

Incentives and Job Redesign: The Case of the Personal Selling Function

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1. INTRODUCTION

The design of incentive plans for salespeople has received substantial attention in the theoretical and empirical business literature (see, for example, Banker, Lee and Potter 1996; Banker, Lee, Potter, and Srinivasan 1998; Basu, Lal, Srinivasan, and Staelin 1985; Joseph and Thevaranjan 1998). In much of this work, the optimal compensation plan is derived in a context wherein a firm interacts with a single salesperson who is responsible for *all* tasks associated with the personal selling function. Field practice, however, differs somewhat from this conceptualization. In particular, a critical decision facing sales firms today is whether to provide salespeople with an assistant to help with a key activity associated with the personal selling function, namely, lead qualification. In such situations, it is likely that firms will jointly maximize the organizational structure as well as the level of incentives. Thus, our primary objective in this paper is to extend the literature by analyzing a model that *simultaneously* solves for the level of incentives as well as the optimal job design.

We conceptualize the selling function as consisting of two distinct activities, namely, identifying high-quality leads and engaging in face-to-face communication. We then consider two job designs. In the first, both activities are assigned to the salesperson. In the second, an individual is hired to assist the salesperson with the task of lead qualification so that the salesperson's time is freed up to improve the quality of the face-to-face interaction. Following industry practice, we will refer to this second agent as the "bird-dog."¹

Given this description of the selling function, we organize our investigation as follows. We analyze a firm that currently utilizes the salesperson-alone structure but is seriously considering whether to hire a bird-dog. We then ask the following research questions: Should the firm hire a bird-dog to assist the salesperson? How are the incentives offered to the salesperson affected by introducing the bird-dog? And, what can the firm expect by way of division of responsibilities under the team structure?

Of course, we are not the first to examine the relationship between incentives and job design. Hemmer (1991) analyzes a model which examines how to optimally organize a manufacturing process. His main focus is to obtain insights into the effect of production technology on the relative advantages of the "assembly-line" and "team" approaches. In contrast to the manufacturing setting analyzed by Hemmer (1991), our model focuses on the job design issue within the personal selling function. Consequently, the two models are driven by very different sets of institutional features. Hemmer (1991), for instance, analyses three efforts across two stages, namely, quantity, quality, and finishing whereas we analyze two efforts across two stages, namely, quality of lead qualification and quality of face-to-face communication. More significantly, Hemmer considers all agents to be of equal ability whereas we specify the bird-dog to be less skilled than the salesperson. In particular, we specify that the bird-dog can perform

¹ In addition, whenever required, we will use the masculine gender for both agents.

only lead qualification and even in this activity, he is less able than the salesperson. Obviously, these differences lead to different findings as well. Hemmer (1991) finds job design to be determined in a non-monotonic fashion by the sophistication of the production technology whereas we find it to be a monotonic function of the *ability of the bird-dog*. In addition, we also find that the *level of incentives* offered to the salesperson under the salesperson-alone structure plays a key role in how the responsibilities will be divided between the two agents under the team structure.

In fact, we characterize our analytical results in a two-dimensional space defined by the ability of the bird-dog and the level of incentives currently offered to the salesperson. In particular, the vertical axis of this space serves as a measure of the ability of the bird-dog at lead qualification. The horizontal axis of this space serves as a measure of the level of incentives that the firm will use if only the salesperson is employed by the firm. This is determined by the risk-related trade-offs described in the extant agency-theoretic models. Not surprisingly, this benchmark level of incentives decreases with the level of risk-aversion of the salesperson as well as the extent of environmental uncertainty.

Under these considerations, our key findings are two-fold and can be summarized as follows. First, we find that even though the bird-dog is not as skilled as the salesperson, the level of sales is higher when the firm utilizes a team structure rather than the salesperson-alone structure. This is because the effort of the bird-dog allows the salesperson to devote more of his time towards improving the quality of the face-to-face communication. Surprisingly, even though sales are higher with the team structure, the firm will not always choose to employ a team. *Substantively, this finding suggests that the team structure may not be appropriate for all industries.*

Second, we find that in those situations where the firm chooses to employ a team structure, the salesperson may not necessarily delegate lead qualification entirely to the bird-dog. Specifically, when the quality of the bird-dog is low relative to the level of salesperson-alone incentives, both the bird-dog as well as the salesperson devote attention to lead qualification. Moreover, the level of incentives offered to the salesperson is *unaffected* by the introduction of the bird-dog. However, when the quality of the bird-dog is high relative to the level of salesperson-alone incentives, the salesperson delegates lead qualification entirely to the bird-dog. Moreover, the level of incentives offered to the salesperson *increases* on account of the introduction of the bird-dog. *Our results here thus reveal that the level of incentives and the optimal job design are related, albeit in a complex manner.*

Our focus on the efficient design of the person selling function is warranted because sales managers are constantly searching for new ways to improve sales force productivity. Enhancing salesperson productivity is of great importance to sales firms because the cost of a single sales call can be as high as \$ 250 and these costs continue to escalate (Marks 1994). Increasingly, sales managers are coming to view assistance with lead qualification as a means of holding down sales costs and improving sales force productivity (Chatterjee 1996). However, despite the practical significance of this topic, there is very little theory available to help sales managers. Our paper is an attempt to redress this situation.

The rest of the paper is organized in the following manner: in the next section, we describe the key features of our research setting. Then, we describe our model and analysis. Next, we present and discuss our findings in the form of four key

Propositions. Finally, we discuss the implications of our research efforts and conclude by summarizing our research contributions.

2. RESEARCH SETTING

We begin by describing the nature of effort and how the two agents allocate effort within the system. We then describe our sales response function. Next, we describe the compensation contracts offered to the agents. Finally, we conclude this section by describing the utility functions associated with the two workers.

2.1 Nature of Effort

We specify that effort in the system is directed at two tasks, namely, lead qualification and improving the quality of the face-to-face communication. The nature of effort in enhancing lead qualification can be described as follows. In this task, customers are pruned from a master list with a very large number of entries, N , to a smaller set, n . It is on these n customers that the salesperson will call during the period. In our setting, devoting effort to lead qualification essentially consists of applying criteria to screen out poor prospects. When zero effort is devoted to lead qualification, no screening is done and the n customers are simply chosen randomly from the N entries. Consequently, the n targeted customers are of the same quality as the average customer on the master list. However, as more and more effort is devoted to lead qualification, more and more criteria are brought into play and the list is essentially pruned with a more selective filter. Consequently, even though n customers are again randomly chosen from the surviving set of customers, they are of better quality since the pool from which they are chosen is of relatively high quality.

We utilize such a mechanism to describe the process of lead qualification for two reasons. First, it allows us to parsimoniously link effort and lead qualification. Second, it allows for lead qualification to be conducted exclusively by either agent or sequentially by both agents. In the latter case, the salesperson uses additional criteria to further refine the reduced list provided by the bird-dog.

The nature of effort in improving the quality of the face-to-face communication is as follows. In straightforward fashion, we posit that effort invested in this task improves the quality of the face-to-face communication. We further assume that this activity requires highly specialized skills. As such, it can only be performed by the salesperson. Overall, we observe that the two efforts improve the *quality* of the two activities in the system.²

2.2 Effort Allocation

Here, we discuss how the agents allocate effort across the two activities. For ease in exposition, we introduce the following notation. We denote total effort by t and effort directed at lead qualification as q . In addition, we also use the subscript 1 to denote variables associated with the salesperson and the subscript 2 to denote variables associated with the bird-dog. In our setting, we posit that the bird-dog is relatively unskilled. Thus, the only task he is competent of performing is lead qualification. Consequently, his entire effort, t_2 , is directed at lead qualification, q_2 (i.e., $t_2 = q_2$). The salesperson, on the other hand, is highly skilled and can perform both tasks. His total effort, t_1 , is channeled between selling and lead qualification. We specify that the

² In effect, we implicitly assume that the agency problem in our setting arises with respect to effort quality. The *quantity* aspect of the salesperson's efforts (i.e., number of customers called) is enforced by verifying the salesperson's call report.

amount of effort that the salesperson devotes to lead qualification is given by q_1 . Consequently, the amount of effort devoted by the salesperson on improving the quality of the face-to-face communication is simply given by $t_1 - q_1$.

2.3 Sales Response Function

Clearly, the overall effectiveness of the personal selling function is likely to be influenced in an interactive way by the care devoted to the two activities, namely, lead qualification and face-to-face communication. Accordingly, we model the impact of these two activities in generating sales as follows:

$$x = \sqrt{(q_1 + \phi q_2)(t_1 - q_1)} + e \quad [1]$$

where,

x = sales generated in the system,

q_1 = effort devoted by the salesperson on lead qualification,

ϕ = a measure of the ability of the bird-dog at lead qualification,

$$0 < \phi < 1,$$

q_2 = effort devoted by the bird-dog on lead qualification,

$t_1 - q_1$ = effort devoted by the salesperson on face-to-face communication, and

e = random shock to account for environmental uncertainty,
distributed $N(0, \sigma^2)$

The first bracketed term in equation (1) represents the quality of the n leads. The second bracketed term incorporates the quality of the face-to-face presentation. The multiplicative functional form captures the fact that the marginal benefit of quality in one activity is a function of the level of quality in the other activity. The square root simply accounts for diminishing marginal returns.

Equation (1) reveals that, in general, the lead qualification process is influenced by the effort choices of both agents with respect to this activity. In other words, both their efforts are useful in arriving at a better set of customers. However, given that the salesperson has a more intimate understanding of the market, we specify that the bird-dog is less productive than the salesperson in this task. Thus, the bird-dog's efforts at lead qualification are scaled by a factor ϕ .

Next, note that our specification that the quality of the face-to-face interaction is determined by $t_1 - p_1$ implies that the salesperson's attention to lead qualification decreases the amount of effort available to improve the quality of the sales presentation. Thus, providing a bird-dog to assist with lead qualification frees up the salesperson's time to improve the quality of face-to-face communication.

Finally, we include the random shock to account for other factors in the environment that can influence the level of sales. Examples of such factors include unpredictable effects of the firm's own marketing mix, competitive actions, and volatility in industry sales.³

³ In practice, the level of dollar sales is bounded above by the maximum potential in the market and bounded below by zero. Thus, our specification of a normal error structure violates these natural bounds. However, as in previous research, we assume that these violations occur with extremely small probabilities. Moreover, the symmetric nature of these violations makes it less likely that they will have a systematic impact on our substantive findings.

2.4 Compensation Plans

We specify that the salesperson is offered a linear ($A_1 + B_1 x$) compensation contract. Following observed industry practice, we specify that the bird-dog is offered a fixed salary contract (A_2) and that his efforts at lead qualification are observed without error by the firm. Thus, effort from the bird-dog is elicited through monitoring.

2.5 Utility Functions

Following the extant literature, we assume that both the salesperson and the bird-dog have a concave utility function that is separable in compensation, S , and effort, t . We also assume that the equivalent monetary cost of expending effort is quadratic in the level of effort expended. Finally, we assume that the salesperson has a negative exponential utility function with constant absolute risk-aversion (r). Under these considerations, the utility function of the two agents can be expressed formally as:

$$U_1(S_1, t_1) = U\left\{S_1 - \frac{t_1^2}{4}\right\} = -\exp\left[-r\left\{S_1 - \frac{t_1^2}{4}\right\}\right], \text{ and} \quad [2a]$$

$$U_2(S_2, t_2) = U\left\{S_2 - \frac{t_2^2}{4}\right\} = U\left\{S_2 - \frac{q_2^2}{4}\right\}. \quad [2b]$$

Given the compensation contracts for the two agents, we can now write the certainty equivalents of the expected utilities, CE, for the two agents as follows:

$$CE_1 = A_1 + B_1 \sqrt{(q_1 + f q_2)(t_1 - q_1)} - \frac{t_1^2}{4} - \frac{r}{2} B_1^2 S^2, \text{ and} \quad [3a]$$

$$CE_2 = A_2 - \frac{q_2^2}{4}. \quad [3b]$$

Obviously, both agents will choose to work for the firm only if their certainty equivalents exceed the certainty equivalents of their reservation utilities (μ_1 and μ_2 , respectively). Moreover, since the salesperson has greater ability at lead-qualification and also possesses unique face-to-face communication skills, we specify $\mu_1 > \mu_2$.

3. FINDINGS

As mentioned previously, we present our findings in a two-dimensional space. The vertical axis serves as a measure of the ability of the bird-dog while the horizontal axis represents the level of incentives that the firm will use if only the salesperson is employed by the firm. Further, because the bird-dog is monitored, we set the reference level of effort obtained from him to the *first-best level*, ϕ . In addition, because the salesperson is governed by incentives, we set the reference level of incentives obtained from him to the *second-best level*, $\frac{1}{(1 + 2rS^2)}$. For ease in exposition, we describe our findings in the form of four key Propositions. Our first Proposition is stated formally as:

Proposition 1:

Although the bird-dog is not as skilled as the salesperson, the level of sales generated by the salesperson is *higher* when the firm employs both the bird-dog as well as the salesperson

rather than the salesperson alone.

Proof: The proof of Proposition 1 as well as all subsequent Propositions can be obtained from the authors.

The intuition behind this Proposition is straightforward. When the firm employs a bird-dog to assist with lead qualification, the salesperson's time is freed up to devote greater attention to increasing the quality of face-to-face communication. This increased effectiveness in face-to-face communication leads to a higher level of sales.

Proposition 2: Although the level of sales generated by the salesperson is higher under the team structure, the firm will not always choose to employ a team. Specifically, in region I, the firm finds it profitable to assign the selling function exclusively to the salesperson. Moreover, the salesperson provides equal quality in the two activities.

According to Proposition 1, employing a bird-dog always results in increased sales. Nevertheless, this incremental benefit comes at a cost in that the firm has to pay the bird-dog his reservation wage in order to employ him. Clearly, when the ability of the bird-dog at lead qualification is fairly low, the incremental benefit may not exceed the incremental cost. This is precisely the case in Region I. Next, to understand why the salesperson chooses equal quality in the two activities, recall that our sales response function is multiplicative in the two activities while the cost function is quadratic in total effort. Consequently, the allocation which maximizes the welfare of the firm is one in which the quality of the two activities is equal. Fortunately, this is the preferred allocation for the salesperson as well; hence, this allocation is achieved without any difficulty.

Proposition 3: In Region II, the firm finds it profitable to hire a bird-dog to assist the salesperson with lead qualification. The bird-dog will be asked to expend the first-best level of effort. The salesperson's incentives, and consequently, his effort, remain *unaffected* at the second-best level despite the introduction of the bird-dog. However, the division of responsibilities within the team is *incomplete* in that the salesperson also chooses to devote some effort to lead qualification. Further, in this region, the efforts of the agents yield *equal* quality in the two activities.

In this region, the ability of the bird-dog is large enough that it becomes worthwhile to hire him. Since the bird-dog is monitored, the firm elicits the first-best level of effort from him. Obviously, the bird-dog will devote all of his effort to lead qualification since this is the only activity that he is competent to perform. On the other hand, since the firm cannot monitor the salesperson, it elicits the second-best level of effort from him. Moreover, in this region, the relative magnitudes of the two efforts are such that the salesperson needs to devote some of his effort to lead qualification to ensure that it meets the firm's goal of equal quality across in the two activities. Fortunately, the

salesperson is willing to invest some effort in lead qualification because he is dissatisfied with the ability of the bird-dog at lead qualification.

Proposition 4: In Regions IIIA and IIIB, the firm again finds it profitable to

assign the selling function to the salesperson bird-dog team. The bird-dog will be asked to generate *less* than the first-best level of effort towards lead qualification. However, the salesperson's incentives, and consequently, his level of effort, will be *greater* than the second-best level of incentives. In addition, the division of responsibilities within the team is *complete* in that the salesperson chooses to devote no effort to lead qualification. Finally, in region IIIA, the efforts of the agents yield *equal* quality in the two activities whereas in region IIIB, the efforts of the agent yield *unequal* quality in the two activities

In regions IIIA and IIIB, as in region II, the ability of the bird-dog is large enough that it becomes worthwhile to hire him. As in region II, the firm has the option of eliciting the first-best level of effort from the bird-dog and the second-best level of incentives from the salesperson. However, in this situation, even if the salesperson allocates all of his effort to face-to-face communication the quality of the face-to-face communication will be lower than the quality of the leads. One way for the firm to achieve its goal of equal quality in the two activities is to distort the efforts induced from the two agents (i.e., induce less than the first-best from the bird-dog and more than the second-best from the salesperson). This is indeed the action taken by the firm in regions IIIA and IIIB. However, this distortion in effort also leads to welfare loss. Consequently, the firm may not always find it worthwhile to distort the efforts to such an extent that equal quality is obtained in the two activities. In particular, in region IIIA the firm distorts the efforts to the point where equal quality is obtained in the two activities. However, in region IIIB, the firm is better off by choosing a lower level of distortion while tolerating unequal quality in the two activities.

4. IMPLICATIONS AND CONCLUSION

Our substantive implications are four-fold and we now discuss them in turn. First, we find that although the introduction of the bird-dog always increases sales, the firm may not find it profitable to introduce a bird-dog. Specifically, as demonstrated by firms located in Region I of the parameter space, we find that the ability of the bird-dog has to exceed a critical level before it becomes profitable to employ such an agent. Thus, firms engaged in industries wherein the process of lead qualification is relatively complicated may find the skills of bird-dog to be inadequate. This may be the case in industries wherein the process of lead qualification requires intuitive and fuzzy criteria rather than well-defined, objective criteria. It is noteworthy to mention that organizational theorists commonly refer to such situations as being characterized by low task programmability (Anderson and Oliver 1987). *Overall, our finding here suggests that in those industries wherein the process of lead qualification is inherently less programmable, hiring support personnel is not an option to increase the efficiency of the personal selling function.*

Second, we find that the impact of introducing a team structure on the level of incentives offered to the salesperson as well as the effort induced from him is different in different parts of the parameter space. Intuitively, to the extent that the services of the bird-dog make the salesperson more productive, one would expect the introduction of a bird-dog to increase the salesperson's incentives. However, we find that this is not always the case. In situations where the quality of the bird-dog is low relative to the level of salesperson-alone incentives, no change is required in the level of incentives offered to the salesperson. Here, the only effect of introducing a bird-dog is one of *substitution* in that the bird-dog replaces some of the salesperson's effort on lead qualification. In contrast, in situations where the quality of the bird-dog is high relative to the level of salesperson-alone incentives, the impact of introducing a bird-dog is to increase the level of incentives offered to the salesperson. Here, the impact of introducing the bird-dog includes *both substitution and enhancement*. The substitution effect is that the bird-dog replaces the salesperson's effort on lead qualification. The enhancement effect is that the firm finds it worthwhile to induce more effort from the salesperson through the use of increased incentives.

Our third implication pertains to the division of responsibilities within the team structure. Surprisingly, we find that for a given level of ability on the part of the bird-dog, the division of responsibilities may be complete or incomplete. When the ability of the bird-dog is high relative to the level of salesperson-alone incentives, the team structure induces complete division of responsibilities in that the salesperson devotes no effort on lead qualification. However, when the ability of the bird-dog is low relative to the level of salesperson-alone incentives, the team structure induces incomplete division of responsibilities in that the salesperson also devotes some effort to lead qualification. *This findings suggests that management need not be surprised to find the salesperson continuing to expend effort on lead qualification even after being provided the services of a bird-dog.*

Our fourth and final implication pertains to the amount of effort induced from the bird-dog. In particular, we find that the amount of effort induced from the bird-dog may differ from situation to situation. In situations where the quality of the bird-dog is low relative to the level of salesperson-alone incentives, it is worthwhile for the firm to induce the first-best level of effort from the bird-dog. However, in situations where the quality of the bird-dog is high relative to the level of salesperson-alone incentives, the firm is best off under-utilizing the services of the bird-dog. Here, the relatively low level of incentives for the salesperson prevents the firm from fully utilizing the services of the bird-dog.

In closing, we remark that our paper extends the literature by introducing a framework that simultaneously solves for the level of incentives as well as the optimal job design in the context of the personal selling function. This is an important and timely extension because practicing sales managers are increasingly coming to view the provision of assistance with respect to lead qualification as a means of reducing selling costs. We hope that our framework and substantive findings will assist sales managers in the efficient design of the personal selling function.

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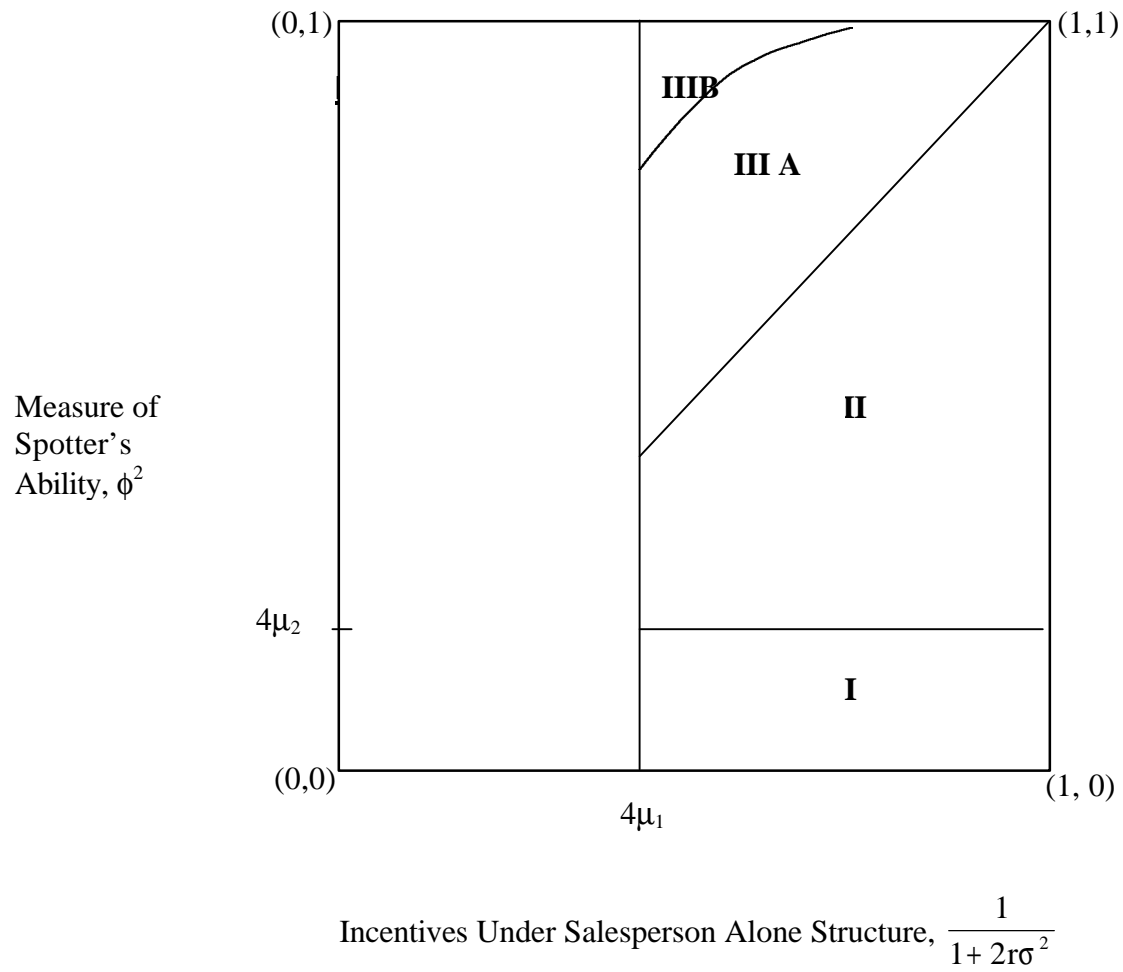


Figure 1. Shape of Regions