

# Quality of cost information utilized in cost management: Evidence from a survey of Japanese factories

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## **Abstract**

The purpose of this study is to clarify the characteristics of cost information utilized in cost management. For this purpose, the framework of cost information quality was applied to enable comprehensive and systematic measurement of the characteristics required for cost information. The relationship between each characteristic (quality) and the degree of use and satisfaction of cost information in cost management was then clarified by conducting a questionnaire survey in the factory. The results showed that (1) representational and contextual quality is positively associated with the degree of use of cost information, but no relationship is found for intrinsic quality; (2) all quality dimensions are associated with satisfaction with cost information; and (3) the moderating effect of representational quality is confirmed for the relationship between intrinsic quality and satisfaction. These findings indicate the validity of prioritizing expressive and contextual quality over the intrinsic quality dimension in the utilization of cost information, and that intrinsic quality is a necessary but not sufficient condition.

**Keywords** Cost Information, Cost Accounting, Information Quality, Cost Management, Questionnaire Survey

## **(1) Introduction**

The usefulness of cost information in cost management has been discussed for some time, and many studies have been conducted. Recent studies on cost information have focused on the issues of indirect cost allocation and the accuracy of cost information (Brierley, 2008, pp.61-63). The accuracy of cost information refers to the degree to which cost information realistically reflects management and production realities. Accurate cost information can be provided only through highly sophisticated cost accounting that appropriately

maps daily activities and causal relationships (Drury, 2015, pp.86-87; Kataoka, 2011, pp. 2-7). It has been pointed out that the usefulness of cost information in modern manufacturing environments has decreased due to the low accuracy of traditional calculations; therefore, studies to clarify the effects of accurate cost information with precise allocation and accurate cost information have accumulated (Johnson and Kaplan, 1987; Kataoka, 2011, pp.2-5). However, the results of studies on the effects of sophisticated cost allocation and accurate cost information, such as the degree of

use and satisfaction in cost management, are not consistent (Gosselin, 2006, pp.662-663). Moreover, sophisticated costing, such as ABC, is not widely used in practice (Gosselin, 2006, pp.649-656).

Some previous studies indicate the importance of information characteristics other than accuracy. For example, Brierley (2008) found various characteristics required for cost information, such as understandability and completeness, from field surveys. This suggests a gap between research and practice in previous studies, which have focused on accuracy. Pizzini (2006) also showed that the level of detail and frequency of reporting affect the usefulness of cost information. These studies suggest that increasing the accuracy of cost information does not directly relate to the usefulness of cost information in cost management. In other words, the sophistication of cost allocation and accuracy of cost information, which have been the focus of previous studies, may not fully explain the effectiveness and usefulness of cost information.

Previous studies have some limitations. First, there is a lack of empirical evidence on the effects of information characteristics other than accuracy. It is not sufficiently clear how properties other than accuracy contribute to cost management as opposed to accuracy, for which a wealth of evidence has accumulated. Second, in studies on characteristics other than accuracy, the relationship between such characteristics is unclear. Some characteristics, such as completeness, detail or relevance, and decision usefulness, may have inclusive or causal relationships. However, since studies are based on various theories and dependent variables, it is difficult to organize the relationships between the characteristics

discussed in previous studies (Iwasawa, 2020, p.52). Third, it is necessary to focus on the use of cost information at the individual manager level. Many previous studies have been based on surveys at the firm or plant level, even though it has also been suggested that even in the same organization, the requirements for cost information may differ depending on contextual factors and important purposes of use. (Abernethy et al., 2001; McGowan and Klammer, 1997; Schoute, 2009). Since some argue that satisfying the requirements of each manager is important for the effective use of accounting information (McGowan and Klammer, 1997), it is desirable to focus initially on the individual level.

Therefore, the purpose of this study is to elucidate the characteristics of cost information utilized in cost management, with a focus on the individual manager level. To achieve this purpose, this study has two features. First, based on the "cost information quality" framework (Section 2), we measure the characteristics of cost information and develop hypotheses (Section 3). This framework makes it possible to systematically measure the characteristics required for cost information; thus, we intend to explain the relationship between cost information and its utilization, for which there has been no consensus on the results in previous studies. Second, we conduct a questionnaire survey of production department managers in two firms (Section 4) to test our hypothesis (Section 5). In this way, we intend to clarify the relationship between each characteristic of cost information and its utilization at the individual level based on empirical evidence.

## **(2) "Cost Information Quality" Framework**

In order to apply the "Cost Information Quality" framework (Iwasawa, 2020), we will first explain the concept of "information quality" and the "four-dimensional model of information quality" which the framework relies on, according to DeLone and McLean (1992), Sekiguchi (2013), and Yakuwa (2010). Information quality, which is a concept of information systems theory, is defined as "fitness for use of information" and refers to the degree to which the management information provided meets the requirements. This concept has attracted attention because information systems theory has focused too much on technical aspects. Research on technological models alone cannot fully explain the usefulness of management information; therefore, it is important to pay attention to the users of information. In order to evaluate and measure information quality, Wang and Strong's (1996) "Four-Dimensional Model of Information Quality" exhaustively and systematically presents the sub-characteristics that constitute information quality. The model presents the constituent characteristics of information quality in an exhaustive and systematic manner based on a large-scale survey. This model makes it possible to measure and evaluate information quality, which is an abstract concept. Specifically, the model shows that information quality is composed of four quality dimensions, and it is possible to measure the quality of information by confirming whether the information being used meets the requirements of the sub-characteristics that constitute each quality dimension.

Relying on this four-dimensional model of information quality, the framework of "Cost Information Quality" presents the

characteristics required for cost information. According to the framework, cost information is required to have nine characteristics in four dimensions: intrinsic quality dimension (accuracy and objectivity), accessibility dimension (ease of operation and accessibility), representational quality dimension (ease of understanding and conciseness), and contextual quality dimension (relevance, completeness, and timeliness) (Table 1).

**Table 1** Cost information quality, component dimensions, and sub-characteristics

Sub-characteristics	Examples of Prior Research
<b>Intrinsic quality dimension</b>	
accuracy	ABC studies and many others
objectivity	Myers et al. (2017)
<b>Accessibility quality dimension</b>	
ease of access	—
ease of operation	—
<b>Representational quality dimension</b>	
understandability	Brierley (2008)
conciseness	Cardinaels (2008)
<b>Contextual quality dimension</b>	
relevance	Mia and Chenhall (1994)
completeness	Pizzini (2006)
timeliness	Chenhall and Morris (1986)

Iwasawa (2020)

Cost information quality refers to “the degree of conformity of the cost information being used with the requirements for cost information.” Based on the awareness of the problem that it is unclear what characteristics are required for cost information and why, Iwasawa (2020) built a framework showing the characteristics required for cost information, empirically confirmed its validity through field studies, and confirmed that the required

characteristics differ depending on the purpose of using cost information. In addition to empirically confirming the validity of the framework through field studies, we confirmed that the required characteristics differ depending on the purpose of the use of cost information.

This study applies the framework of cost information quality to measure the characteristics of cost information for three reasons. First, it enables us to comprehensively and systematically measure the required characteristics of cost information. As already mentioned, although there are a wide variety of points that have been noted in previous studies regarding the characteristics required for cost information, the theories and explanatory variables used in these studies are inconsistent, making it difficult to integrate the research results. In this study, we apply the framework, which is based on the main concepts of information systems theory and has been empirically verified by field studies, to solve the research problem. Second, it is possible to measure the characteristics of cost information for each purpose of use. It has been shown that the degree of characteristics required for cost information varies depending on the purpose of use (Schoute, 2009); however, previous studies did not take this into consideration. Since the framework empirically shows that the required characteristics differ depending on the purpose of use, it makes it possible to conduct research for each purpose from the viewpoint of users. Third, the framework is robust as a measurement framework. Since it relies on the major models of information systems theory, research on measurement methods for the concept has been conducted, such as Lee et al. (2002) and other studies on the measurement of

concepts. By using these studies, it is possible to conduct research based on concept measurement with higher validity.

### **(3) Developing a Hypothesis**

#### **1. Constituent dimensions of cost information quality required for cost management: Focusing on intrinsic, representational, and contextual quality**

Among the four quality dimensions of cost information quality, this study focuses on three of these quality dimensions: intrinsic, representational, and contextual. This is because for planning and control (P&C) purposes, including cost management, intrinsic, representational, and contextual quality dimensions are required, and the accessibility quality dimension is less important (Iwasawa, 2020). Unlike management decision making purposes where managers use the information on an ad hoc basis, cost information for P&C purposes is provided through periodic reports, such as monthly reports; therefore, easy accessibility is not required. In addition, ease of operation is not important because there is seldom any need for extracting specific figures from cost information for P&C purposes.

Therefore, based on empirical evidence from previous studies that cost management has requirements regarding the intrinsic, representational, and contextual quality dimensions, this study measures the seven sub-characteristics that make up the three quality dimensions. According to the definition, for each quality dimension, if the level of the constituent sub-characteristics is high, it is expressed as "high quality." For example, in terms of the intrinsic quality dimension, if the information provided satisfies accuracy and objectivity, which are the sub-characteristics of the intrinsic

quality dimension, it is expressed as “high intrinsic quality.”

## **2. Degree of use and satisfaction with cost information in cost management: Explained variables**

For the following two reasons, we focus on the "degree of use" and "satisfaction" of cost information in cost management as variables to measure its utilization in cost management. The first reason is its importance. According to DeLone and McLean (1992), in information systems theory, these two variables, namely, degree of use and satisfaction, have been widely used as explained variables to measure the success of information systems and the impact of management information on users. This is because of the problem that the usefulness of a system, regardless of how technologically superior, is low when there is a cognitive gap between information providers and users. Management information that is not often used and has a low level of satisfaction in the field will not produce results and contribute to the organization. Therefore, it is important to pay attention to these variables in cost information, which is part of management information. It has been pointed out that the value of accounting information depends not on its sophistication as a method, but on how it is used and interpreted (Hall, 2010). In fact, many previous studies on cost information have focused on this issue (e.g., Foster and Swenson, 1997; Schoute, 2009); however, the degree of satisfaction with sophisticated allocation calculations varies among users, and it is not clear what characteristics are related to these variables.

Second, it is anticipated that the characteristics of information associated with

each of these variables may differ. It is true that the degree of use and satisfaction level are related, and there is a certain correlation between them; however, in management systems theory, it has been shown that the factors that affect each variable are different (DeLone and McLean, 1992, pp.66-69). For example, in a situation where management information must be used, it is insufficient to measure only the degree of use. Therefore, it is necessary to measure both variables ("degree of use" and "satisfaction") because it is expected that the characteristics related to the degree of use and degree of satisfaction are not necessarily the same for cost information, as described later.

## **3. Relationship between the component dimensions of cost information quality and the degree of use and satisfaction of cost information in cost management**

We discuss the relationship between the intrinsic, representational, and contextual quality dimensions and the degree of use and satisfaction of cost information.

As for the representational quality and the contextual quality dimensions, it is presumed that these dimensions are closely associated with both the degree of use and satisfaction of cost information. It has been observed that the understandability of costing is enhanced to encourage its use in manufacturing plants (Hiromoto, 1988; Merchant and Shields, 1993). If plant managers cannot understand the factors behind the numerical values, they will not make the next improvement. In addition, if the amount of information is large and the conciseness of accounting information is low, it will have an adverse effect on the decision making of users (Chewning and Harrell, 1990).

Furthermore, with regard to the context quality dimension, the importance of providing appropriate cost information according to the user's task has been pointed out for a long time, as in the maxim "different costs for different purposes." Since the usefulness of cost information in a range different from that of one's accounting responsibility is low, reporting cost information in an appropriate range, mesh, and at an appropriate time leads to its usage and satisfaction (Arai et al., 2010; Chenhall and Morris, 1986; Pizzini, 2006).

The intrinsic quality dimension is expected to have a close relationship only with the degree of satisfaction of the cost information and a weak relationship with the degree of use. Since many cases have reported that cost information with low accuracy leads to users' distrust, that is, values that deviate from the senses of the manufacturing site (Abernethy et al., 2001), it is closely related to the degree of satisfaction. As for objectivity, there is empirical evidence that informal cost information, which is not monitored by the IT department and is provided by individual employees, is less objective and verifiable, and thus trust in cost information is reduced (Myers et al., 2017). Thus, objectivity is also assumed to be related to satisfaction.

However, the relationship between the intrinsic quality dimension and the degree of use is less relevant. The intrinsic quality dimension, as defined, is a dimension related to the numerical data of the information and is less related to the ease of use of the information than the other quality dimensions. For P&C purposes, including cost management, cost information is often connected with performance evaluation, and managers are responsible for costs. Therefore, it is difficult to assume that they do not use cost information to

improve the figures even if they are aware of the problems of accuracy and objectivity to some extent. Therefore, we propose the following hypotheses:

*Hypothesis 1: The representation and contextual quality of cost information is positively associated with the degree of use of cost information in cost management.*

*Hypothesis 2: The intrinsic, representational, and contextual quality of cost information is positively associated with the satisfaction of cost information in cost management.*

#### **4. Moderating effects of representational and contextual quality dimensions on the relationship between intrinsic quality dimensions and satisfaction**

In this study, we expect a moderating effect of representational and contextual quality dimensions on the relationship between the intrinsic quality dimension and satisfaction with cost information. In other words, the relationship between the intrinsic quality dimension and satisfaction differs depending on the level of representational and contextual quality.

Previous studies have pointed out that accurate allocation calculations and highly accurate cost information do not necessarily directly lead to satisfaction (Brierley, 2008; Schoute, 2009; Shields, 1995). With regard to this issue, when accuracy and other characteristics are traded off, cases have shown that other characteristics are often prioritized over accuracy. For example, the sophistication of indirect cost allocation makes the focus of cost management unclear and hampers the

understandability of cost information in the production line (Hiromoto, 1988; Merchant and Shields, 1993). In other cases, highly accurate cost information fluctuates rapidly, making it difficult for users to understand and operate the information according to their purposes (Iwasawa 2020). In all of these cases, the usefulness of cost information was ensured by giving priority to other characteristics rather than accuracy. In other words, the intrinsic quality (accuracy) of cost information does not directly lead to the satisfaction of cost information by itself, but only when it is combined with other characteristics. For instance, in a situation where the meaning of cost information is difficult to understand and its relevance to the task is weak, no matter how accurate and objective the value, it will not lead to satisfaction. Therefore, we propose the following hypothesis:

*Hypothesis 3: Representational and contextual quality moderates the relationship between intrinsic quality and satisfaction with cost information in cost management.*

#### **(4) Research Methods**

##### **1. Selection of surveyed companies and description of the use of cost information**

In order to test our hypotheses, we conducted an in-factory questionnaire survey in six factories of two manufacturing companies that cooperated with our survey (Table 2). Company A is classified as a plastic product manufacturer and mainly manufactures and sells plastic resins. Company B is classified as an electronic equipment manufacturer and mainly manufactures and sells electronic devices, primarily semiconductors.

The surveyed companies were selected for

two reasons. First, the companies are implementing improvement activities based on cost information, as are many manufacturers. In these companies, cost information is reviewed at the monthly cost meeting attended by lower managers (equivalent to line managers and section managers) and upper managers in all plants, to confirm the production status of the previous month and to discuss improvements in the following month. Since managers are responsible for the cost of manufactured products and the expenses of their own departments or production lines, they must account to the factory manager for any deviation from the budget target. In addition, each factory's accounting department organizes a series of information on costs as described below in Excel format, and sends it to the managers before the cost meeting.

Second, product cost information is utilized for cost management. Product cost information is sometimes unsuitable for performance management because the responsibility is often ambiguous due to the problem of overhead cost allocation (Obata, 2017). However, in the factory of the target company, the correspondence between manufactured products and production lines is clear; thus, the manufacturing cost of a product group and the responsibility relationship of each manager are clear. Therefore, when the product cost exceeds the budget, the production department is required to improve it. In addition, related departments such as production control and quality control will be included in the discussion to reduce the product cost from the perspective of production planning and product mix. Since intrinsic quality (accuracy and objectivity), which is measured in this study, is often an issue in the calculation of product costs, we

preferred companies using product cost information in cost management for the study.

The following is an explanation of the usage of cost information in the cost management of the companies. The cost information mainly used in the factories of the target company is the product cost information for each product group, the cost information broken down by department and production line, and the material cost information, each of which is shared with the analysis of the difference between the forecast and actual costs. First, with respect to the product cost of each product group, Company A, which manufactures plastic resins, presents the product cost per unit (gram), and Company B, which manufactures semiconductors, presents the product cost per unit. These are calculated within the scope of manufacturing costs and are presented after allocating overhead manufacturing costs. When the actual cost deviates from the budget, each manager is required to explain the cause of the deviation to the factory manager at the monthly cost meeting and to make improvements for the next period. In addition, relevant departments in the factory other than the production department also discuss how to lower costs based on product cost information. For example, the quality control department is required to consider production problems from the perspective of failure costs and losses of specific products, and the production control department is required to examine the production plan and product mix to be manufactured in order to reduce the cost.

In analyzing the factors that cause changes in the cost of products, it is important to have information on expenses and material costs broken down by department and production line. Each department in the factory and each

production line in the production department is assigned a budget target for expenses, and the information on actual expenses is compiled and reported monthly. Cost targets are also set for related departments other than the production department in the factory, such as the quality control and safety control departments, and cost information for each department is given. In addition, information on material costs is also important. Since most of Company A's raw materials and Company B's parts are imported, and they are strongly influenced by exchange rates and energy prices, the price of raw materials fluctuates widely. By analyzing the reason for the difference in material costs between the actual and budgeted costs by comparing the material usage rate in each line, the managers are able to make improvements for the next month.

Although the same cost information is reported and used in each factory, it is assumed that the recognition of the quality of the information and the degree of its use vary. As for the intrinsic quality of cost information, Company A, for example, manufactures plastic resins, several basic resin products, and derivative products with special processing according to orders, and the number of these derivative products is several tens of thousands. Therefore, the line in charge of manufacturing basic resin products is a small-mix, high-volume production line, while the line dealing with derivative products is a large-mix, low-volume production line. As a result, even if product cost information is based on the same allocation calculation, the accuracy and objectivity of the information may differ depending on the production line in charge. As for the quality of representation and context, it is presumed that the perception of quality may differ depending

on the users' accounting knowledge, the departments or plants, job titles, the degrees of interest in costs, and relationships with the accounting department.

**2. Data collection**

The survey subjects were lower managers (equivalent to line managers and section managers) and upper managers who belong to the production department and related departments in the factory. This is because it was expected, based on prior interviews, that they view cost information, make decisions based on cost information, and engage in improvement activities, as already mentioned.

**Table 2** Questionnaire survey overview

Company	Factory	Number of subjects	Number of collections	Implementation period
A	P (Japan)	18	17	November 2018
	Q (Asia)	18	14	June–July 2019.
	R (Asia)	16	15	August 2019
	S (Asia)	12	10	September 2019
B	X (Japan)	29	23	February 2019
	Y (Japan)	18	12	
Total		111	91	(82.0%)

In Company A, the questionnaires were distributed by e-mail through the accounting department of each factory, and the respondents then responded directly. In Company B, the

survey was distributed and collected via the General Affairs Department. This enabled us to collect the responses without going through the respondents' supervisors, the accounting department, or any other department related to the survey content.

**3. Measurement of variables**

Cost information quality was measured based on Iwasawa (2020) and Lee et al. (2002) who developed a measurement scale for the four-dimensional model of information quality (Wang and Strong, 1996). Specifically, we modified the expressions of the questions in Lee et al. (2002) to fit the cost information and measured it on a seven-point scale (Table 3). The questionnaire was reviewed in advance by the accounting staff of each factory to ensure that there were no discrepancies in the wording of the questions. The results show that the Cronbach's  $\alpha$  of the variables for each quality dimension is generally at a reasonable level<sup>1</sup> (Table 3). In order to avoid multicollinearity, all variables were centered on the mean value.

In addition, as control variables, we set dummy variables for the respondent's company, department (1 for production department), and position (1 for section chief or higher). In each variable, it was considered that the importance of cost information in business operations differs depending on job title; hence, it was necessary to control for the effect<sup>2</sup>. For example, in the case of Company A, which is an equipment industry, and Company B, which is a processing and assembly industry, the

<sup>1</sup> Items assumed as objectivity 2 were excluded because they significantly lowered the Cronbach's  $\alpha$  for intrinsic quality

<sup>2</sup> We did not include factories as a control variable because we did not think that they

would have a direct impact on the degree of use of cost information or the level of satisfaction, since there were no major differences in production patterns, business contents, or management styles within each company.

**Table 3** Measurement of variables

Sub-characteristics	Questionnaire	Min-Max	Avg	SD
<b>Intrinsic quality</b> (Cronbach's α=0.77)		2-7	4.65	0.91
accuracy 1	The numerical values in the cost information show production conditions extremely accurately.	2-7	4.77	1.10
accuracy 2 (R)	The numerical values in the cost information seem detached from the actual situation.	1-7	4.50	1.36
accuracy 3	The numerical values in the cost information are extremely realistic.	2-7	4.70	1.05
objectivity 1	The calculation process of the numerical values is very transparent.	1-7	4.65	1.22
<b>Representational quality</b> (Cronbach's α=0.91)		2-7	4.71	1.10
conciseness 1	The format is clear and easy to read.	2-7	4.71	1.26
conciseness 2	The cost information is compiled in appropriately sized batches.	2-7	4.66	1.20
understand-ability 1	The cost information was provided in an easily digestible manner.	2-7	4.97	1.25
understand-ability 2	It is easy to locate the occurrence factor and change factor of the costs.	1-7	4.51	1.27
<b>Contextual quality</b> (Cronbach's α=0.84)		2.17-7	4.79	0.95
completeness 1	All necessary data is recorded in the cost information.	2-7	4.65	1.18
completeness 2	The detailed breakdown of the data in the recorded cost information is sufficient.	1-7	4.44	1.22
relevance 1	The recorded information is sufficiently related to my work.	1-7	4.77	1.38
relevance 2	The scope of the cost information is consistent with the scope of my work.	1-7	4.70	1.36
timeliness 1	The reporting of the cost information is perfectly timed for when I need it.	2-7	5.08	1.14
timeliness 2 (R)	The cost information does not reflect the current situation.	1-7	5.13	1.43

(R) indicates the inversion scale.

<sup>3</sup> In terms of multicollinearity, the maximum of Variance Inflation Factor (VIF) for any of the

importance of cost information in business operations is assumed to be different because the proportion of controllable costs for production managers is different due to the difference in the fixed cost ratio.

**Table 4** Correlation between quality dimensions

	Intrinsic quality	Representational quality	Contextual quality
Intrinsic quality	1		
Representational quality	0.55	1	
Contextual quality	0.49	0.50	1

**(5) Results and Discussion**

**1. Hierarchical multiple regression analysis**

To test the hypotheses, this study conducted a hierarchical multiple regression analysis assuming two models for the two dependent variables: the degree of use of and satisfaction with cost information in cost management. In Model 1, the main effects of intrinsic quality, expressive quality, and contextual quality as well as the control variables already mentioned, were entered. In Model 2, the interaction variables between intrinsic quality and expressive quality and between intrinsic quality and contextual quality were added to the variables in Model 1.

Table 5 shows the results of the multiple regression analysis<sup>3</sup>. Regarding Hypothesis 1, Model 1a confirmed that expressive quality and contextual quality were positively associated with the degree of use of cost information

variables in the model was 2.42, showing no major problems with the results of the analysis.

(significance levels of 5% and 0.1%, respectively). As expected, the relationship with intrinsic quality was not confirmed. Therefore, Hypothesis 1 is supported.

**Table 5** Results of multiple regression analysis <sup>a</sup>

	Degree of use <sup>b</sup>		Satisfaction <sup>c</sup>	
	Model 1a	Model 2a	Model 1b	Model 2b
<i>Cost information quality dimensions<sup>d</sup></i>				
Int	-0.07	-0.07	-0.06	-0.05
Rep	0.28*	0.25*	0.33***	0.38***
Con	0.52***	0.53***	0.50***	0.44***
<i>Interactions</i>				
Int * Rep		-0.18		0.25*
Int * Con		0.08		0.01
<i>Control variables</i>				
Company	0.01	0.04	0.07	0.02
Dep	0.10	0.11	-0.01	-0.03
Position	0.07	0.06	-0.09	-0.09
Adj. R <sup>2</sup>	0.490	0.496	0.533	0.589
F	15.27***	11.93***	17.90***	16.91***

†p<0.1, \*p<0.05, \*\*p<0.01, \*\*\*p<0.001

<sup>a</sup> Estimate by least squares method

Coefficients are standardized

<sup>b</sup> **Degree of use:** “I always use the cost information for my assignments in cost management.”

<sup>c</sup> **Satisfaction:** “I am extremely satisfied with the cost information reported in cost management.”

<sup>d</sup> **Int:** Intrinsic quality; **Rep:** Representational quality; **Con:** Contextual quality

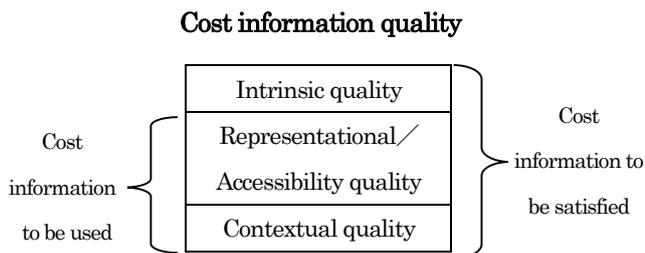
Next, we examine Hypothesis 3. In Model 2b, the effect of the interaction term between intrinsic quality and representational quality on the level of satisfaction with cost information was confirmed at the 5% level of significance. However, the effect of the interaction term between intrinsic quality and contextual quality was not confirmed. Therefore, Hypothesis 3 is

partly supported.

Finally, we examine Hypothesis 2. Model 1b confirmed that representational quality and contextual quality were positively related to the level of satisfaction with cost information (5% and 0.1% significance levels, respectively). As for intrinsic quality, although the direct relationship was not confirmed, the effect of the interaction term was significant in Model 2b, as already mentioned, and the indirect relationship was confirmed. Therefore, Hypothesis 2 is supported.

In Model 2a, the main effect is similar to that of Model 1a, and the interaction terms are not significant. These results are consistent with the assumption made when constructing the hypothesis that intrinsic quality does not affect the degree of use of cost information.

These results suggest priority relationships between the characteristics required for cost information (Figure 1). While representational and contextual quality are related to both the degree of use and satisfaction, intrinsic quality is related only to satisfaction and had no effect on the degree of use. This means that no matter how high the accuracy (intrinsic quality), it will not lead to the use of cost information unless the quality of representation and context are ensured. This result is consistent with those of previous studies. These studies reported cases in which other characteristics are often prioritized over accuracy when accuracy is traded off with other characteristics (Hiromoto, 1988; Iwasawa, 2020; Merchant and Shields, 1993). Based on the results of this study, it can be interpreted that representational and contextual quality are prioritized over intrinsic quality because accuracy (intrinsic quality) does not lead to the use of cost information unless other characteristics are improved.



**Figure 1** Relationship between cost information quality and degree of use and satisfaction with cost information

### 2. Simple slope analysis

To test Hypothesis 3 and interpret the results, a simple slope analysis was conducted as an additional analysis because the effect of the interaction term between intrinsic quality and expressive quality was significant. Specifically, referring to Aiken and West (1991), we assumed a single regression line for intrinsic quality when the score of expressive quality was  $\pm 1SD$  (standard deviation), with satisfaction with cost information as the dependent variable.

As a result, when the representational quality was low ( $-1SD$ ), the relationship between intrinsic quality and satisfaction was not confirmed ( $\beta = -0.14, p = 0.34$ ), but when the representational quality was high ( $+1SD$ ), the relationship between intrinsic quality and satisfaction was suggested ( $\beta = 0.24, p = 0.06$ ). This is consistent with the expectation made when constructing the hypothesis that intrinsic quality does not directly lead to satisfaction on its own, but only when high representational quality is used to increase satisfaction.

These results suggest that intrinsic quality is a necessary but not sufficient condition for the satisfaction of cost information. Inherent quality alone, including accuracy, which is the focus of previous studies, is limited in increasing the satisfaction of cost information, and its

impact depends on other characteristics. It is true that the discussion on allocation calculation and accuracy is important in cost accounting theory, and the contribution of these research groups is significant. However, the results of this study show that no matter how sophisticated the cost allocation is designed to be and how accurate it is, if other characteristics are not taken into account, the effect will be partial.

### (6) Conclusion

The purpose of this study is to clarify the characteristics of cost information utilized in cost management. For this purpose, the framework of cost information quality was applied to enable the comprehensive and systematic measurement of the characteristics required for cost information. The relationship between each characteristic (quality) and the degree of use and satisfaction of cost information in cost management was then clarified by conducting a questionnaire survey in the factory. The results showed that (1) representational and contextual quality is positively associated with the degree of use of cost information, but no relationship is found for intrinsic quality; (2) all quality dimensions are associated with satisfaction with cost information; and (3) the moderation effect of representational quality is confirmed for the relationship between intrinsic quality and satisfaction. These findings indicate the validity of prioritizing expressive and contextual quality over the intrinsic quality dimension in the utilization of cost information, and that intrinsic quality is a necessary but not sufficient condition.

The contributions of this study are as follows. First, by relying on the cost information

quality framework, this study confirmed the relationship between cost information and its utilization with higher explanatory power, where previous studies have not reached a consensus on the results. In contrast to previous studies that focused on a few characteristics, this study used a more systematic framework to show the impact of each characteristic. As a result, this study shows that accuracy alone does not lead to the use and satisfaction of cost information, and that it is important to consider various characteristics.

Second, this study also contributes to the group of studies that have focused on characteristics other than accuracy. Since these studies pointed out the importance of various characteristics, it was difficult to integrate their results. Therefore, by relying on the cost information quality framework, the findings of the previous studies are organized, and several interesting discoveries are made, such as the fact that the impact of each characteristic on the use and satisfaction of cost information is different, and that there is a moderating effect.

Third, the study could accumulate empirical evidence at the individual level of factory managers. In this study, although managers in each factory use the same cost information, their perceptions of the quality of the information differ. This indicates that it is insufficient to investigate cost accounting and information only at the company or factory level, which has been the subject of many previous studies, and that it is important to also investigate it at the lower and individual levels.

However, there are some limitations. First, it is necessary to pay attention to the interpretation of the results because of the measurement problem of cost information quality. In this study, from the standpoint that

the perception of cost information quality is important for the utilization of cost information, all the characteristics of cost information are measured by users' perceptions; however, it is assumed that the correctness of the perceptions may vary. It is also assumed that the correctness of cognition may vary. For example, there may be a case where the accuracy of cost information is misperceived as high even though it is actually low due to users' accounting knowledge. In this study, since the dependent variable is also based on users' perceptions such as satisfaction, there is no major problem with the results of the analysis itself, which shows the relationship between the variables. However, as shown in the example, if the actual level and perception are extremely incompatible, it is undeniable that decision making based on cost information may be inappropriate even if the degree of use and satisfaction are high. In other words, it may not be enough to increase the perception of the quality of cost information. Therefore, it would be desirable to conduct research that also considers more objective outcome variables beyond the perception of users, such as organizational performance.

In addition, due to the limited size of the sample, contextual factors could not be considered. Previous studies have shown that the demand for cost information, the effect, and the actual level of cost information differ depending on the contextual factors in the factory.

Despite these limitations, the result of this study that "high quality cost information meeting various characteristics is useful to utilize cost information in cost management" has many academic and practical implications. Based on the findings of this study, further research is desirable.

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