 2003 annual report, the CEO commented on the new system as follows:

> Currently, we are promoting standard variable margin (SVM) management across the board as a framework expressly for cost reduction. SVM is allied with the concept of gross profits and based on the deduction of standard variable costs (SVC), such as procurement and in-house machining costs, as well as direct selling expenses from sales. This management method is nothing special, and I learned it from Dresser Inc., the partner of Komatsu Dresser Company where I worked as its president in the United States. It is very useful for identifying cost-related problems. We need different approaches to improve fixed or variable costs, and we can identify the respective problems and improvement targets for the development of effective approaches by undertaking thorough SVM management. (Komatsu Ltd., Annual Report 2003, p.7)

For the CEO, SVM aims to separate fixed and variable costs to enable appropriate measures to improve each type of cost. The existing management accounting method based on traditional full

costing does not provide appropriate information to manage such costs. For the new CEO, who formerly worked in the engineering department of Komatsu, direct costing practices at the US subsidiary appeared much more reasonable compared to traditional costing practices used at Komatsu's head office.

4.1 SVM management

SVM management is a simple management accounting technique based on direct costing (see Table 1). Standard variable cost (SVC) is calculated based on actual unit variable cost at the end of the previous December. This includes direct material cost and processing fees for subcontracts. SVC rate is consistently applied during the current period. Improved variable cost is counted as part of the other variable costs (OVC). Each manufacturing department is required to improve OVC through daily KAIZEN activities and efficient equipment investment. Managers monitor the variance between expected and actual cost, analyse the reasons for the variance, and report on this at the monthly cost meeting. The manufacturing department is also expected to improve capacity cost (CC), for which they are responsible for controlling overtime hours of indirect labour or controlling rate of capacity utilisation.

Sales departments must improve SVM ratio by maintaining or raising prices. Their performance is separated from the current effort of the manufacturing department by applying a "standard cost." Therefore, even if manufacturing departments succeed in reducing costs, SVM as a performance measure of the sales department will not increase. Research and development department is responsible for increasing SVM by developing high-value-added products. The purchasing department is expected to improve OVC by collaborating with subcontractors to reduce components cost. All of these sections were also responsible for the reduction of CC under their control.

Table 2. Calculative structure of SVM.

Sales	SVC ＋ Direct selling expense		SVC	Direct material cost, processing fees for subcontracts, etc.
			Direct selling expense	Packaging cost, transportation cost
	SVM		OVC (other variable cost)	Cost of quality assurance Labour rate variance, Cost of idle capacity Price variance, etc. Loss on valuation of inventory, etc.

			CC	Administration cost, etc.
			Profit	

Source: Compiled by the authors from internal documents)

Before implementing SVM management, plant managers' performance was evaluated based on each plant's profit. However, profit includes uncontrollable noise such as sales volume and purchasing price. Therefore, the use of profit as a performance measure is inappropriate. SVM management identifies costs and assigns responsibility to plants or department managers who can control them.

In budgeting, SVM management was used for planning and controlling each department. When the company has made decisions regarding the company's sales and operational profit targets, the CEO used this new method without any assistance. Therefore, CEO_2 (Chairman, successor of CEO1) stated that in short-term profit planning using SVM management, CEO make sales budget decisions top-down rather than bottom-up, as many Japanese companies use (CEO_2, #16). In determining the level of price, gross profit, and capacity cost, top management can easily perform calculations on the desk without the help of the accounting department.

He highlighted that the main purpose of the implementation of the new control system was short-range profit planning. The new control system based on direct costing provides an easy-to-understand framework for planning sales and profits. The operating profit margin can be easily calculated by multiplying the increase in sales by a given SVM ratio (CEO_2, #16).

Therefore, SVM management provides appropriate information for creating a budgetary plan for the next fiscal year. As the chairperson noted, before implementing SVM management, top managers could not create a sales and profit plan without the accounting department's assistance.

Based on the budgetary target, at the shop floor level, monthly budgetary control is conducted using SVM management. In each plant department, middle/lower managers report the actual variable cost and its difference from the standard, which is referred to as "OVC" (see Table 2). Simultaneously, they report the actual amount of fixed costs and their difference from the target level. When there is an unfavourable variance, they are required to explain the next month's action plans.

4.2 Controlling fixed cost

In the first managerial reform, the most important issue for the new CEO (CEO1) was to obtaining fixed costs under control. The company learned the importance of managing fixed costs by proceeding with the unpleasant experience of being unable to control them using a traditional cost allocation system. Budgetary control based on SVM management was used for addressing this problem. SVM management provided top managers with important information for making decisions about managerial reform. Therefore, he noted the following:

> It may be impossible to implement managerial reform without SVM management . To reduce this, capacity cost should be strictly controlled. If the level of fixed costs of each department is not clear, forming a target or knowing the level of achievement is not possible. (CEO1, #12)

SVM management was implemented to create transparency from the top management's perspective, that is, downward transparency. Top managers required information on how much variable and fixed costs were incurred in each department. Planning and controlling a company without appropriate information is impossible.

To strictly control the cost, CEO1 felt that considering the perspective of middle/lower managers at the manufacturing site in the information at the board meeting was necessary.

> The previous types of [management] activities cannot put [the accounting information] in activities. That is the difference. Even if an order is made to reduce SGA expenses, everyone is trying to do so [but they cannot do it]. Otherwise, [we should say] reduce fixed costs, or if you keep fixed costs, you should improve output or lower SVC. If it's not like that, [employees] do not understand what they should do at the shop-floor level. (CEO1, #12)

Through his engineer and manager experience, CEO1 knew what words were necessary to spur action at the manufacturing site. He believed that information based on SVM management would help reduce costs in the first managerial reform.

However, this was not necessarily intended to develop enabling performance measures for employees. The company then had no capacity to consider usability for middle/lower managers. The message from CEO1 to the employees expressed a strong sense of urgency over the fall in the red. In the message, he said, "To date, you may have thought that Komatsu was a first-class company. But from now on, you must not think so. Think that you are working for a second-rate company. If you think Komatsu is a top-notch company, you may think you should do everything for the sake of appearances. But you don't have to think that way." Some people who knew the company then said that this had changed their mindset. Additionally, the message from the CEO1 that "we can only do one major surgery" was perceived as harsh by employees. Many of the remaining employees understood the severity of the company's situation when they saw that employees were leaving the site after soliciting voluntary retirement.

Under the former system based on full costing, even though they had set budget targets for fixed costs, workers tended to think that budget overruns were not serious. As product sales volume was increasing because of market growth and they knew the costs would be allocated based on sales, costs were assumed recoverable in the growth phase. This resulted in fixed costs increasing, though they were variable costs.

> The cost accounting at Komatsu, when I entered this company, was used as the traditional

method. For example, in terms of cost at a factory, variable costs are directly imposed on the products. However, fixed costs were allocated based on certain criteria. For example, this section has three accountants in charge in relation to products, so the labour cost of three people was allocated [to the product]. We performed a cost allocation based on a weak base. The problem with this method is that the allocated costs increase as sales increase because fixed costs are calculated by multiplying the allocation rate by the number of products. (CFO, #3)

In this situation, where increases in fixed costs were not regulated, managers stated the following:

There was a feeling that, for example, plant management expenses at the plants and general administration costs at the headquarters are fixed costs. However, there was a feeling that it would not be a problem if [fixed costs] increased as sales increased. (Manager, Accounting Department, #4)

When the company is profitable, for example, sales promotion expenses and that kind of cost increase, particularly in the sales department, sales promotion expenses will naturally increase as sales increase. As a result, fixed costs steadily increased. Even if Japan's bubble economy burst and sales were halved, fixed costs could not be reduced. (senior manager, accounting department #3)

In the plant, we would like to make capital investments to improve further. Capital investment, costs, and expenses will increase. However, it is OK if there is still a profit. (Manager, Accounting Department, #6).

CEO1 then adopted the idea that fixed costs should be controlled by separating the budget between variable and fixed costs. CEO1 believed that the separation of variable and fixed costs was the key concept of SVM management. Cutting fixed costs through budget control was the primary aim and was included in the SVM management manual. Thus, SVM management was used as a control system for managerial reform to achieve drastic cost reductions. The initiatives for cost reductions were implemented in a top-down manner within the first managerial reform, which lasted 1 to 2 years.

4.3 Implementation process of the new control system

Under the instruction of CEO1, CEO_2, who was a senior manager at that time, SVM management was implemented. CEO1 appointed CEO_2 as the project leader. According to CEO1, the appropriate person overseeing this project was someone familiar with cost management and could determine what to discard and what to keep in SVM management implementation. CEO_2, who was the director of the Tennessee plant at the time and had also served as the head of the cost control

department, met these requirements. He was called back to Japan in the direction of CEO1 to lead the implementation of SVM management.

Regarding the implementation process, as introducing the same rules at production and sales subsidiaries around the world was necessary, they took their time to adjust the details of these rules. CEO_2, who led the project at that time, stated the following:

> It was especially difficult to implement the new control system, rather than the sales department. For example, depreciation costs related to plants should be fixed costs, and the cost in an inspection process should be a variable cost . This policy was slightly different for each plant. Perhaps in terms of SVM, I think that it can be shifted by a little less than 1%, comma 5, or 1%. From an accounting perspective, the difference is not so problematic if it is approximately 1%. So, as it is, I decided to make it easier to do for each plant. I spent about half a year doing that, and forcibly introduced the SVM. This is the process of progress . Laterally looking at an American subsidiary, accountants wanted too much (the rules of calculation) . . . there were various opinions. However, as a top manager, I gave instructions to ignore these trivial problems. (CEO2, #16)

During the time of the first managerial reform, using this new method, CEO1 instructed that fixed costs should be reduced significantly. Moreover, they suggested concrete methods to achieve targeted reduction. When SVM management was introduced for the first managerial reform during the crisis, it was used for clarifying and decreasing the level of fixed costs in each department in a top-down manner. Little consideration was given to supporting employees' daily tasks.

The CFO (at the time of interview), who supervised the accounting department at that time, looked back on the first managerial reform and commented:

> [At the time of the first structural reform], we carefully analysed the contents of Komatsu. Then, we reformed weak points while leaving strong points . I think that it was good that we carried out what everyone easily understood in an easy-to-understand way. The situation was quite severe then, but understanding strengths and weaknesses I mentioned earlier properly by everyone, we all discussed and agreed on what to do, and what to stop. I think that this was very good. (CFO, #3)

As this quotation shows, although the employee perspectives were not reflected in the structure of the new control system, all organisational members joined the discussion to decide a concrete method for achieving the target. Information generated from SVM management provides an easy-to-understand framework to link the target number and the field knowledge of employees.

4.4 Mediation by accountants: standard cost

The company implemented standard costing practices under a full costing-based system before implementing SVM management. However, an important change was made in the implementation process of the new control system. Along with the introduction of the new control system, the company changed its decision rule for standard costs.

This change was led by accountants, who had experience in plants, in a project team formed in the accounting department charged with implementing SVM management. Implementing the new control system required CEO1 to simply instruct the team to abandon the current full-cost accounting system with its complex cost allocation and introduce a direct costing system similar to that used at a US subsidiary. The project team began making detailed operational rules following the instructions of CEO1. Using their knowledge from their working experience, accountants created a manual and presentation documents explaining the purpose and merits of the new control system and detailed implementation instructions. They communicated with staff at plants to clarify the practical problems that they might face. A database software program was installed on the corporate network for this purpose. They used a question-and-answer format to solve each problem identified by front-line managers.

Simultaneously, the accountants considered ways to solve the company's other problems concerning standard costs. Before SVM management was introduced, target cost was set as the standard cost, which was sometimes difficult to achieve. The accountants recognised that it sometimes discouraged managers and workers on the shop floor. A manager who was a member of the project team noted the following:

> When we made the next year's business plan at the end of December, the plan tended to reflect the expectation that the remaining gap (between standard cost and actual cost) would be bridged in the last quarter (Jan-Mar). However, the gap remained the following April when the new fiscal year started. Some departments or products were underachieved, and further improvements were required. Many shop-floor workers struggled with this problem. We then replaced the target cost with the actual cost at the end of December. Operating workers are released from the world of debt. Nobody said, do not do that. (senior manager, accounting department #3)

With the introduction of SVM management, the standard was modified from a future target to actual costs. The actual variable cost at the end of the previous December was set as the "standard" for the next fiscal year. In response to this change in the "standard," a manager noted:

> I used to work as a front-line leader. Standard man-hours were provided. However, it was impossible to achieve for some products . Among the manufacturing sites, we compare the groups which are profitable or not. I was scolded for the deficit in my field group. Even if it was an

impossible number of man-hours to achieve, we had to improve it. I realised that there were large gaps. I thought that returning to the actual number was appropriate. (senior manager, administration department #6)

Hard-to-achieve target levels brought a serious problem besides discouraging shop floor managers. Numerical manipulation was conducted to hide the unachieved target and, as a result, the target level became unclear. The other managers looked back on those days and said the following:

> At that time, the control of digestibility was very strict. It was absolutely mandated to reduce the annual rate by 5%. As for what kind of management we were doing, cut the number of standard man-hours by 5% at the beginning of the fiscal year. We undertake the KAIZEN activities to realise this. If only 3% instead of the 5% target could be realised, the unachieved 2% will be carried forward to the next year. When you do that kind of thing repeatedly, the shortage steadily increases. It is difficult to recover from this. Then, (managers) put a different budget in such a shortage or do so. If you do this kind of thing, the target numbers become invisible. However, in the current SVC(SVM) management, the numbers to be targeted are clear so that there is no biased indicator or management, as I said, at the moment. (CFO of subsidiary #8)

In that sense, modification by accountants contributed to improving upward transparency. During our interviews, we could not find any managers who took a negative change in standard setting. The change reflected front-line manager perspectives, which improved their usability of the cost information generated from the control system. Even though the CEO did not instruct the accountants to change the definition of a standard cost, accountants autonomously repaired the control system. These autonomous repairs reflect the KAIZEN routines that have taken roots in Komatsu. The organisational routine of not accepting the status quo as good. However, improving it to achieve an even better state gave rise to this act of autonomous repair.

4.5 Improving internal transparency: concordance with KAIZEN routines

SVM management changed management at the shop floor level. Contrary to the previous method, where managers needed to see the differences for all items, the current method controls the difference of SVC as a part of OVC (see Figure 1). This helps narrow the control points which managers should focus on in daily control practices. Regarding this point, the manager commented the following:

> [The construction machinery industry] sells the vehicle's body [Cost of] every part shifts based on various factors. Therefore, it is better to see and control just the shifted amount by setting the standard cost of each item. This is different from the past SVC management, which confirmed each part. We can concentrate on checking the items that are different. That is why, I

think, management of the OVC (SVM management) contributed to simplification of indirect jobs. Monthly management has changed. (Manager, manufacturing department, #6)

By the introduction of SVM management, SVM means that a gross margin was excluded from the control points of a plant. Since the standard cost is fixed during the fiscal year, the increase/decrease of SVM is owing to the increase/decrease of product price, or increase/decrease of sales amount, which are all related to efforts by the sales department. . . . Therefore, their efforts should be assessed. (Manager, Accounting Department, #4)

Concerning cost management, just by managing SVC or OVC, we have the number of plans, and we should check the difference against them. I think it is easy to understand. (Manager, Production Department, #13).

As managers mentioned, SVM management provides useful information for front-line managers to manage the shop floor. This is because the information is consistent with the way of thinking prevalent there, which can be understood from "The Komatsu Way." The Komatsu Way is "a statement of values that the Komatsu Group should pass down in a lasting way wherever it operates, including in its management, to ensure its continuing commitment to enhancing Quality and Reliability in the service of corporate value" (Komatsu, HP). It consists of a management section and an all-members section. The all-members section was "written by gathering information from all manufacturing, development, and sales sites' (Sakane, 2011, p.196), and it is "not a mere top managers' intention, but a statement developed and selected over a long history" (Sakane, 2011, p.196). Basically, the Komatsu Way represents important knowledge, which is standardised in the field.

The statement, "do not think of the current status as the best," found in the all-members section, is solid testimony to the strong KAIZEN culture at Komatsu. Such a pattern of action enables organisational reform through SVM management. However, when CEO1 took over as CEO, the strong KAIZEN culture vanished. He started the reform initiative by restoring the culture. He argued the following:

I think the conventional way of addressing KAIZEN underlines structural reforms of clarifying the current status and facts based on data, visualising the goals and direction, and making the system able to produce new ideas. In fact, this is the way of thinking about QC activities that Komatsu introduced in the 1960s; it is embedded in our DNA . Because we have QC, structural reform quickly penetrated all parts of the company. This is why we had a good result. (Sakane, 2009, pp.51-52)

However, according to CEO1, following the appreciation of the yen after the Plaza Accord and expansion of offshore production, manufacturing sites became the primary focus of TQC instead of

the entire company (Sakane, 2009, p.103). In 2002, the company started a new improvement initiative, called the "NQ-5 promotion activities," which aimed to restore the traditions of QC to the whole company, including indirect departments and overseas subsidiaries. In terms of the NQ-5 promotion activities, CEO1 noted, '[a]ny topic is fine if employees can act on it . . . the important thing is that each employee feels the KAIZEN activities are rewarding and does them with passion' (Sakane, 2009, p.105). A manager described the relationships between Houshin development, which is a core technique of TQC and SVM management, as follows:

> Our company has the ability to control things through the system of Houshin (policy) development, or through subsidiary management. That is why the staff easily accepted the new OVC management (SVM management) beyond expectations. I think that this is a true story . The staff of the accounting department took it easily. However, the reason the plants accepted it was that it was accepted at the manufacturing sites. (senior manager, administration department #6)

Another manager referred to the similarity of SVM management with QC activities as follows:

> In short, 'why are things different, why has the number declined'?' SVM management is a way of doing things that repeatedly ask 'why' questions. This is the same as QC. If top managers asked us why this had to happen, and we could not answer the question, we should raise the number of control points. Of course, we should be able to explain the reason logically. We then come to manage the manufacturing sites, as we explain to top managers. Personally, I think it penetrated naturally. (Manager of Manufacturing Control #6)

As the above quotes show, managers are clearly conscious of top managers' perspectives. They set the "control point," which they should monitor and control, in line with top managers' perspectives. SVM management supports the process of management from problem finding to resolution. This means that the information provided by SVM management is relevant for shop floor managers.

Based on their specialised local knowledge and expertise cultivated in a long tradition of continuous improvement thorough TQC activities, front-line managers can specify the method for improve costs. To achieve cost reduction, managers translate accounting numbers into concrete actions without assistance. According to one of the managers of the accounting department(manager, accounting department, #13), when head office asks for cost reductions, they are sometimes instructed to reduce costs by a certain percentage in items other than labour costs and depreciation. Specific methods for further cost reduction were planned and implemented at the discretion of the front line.

Before introduction of SVM management, the link between accounting information and local knowledge was missing. The new control system improved upward internal transparency by reconstructing the relationship between accounting information and organisational knowledge accumulated in a long tradition of TQC activities on the shop floor. Our interviews stated that

managers perceived that the implementation of SVM management clearly contributed to improving internal transparency.

4.6 Improving global transparency

For managers of the manufacturing department, SVM management clarified the cost items to be controlled. The manager stated the following:

> [Before the introduction of SVM management], knowing how the KAIZEN activities I had implemented contributed to the performance of our company was difficult. (senior manager, manufacturing department #6)

Under the previous control system based on a traditional full costing system, front-line managers could not easily understand the relationships between the performance of their own unit relative to the whole company. The profit of the plant was affected by the sales level, which is a result of the sales department's effort. Additionally, the allocation of fixed costs provided misleading information for front-line managers during the expansion phase, which allowed for an increase in fixed costs. By making cost responsibility clear for front-line managers, SVM management improved global transparency.

SVM management guided the change in front-line manager perspectives from man-hour-based management to cost management. According to one manager, in the past, purchased parts, which accounted for the majority of the total cost, were not discussed enough. However, processing costs, which accounted for about 10–20% of the total cost, were tightly controlled. The introduction of SVM management brought a different perspective to employees by focusing on the total cost. The introduction of SVM management brought a different perspective to employees by focusing on the overall cost.

SVM management provides information that connects a broader context to managers' own performance. The contribution of the unit, which is the responsibility of the manager of the unit, to the profit of the whole company was clarified through OVC and CC:

> Concerning the purchased parts, the result of partner enterprises' cost improvement, the fluctuation of the material prices, and so on is clearly shown as OVC, which is the difference with standard costs . . . OVC can be used in a way that we set the annual target of OVC and assess the achievement of the target of OVC . . . I feel that it became easier to manage. (Manager, Production Department, #13).

SVM management facilitates middle managers' understanding of accounting numbers by providing an easy-to-understand framework.

> Before [the implementation of SVM management], only accountants understood the meaning of accounting numbers. But people in the administrative department come to be able to understand. . . . In this way, managers of local subsidiaries, who are 50 or 60 years old, have become able to manage. I think it is after the implementation of the system. If we use the old system, only accountants can understand it. (senior manager, administration department #6)

4.7 SVM management in the second managerial reform

The world economy fell into a historical recession after the Lehman Brothers bankruptcy in the autumn of 2008. CEO_2 then began the second drastic managerial reform. Hence, he began restructuring the global production network, which included consolidating plants from eight to three in North America, and eight to five in Japan. In a crisis situation, CEO_2 used SVM management in a coercive manner. According to CEO_2(CEO_2, #16), the 55 billion yen cost reduction implemented in this second reform was based on the concept of SVM management. The fixed cost level then ballooned from 320 billion yen when sales were 1 trillion yen to 350 billion yen as sales increased. CEO_2 thought that bringing this to the historical level of 320 billion yen would be possible.

SVM management provided information about the clear target of cost reduction. According to our interview with him, approximately 60% of cost reduction was implemented in a top-down manner, and the ideas for the remaining 40% came from the shop floor. In this way, the information obtained from SVM management is also used by top management to reduce costs and improve downward internal transparency. After calculating the target amount of cost reduction, he allocated it to each department:

> I assigned [a target of] 5% [to each department]. This is like red tape. However, it is difficult to achieve this. However, it is difficult to say that your department does not need so much, as you did your best; everybody should have worked hard. However, this would be below the target. Then, I remedied this using a top-down approach. (CEO_2, #16)

In a crisis, employees' discretion in choosing a method for cost reduction is comparatively limited. During a short period, top managers mobilise this type of control to implement drastic cost reductions. The CEOs believed that such a massive cost reduction in management reform should not be done in a gradual sequence. Therefore, in both management reforms, significant cost reductions were made in a short period of time. At this time, the past efforts and conditions of each department were not considered, and a uniform cost reduction target was imposed in a "bureaucratic" manner. It can be understood that the perspective of employees was relatively unimportant in management reform.

Drastic cost reduction negatively affects employee motivation. Therefore, in the case company, this coercive type of control is not mobilised regularly under stable conditions. The CEO consciously avoided the situation in which the control system would be perceived negatively.

Global transparency is important for front-line managers to understand and accept the necessity of changes.

> By introducing SVM management, we changed the calculation method of the product's SVM. Fixed cost is put into one basket and never changed even if the sales amount changes. The awareness of management has changed completely. Conversely, when sales decline and fixed costs are the same, profit never increases. Then, it became much easier to imagine that we need to reduce it to ensure our commitment to profit for shareholders.. I thought this was a good method. (Manager, Accounting Department, #4)

In the sales decline phase, SVM management provided a clear target for cost reduction. It works as an effective tool to persuade managers to be involved in company-wide managerial reform.

5. Discussion and conclusions

In this case, the newly implemented control system noticeably improved usability of the information for the employees. In the process of building enabling control in the case company, the accountants played a pivotal role in improving the usability of the control system for employees. In the following, we discuss the role played by accountants.

5.1 From translator to engineer: Mediating the perspectives of top management and employees

Accountants as business partners are traditionally expected to use their ability to break down numbers to bridge the gap between accounting figures and field information to front-line managers (Burns and Baldvinsdottir, 2005; Järvenpää, 2007). In this way, the role of an accountant who acts as a mediator between accounting information and field information can be called a "translator" Translators support people who do not hold knowledge of other languages by exclusively internalising information using language conversion. According to this metaphor, accountants as translators are not supposed to improve the usability of the accounting control system. Rather, they are supposed to support front-line employees by going into the field themselves and proactively performing translation activities.

In this regard, "(c)ausal knowledge about the processes in which organisations engage is to a large extent sedimented in operating procedures'" (Jönsson and Grönlund, 1988, p.520), while "(t)he financial orientation of management accounting limits its capability to penetrate into the underlying processes where local knowledge is being stored'" (Vaivio, 2004, p.45). There are tensions between field knowledge and accounting knowledge, which are close yet sometimes in conflict. To resolve

these tensions, accountants are going beyond accounting knowledge and acquiring “an ability to break down numbers”(Burns and Baldvinsdottir, 2005, p.740), and front-line managers are also trying to deal with this problem by acquiring accounting knowledge (Kurunmäki, 2004; Llewellyn, 1998). These developments show that translating accounting figures and field information is not an easy task for accountants and other employees.

The key finding from this case was the change in the way managers, who were previously unable to handle accounting information, were now able to understand and analyse it on their own. Here, the role of the accountant as a translator was clearly diminished. In the developing process of enabling control, translation by accountants does not necessarily improve usability of front-line managers as users of the system. A control system with high usability for field managers is a control system that allows them to easily perform difficult translations without needing the accountants. In the construction of an enabling type of control system, the role of the accountant is not the exclusive user of accounting knowledge(translator) but as an engineer who creates an easy-to-understand control system that enables translation by non-accounting experts, the front-line managers themselves.

In this case, the basic concept of the control system called SVM management, which was newly introduced under the direction of the CEO, was to lay the groundwork for implementing management reforms by separating variable and fixed costs and clarifying the responsible costs by department. The consideration was not the usability of the system for employees. However, the clarification of the variable and fixed costs responsible for each department from the top management's perspective. Top management attempted to increase downward transparency and control these costs by implementing SVM management.

This improvement in downward transparency has contributed to improving upward transparency. Basically, the classification of variable and fixed costs helped managers understand what they should do for each cost in the field. Additionally, clarifying the responsible cost for each department increased global transparency from the manager's perspective and made clearly understanding the contribution of each department possible. This is because top management was aware of the high affinity of such a direct costing approach with shop floor management when they introduced SVM management.

Apart from the top management’s intentions, the accountant added innovations to the control system so that SVM management could be used not only for temporary management reform but also in the subsequent daily management cycle. Based on the empirical knowledge gained from their work experience in the factory, accountants succeeded in removing the factors that reduce the motivation of front-line employees by modifying the method of determining the standard cost. Under the new standard cost determination method, cost variances are captured as differences between past and current results, providing more understandable and highly usable information for front-line managers.

Hence, while improvements in upward transparency can contribute to improvements in downward transparency in some areas, simply improving upward transparency may leave some areas less usable

for employees. In this case, the accountants skilfully corrected these discrepancies based on their knowledge of accounting experts and their field experience.

The case shows that in a building enabling control system, it is not just a matter of considering upward transparency from the employee perspective. What employees want to watch is what top management watches. Improving the usability of the system for employees means simplifying information in a way that does not conflict with what the top management watches. As accounting calculation structures changes, such as the method of determining standard costs, have various ripple effects, such considerations need to be made by accountants as the accounting profession.

As Wouters and Roijmans (2011) highlight, without collaboration between front-line managers and accountants, providing high-usability information for front-line managers is impossible. In this case, accountants communicate with front-line managers in a variety of ways to implement SVM management. However, what is required in such a collaborative process is the ability to meet the requirements of top management while skilfully reconciling them from the perspective of the employees. This is not a task that unilaterally improves the usability of the system for employees. This indicates that enabling control is not a style of control that allows unlimited autonomy for employees, but rather allows employees to make decisions under controlled autonomy based on the direction of top management.

5.2 Organisational context influencing the role of accountants: KAIZEN capabilities and metaroutines

What are the organisational contexts that have influenced accountants' role in the process of developing enabling control in the case company? This point is discussed from two perspectives: KAIZEN capabilities and metaroutines.

First, the company has a high level of capabilities for on-site improvement, such as TQM. Such KAIZEN capabilities are the ability to develop action plans for autonomous and continuous improvement of major concerns in the field. The presence or absence of such capabilities is closely related to internal transparency. No matter the amount effort was put into making accounting information easier to understand, without this ability to improve, internal transparency would not have improved. Then, the role of accountants may be as business partners, using their ability to break down numbers (Burns and Baldvinsdottir, 2005) and their panoramic knowledge (Mack and Goretzki, 2017) to make specific suggestions to front-line managers.

Habran et al. (2021) highlight three ways in which the relationship between financial and operational concerns can be mediated: developing tools, developing collective dialogical spaces, and developing the ability to link financial and operational concerns. What was done at the case study company was not simply to break down financial numbers into nonfinancial indicators but develop tools that would make understanding the financial numbers themselves easier. This is because, in the

tradition of TQM in the case companies, once the quality of the financial figures given to them had been improved, they were fully capable of improving them by autonomously developing the financial figures into nonfinancial indicators and action plans in the language of the field, and the tools for such a development process itself were not needed. Thus, the development of the tool here was to make the accounting numbers clear and understandable to support front-line managers' ability to link financial concerns with operational concerns.

Thus, the role of accountants in building enabling controls is likely determined relative to other control factors. For instance, Shields (1995) highlights that linkage with speed initiatives such as JIT was found to be related to the success of ABC implementation. Implementing a control system is closely related to field practices such as improvement activities. Moreover, internal consistency among multiple control factors affects the functionality of control systems (Abernethy and Chua, 1996; Bedford et al., 2016; Gong and Ferreira, 2014; Sandelin, 2008). This internal consistency also influences upward internal transparency. The introduction of SVM management did not require changes to existing TQM practices in the field, but SVM management had familiar aspects of TQM practices. The change in the method of determining the standard cost led to the clarification of the responsible cost and the difference from the historical (standard) performance, which was perceived by the field managers as an improvement in internal transparency.

Contrarily, the role of accountants may be different if a control system is introduced that requires changes in existing field practices. Developing the tool may have required a role that repairs internal consistency among the control systems, or it may have required a role that develops collective dialogical spaces and the employee's ability. In the case company, transparency was improved by the engineering work described above because the manufacturing site had accumulated sufficient organisational capacity to relate accounting figures to on-site improvements.

Second, metaroutines (Adler, Goldoftas, & Levine, 1999), which seeks to improve the control system, influences the role of the accountant. To put it simply, this is the culture of KAIZEN, which has taken root in the case companies. The existence of a pattern of behaviour that does not easily affirm the status quo but seeks to make repeated improvements as an organisational routine of the accounting staff contributed to the establishment of enabling controls.

The importance of top management support in management accounting change has been repeatedly highlighted (Chanegrih, 2008; Innes and Mitchell, 1995; McGowan and Klammer, 1997; Shields, 1995). Despite the fact that change requires top management support, the dilemma exists that such excessive top management interventions do not enhance the usability of the control system for employees. Jordan and Messner (2012), for example, point out that top management's intensive attention to certain indicators can lead managers to perceive the control system as coercive.

Englund and Gerdin (2015) found that strict goals set by top management contributed to the establishment of an enabling PMS. They argue that even though strict goal setting by top management

should have had negative effects in terms of improving employee usability, strict goals caused 'breakdowns' of mental model (Hall, 2011), and nudged efforts to restore internal transparency. In this study, SVM management is initially intended to be used in a coercive manner under top-down management reform. This may also have a negative effect on employee usability.

However, as already mentioned, the process of SVM management evolving into enabling control is not a linear story that can be explained by the intentions of top management alone. It is a process of management accounting change that has arisen through the interrelationship of various factors, such as top management, front-line managers, accountants, direct costing, standard cost determination methods, TQM, and KAIZEN culture. In this process of change, SVM management was used as an enabling control.

Our case study shows that not only the relationship between management and employees, but also the engineering work of the accountants who mediate between them is important in developing enabling controls. Even if the control system is created for top-down management reform, it will be recognised by employees as enabling control through the process of repairing the control system by the accountants, not by the front-line managers themselves.

5.3 Summary and limitations of this study

Using a case study of a major construction equipment manufacturer, this study shows that in developing enabling control, the accountant acts as an engineer of accounting who mediates between downward transparency from top management's perspective and upward transparency from the employee perspective. To improve the usability of a control system for employees, showing employees what top management sees in a way that relates to the routines that solve the challenges that employees face in their daily work was necessary. We also discussed the organisational contexts that have influenced this kind of engineering work, such as KAIZEN capabilities and accounting metaroutines.

In this study, we focused on only two of the four design principles of enabling control. The remaining two design principles and the role of accountants have not been fully explored. Additionally, because the interview research was conducted not in real time but retrospectively, the interviewees' memories may have been incorrect or unreliable.

Furthermore, to avoid respondent bias, this study conducted interviews with people from diverse backgrounds as much as possible. However, as these interviews were conducted in the form of multiple meetings rather than one-on-one, issues remain as to whether the true intentions of the interviewees were adequately heard. This paper is an interpretation of the practices of the research sites at the time of the investigation from the perspective of the authors, and does not reflect any changes since the investigation.

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