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Article

Taking an alternate route: redesigning sales management control systems for new product selling

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Taking an alternate route: redesigning sales management control systems for new product selling

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ABSTRACT

Salespeople play a critical role in new product selling. Owing to the time lag between sales efforts and accounting outcomes, salespeople under budget pressure created by outcome-based control systems may engage in myopic revenue management by prioritizing the selling of existing products. While increasing sales efforts through activity-based control systems has been considered effective in alleviating this problem, opponents argue that it results in micromanagement and undermines new product selling. Recognizing these issues, this study conducted an empirical analysis using repeatedly measured objective data from an electronic component trading company in Japan to examine the feasibility of a sales management control system redesign. The analysis revealed that sales effort quantity had a negative effect on sales quotas but was positively related to revenue mileposts, such as project generation and closing. Furthermore, the effects of sales effort quantity on revenue mileposts weaken as sales effort quality increases. The results imply that outcome-based control systems are more effective for smart workers with high sales effort quality and activity-based control systems are more effective for hard workers with low sales effort quality.

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SUBJECTS

Sales; Marketing; Accounting

Introduction

“The ongoing project for new product selling has realized limited revenue during the current accounting period due to the nature of the products, which often require extensive performance testing at the client’s end. I continue to pursue outcome-oriented negotiations, expecting an increase in revenue in the upcoming accounting cycle.” (Comment made by one salesperson in our sample)

This comment was provided by a salesperson of an electronic component supplier to explain to the upper management the reasons for not meeting the sales quota to the upper management. Salespeople are constantly under pressure to meet their sales quotas. However, the sales cycle for new products does not align with the accounting cycle, with a time lag between sales and revenue realization, which is associated with the evaluation of salespeople’s performance (Kerr & Marcos-Cuevas, 2022). In addition, new product selling is more challenging than existing product selling and takes more effort and time (Atuahene-Gima, 1997); therefore, making pursuing new product selling difficult for salespeople to achieve their sales quotas. Therefore, salespeople may consider new products as efforts that do not yield proportional rewards and may engage in counterproductive sales behaviors by allocating more resources to selling existing products rather than new products (Atuahene-Gima, 1997). Shifting sales efforts from new to existing products in this manner affects future revenue (i.e. depending on new product sales) for the current revenue (i.e. depending on existing product sales) and myopic marketing management,

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specifically known as myopic revenue management (M. J. Ahearne et al., 2016; Chapman & Steenburgh, 2011; Srinivasan & Ramani, 2019).

Sales management control systems (SMCSs), which measure salespeople's outcome-, activity-, and capability-based performance (Challagalla & Shervani, 1996), should be redesigned to motivate salespeople adequately for selling new product. This study addresses three research gaps in the field of SMCSs for selling new products. First, there is a conflicting argument regarding the role of outcome- and activity-based control in new product selling. Previous research has not reached a consensus on whether outcome- or activity-based control is more effective in new product selling. Atuahene-Gima (1997) argues that new product selling can be promoted through activity-based control because new products require much more sales effort than existing products. In contrast, M. Ahearne et al. (2010) suggest that outcome-based control is effective in new product selling because salespeople can adapt their selling based on the detailed knowledge of the market and customers. We aim to disentangle such conflicting arguments by demonstrating that the relationship between sales effort quantity (i.e. hard selling) and outcomes is moderated by sales effort quality (i.e. smart selling). Specifically, we show that the relationship between sales effort quantity and the outcomes (i.e. project generation, project closure, and future sales quotas) is weaker for salespeople with high quality of smart selling but stronger for salespeople with low quality of hard selling, indicating that outcome-based control is effective for the former, while activity-based control is effective for the latter.

Second, in the context of new product selling, accounting performance metrics, such as sales quotas, may not be appropriate dependent variables when examining the relationship between behavior and outcomes. In B2B settings, the sales cycle is a time-consuming process (M. Ahearne et al., 2012), often extending beyond the accounting cycle (Kerr & Marcos-Cuevas, 2022). To address this timing issue, previous research has used sales quotas in future accounting cycles as dependent variables (M. Ahearne et al., 2010). As an alternative, we propose using intermediate outcomes or revenue milestones that are highly likely to be achieved within the current accounting cycle as dependent variables (Glover & Ijiri, 2002; Matsuoka, 2020). Revenue milestones involve information related to pre-revenue stages, such as the generation and closing of projects for new product selling, with revenue realized only when the product is delivered after passing through these milestones. This study verifies whether current sales efforts for new product selling are reflected in *current* revenue milestones and *future* sales quotas.

Finally, this study employs objective data related to behaviors (i.e. sales effort quantity and sales effort quality) and outcomes measured by SMCSs rather than subjective data (i.e. salespeople's perceptions of control systems). Objective data, particularly those collected through repeated measurements at the salesperson level, provide unbiased, verifiable, and highly compelling measures of salesperson performance (Plouffe et al., 2016). Repeated measurements of objective data at the salesperson level are useful for revealing within-salesperson relationships among performance measures, as opposed to between-salesperson relationships (Bolander et al., 2021). However, the use of objective data in the context of sales performance is limited compared with that of subjective data (Kerr & Marcos-Cuevas, 2022), and repeated measurements of objective data have rarely been utilized in most cases (Plouffe et al., 2016). Despite the longstanding academic interest in sales performance (Verbeke et al., 2011), its "measurement" remains an unexplored research frontier (Hall & Lee, 2019). Therefore, as this study examines the relationship between the performance measures of outcome-, activity-, and capability-based control systems using repeated measurements of objective data, the results contribute valuable insights to the field of sales management research.

Figure 1 summarizes the hypotheses of this study. For hypothesis testing, we select a small-to medium-sized trading company in Japan that primarily deals with electronic components, including semiconductors. However, the company has its own manufacturing facilities and engages in the sale of in-house developed components. For this enterprise, regardless of whether the products are supplier-made or in-house, new product selling is the key to retaining and increasing revenue. This is because high-tech components, such as semiconductors, have technical lifecycles; therefore, suppliers must offer new products that match the improved performance of the upgraded devices to ensure that customers continue to adopt their products. Hence, we believe that the results of this study can be generalized to B2B companies that must maintain customer relationships through new product selling.

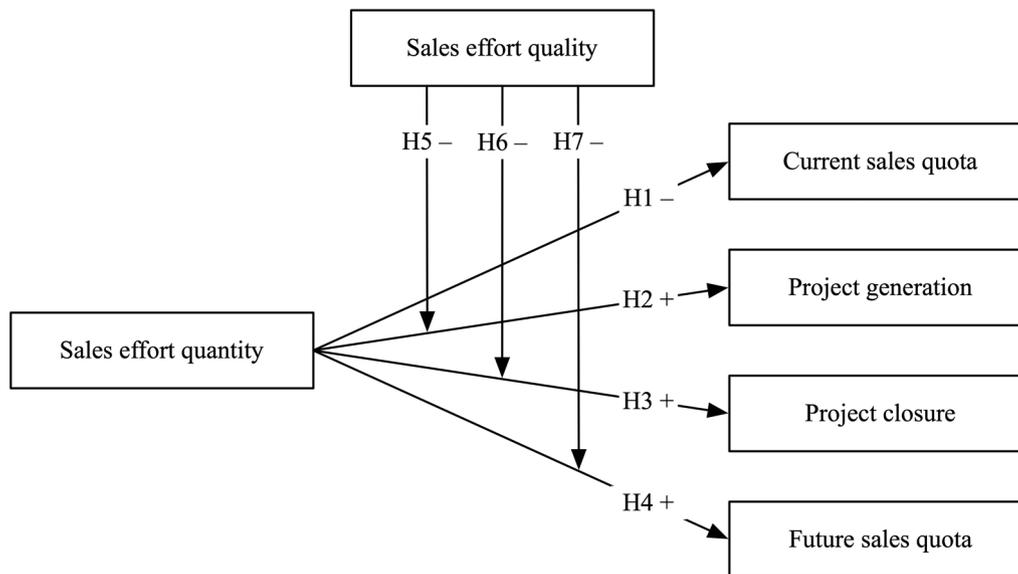


Figure 1. Research model.

Theory and hypotheses

Types of SMCSs and performance

SMCSs align salespeople with organizational goals (Darmon & Martin, 2011; Malek et al., 2018). Although the conceptual framework encompasses both formal and informal aspects of SMCSs (Malek et al., 2022; Ohiomah et al., 2019), this study focuses on formal SMCSs. Literature divides formal SMCSs into the following three categories: outcome, activity, and capability control systems (Challagalla & Shervani, 1996; Katsikeas et al., 2018; Ohiomah et al., 2019). Although there is another SMCS category, the input control system (Jaworski, 1988), we focus on the outcome, activity, and capability control systems for two reasons. First, the objects of input control systems are not controllable by salespeople because they involve resource allocation, such as selection criteria, recruitment and training programs, manpower allotments, and strategic plans, before the start of sales activities (Jaworski, 1988). Second, only a few exceptional studies (Kim & Tiwana, 2016; Tienken et al., 2023) have addressed input control systems (Malek et al., 2018).

Outcome-based control systems use outcome performance measures, such as revenues and sales quotas, to evaluate and reward salespeople (Bolander et al., 2021). Outcome-based control systems are not relevant in achieving outcomes. Thus, sales managers with outcome-based control systems do not directly monitor sales behavior (Anderson & Oliver, 1987). Furthermore, outcome-based control systems have a higher proportion of variable pay (Atuahene-Gima, 1997).

Behavior-based control systems, which are composed of activity-based and capability-based control systems, have garnered interest in contrast to outcome-based control systems (e.g. Amenuvor et al., 2023; Park et al., 2023; Vieira et al., 2022). The primary focus of behavior-based control systems is on the sales effort required to achieve the desired results. Behavior-based control systems prioritize methods for achieving results over the results themselves. Thus, sales managers with behavior-based control systems actively direct and monitor sales behavior (Anderson & Oliver, 1987). Furthermore, under behavior-based control systems, the proportion of fixed pay tends to be higher (Atuahene-Gima, 1997).

Performance related to sales efforts includes activity and conversion performances (Bolander et al., 2021). Activity performance is associated with the quantity of sales efforts, involving activities such as calls made for lead generation and meetings with prospects. Thus, activity performance measures are used in activity-based control systems. Conversely, conversion performance is related to the quality of sales efforts and serves as a comparative indicator between activities and outcomes such as success rates. Since capable salespeople with skills and abilities such as presentation, negotiation, interpersonal communication, planning, and so on (Challagalla & Shervani, 1996), can efficiently progress through the

sales funnel, conversion performance measures reflect the results of the use of capability-based control systems. In other words, activity performance reflects how *hard* salespeople work, whereas conversion performance indicates how *smartly* they work.

Effect of sales effort quantity on current sales quotas

Marketing literature has explained that, owing to pressure from capital markets, companies manage their earnings by reducing marketing expenses and implementing revenue management strategies, such as price promotions (e.g. Chapman & Steenburgh, 2011; Mizik & Jacobson, 2007; Mizik, 2010). These studies consider myopic marketing as actions taken by CEOs and CFOs responsible for company profits toward the marketing department (M. J. Ahearne et al., 2016; Srinivasan & Ramani, 2019). Therefore, strengthening the internal power of marketing departments is considered effective in curbing myopic marketing.

While prior research addresses the pressure from capital markets on companies, this study focuses on budget pressures from management to managers and from managers to frontline employees (Merchant, 1990). The mechanism of myopic revenue management lies in responsibility accounting systems, which create budgetary pressure on managers and employees in a manner similar to how capital markets exert pressure on top management. Responsibility accounting systems break down budgeted profits into accounting figures such as revenue, manufacturing costs, selling or marketing expenses, and research and development expenses, and allocate them as targets for various internal departments. In this context, the sales department is considered a revenue center because it is difficult to establish a linear relationship between selling expenses and revenue (Anthony et al., 2014). As a revenue center, the sales department is responsible for maximizing revenue within the budgeted selling expense range.

Budget pressure placed on the sales department in the form of revenue targets is enforced on individual salespeople through outcome-based control systems (Jaworski & MacInnis, 1989). Thus, outcome-based control systems are closely linked to organizational responsibility accounting systems (Merchant & Van der Stede, 2017). By achieving the sales quotas imposed on them, individual salespeople enable the sales department to meet revenue targets, ultimately exceeding the company's break-even point and maintaining or strengthening financial health. However, as management responds to capital market pressure, salespeople may also be tempted to engage in myopic revenue management in response to budget pressure. Outcome-based control systems induce myopic revenue management by strongly motivating salespeople to attain goals through financial incentives linked to sales quotas, without questioning the means of achieving those results (Atuahene-Gima, 1997). Some salespeople may prioritize current revenue over future revenue to avoid periods of low income, even if it affects potential sales from selling new products.

The preference for existing products over new products is due to the extensive sales effort required and the time it takes to realize the associated financial outcomes. For example, when selling a new product to an unfamiliar, new customer, it necessitates strenuous communications. Regardless of whether the customer is new, new products require customers to test performance, delaying the purchase decision. Even if customers adopt product knowledge due to the efforts of salespeople, their purchasing decision occurs subsequently (Endres et al., 2024). As a result, selling new products demands greater effort and the accounting outcomes tend to materialize in future accounting cycles rather than the cycle in which the sales efforts were made. Therefore, increasing sales efforts for new products may not contribute to current sales quotas. In fact, such efforts could even hinder current sales quotas, because allocating substantial sales resources to new product selling impedes selling existing products, which are more likely to yield immediate revenue. As a result, in situations with budget pressures, salespeople will in all probability focus their efforts on selling established products rather than new ones to achieve their sales quotas, which are usually measured as total sales or gross profit the salespeople attained. Consequently, salespeople can achieve current sales quotas by reducing sales effort quantity toward new product selling. This can be hypothesized as follows:

H1: Sales effort quantity for new product selling negatively influences current total sales quota.

Effects of sales effort quantity on new product selling

Activity-based control systems can be utilized to mitigate the skewed allocation of sales efforts toward established products because they are detached from the responsibility accounting system that generates budget pressures. Under activity-based control systems, the proportion of variable pay linked to sales quotas is lower, whereas that linked to fixed pay is higher. Consequently, salespeople are more likely to exert efforts toward strategic tasks that may not yield immediate results (Atuahene-Gima, 1997). For example, if the activity-based control system emphasizes the quantity of sales effort for new product selling (e.g. the number of customer visits), then salespeople are more likely to engage in relationship-building activities that do not yield immediate sales but contribute to long-term projects for new product selling.

In an activity-based control system, the quantity of sales effort before outcomes is measured as activity performance (Homburg et al., 2019). Efforts in the context of new product selling refer to “the amount of time, activity, or persistence of the salesperson selling the focal new product” (Atuahene-Gima & Michael, 1998, 906). The lengthy process involved in achieving outcomes requires various types of sales efforts, which include the number of phone calls made for lead generation, expended labor hours, and meetings conducted to convert prospects. These efforts for new product selling effectuate two revenue mileposts. The first milepost occurs at the generation stage of new product selling projects, when communication begins between salespeople and customers with the assumption of new product adoption. To generate new product selling projects, salespeople need to establish contact not only with existing customers but also with customers who have no current business dealings with them and with entirely new sales leads. The second milestone is the successful closing of new product selling projects. Between project generation and closure, customers may request product explanations, quotations, and product customization. To accommodate these diverse customer requirements, salespeople must exert considerable effort to steer projects toward success.

Previous research has demonstrated that sales effort quantity leads to improved salesperson performance. For example, a study by Ohiomah et al. (2019) have shown that the use of lead management systems increases the number of calls, which in turn intensifies follow-up efforts and impacts sales performance (Ohiomah et al., 2019). Additionally, there are research findings indicating that activity control (Lessassy, 2023) and activity-based incentive systems (Rao et al., 2021) can enhance performance. Also, some research has revealed that salespeople with ambidexterity, who not only provide customer service but also engage in sales activities concurrently, achieve higher sales performance (e.g. Ahmad, Liu, Akhtar, et al., 2022; Ahmad, Liu, Irfan, et al., 2022). M. Ahearne et al. (2010) demonstrated that increasing sales efforts enhances customers’ perceptions of products, which ultimately leads to the future sales of new products. Given that new product sales involve two stages, project generation and contract closure, the following two hypotheses are proposed:

H2: Sales effort quantity positively influences the number of newly generated projects for new product selling.

H3: Sales effort quantity positively influences the number of successfully closed projects for new product selling.

Once the projects are successfully closed, contracts for new products are established. As sales efforts continue until contracts are signed, there is little time lag when sales efforts are linked to the number of generated and successfully closed projects. However, sales efforts significantly decrease after new product contracts are signed. After contracts are signed, salespeople are required to deliver products by deadline and provide support when needed. Nevertheless, under the generally accepted accounting principles, revenue is basically recognized when products are delivered. In business-to-business transactions, sales cycles tend to be longer (Homburg et al., 2019), which delays the realization of current sales efforts into revenue. Therefore, current sales efforts are reflected in accounting-based performance (e.g. sales quota) in future accounting cycles because of the mismatch between sales and accounting cycles (Kerr & Marcos-Cuevas, 2022). Some previous studies have revealed that current sales efforts influence future sales revenue (M. Ahearne et al., 2010; Kumar et al., 2008). Based on this reasoning, we derive the following hypothesis:

H4: Sales effort quantity positively influences future total sales quotas.

Moderation effects of sales effort quality on new product selling

Activity-based control systems tend to micromanage salespeople, potentially leading to negative outcomes. For instance, salespeople under the influence of an activity-based control system may experience stress, low self-esteem, or distrust managers because of close monitoring of their actions. However, Atuahene-Gima (1997) argues that this issue does not apply in the context of new product selling. This is because salespeople typically have minimal contact with top management, and, through an activity-based control system, they become aware that top management is interested in and supportive of new product selling.

In contrast, M. Ahearne et al. (2010) claim that activity-based control systems inhibit new product selling. They conduct a survey targeting salespeople in the women's healthcare division of a pharmaceutical company and find that salespeople who perceived an activity-based control system are more likely to elicit efforts toward new product selling than those who did not. However, they also revealed that salespeople's perception of an activity-based control system weakens the impact of new product selling efforts on the achievement rate of sales quotas mediated by customer product awareness. M. Ahearne et al. (2010) explain this by stating that activity-based control systems reward salespeople based solely on their actions, leading them to increase their approaches to prospects without utilizing their market knowledge and promoting new products unrelated to customer needs. Instead, the salespeople's perception of an outcome-based control system that does not focus on the sales process itself is found to be more effective in enhancing sales efforts to sell new products. M. Ahearne et al. (2010) conclude that an outcome-based control system influences people to work smarter, while an activity-based control system influences people to work harder. A similar finding has been demonstrated in the context of inside sales. Based on self-determination theory, Conde et al. (2021) revealed that outcome-based control enhanced the autonomous motivation of telemarketers, thereby improving job performance, but these relationships were weakened by phone operational outcome control (i.e. activity-based control), such as call time.

Their argument aligns with the assertion made by Bolander et al. (2021) that activity performance relates to the level of sales efforts, indicating how hard salespeople work, whereas conversion performance relates to the quality of sales efforts, indicating how smartly they work. This study proposes that conflicting claims regarding the effectiveness of activity-based control systems in new product selling can be organized based on the quality of sales efforts. The core of M. Ahearne et al. (2010) rationale is the adaptive selling capabilities of salespeople. Salespeople with adaptive selling capabilities fit well with outcome-based control systems that provide flexibility in the sales process. Therefore, salespeople with a high sales effort quality can achieve better outcomes with a low sales effort quantity. However, salespeople lacking adaptive selling capabilities cannot select the most suitable products for promising customers. These salespeople have low sales effort quality and need to increase their sales efforts to achieve outcomes.

Previous studies have demonstrated that the abilities of salespeople can lead to the purchase of new products through the adoption of customers' new product knowledge (Endres et al., 2024). Additionally, technical and salesmanship skills have been found to enhance sales performance (Ohiomah et al., 2019). Research has used proxies of sales capabilities, such as sales experience and education (Fujii, 2024), and age and/or tenure (Park et al., 2023; Vieira et al., 2022). Furthermore, rather than measuring capabilities directly, some studies have focused on verifying the effects of capability-based control, finding that it can reduce salespeople's turnover intentions (Bande et al., 2021) and increase work engagement and creative performance (Hu et al., 2024). However, other research has shown that capability-based control is unrelated to operational performance (Conde et al., 2023). According to Epler et al. (2023), ability control enables adaptive selling, and Miao et al. (2022) have demonstrated that adaptive selling enhances sales performance. Nonetheless, none of these studies have addressed how the quality of sales effort moderates the relationship between the quantity of sales effort and salesperson performance. The effects of sales effort quality are realized when the effort is actually exerted. High-capability salespeople achieve results with less effort, whereas low-capability salespeople need to exert more effort to achieve the same results. Therefore, this study proposes the following hypothesis.

H5: The effect of sales effort quantity on the number of newly generated projects for new product selling is lower for salespeople with higher sales effort quality.

H6: The effect of sales effort quantity on the number of successfully closed projects for new product selling is lower for salespeople with higher sales effort quality.

H7: The effect of sales effort quantity on future sales quotas is lower for salespeople with higher sales effort quality.

Data and analysis model

Research site and data collection

The research site is a Japanese electrical part supplier. The company mainly distributes other manufacturers' products but also develops in-house products and customizes electrical parts according to customers' requests. Moreover, the company has a manufacturing function because it holds some electrical part makers as subsidiaries. Salespeople respond flexibly to individual customer needs by customizing and combining internal and external products. Sales capabilities supported by development, customization, and manufacturing function are the company's critical strength.

The company, whose products have a technical lifecycle, emphasizes new product selling because customers who purchase new products are more retainable. Additionally, selling a new product is a major means of acquiring new customers who are likely to continue purchasing the product during its lifecycle. The company defines new products as those launched within 3 years.

The company evaluates salespeople's performance twice a year. In other words, the budgetary period for performance evaluation of salespeople is 6 months. The collected data covered eight periods from April 2016 to March 2020 (48 months/6 months per period). The number of salespeople was 11, except for sales managers. Although 11 people were the targets initially, some of them temporarily left or retired from the company during these eight periods. Thus, the final number of samples was reduced to 75.

Two datasets were created for this study. The first dataset analyzed the effects of sales efforts level and quality level on project generation and closure. Seventy-six samples from this dataset were included in the analysis. The second dataset examined the impact of sales quantity and quality on future sales quotas. Owing to the time lag between the independent and dependent variables, the number of samples was reduced by a single period. Thus, 69 samples were analyzed.

To collect data on salesperson performance, we consulted the records of the activity control system and outcome control system operated by the company. The data were anonymized so that salespeople could not be identified. We provided feedback to the salespeople on the results of the analysis. Moreover, we explained to the salespeople that the results of the analysis would be used in our study. We informed them that their data had been anonymized and that the statistical analysis presented in the study would be highly averaged. Then, we requested their consent to use their performance data for research purposes. Approval to conduct research based on this procedure was obtained from the Human Subjects Research Review Committee at Tohoku Gakuin University. The approval number is 2023-029. Consent was obtained in written form from the participants. The first author delivered a 2-hour presentation about the purpose and results of the analysis. Additionally, the first, second, and last authors further explained that participants' confidentiality would be fully protected, as the results would be disclosed only in a highly aggregated form after statistical analysis. We also emphasized that participants could withdraw from the survey at any time and that declining to participate would not result in any social losses.

Measures

In this study, all variables used for hypothesis testing were objective secondary data regularly measured by the focal company's internal systems, rather than subjective primary data measured by researchers. Figure 2 summarizes how objective salesperson performance was repeatedly measured.

Current sales quota and future sales quota

A Japanese electrical parts supplier measures its sales quota based on a year-to-year comparison of sales. Current sales quota refers to the quantum of sales recorded in the present accounting cycle, and future sales quota pertains to the sales figure in the next accounting cycle.

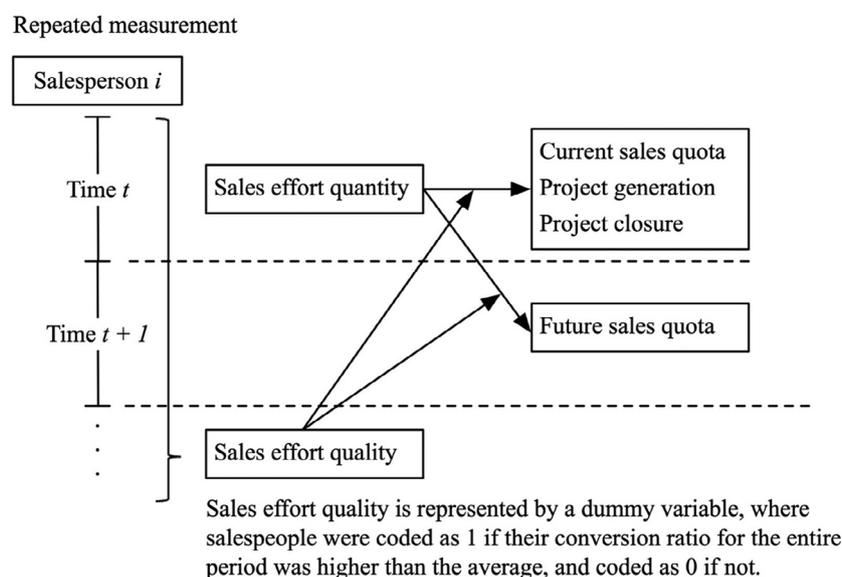


Figure 2. Repeated measurements of salesperson performance used in the analysis.

Project generation

The Japanese electrical parts supplier measures revenue milestone performance through an internal project management system for new product selling. The system sets the following four revenue milestones: (1) product appeal, (2) sample provision, (3) customer examination and consideration, and (4) acceptance. The dates on which each customer passed through each of the four milestones are recorded. Although most projects are developed based on salespeople's product appeal, a non-negligible portion of the total projects skips some of the first three milestones. For example, a project may be generated through contact with a customer, skipping the first milestone (i.e. product appeal). In this case, the project may start at the second milestone (i.e. sample provision). Thus, the project generation date is defined as the earliest of the four milestones. We measured the number of projects generated per salesperson every 6 months.

Project closure

As a project-closing measure, we used the number of accepted projects per salesperson over a 6-month period. For the Japanese electrical parts supplier, the time elapsed from project generation to closing (i.e. acceptance) was approximately 145 days (4.8 months) on average, and 44.5 days (1.5 months). Customers often reached the first three milestones on the same day but took longer to pass the third milestone (i.e. customer examination and consideration) to the last milestone (i.e. acceptance).

Sales effort quantity

We measured sales effort quantity through an internal information system for sales activities. The system records the working days, days of customer visits, and number of meetings for new product selling by each salesperson. Among them, the number of meetings was chosen as the measure of sales effort quantity for hypothesis testing because salespeople meet customers to appeal new products, provide samples, support customer examinations, and negotiate deals.

Sales effort quality

When measuring capabilities, subjective perception measures are used, such as adaptive selling, salesperson creativity (Epler et al., 2023), technical skills, and salesmanship skills (Ohiomah et al., 2019). Examples of objective measures for capabilities include salespeople's age (Vieira et al., 2022), tenure (Bande et al., 2021), sales experience, and education (Fujii, 2024). However, these are proxies for capability variables. As Bolander et al. (2021) pointed out, conversion performance reflects the quality of sales efforts, which is associated with capabilities of the adaptive selling. Thus, a dummy

variable was created to categorize salespeople into those with higher capabilities and those without based on the conversion ratio from project generation to project closure. Salespeople were coded as 1 if their average conversion ratio for the eight periods exceeded the overall average and coded as 0 if not.

Analysis model

A repeatedly measured dataset enables the control of time-invariant unobserved heterogeneity between salespeople based on fixed effects or multilevel regression models (Hamaker & Muthén, 2020; Matsuoka, 2022). These models can explain within-salesperson variance (Bolander et al., 2021) because they control for unobserved factors that are unique to each salesperson without using control variables. For example, variables such as tenure and sales experience are between-salesperson level variables, while sales performance is a within-salesperson level variable. Analysis based on repeated measures data can partition the variance between the between-salesperson level and the within-salesperson level. This allows for the exclusion of tenure and sales experience from the analysis of the within-salesperson level, ensuring they do not influence the period-to-period variation in sales performance.

Although multilevel regression models have an advantage over fixed-effects models in identifying the effect of time-invariant variables at the between-salesperson level, this study employed a fixed-effects model for two reasons. First, it did not focus on heterogeneity among salespeople. Second, as the dataset includes only 11 salespeople, statistical tests at the between-salesperson level based on multilevel regression models are not practical. Therefore, following the steps of a fixed-effects model (Allison, 2009), we created 10 dummy variables ($11 - 1$) for each salesperson and introduced them into the regression analyses.

Furthermore, project generation and closing are variables related to event frequency and follow a Poisson distribution. Therefore, in the fixed-effects model, with these variables as dependent variables, we conducted a Poisson regression analysis. The software used for the analysis was Mplus Version 8.10.

Results

Correlation between revenue milestone and outcome measures

Table 1 presents the means, standard deviations, and correlations among the variables. Three interesting phenomena are observed based on the correlation coefficients. First, future sales quotas were significantly and *positively* correlated with project generations ($r=0.429$, $p<0.01$) and closures ($r=0.438$, $p<0.01$). This suggests that even if projects for new product selling are successfully generated and closed in the current accounting cycle, the revenue from product delivery may be carried over to the next accounting cycle. Next, current sales quotas are significantly and *negatively* correlated with project generation ($r = -0.212$, $p<0.10$) and sales effort quantity ($r = -0.249$, $p<0.05$). This implies that securing a sales quota in the current accounting cycle spoils new product selling, thus affecting future outcomes. Finally, there was a significant positive correlation between project closure and project generation ($r=0.736$, $p<0.01$). This implies that a sufficient number of project generations must be performed as a prerequisite for increasing project closures. Next, we examine how the level and quality of sales efforts are related to future sales quotas, project contracts, and project generation using a fixed-effects model.

Table 1. Descriptive statistics and correlations.

	Mean	S.D	(1)	(2)	(3)	(4)	(5)
(1) Future sales quota	-0.855	50.041					
(2) Current sales quota	3.017	52.137	-0.351***				
(3) Project generation	5.240	7.229	0.429***	-0.212*			
(4) Project closing	2.413	4.073	0.438***	-0.101	0.736***		
(5) Sales effort quantity	101.080	29.999	0.086	-0.249**	0.246**	0.242**	
(6) Sales effort quality ¹	0.493	0.500	0.241**	-0.016	0.255**	0.358***	0.040

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$.

¹1 = Salespeople with higher selling capabilities, 0 = Salespeople with lower selling capabilities.

Table 2. Effects of sales effort quantity and sales effort quality on project generation, project closure, current sales quota, and future sales quota.

	Current sales quota		Project generation		Project closing		Future sales quota	
	β	S.E	β	S.E	β	S.E	β	S.E
Model 1: Main effect of sales effort quantity								
Sales effort quantity	-0.348	0.125***	0.324	0.048***	0.400	0.070***	0.047	0.129
Model2: Interaction effect of sales effort quality								
Sales effort quantity	-0.352	0.119***	0.370	0.049***	0.534	0.089***	0.052	0.129
Sales effort quality ¹	-0.386	0.183**	0.572	0.097***	0.591	0.148***	0.125	0.199
Sales effort quantity ²								
Sales effort quality	0.182	0.118	-0.218	0.049***	-0.302	0.090***	-0.044	0.127

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$.

¹1 = Salespeople with higher selling capabilities, 0 = Salespeople with lower selling capabilities.

²Dummy variables for each salesperson are omitted.

Main effects of sales effort quantity

Model 1 in Table 2 shows the results of the main effects of sales effort quantity on the current sales quota, project generation, project closure, and future sales quota. Sales effort quantity significantly and negatively influenced current sales quota ($\beta = -0.348$, $p < 0.01$), supporting H1. This result suggests that, due to the time lag between sales and accounting cycles, efforts for new product selling may hinder the achievement of current sales quotas, thereby rationalizing the use of revenue mileposts as intermediate outcomes.

Sales effort quantity had a statistically significant positive effect on project generation ($\beta = 0.324$, $p < 0.01$), which supports H2. Furthermore, sales effort quantity had a statistically significant positive effect on project closure, supporting H3 ($\beta = 0.400$, $p < 0.01$). These results indicate that sales effort quantity is reflected in revenue milestone performance, including project generation and contracts, within the same accounting cycle in which the sales effort quantity occurred. However, sales effort quantity does not have a statistically significant relationship with future sales quotas ($\beta = 0.047$, n.s.). Therefore, H4 is not supported. This may be because revenue generation can be distributed over multiple future periods and not just the next accounting cycle. For example, in businesses dealing with electronic components, such as semiconductors, orders are placed every time customers produce their products, and this continues till the product lifecycle lasts. Therefore, the realization of revenue spans multiple periods. In such cases, the relationship between sales efforts and future sales quotas may weaken.

Moderating effects of sales effort quality

Model 2 in Table 2 shows how sales effort quality of salespeople moderates the effect of sales effort quantity. Even after introducing the interaction term of sales effort quality, the effects of sales effort quantity on project generation and project closure remained significant and positive, with $\beta = 0.370$ ($p < 0.01$) and $\beta = 0.534$ ($p < 0.01$), respectively. Additionally, sales effort quality had statistically significant positive effects on project generation and project closure, with $\beta = 0.572$ ($p < 0.01$) and $\beta = 0.591$ ($p < 0.01$), respectively. These results suggest that both hard and smart work contribute to new product selling. The interaction term of sales effort quantity and sales effort quality negatively and significantly influences project generation ($\beta = -0.218$, $p < 0.01$) and project closure ($\beta = -0.302$, $p < 0.01$), supporting H5 and H6. This implies that hard work is less effective in new product selling to salespeople who can engage in smart work. On the other hand, the interaction term of sales effort quantity and quality does not significantly influence future sales quota ($\beta = -0.044$, n.s.), rejecting H7.

To foster visual understanding, Figure 3 and Figure 4 illustrate the interaction effects of sales effort quantity and quality. Figure 3 shows that for salespeople with high-quality sales effort, the logarithmic mean of project generation increases by only 0.140 (2.050 – 1.910) as the number of sales meetings increases from below average to above average. Additionally, Figure 3 indicates that for salespeople with

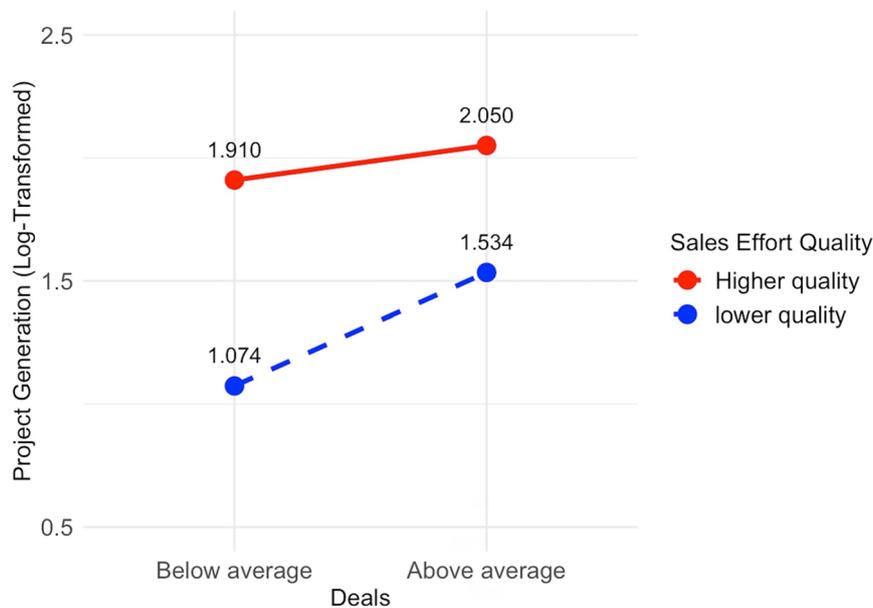


Figure 3. An illustration of the interaction effect of sales effort quantity and quality on project generation.

low-quality sales effort, the logarithmic mean of project generation increases by 0.440 (1.534 – 1.074) when the number of sales meetings rises from below average to above average. Thus, the effect of the number of sales meetings on project generation is 0.300 (0.440 – 0.140) smaller for salespeople with high-quality sales effort.

Figure 4 demonstrates that the same interaction effect applies to project contracts. According to Figure 4, for salespeople with high-quality sales effort, the logarithmic mean of project contracts increases by only 0.276 (1.529 – 1.253) as the number of sales meetings increases from below average to above average. On the other hand, for salespeople with low-quality sales effort, the logarithmic mean of project contracts increases by 0.735 (0.435 + 0.300) when the number of sales meetings rises from below average to above average. Thus, the effect of the number of sales meetings on project contracts is 0.459 smaller for salespeople with high-quality sales effort.

Finally, although unrelated to the hypotheses, an analysis was conducted to determine how sales effort quantity and sales effort quality, as well as their interaction term, affected the current sales quota. The results revealed that current sales quota was negatively influenced by both sales effort quantity and sales effort quality, with $\beta = -0.352$ ($p < 0.01$) and $\beta = -0.386$ ($p < 0.05$), respectively. The interaction term between sales effort quantity and sales effort quality does not have a statistically significant impact on sales quota. These findings suggest that, even after controlling for sales effort quality, increasing sales effort quantity in new product selling makes the achievement of sales quotas more challenging. These results reiterate the rationale for using revenue mileposts as an intermediate outcome for new product selling. Table 3 summarizes the results of hypothesis testing.

Discussion

Implications for literature development

Using performance data provided by SMCSs rather than salespeople's perceptions, this study deepens we deepen our understanding of how the design of outcome-, activity- and capability-based controls can promote or inhibit new product selling. To align salespeople's goals with those of the organization (Darmon & Martin, 2011) and guide long-term organizational prosperity, SMCSs must be designed carefully. Despite their importance, research on the role of salespeople in new product selling has been limited. Hence, this study has some significant implications.

In terms of implications for literature development, we identified three areas. First, this study demonstrates that the quantity of sales effort in new product selling is reflected in revenue mileposts, such as

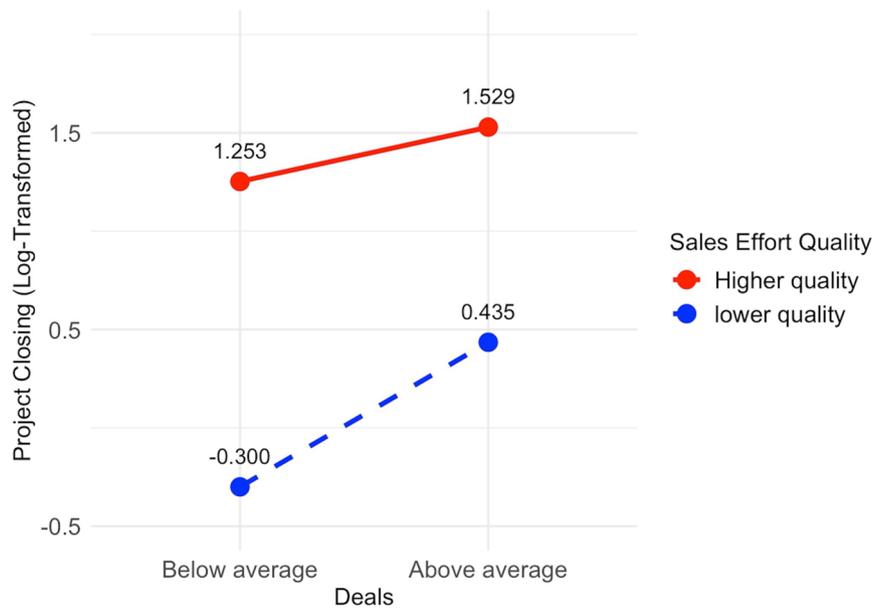


Figure 4. An illustration of the interaction effect of sales effort quantity and quality on project closing.

Table 3. Summary of hypothesis testing.

Hypotheses	Hypothesized directions	Results
H1:Sales effort quantity → current total sales quota	-	Supported
H2:Sales effort quantity → project generation	+	Supported
H3:Sales effort quantity → project closure	+	Supported
H4:Sales effort quantity → future sales quota	+	Rejected
H5:Sales effort quality → the effect of sales effort quantity on project generation	-	Supported
H6:Sales effort quality → the effect of sales effort quantity on project closure	-	Supported
H7:Sales effort quality → the effect of sales effort quantity on future sales quotas	-	Rejected

project generation and closure, rather than current and future sales quotas due to the time lag between sales and accounting cycles. Research attempting to measure the impact of sales effort quantity should prefer revenue mileposts as dependent variables over accounting performance measures, such as sales quotas, to avoid misconceptions suggesting that increased sales effort quantity cannot yield results. This study also reveals that the level of new product selling efforts hinders the achievement of sales quotas within the same accounting cycle, likely because of the greater effort required for new product selling, with the consequence of reducing resources available for existing product selling. Thus, using outcome-based control systems, which convey budgetary pressure to salespeople through responsibility accounting, may lead to myopic revenue management by biasing sales efforts toward existing products. The demonstration of the negative aspects of outcome-based control systems constitutes a significant contribution to this study.

Second, it disentangles conflicting arguments about the effectiveness of outcome-based versus activity-based control systems in new product selling by demonstrating how sales effort quality influences the relationship between sales effort quantity and intermediate outcomes. This reveals that higher sales effort quality weakens the effect of sales effort quantity on the intermediate outcomes (project generation and contracts). This indicates that outcome-based control systems are more effective for smart workers with high-quality sales efforts, whereas activity-based control systems are preferable for hard workers with low-quality sales efforts. Hence, future studies examining the effectiveness of these control systems should consider the quality of the sales efforts.

Third, this study examines the relationships between objective performance data provided by SMCSs, particularly Bolander et al. (2021) distinction between activity performance and conversion performance as representations of sales effort quantity and sales effort quality, respectively. These had positive effects on objective intermediate outcomes such as project generation and closure but negative effects on final outcomes such as sales quotas. All variables were measured as objective data, making the study's

findings unbiased, verifiable, and compelling. This study leveraged the strengths of panel data using fixed-effects models, successfully controlling for unobserved heterogeneity at the salesperson level. Although studies using objective data are significantly less common than those based on subjective data (Kerr & Marcos-Cuevas, 2022), studies based on surveys measuring all dimensions of activity, conversion, and outcome performances as objective data are scarce (Bolander et al., 2021). Hence, this study fills this gap by demonstrating hypothesis testing using objective data while controlling for salesperson-level unobserved heterogeneity.

Managerial implications

The results have several managerial implications. First, companies that deal with short-life-cycle high-tech products and where new product selling plays a critical role in a company's survival should consider incorporating revenue mileposts as intermediate outcomes within their outcome-based control systems (Glover & Ijiri, 2002; Matsuoka, 2020). Although sales quotas are commonly used in outcome-based control systems, they can suppress efforts toward new product selling because of the time lag between the sales and accounting cycles. This does not imply that sales quotas should not be used; the control of salespeople based on accounting performance measures is essential for generating revenue beyond the break-even point and maintaining or strengthening financial health. However, the negative effects of outcome-based control systems on salespeople must also be considered. In the long term, a company's strength deteriorates if sales of new products decline. To mitigate the negative effects of accounting outcomes, using intermediate outcomes related to future revenue is effective because they can materialize within the accounting cycle in which sales efforts are made. For example, this includes the number of potential customers acquired through prospecting, the number of new product sales projects generated, the progress of these projects, and the closure of projects. All of these are revenue mileposts that occur before actual sales revenue is realized.

Second, companies should consider varying the weights of their outcome- and activity-based control systems according to their salesperson capabilities. The findings suggest that sales effort quality influences sales effort quantity in new product selling. This implies that applying a uniform control system to all salespeople in an organization may not be appropriate. If SMCSs emphasize outcome-based control systems, hard workers may be tempted to engage in myopic revenue management, whereas a focus on activity-based control systems can constrain the potential of smart workers. A possible approach is to rank salespeople according to their sales effort quality and adjust the weights of their outcomes and behaviors accordingly. For example, as demonstrated in this study, categorizing salespeople based on past project conversion rates is one method. Alternatively, position titles or internal certification systems could also be employed. Using such methods, sales representatives can be classified into smart workers, who consistently deliver high-quality sales efforts, and hard workers, who engage in low-quality sales efforts. Salespeople can be categorized as smart workers with consistently high-quality sales efforts and hard workers with low-quality sales efforts. Companies aiming to foster smart workers should use capability-based control systems that measure, monitor, and reward salespeople's skills and abilities (Challagalla & Shervani, 1996; Miao & Evans, 2012, 2013, 2014).

Finally, if companies value the quality of sales efforts, they should advance the use of conversion performance. As Bolander et al. (2021) demonstrate through a survey of practitioners, conversion performance is perceived to be less important than activity or outcome performance. However, this study's findings suggest that smart salespeople with high-quality sales efforts not only efficiently progress new product selling but also potentially lead large-scale new product selling projects to success. Applying conversion performance is more effective in understanding how much improvement in knowledge and skills through training contributes to enhancing the quality of sales efforts. In this study, we have utilized the conversion ratio from project generation to project closure (i.e. project success rates), but various conversion performance measures are possible, such as activity conversions (meetings/calls and proposals/meetings) and outcome conversions (deals/calls and deals/meetings) (Bolander et al., 2021). Moreover, the use of conversion performance may encourage the adoption of capability-based controls. Applying conversion performance measures is more effective for understanding how much improvement in skills and abilities through training and that contributes to enhancing the quality of overall sales activities.

Limitations and future research directions

This study's contributions are substantial; however, it has some limitations. First, hypotheses 4 and 7 were not supported. There are various uncertainties between current activities and future revenues. Unraveling these factors is an interesting challenge for future research. Second, it used a dataset from small- and medium-sized enterprises; therefore, the sample size was small. However, as shown by Hultink and Atuahene-Gima (2000), meaningful results can be obtained even from a small number of samples. Increasing the sample size should not be solely for the purpose of achieving statistical significance; more data can lead to more stable estimations. Third, it focused on small- and medium-sized enterprises in Japan dealing mainly with semiconductors; however, the results may vary for different sectors and contexts. Research using secondary data is still in its early stages and it will be necessary to conduct more research utilizing secondary data in the future. Finally, it addressed only parts of the SMCSs, the outcome-, activity-, and capability-based control systems, without addressing others such as input control systems related to sales resource acquisition (Kim & Tiwana, 2016; Tienken et al., 2023) or informal control systems (Malek et al., 2022). It is challenging to cover all dimensions in one study; however, examining how these factors interact with other control systems in the context of new product selling is a promising topic for future research.

Authors' contributions

Conception and design: K. Matsuoka, H. Ishii, and Y. Zhu. Acquisition, analysis, and interpretation of the data: K. Matsuoka, H. Ishii, and A. Kawaguchi. Drafting the paper: K. Matsuoka and Y. Zhu. Reviewing the paper critically for intellectual content: All authors. The final approval of the version to be published: All authors. Agreement to be accountable for all aspects of the work: All authors.

Disclosure statement

The second and last authors are the CEO and CFO of the research site company, respectively.

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Data availability statement

The salespeople of this study did not give written consent for their data to be shared publicly, so due to the sensitive nature of the research supporting data is not available.

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