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Studies on Behavioral Issues in Target Cost Determination and Allocation Processes

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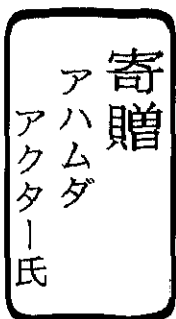
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Dedicated to my parents

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Abstract

Target costing is widely known as the system to support the cost-reduction process for reducing the price of the product at the new product development, which has been adopted not only in the automobile and other assembly manufacturing industries but also in the process-type industries. For its successful implementation, the target cost must be determined in a rational manner. If it is not determined rationally, the designing activities cannot be controlled, and targets will be ineffective and the discipline of the whole target costing system would be lost. An effective way to determine the target cost rationally is to link cost reduction activity to the behavioral base of target costing that deals with the behaviors needed to succeed at target costing, including issues of employee motivation, morale, and performance measurement and evaluation. These issues are addressed in this thesis. We conducted two laboratory experiments to assume a real-world situation of a target cost-setting process where to determine the target cost in an environment of product design and development a department was created. The research questions dealt in the laboratory experiment were also investigated by data collected through questionnaire survey to see whether the impact of independent variable upon the dependent variable also exist in the uncontrolled real-world situation.

Chapter 3 deals with the motivational impacts of target-information type and target attainability on the cost-reduction performance of product designers. Alternative target-information types are ideal, total and incremental targets. The attainability of target has two levels, tight and loose. The goal-setting theory in psychology is used for hypotheses formulation. To test the hypotheses we conducted a laboratory experiment on ninety-six subjects. ANOVA results show that no significant effect of target information type and tightness is found when the goal-

acceptance proposition is not considered. The cost-reduction performance of the high-acceptance group improves with the level of tightness. Further, when incremental targets are assigned to the low-acceptance group, setting loose-targets improves their actual performance ratio more than tight targets. When ideal targets are provided along with total targets to the low-acceptance group, setting tight total-targets produce better performance.

Chapter 4 empirically examines how the tightness of target profit and target cost methods influences the target cost achievement. The findings are based on a mail-out survey of 146 machinery, electrical and electronics, transportation equipment, and precision machinery companies listed on the Tokyo stock exchange Part I. The effects of these variables on target cost achievement are evaluated through a variation of logistic regression of ordinal categorical variables called proportional-odds model. The findings of the study confirm our hypothesis that tighter the target profit and cost methods employed better the target cost achievement. The uses of 'tight' (subtractive) and 'medium-tight' (combination) method for calculating target cost, render higher target cost achievement level in case of wider utilization of tight target profit ($TP1_H$). Similarly, the higher use of 'medium-tight' target profit method ($TP2_H$) along with 'tight' target cost method improves the target cost achievement. Irrespective of the target profit method employed, adding-up method, the loose method for determining target cost does not improve the target cost achievement level.

Chapter 5 deals with the motivational impacts of alternative participation and performance evaluation methods on the cost-reduction performance of the product designers in product development process. Alternative participation methods for establishing the target cost consist of the participative and the nonparticipative

approaches. In addition, the alternative performance evaluation methods include the evaluation based on only the controllable item measure and on both controllable and uncontrollable item measures. To test the hypotheses that are proposed with respect to the above impacts, we conducted a laboratory experiment on 120 subjects. When participation and performance evaluation factors are considered separately, the cost-reduction performance of product designers improves if they can participate in target-setting process and are evaluated by their controllable information. In investigating their joint influence, it is found that the combinations of participative method and controllable item and nonparticipative and uncontrollable item information have improved cost-reduction performance. Among all the independent variables, controllable item information is the most dominant variable as it has the strongest effect on cost reduction.

Chapter 6 reports the results of an empirical study designed to assess the effects of behavioral factors in target cost allocation on target cost achievement level. The findings are based on data collected through questionnaire survey. Pair-wise relationships between the variables as well as their combinatorial effects on target cost achievement are estimated through a variation of logistic regression of ordinal categorical variables called proportional-odds model. The single effects of the variables show that target cost can be achieved at higher level when product designers participate in the target cost allocation process. However, the effect of performance evaluation measures was not found statistically significant. When participation variable is categorized into two levels, we observed that the results of this field study are generally consistent with those from a previous laboratory experiment, which showed that the product designers evaluated by controllable information perform better under the conditions of high participation. Moreover, the designers evaluated

by uncontrollable information perform better under the conditions of low participation. We observed the similar trend when participation was categorized into three levels, in addition, the effect of joint participation was found much closer to the nonparticipation.

In chapter 7, we intend to see the combination effects of behavioral factors in target cost determination and allocation on the target cost achievement by using the survey data. The expected model portrays that, when adding-up method is used in determining the target cost of a product, the target cost achievement level will be the highest if the designers cannot participate in the allocation of target cost and their performance is evaluated by uncontrollable information ($ADD \times NP \times UC$). Again, when combination method is used in calculating target cost of a product, in that case also target cost achievement level improves when only the designers participate in target cost allocation process and their performance is evaluated by controllable information ($COM \times P \times C$). However, the result is marginally significant. On the other hand, target cost achievement level declines the most when the use of combination method is accompanied by the joint participation of product designers and manager and performance is evaluated by controllable information ($COM \times JP \times C$). Probably, in joint participation, the dominance of product manager is high which makes the state of joint participation equivalent to the nonparticipation. The interaction of nonparticipation and performance evaluation by controllable information creates cognitive dissonance that may contribute to the lowest performance of $COM \times JP \times C$.

There are hardly any previous studies in the target costing literature dealing with the research questions that are being investigated by this research. The research problems are of immense importance as these facilitate the determination of a rational target cost on which the success of a target costing system depends.