Sales force modeling: State of the field and research agenda

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Abstract Inspired by Erin Anderson's contributions to sales force research, this
paper focuses on research that utilizes quantitative models to investigate important
questions in sales force management. The purpose is to summarize several
significant developments in knowledge over the last 40 years and identify major

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opportunities for impactful theoretical, empirical, and decision model-based research in the future.

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Personal selling by sales forces is an important marketing instrument in many industries. Zoltners et al. (2008) report that the US economy is estimated to spend $800 billion on sales forces, almost three times the amount spent on advertising in 2006. The average company spends 10%, and some industries spend as much as 40% of their total sales revenues on sales force costs. A recent meta-analysis of econometric studies of personal selling sales response relationships indicates that the mean personal selling sales elasticity (corrected for methodological biases) is about 0.314, significantly larger than the mean advertising-sales elasticity of about 0.22 (Albers et al. 2008). Thus, sales forces have a significant impact on both top line and bottom line performance of firms, especially those in business markets. Enhancing sales force productivity goes a long way toward enhancing marketing productivity.

However, the volume of research on sales force topics in the leading marketing journals has not matched its importance in the marketing mix. For example, Zoltners et al. (2008) report that *less than 4% of articles* published in the *Journal of Marketing*, the *Journal of Marketing Research*, and *Marketing Science*, between 2001 and 2006 are sales-related. This is not to say that sales force research is being ignored in general. Indeed, Williams and Plouffe (2007) note that over 1,000 articles have been published in a 20-year period (1983–2002). However, they also find that the top three journals published a mere 10% of this total number of research articles. Further, based on their respective surveys, both Zoltners et al. (2008) and Williams and Plouffe (2007) agree that there is a shortage of relevant research on topics of greatest concern to sales executives. According to their Sales Executive Issue Inventory compiled from sales managers' responses, Zoltners et al. (2008) report that these topics include sales force structure, sizing, compensation, quota-setting, targeting, and territory alignment. This is very consistent with the finding of Williams and Plouffe (2007) that the field-level or implementation-oriented topics of time and territory management, quotas, forecasting, and budgeting/cost analysis topics involving "financial aspects of the firm's operations" were the least researched topics (*less than 3%* of published articles) by academics during the evaluated time period despite their obvious importance to successful sales practice.

Interestingly, all of these topics have been investigated to varying degrees using quantitative models over the years (e.g., Albers and Mantrala 2008) but, apparently, not in sufficient depth, applicability, or accessibility to resolve sales managers' continuing concerns in these areas. It is hard not to conclude that the bulk of academic research has been driven more by what scholars think is important and/or doable with data available for publication purposes rather than by managerial relevance—in effect "Looking under the light for keys dropped elsewhere?" Overall, real-world investments in sales forces clearly exceed formal knowledge of their management.

This paper focuses on research that is amenable to quantitative, economic, or econometric modeling to investigate what the authors view as relevant questions in

sales force management. Our goal is to summarize several significant developments in knowledge over the last 40 years and identify major opportunities for impactful problem-driven, model-based research in the future.

1 Sales force models research framework

To guide our discussion, we conceptualize a five-layered "complex" of sales force management *problem areas* deserving research as shown in Fig. 1. The outer peripheral layer is the interface between marketing strategy and sales where two broad problem areas are *the sales force role in the "Go-to-Market" (GTM) strategy* and achieving *Sales–Marketing cooperation*. The marketing strategy–sales interface overlays the sales force strategy layer involving seven key problem areas: "*make or buy*" (i.e., independent vs own sales forces, e.g., Anderson and Weitz 1986), optimal *sales force size*, *structure*, *salesperson selection*, *control system characteristics and metrics*, *compensation and control strategy* (*level*, *type*, *components*), and *training programs*. The Sales Force Strategy envelopes the sales force operation layer comprised of the more short-term problem areas of optimal *selling effort allocation*
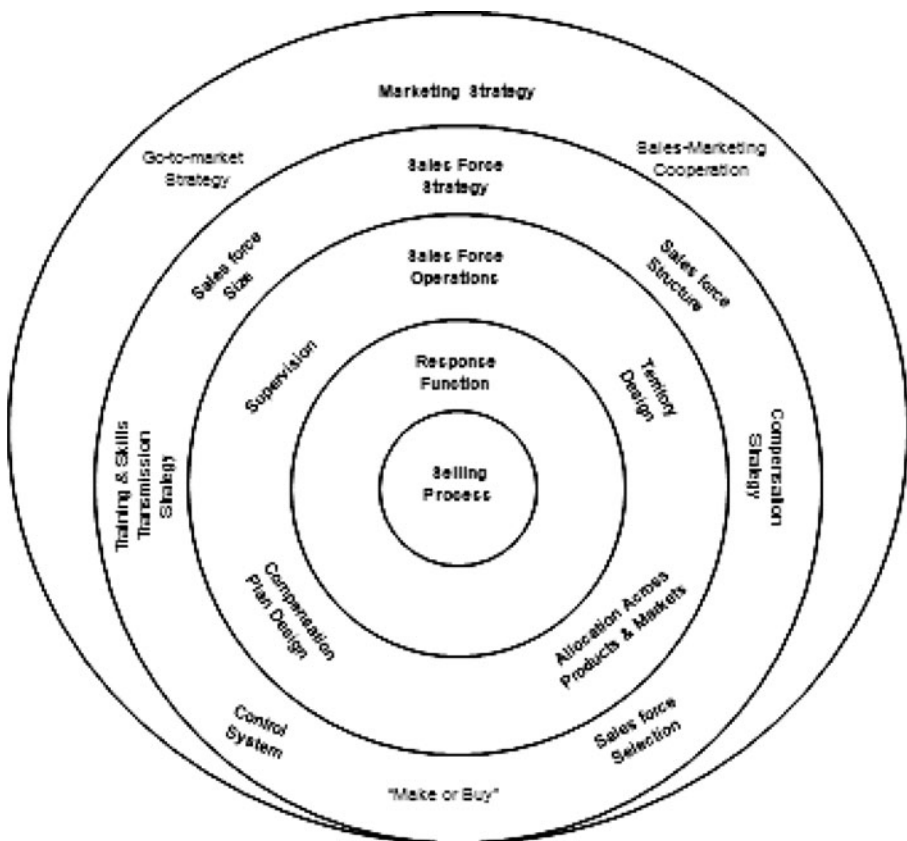

Fig. 1 The sales force models research complex

across products and markets, *territory alignment*, *deployment of sales supervisors* (e.g., district managers), *structuring compensation plans* (e.g., setting "gates" and "rates") *and incentive programs*. Optimization of Operations depends on the behavior of "Response Functions," the subject of the second innermost layer. Response functions represent how sales at relevant levels of aggregation vary with selling activities (efforts) and other external factors such as competitive and random environmental influences. The basic problem area in this layer is valid estimation of the effects of salespeople's selling efforts on sales for management and decision-making purposes. The selling efforts themselves would be guided by the *selling process*, i.e., the set of activities that management would like sales reps to actually do in their jobs. Therefore, we show the selling process at the core of our framework, encompassing problem areas such as determining the *optimal formats for sales-people's interactions with customers*.

Our concentric circles or "onion" conceptualization reflects the *interrelatedness* that prevails across and within the layers of the sales force management complex. Thus, optimization of any of the operations decisions depends on the assessments of the underlying response functions, as well as higher-level sales force strategy decisions, e.g., sizing. However, the latter in turn depend on how operations are executed, e.g., the optimal size of the sales force depends on how it is deployed across markets (see, e.g., Mantrala et al. 1992). These interdependencies considerably complicate the development of models for globally optimizing sales force decisions—especially considering the differing organizational groups, levels, and time horizons of stakeholders involved in these decisions. Not surprisingly, past research has progressed by way of compartmentalized models focused on solving a subset of decision problems, e.g., Lodish's (1971) CALLPLAN model for sales calls allocation across customers taking sales force size, structure, and territory design as fixed.

In this article, we review selected issues within key problem areas in each layer and identify a number of specific open questions for further research. As will become evident, productive management of sales forces, much more than management of other marketing domains, demands the development and integration of rich theories and models from multiple perspectives, e.g., buyer behavior, human resource management, economics, and operations research. Our discussion begins with sales force models research needs in the outermost layer of Fig. 1 and progresses inward. Table 1 presents a summary of the proposed research agenda.

2 Layer 1: Marketing strategy–sales interface

1.1   Sales force role in GTM strategy: A basic question of GTM strategy is when do firms need personal selling and sales forces? Wernerfelt (1994) formally explores this issue starting from the premise that buyers are trying to find products that match their needs. He concludes that personal selling (honest two-way communication) improves the quality of matches in markets where consumers have different ideal points and is needed when (a) products are complicated and buyers are unsophisticated; (b) the cost of the agent's time is low relative to that of the buyer; (c) the product line is wide and consists of more "high-end" products; (d) bad buyer experiences can affect later sales more (reputation).

Wernerfelt's (1994) conclusions explain the traditional dominance of personal selling in areas like pharmaceuticals marketing. Although the target buyers (physicians) are hardly "unsophisticated," traditionally, their cost of time to research alternative new treatments has been a lot higher than that of the pharmaceutical sales rep. Recently, however, technologies are enabling a steady lowering of the buyers', e.g., physicians' search costs. Firms themselves have pursued "digitization" of aspects of the selling activity (Johnson and Bhardwaj 2005), e.g., e-detailing in the case of pharmaceutical sales to reach targets more efficiently, but this naturally has significant implications for the role of sales forces in the firm's GTM channels mix. For example, digitization by way of a web-channel can cannibalize some sales by the sales force, thereby becoming a source of channel conflict but at the same time can enhance the sales force's effectiveness in other respects if customers use both channels. Such potential synergies are not accounted for in traditional models of channel optimization which have focused more on accounting for the cannibalization between channels. Some important open questions then are

- How should the impact of selective digitization of selling activity on sales force productivity be modeled?
- What is the optimal division of investments in technology and sales force effort when the former reduces the potential but enhances the effectiveness of the latter?
- How should GTM strategies including web-based sales channels or direct marketing and sales force effort be designed, implemented, and managed so as to enhance synergies and reduce channel conflicts?

1.2 Sales–marketing cooperation: Weitz and Anderson (1981) pointed out the importance of aligning marketing units and sales units. Recently, the impact of sales–marketing cooperation on market-related performance has received renewed attention (Homburg and Jensen 2007). Studies have shown that the task division between marketing and sales varies across firms (Kotler et al. 2006). "Sales" is frequently the larger and more powerful unit. In such situations, a relevant question to ask is whether sales force strategy is a part of marketing strategy (as conceptualized in Fig. 1) or the reverse, where the marketing department's role toward the sales department is more of a communication support rather than a strategic counterpart or driver (Homburg et al. 2008)?

More specifically, two theoretically fruitful perspectives for additional theory-building research on the sales–marketing interface are the *synergy* and *control* perspectives. The *synergy perspective* emphasizes the co-optimization of sales investments and marketing investments and suggests questions such as

- What is the optimal level of spending and budget allocation if marketing oversees investments in products across customers whereas sales is responsible for investments in customers across products?
- How should the mix of sales force and marketing's advertising spending vary with the degree of synergy between them and over business cycles (e.g., Raman and Mantrala 2006)?
- When are potential marketing–sales coordination mechanisms such as cross-functional team structures, joint goals, or incentives (e.g., Rouziès et al. 2005) optimal and how should they be structured?

Table 1 Summary of open questions for sales force models research

Layer	Topic	Subareas	Representative open questions
Marketing strategy–sales interface	Go-to-market strategy	When do firms need sales forces?	What is the impact of digitization on sales force productivity?
		Multicontact approaches	How should multicontact selling approaches be optimally designed and managed?
	Sales and marketing cooperation	Hierarchization of marketing and selling strategies	How should sales and marketing advertising expenditures be optimally set considering synergies and business cycles?
		Alignment of marketing and selling efforts	When and what marketing–sales coordination mechanism are optimal?
		Sales leads optimization	How should marketing and sales be deployed to manage the "sales funnel"?
		Task division	Should marketing and sales share pricing authority?
Sales force strategy	"Make or buy"	Direct vs outsourced sales forces	Why do hybrid sales organizations exist? When, with whom, and how long should sales force outsourcing be pursued over business lifecycles?
	Size and structure	"Pay as you go" vs proactive sizing	What is the optimal sales force size strategy in dynamically changing environments?
		Efficiency vs effectiveness structuring	When should a company deploy geographic, product, customer, or functional specialists?
		Team selling	When should team selling be used? How should the optimal team size and composition be set?
	Structure, compensation and control	Compensation of key account teams	How should key account teams be compensated?
		Joint allocation, specialization, and compensation decisions	What are the effects of differences in margins, abilities, and reservation wages on sales force allocation and specialization?
		Dynamic response to compensation formats	How should sales quotas or goals vary over time?

	Empirical tests of compensation theory	When should periodic contests be used, and what are their optimal parameters?
		What are the effects of equal vs. differential compensation in teams
		What is the impact of endogenous contract selection on incentive effect estimation?
Sales force selection and compensation		How should the firm credibly signal its selling environment to prospective salesperson's recruits?
Sales force training and compensation	Skills transmission	How can the firm set incentives to induce skills and knowledge-sharing among its sales force?
Territory design and call planning	Locational aspects	What is the best way to capture the locational aspects of calls in territory design?
	Work balance	How can one achieve the best compromise between balancing and travel time minimization?
Compensation plan structure	Modifications on traditional salary, commission and quota-bonus	How should compensation plans be modified to (a) promote up-selling and cross-selling? (b) Motivate persistent selling effort in lengthy sales cycles?
Sales Force Operations		
Response function	Functional form	Is the most appropriate form S-shaped or concave?
	Accounting for endogeneity	What is the best compromise between capturing endogeneity and deriving optimal allocations?
	Aggregation level	How can meaningful recommendations for sales resource allocation be derived from aggregate models?
	Qualitative aspects	How should qualitative aspects of sales calls be incorporated into response models?
Selling process		When should sales presentation format be designed for two-way communication as opposed to seller- or buyer-driven formats?

The marketing–sales synergy perspective is particularly important in addressing one of the highest priority areas for today's sales managers: *optimizing sales lead generation programs* (Trailer and Dickie 2006). The significant upside potential from careful collaboration between marketing and sales in their lead generation and follow-up communication efforts has been demonstrated by Smith et al. (2006) in a decision model-based case study of a home improvement marketer. However, there remain opportunities for impactful and relevant research in this area (e.g., Lilien 2009). For example,

- How should marketing and sales resources be deployed to optimally manage the "Sales Funnel"—a popular concept of a dynamic stage-wise customer acquisition process in sales management (e.g., Söhnchen and Albers 2008)?

On the other hand, the *control perspective* emphasizes marketing's role in checking and balancing the sales force (Strahle et al. 1996). In this view, a controlled productive conflict of sales and marketing objectives leads to better organizational outcomes than does perfect alignment and harmony (Homburg and Jensen 2007; Menon et al. 1996). For instance, in the context of delegation of pricing authority, Jensen and Homburg (2008) empirically investigate the issue of the degree to which pricing authority should be shared between sales and marketing via a survey of 329 firms. Their data suggest that shifting price authority from sales to marketing positively affects profitability and marketing should be the "price guardian" of the firm. In contrast, Frenzen et al. (2009) find that delegating price authority to the sales force improves firm performance. Clearly, this debate is important and deserves more economic analysis of the following issue:

- When should marketing and sales share pricing authority and when should it be concentrated in one or the other function?

3 Layer 2: Sales force strategy layer

2.1 "Make or buy": In her path-breaking 1985 research (reprinted as a "classic" in *Marketing Science's* Jan–Feb 2008 issue), Anderson (2008) finds that the greater the difficulty of evaluating a salesperson's performance, the more likely is the firm to substitute monitoring for commissions as a control mechanism, i.e., to use a direct sales force. In an independent study, Krafft et al. (2004) found strong support for this finding. Subsequently, Anderson and Weitz (1986) note that most practical situations fall in the gray area where neither *make* nor *buy* strategy is clearly superior—and a "hybrid" and/or multichannel system may be optimal. A hybrid system has some of the authority and supervision of the *make* option but the separate ownership of the *buy* option (e.g., American Express' financial advisors). However, there has been little theoretical progress since Anderson's (2008) research. Some open questions in this domain include

- Why do mixed or hybrid (as opposed to pure form, i.e., fully company-owned or fully independent) sales organizations exist? Under what conditions is a hybrid sales force design optimal?

- How should hybrid sales organizations be managed and compensated?
- When, with whom, and how long should sales force outsourcing be pursued over business lifecycles, (Zoltners et al. 2006)?

2.2 Sales force size and structure: Two fundamental Sales Force Strategy decisions that must be responsive to the firm's overall business strategy as well as the product life cycle, are determining the appropriate *size* and *structure* of the sales force. Zoltners et al. (2006) indicate that quick build-ups of investment during the product launch phase are advisable, but many firms tend to use a less productive "pay as you go" approach leading to undersized sales forces. Most companies appear not to size their sales force profitably. Sales executives tend to be short-term oriented and risk averse when a sales force size increase is warranted, and protective when downsizing is necessary. Currently, a key question in these recessionary times is

- What is the nature of dynamically optimal sales force sizing strategies over the early stages of product life cycles and over business cycles, i.e., in periods of upturns and downturns (e.g., Raman and Mantrala 2006)?

Sales force size also varies with the firm's sales force structure, reflecting tradeoffs the firms must make between selling efficiency and effectiveness. More complex sales processes usually require more specialization and more people, i.e., enhancing effectiveness at the cost of efficiency. Considering that the complexity of sales tasks is likely to vary across firms and industries, Godes (2003) develops a theoretical economics model to address the issue: "When should the most highly skilled salespeople sell the best products?" He finds that this should occur when the selling task is very complex. Based on this general result, Godes (2003) also provides insights into issues such as which salespeople (high or low skilled) should the firm hire and how they should be organized and trained.

However, with the notable exception of Rangaswamy et al. (1990), there is very little research that provides directions for *when and how to specialize* sales forces. Conceptually, as Zoltners et al. (2004) suggest, the answers to these questions depend on the *salesperson bandwidth*, i.e., the amount of information that s/he can communicate relative to what is required, considering the range and complexity of the product line, required selling functions, and customers' buying processes. Intuitively, when the salesperson bandwidth is exceeded by the demands of a sales job, it is time for specialization, but this concept is worthy of further investigation. The open questions include

- When and how should a company deploy geographic, product, customer, or functional specialists? Here, a theoretical model that derives the optimal sales force size and structure based on assessments of salesperson bandwidth would be an interesting and valuable development.

Aside from choosing between generalist or specialized sales forces, many B2B marketers have responded to sales environment trends, e.g., increasing product complexity, customer demands, technological innovation, regulatory oversight, and competition, over the last decade by shifting away from a model of "lone-wolf" salespeople to ad hoc selling teams (Jones et al. 2005, see also Frenzen and Krafft

2009). However, the optimal use and design of sales force teams has also not been subject to much formal analysis in sales force models research. Some open questions here are

- When should team selling be utilized?
- What is the optimal size of a selling team? What are its determinants?
- What is the optimal composition of teams, e.g., should teams pair up equally strong salespeople or a strong and weak salesperson (Garrett and Gopalakrishna 2006)?

2.3 Sales force structure, control, and compensation strategy: Sales force control systems consist of the performance metrics and procedures used to monitor, direct, and evaluate salespeople while the compensation strategy speaks to the firm's choices with respect to the level and ratio of fixed to variable pay. The control system and compensation strategy directly impact both sales force motivation and performance (e.g., Brown et al. 2005).

Since the publication of the paper by Basu et al. (1985), the agency-theoretic perspective has been the dominant research paradigm for sales force compensation research. Further, most of the early work concentrated on pure compensation strategy questions, e.g., what should be the form of the plan, assuming a fixed geographically specialized structure, i.e., each salesperson in an independent territory selling all products to all customers (see, e.g., the reviews by Coughlan 1993 and Albers and Mantrala 2008). Transaction Cost Analysis (TCA) has also been used to examine sales force compensation issues—viewing commission compensation as reflective of high market control and salary compensation as reflective of high administrative control (e.g., Anderson and Weitz 1986; John and Weitz 1989). Krafft et al. (2004), however, provide empirical evidence that TCA is more applicable to "make or buy" decisions rather than motivating performance.

Basu et al. (1985) emphasized absolute output-based control systems (as opposed to behavior-based control systems [Anderson and Oliver 1987]) via the use of incentive pay tied to sales-based performance metrics. The initial assumptions of firm-salesperson information symmetry and sales force homogeneity were then relaxed by Lal and Staelin (1986) and Rao (1990). Subsequently, Raju and Srinivasan (1996) investigated the optimality of sales quota-based compensation plans. Later research (e.g., Joseph and Thevaranjan 1998) introduced behavior-based control via the notion of partial monitoring. Models for the use of relative (as opposed to absolute) sales performance-based incentives, e.g., *sales contests*, have also been investigated, and some useful prescriptions with respect to optimal prize structure have been derived (e.g., Kalra and Shi 2001; Murthy and Mantrala 2005).

So far, however, the optimal design of compensation plans for special sales force structures like teams has only been sparsely treated (e.g., Thevaranjan and Joseph 1999; Frenzen and Krafft 2009). In particular, one form of sales team deserving more attention is the use and compensation of Key ("major," "national," or "strategic") Account Management teams which is an approach for firms to build long-term links to their most important customers, e.g., Homburg et al. (2002). Determining the best way to compensate Key Account Managers (KAMs) so as to attract the right talent to the job, motivate the desired results among the largest and most important customers, and ensure the desired level of teamwork between KAMs

and the field sales force to ensure excellence in customer coverage is a major challenge for companies. Open questions here include

- How should key account teams be compensated?
- What should be the compensation plan horizon?
- When should there be "double credit compensation" or "split credit" compensation?

The early research also did not consider situations where even if individual salespeople are in independent territories, performance metrics can be correlated across markets or products and have implications for jointly optimal territory allocations and compensation structure. For example, Caldieraro and Coughlan (2009), show that a firm may sometimes find it optimal to enter a geographic market with lower sales potential if the environmental uncertainty in that market is negatively correlated with that of its existing market. In effect, the negative correlation allows the introduction of a *group incentive* that lowers the risk imposed on the salespeople. This lower risk, in turn, increases contracting efficiency. Similarly, the correlation between new and existing product sales is considered by Banerjee and Theveranjan (2008) in examining the questions: When a new product is introduced, what happens to incentives on an existing product, and what is the best structure—single or specialized? They show that when the uncertainty associated with sales of a new product is negatively correlated with that of an existing product, it may actually be optimal to employ a generalist (i.e., one salesperson selling both products)—because this lowers the overall risk faced by her/him—rather than a product-specialized structure (two salespeople selling two different products) even though the latter may be more effective. Open questions in this domain include

- What are the effects of differences in product margins, salesperson abilities, or in minimum utilities on a firm's joint choice of territory allocations or product specialization (between negatively correlated or positively correlated territory or product sales types) and compensation schemes?
- What are the implications of team selling or salespeople's perceptions of *fairness* of the joint territory allocation and compensation decisions?

Another interesting avenue for theoretical research is explaining empirical findings with respect to agents' dynamic response to periodic sales quota-bonus plans and/or periodic contests (e.g., Steenburgh 2008; Gopalakrishna et al. 2009)—and examining the implications for multiperiod quota-setting and incentives policies (e.g., Mantrala et al. 1997, Leone et al. 2006). Open questions here include

- How should sales quotas or goals be set and adjusted over time?
- When should periodic contests be used? What is their optimal length and frequency under different selling conditions?

2.4 Empirical tests of compensation theory: Researchers pursuing empirical tests of agency-theoretic predictions are faced with the daunting task of finding appropriate empirical measures for four theoretical constructs, viz. *opportunity cost*, *marginal product*, *salesperson risk aversion*, and the

variability of output conditional on effort. Most studies use cross-sectional data (e.g., Coughlan and Narasimhan 1992) with one observation from a salesperson or sales force type such as *intermediate* or *experienced* sales force. Most of these studies find strong support for predictions relating to opportunity cost and marginal productivity but weak support for sales variability and practically none for predictions relating to salesperson risk aversion (see, e.g., John and Weitz 1989; Krafft et al. 2004; Misra et al. 2005). In their study, Misra et al. (2005) allow *both the firm and the salesperson to be risk-averse* and analytically predict that bigger and more risk-averse firms will pay more and provide more incentive pay to their salespeople. They find empirical evidence supporting these predictions. However, there remains a need for more research on incentive effects in a *competitive context*, in *team selling*, and more *longitudinal data-based research* on the effect of effort and incentives (cross-sectional data are not adequate to test predictions on salesperson risk aversion due to the prior sorting of salespersons into different firms). For example, two open empirical questions are

• In team selling contexts, what are the motivational and performance effects of rewarding team members differentially (i.e., according to their individual contributions or position) vs equally (e.g., by dividing group incentive payments evenly among team members)?
• Under which environmental and task-related circumstances is it more effective to remunerate team members differentially or equally?

Lastly, any empirical research aimed at assessing the magnitude of the *incentive effects* (i.e., the impact of incentives on outcomes) of different sales force compensation plans must account for the endogenous selection of contracts by salespeople. Thus, an important emerging direction for new empirical research is the *structural estimation* of moral hazard models (e.g., Banerjee et al. 2009; Chintagunta 2009).

2.5 Salesperson selection and compensation: Interactions between sales force selection and compensation policies naturally exist, but research on this aspect of sales force strategy is limited. Joseph and Thevaranjan (2008) analytically explore the issue of how selection criteria, e.g., risk aversion level, impact the compensation contract. They find that the least risk-averse salespeople are not hired by those firms plagued by the highest level of environmental uncertainty; rather, the relationship is nonmonotonic. However, the agency-theoretic prediction of a negative relationship between commission rate and uncertainty (e.g., Basu et al. 1985) is preserved.

Taking another tack, Godes and Mayzlin (2008) focus on the firm's ability to hire and retain agents by using its compensation scheme to signal the ease of its sales task (and, thus, earnings potential) for the agent who joins the firm. They assume it is the firm that has private knowledge about the marginal productivity of effort (ease of sales task) inside the firm, unlike earlier adverse selection literature (e.g., Lal and Staelin 1986) which assumes the agent possesses private information. Godes and Mayzlin's (2008) analysis finds that a convex shape of the compensation scheme can serve as a credible signal of the marginal

productivity that the agent would experience at the firm and screen out unproductive salespeople. They also present results from an experiment that is consistent with the developed theory. Open questions they note include

- What are other mechanisms, e.g., related to sales force structure or underlying compensation metrics, that firms can use to signal various unobservable qualities of the firm and its markets to recruiting prospects?

2.6 Sales force training and compensation: Two distinct approaches to skill transmission in large sales organizations are (a) "train the trainer approach," in which there is a top-down flow of training in the sales organization and (b) informal, voluntary transfer of selling knowledge and skills from more skilled salespeople to other members of the organization. Caldieraro and Coughlan (2007) analyze the costs and benefits of these approaches and how they impact the overall compensation and incentives strategy of the firm. However, many open questions do remain.

- Under what conditions will salespeople or sales managers in the organization have incentives to either share or withhold their skills and abilities with other people in the selling organization?
- Will an able/skilled salesperson or manager prefer to be in organizations with other similarly able peers, or would he/she prefer to be the "big fish in the small pond"?
- How can the organization motivate sales managers and senior salespeople to hire other potentially talented salespeople and to help everybody in the organization to reach their potential?

4 Layer 3: Sales force operations

3.1 Sales territory design and call planning: Since the early work of Lodish (1971), tremendous progress has been made in building and implementing sales territory design models and call planning models (e.g., Zoltners and Sinha 2005). However, despite the achievements, a number of questions remain. For example, Lodish (1971) approximates the locational aspect of optimal calls on customers by constraining the number of visits to any customer to the number of tours into the respective geographic subarea. On the other hand, Skiera and Albers (1998) propose another approximation by calculating the average travel time that is necessary in a tour to visit a certain customer. So far, there has been no attempt to examine which of these methods provides better results in the field leading to the question:

- What is the best way to capture the locational aspect of calls on customers in optimization models?

Next, the state-of-the-art model for sales territory design in practice is still the balancing model by Zoltners and Sinha (1983). It achieves balancing by imposing constraints that certain criteria like workloads or sales potentials should lie between some specified lower and upper bounds. However, Zoltners and Sinha (1983) are

silent about the optimal spread between these bounds even though bounds that are too tight can result in oddly shaped territories due to the neglect of travel time considerations. In contrast, Skiera and Albers' (1998) suggest working with sales response functions that take geographical considerations into account. Which approach leads to a better compromise between travel time minimization and achieving a good balancing is still unresolved. Therefore, a question for further research is

- How can territory design models achieve a best compromise between achieving good balancing and travel time minimization?

3.2 Structuring specific compensation plans with varying objectives? Companies selling multiple products frequently wish to emphasize sales of some articles and deemphasize sales of others over some accounting horizon. A favored mechanism for doing this is modification of existing short-term sales quota-bonus structures. Mantrala et al. (1994) proposed an implementable model for this purpose, but since then, there has been little published work on decision aid models to cope with multiple operational challenges. New needs for such models are reflected by the following open questions:

- How should compensation schemes be modified to promote *up-selling* (selling higher-priced, higher-margin products) and/or *cross-selling* (selling related products or add-ons)?
- How should sales quotas, commission plans, and bonuses be adjusted during a business upturn or downturn?
- How should compensation schemes be modified in the face of lengthening sales cycles to motivate persistent effort?

5 Layer 4: Response function calibration

4.1 Methods: The specification and estimation of selling effort sales response functions are required for making most operational sales force decisions. Response function calibration has evolved from the early decision calculus (DC) approach utilizing managerial judgment-based estimation of response functions (e.g., Lodish 1971) to more objective (albeit complicated) data-based econometric techniques, such as latent class regression, maximum simulated likelihood (MSL), and hierarchical Bayes (HB). However, there are as yet few field studies demonstrating which approach arrives *at better parameter values* for allocation decisions *and/or more effective allocation decisions.* For example, Proppe and Albers (2009) perform a computer-based simulation experiment on a set of heterogeneous panel data with relatively few time units. They find that HB and MSL perform well in situations with lots of data and small error. However, in situations with few data and large errors, simple allocation heuristics and the fixed effects approach work better. More such investigations are needed.

Besides the estimation method, the choice of the response functional forms in theoretical and empirical models is critical. Recent articles on the response of the number of prescriptions in the pharmaceutical sector in the form of count models not only allow for concave but also for S-shaped response curves (as in the early DC models). The results, however, show concave relationships (Dong et al. 2009). An open question for sales force modelers is then

- What is the most appropriate form of the sales response function—is it S-shaped as in the early DC models or inherently concave?

Next, endogeneity issues in empirical personal selling response models have been dealt with by Manchanda et al. (2004) and by Dong et al. (2009) However, the closer the estimation is to optimal behavior, the less room is given for allocation improvement (Chintagunta et al. 2006). This raises the question:

- What is the best compromise between capturing endogeneity and the derivation of optimal allocation behavior?

With respect to the aggregation level, over the last few years, response models have become more and more disaggregate. In pharmaceutical research, response is now typically modeled at the individual physician level. However, this is only possible for voluntary physician panels. In Europe, privacy rules do not allow access to individual physician-level prescription data but only permit collection of data from large enough aggregates that do not allow tracing back to individual physicians. This raises the practical question:

- How can analysts limited to working with more aggregate models derive meaningful recommendations for sales resource allocation?

Lastly, salespeople's results are affected by not only their effort but other qualitative aspects of sales calls, e.g., the different media through which they communicate with the customer, the intensity of presenting certain products (in a pharmaceutical setting, this relates to the position of a product that is detailed in a visit), and the content of a call (e.g., product information vs relationship building). With CRM systems becoming more and more sophisticated, this kind of information can be collected and potentially used with great benefit. Therefore, a worthwhile question for future research is

- How can qualitative aspects of calls be incorporated into response models?

6 Layer 5: The selling process

The firm's decisions surrounding the *selling process*, i.e., *what activities it wants its salespeople to do* in their interactions with customers are critical and impact response functions, operations, and, ultimately, strategies. Selling process decisions include questions such as: Should the sales force engage in "hard selling" or "bait and switch" (Gerstner and Hess 1990; Chu et al. 1995)? Should the salesperson allow the customer to drive the sales presentation (Bhardwaj et al. 2008)? Formal analyses of such questions provide insights that can help firms better adapt their

selling process to changes in their sales environment in competitive markets. An interesting follow-up question to the research by Bhardwaj et al. (2008) is

- When should the sales presentation format be designed for two-way communication or a dialogue about multiple attributes between the customer and salesperson as opposed to seller-driven or buyer-driven format?

7 Conclusions

Erin Anderson's research touched on virtually all facets of sales force research covered by this article. However, there is much more to be done in this crucial area of management. Equally important, sales force model builders have to find effective ways to disseminate their findings, insights, and implementable models to the practitioner community as well as launch more collaborative research projects. We hope this paper serves as a catalyst for such future research and collaborations.

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