Sales-Force Decision Models: Insights from 25 Years of Implementation

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Over 25 years, we have developed many sales-force and modeling insights through over 2,000 projects with several hundred selling organizations in over 50 countries. Content insights are useful in making sales-force decisions. Examples are that profitability is flat for a wide range of sales-force sizes; phased sales-force growth is rarely optimal; focused strategies dominate scattered strategies; most sales territories (55 percent) are too large or too small; and no compensation plan satisfies everyone. Implementation insights concern model building, use, and implementation, for example, a model's economic value can come from such sources as reduced uncertainty, accuracy, increased speed, objectivity, and stakeholder involvement; theory and practice have different and complementary perspectives; experience and wisdom are sometimes better than models; and models provide insights, while people make decisions.

Two global firms recently merged and asked us to help them design new sales organizations in each of 40 countries. The integration would affect over 15,000 salespeople. In just two months, over 100 people from our consulting firm used well-tested normative sales-force decision models with strong implementation processes to design and integrate the sales forces. We could not have imagined such an undertaking when we began our careers as marketing modelers in the early '70s.

MARKETING—SALES FORCE
DECISION ANALYSIS—APPLICATIONS

At the beginning of his teaching career in 1973, one of the authors (Zoltners) fearlessly made a pronouncement to a business models class, "In 15 years, models will play a prominent role in most major business decisions." In this paper, we examine how this author would adapt his proclamation after implementing models for over 25 years.

Our modeling experience is narrow and deep. We have used descriptive and normative models repeatedly to address decisions concerning such sales-force issues as size, structure, resource allocation, incentive compensation, and geographic deployment. The descriptive models have characterized how markets react to various sales-force decisions while the normative models were optimizers that searched the solution space to find the best sales-force decision (Table 1).

From 1983 to 2000, we, along with our colleagues at ZS Associates, a consulting firm focusing on sales-force issues, have implemented these models in over 2,000 projects for hundreds of organizations. Two to three percent of all of the field salespeople in the US have been touched by the results. The firms had pressing issues that required quick attention. Companies sought help when merging separate selling organizations, when launching new products, when facing deregulation, or when faltering in performance.

We have learned, and our clients have learned from this experience. Two types of insights have surfaced. Content insights stem from observing the results of repeated model applications across companies, industries, countries, and contexts. They are insights about sales-force sizing, sales-resource allocation, sales-force deployment, and sales-force incentive compensation. Implementation insights are lessons that we learned about model building, model usage, and model implementation.

Three project samples were chosen to quantify some of the content insights. The samples were convenience samples. They included projects that were well documented and easy to access. The ZS-SRA Sample is designed to develop sales-force size and resource-allocation insights. It comprises 50 sizing studies in six countries with sales forces ranging in size from 35 to several thousand. All of the studies were conducted for companies that manufactured and sold health-care products.

The ZS-TA Sample is used to develop sales-territory-alignment insights. It is based on 36 different sales-force-alignment implementations in eight industries. All implementations were in the US and Canada.

The ZS-IC Sample is used to develop sales-force incentive-compensation insights. It is based upon seven compensation studies in six industries. All implementations were in the US and Canada.

Our content insights are provided next.

The Model Builder Learns Through the Model-Building Process

Descriptive marketing models are developed to learn about market behavior and marketing theory. Normative marketing decision models are designed to help managers make good marketing decisions. But normative decision models can also contribute to marketing theory. They have produced many useful sales-force insights for their model developers.

Sales-force issue	Relevant decisions	Descriptive model	Normative model
Sales-force size and resource allocation	Determine sales-force size Allocate sales-force effort to market segments and products	Sales-response models describe how selling effort affects the sales for market segments and products	Usually nonlinear programming models that maximize 3 to 5 year profitability for alternative sales-force sizes and product and market allocations
Sales-territory design	Assign accounts or geographic units to salespeople	Models calculate coverage, disruption, and profit impact of alternative assignments	Usually integer programming models that maximize coverage, minimize disruption, or maximize profit
Incentive compensation	Design incentive plan	Nonstandard models relate incentive compensation plans to company sales and profits, for example, disaggregate models link plan elements with each salesperson's utility for time and money, and sales response models link each salesperson's call effort with territory sales to develop the aggregate relationship	Nonstandard models, for example, individual utility-maximizing time-allocation models feed aggregate sales-response maximizers

Table 1: These sales-force issues lend themselves to implementable descriptive and normative modeling initiatives.

Effort Drives Sales

That marketing investment drives sales is a fundamental principle supported by data (Figures 1 and 2). Most executives believe this principle, yet they sometimes use decision rules that run counter to its premise:

—While addressing his divisional vice presidents of sales, a CEO of a Fortune 50 firm stated that last year he "cut the total company sales-force size and sales went up." He did not allow any of the divisions to increase their sales forces and cut most of them. Will sales go up even further if he cuts the sales force again?

—Having completed a rigorous model-based analysis, a national sales manager made the following recommendation to his division president: "We need more salespeople, a 10 percent increase in size, and I project that we can increase revenues by five percent." The president's response was, "So you think that you can increase revenues by five percent? Do it! But keep the head count the same—just get 10 percent more efficient." What an outcome—the president increased the sales manager's revenue goal without increas-
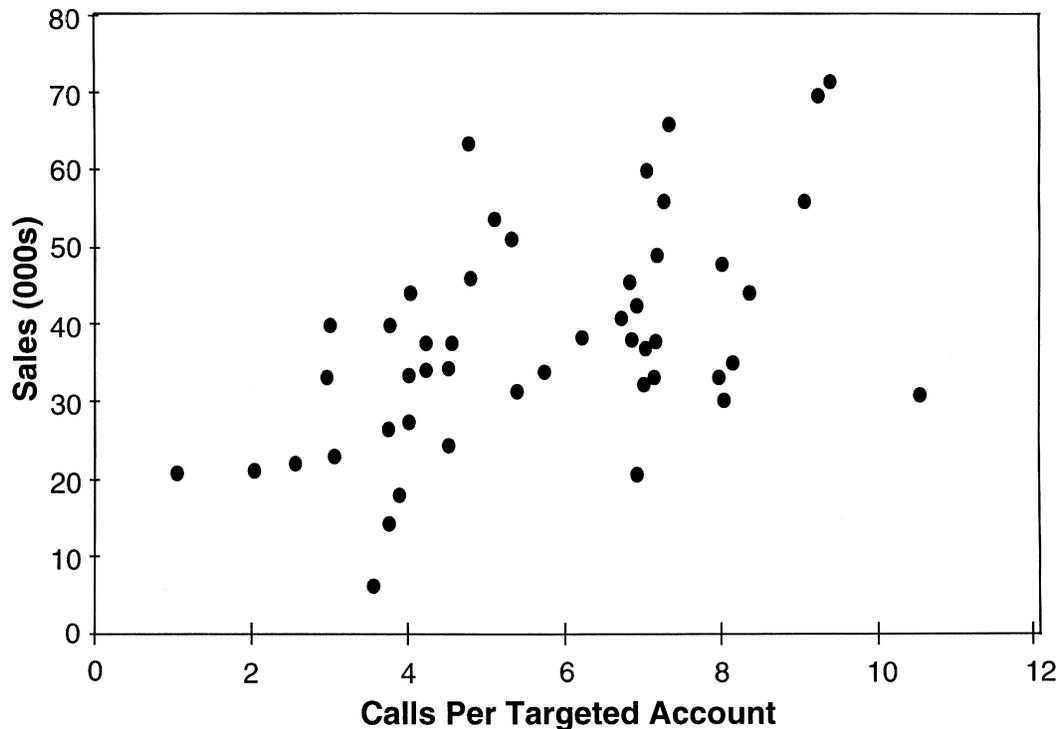
Figure 1: This scatter plot using cross-sectional data shows a statistically significant relationship between sales-force effort and sales for a market segment serviced by a medical sales force. Every dot represents a sales territory.

ing the sales force. Will this manager make such a proposal ever again? —At an internal sales-force productivity workshop, a country general manager asserted that he maximized profits. When asked how, he responded that he "kept sales-force costs at 11 percent of sales."

These examples demonstrate that some managers don't incorporate the premise that sales-force effort drives sales into their investment philosophy. The CEO would have had even higher sales had he not cut his sales force. The division president believes that the best way to increase sales is by increasing productivity. It was interesting to observe the president's reaction when he was told that the sales-force size might actually need to be increased as

a result of a productivity improvement. Productivity improvement lowers the average cost of a sales call. Consequently, customers and prospects that were not profitable enough to call on become worth the call. Finally, the country general manager was evoking a backwards principle by suggesting that sales should drive sales-force effort.

Two rational reasons for these decision rules are likely. First, top managers may believe that the extra investment needed to increase size would be wasted because weak management processes would not increase effective sales activity. Second, they know that the costs are incurred now and are certain, but most of the impact is in the future and is not guaranteed. How-
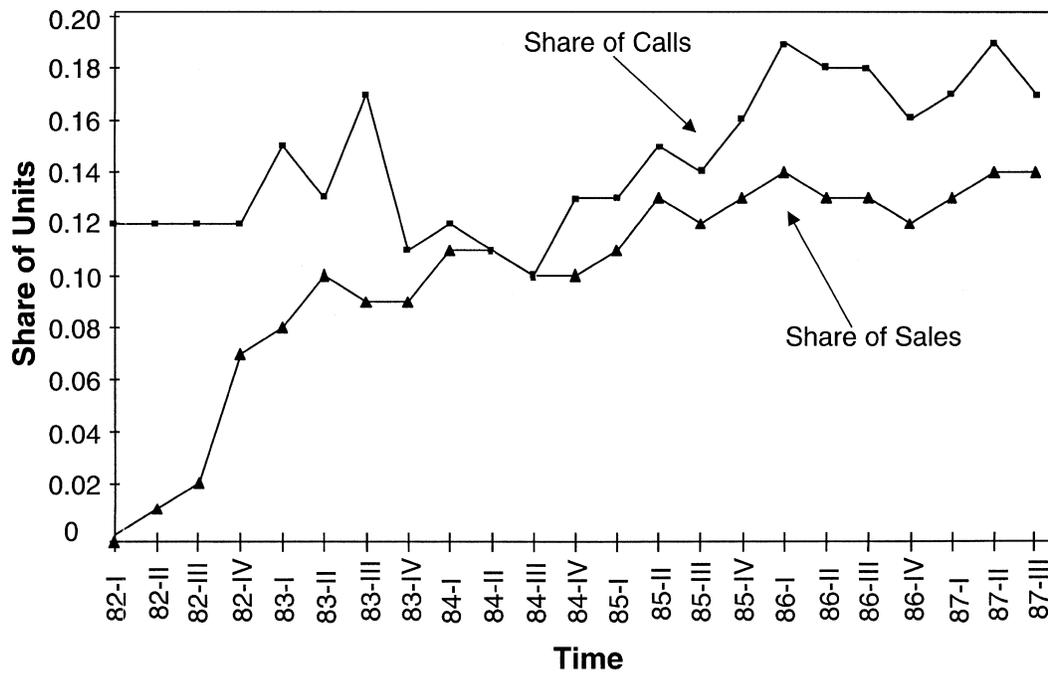
Figure 2: This scatter plot using longitudinal data shows a statistically significant relationship between sales-force effort and sales for a product sold by a pharmaceutical sales force. Every dot represents a quarter of the year.

ever, a well-managed increase in sales-force size usually leads to incremental short- and long-term increases in sales but not necessarily to short-term increases in profits.

To determine the winners of its annual incentive trip, a large consumer-products company ranked its sales territories from the highest to the lowest performing. The ranking showed that the fourth best territory (out of 250) in the country was a vacant territory. Who should go on the trip? How does this happen?

Carryover

In most industries, carryover from prior years' selling effort contributes to current sales in a territory. Some selling environments favor carryover more than others. Significant differences in carryover can even be observed across products sold by the same sales force. For example, in the pharmaceutical industry, acute-care products, such as antibiotics or antihistamines, have low carryover because patients typically take these medications for short periods. Salespeople can often persuade physicians to try new acute-care medications particularly when they have little health risk associated with them. Chronic-care products, such as blood pressure medications or Alzheimer's treatments, typically have high carryover. Once patients start using such medications, they will likely stay on them for a long time. Physicians are reluctant to switch patients from medications that are working, and they tend to prescribe products for new patients that they have found effective in the past.

Carryover can be quite pronounced. The ZS-SRA Sample provides insight into the size of the carryover that can be expected in the health-care industry. The 95-percent confidence interval for the aggregate sales-force carryover for the 50 companies that were members of the sample is 75 to 85 percent in the first year, 62 to 78 percent in the second year, and 52 to 70 percent in the third year (Figure 3).

Sales forces are undersized if the carryover effect is not considered. The best first-year sales-force size changes depending on which criterion management decides to use. Based on the ZS-SRA Sample, the best sales-force size using a one-year

contribution criterion is 18 percent smaller on average than the best size using a three-year discounted contribution criterion (Figure 4).

The Flatness Principle

Company profitability can be flat for a wide range of sales-force sizes around the optimal size. Other authors have observed this result as well [Chintagunta 1993; Mantrala, Sinha, and Zoltners 1992; Tull et al. 1986]. The ZS-SRA Sample demonstrates the degree to which flatness is evident in practical settings. The three-year discounted contribution varied, on average, two percent for sales-force sizes that varied plus or minus 20 percent from the
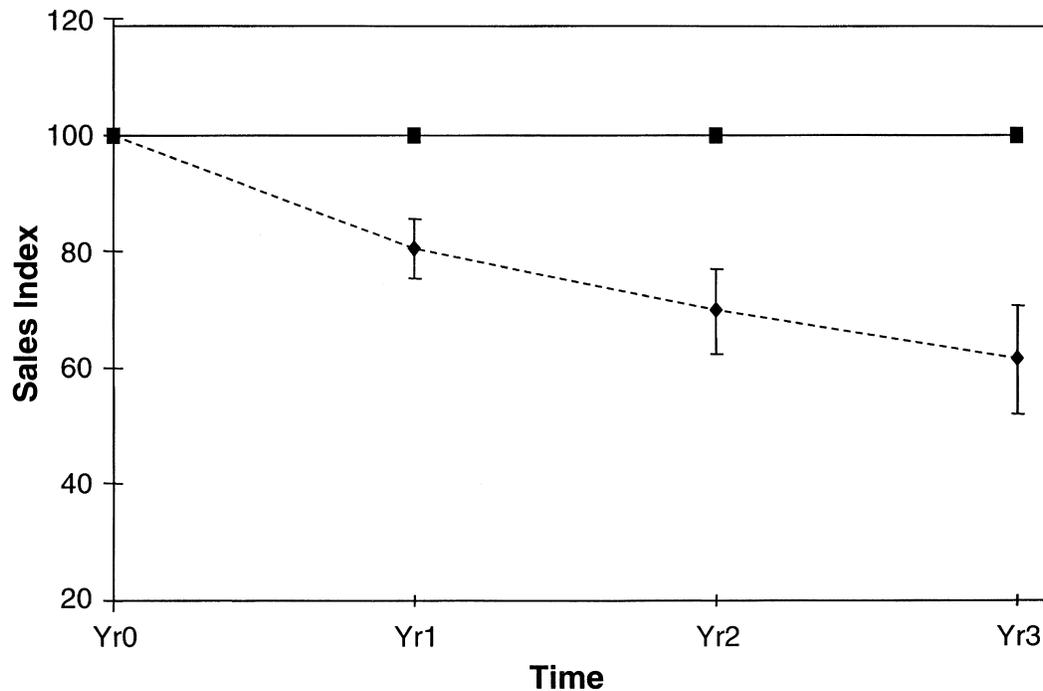

Figure 3: The magnitude of sales carryover across companies in the ZS-SRA Sample. We define the base-case effort plan for any company as its current three-year sales-force size, structure, and resource-allocation plan. The base-case scenario (solid line) represents the average performance across all of the base-case plans for the companies in the sample. We indexed sales at 100 in each year because sales levels varied across companies and over time. The zero-effort scenario (dashed line) represents an average model-based projection of sales if the 50 companies were to have no sales forces. It is an estimate of carryover.
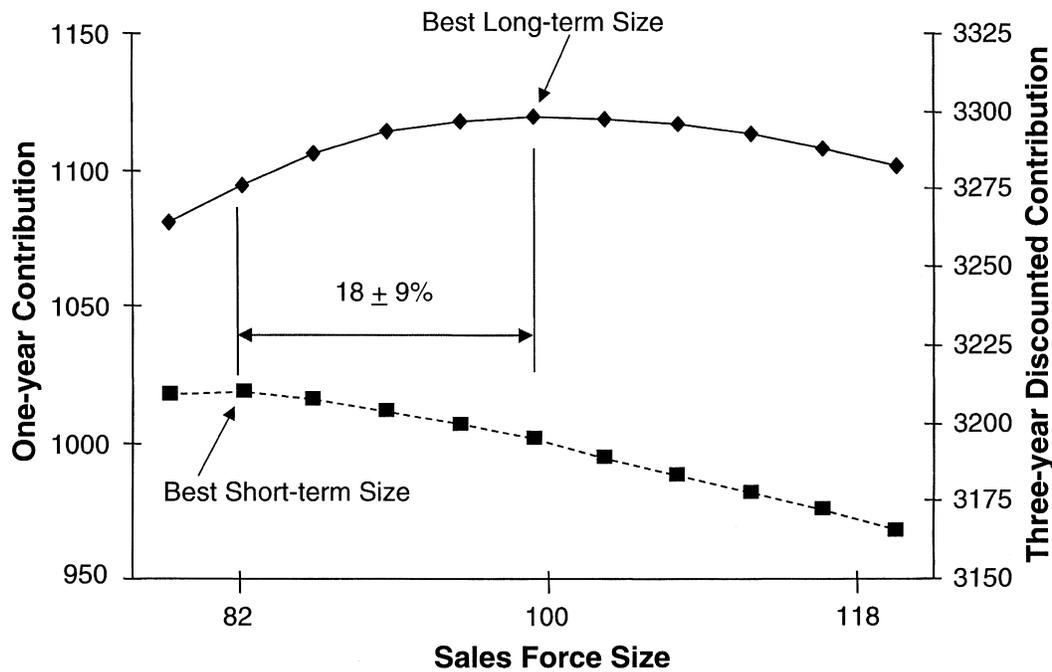
Figure 4: The impact of carryover and multiyear thinking can affect the best sales-force size. Based upon the ZS-SRA Sample, the best sales-force size (95 percent confidence interval) is between nine and 27 percent smaller using a one-year contribution criterion than a three-year discounted contribution criterion. The solid curve represents the three-year discounted contribution and the dashed curve represents the one-year contribution associated with different sales-force sizes. The one-year contribution is defined as net sales minus consolidated variable product costs, advertising and promotion costs, field-support costs, and sales-force cost. The three-year discounted contribution is defined as the present value of the next three years of contribution.

optimal size (Figure 5).

When they are asked to increase sales, most sales executives will ask for more salespeople. This makes sense since sales-force effort drives sales. The ZS-SRA Sample calibrated a more subtle result: Resource allocation has a bigger impact on profitability than sizing. The cliché "work smarter, not harder" is appropriate. For the 50 companies in the ZS-SRA Sample, a size and resource-allocation strategy was available that would produce, on average, a 4.5 percent contribution improvement over the company's current or base case three-year sales-force strategy. Only 29

percent of the incremental improvement was attributable to a size change; the rest was due to resource allocation (Figure 6).

Variation in Elasticities

Optimization theory tells us that a resource is allocated optimally if the incremental returns are equal across all marketing entities (for example, products, markets, activities, and marketing-mix elements) that want the resource. How close do companies actually come to allocating their sales-force effort optimally? We calculated sales-response functions for each of the over 400 products promoted by the 50 companies in the ZS-SRA Sample. As-
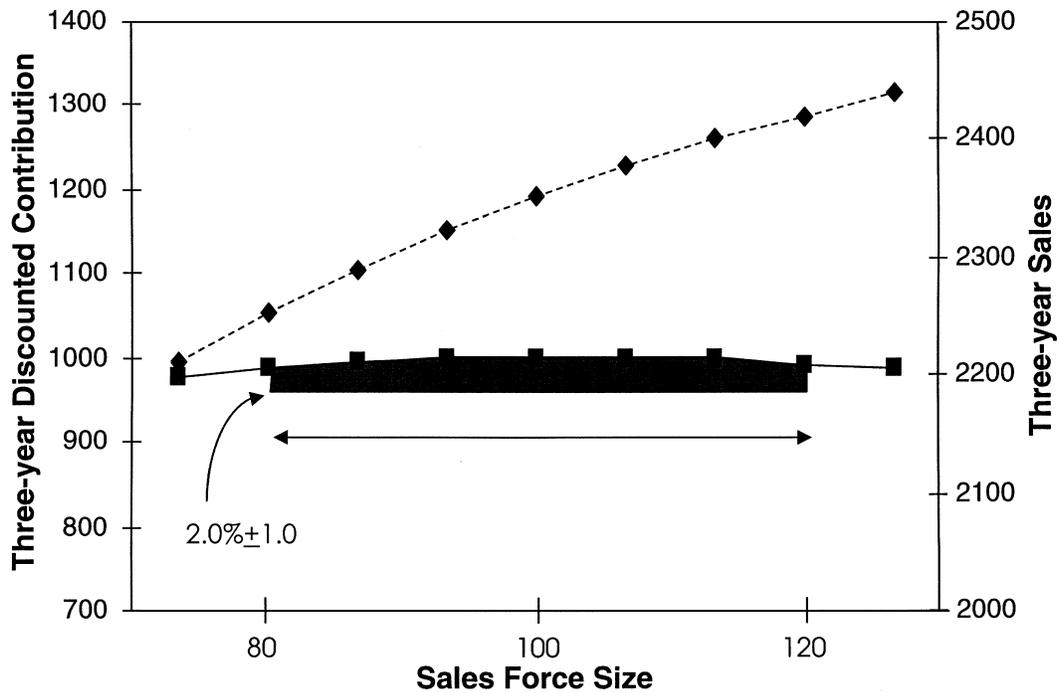
Figure 5: The ZS-SRA Sample demonstrates that long-term profitability is flat over a large range of sales-force sizes. Three-year discounted contribution varied between one and three percent (95-percent confidence interval) for sales-force sizes that ranged plus or minus 20 percent from the optimal size. We normalized all sales-force sizes to 100 and the three-year discounted contribution to 1,000 to facilitate comparison across the 50 companies in the sample. Three-year sales appear as a dashed line and three-year discounted contribution as a solid line.

suming that they implemented their current base-case effort-allocation strategies, the ratio of the largest incremental return to the smallest incremental return averaged more than eight. These companies were not very effective in allocating sales-force effort. The ratio of the largest incremental return to the smallest incremental return was 5.57 for the five products promoted by one company (Figure 7).

Upsizing and Downsizing Rules

Decision makers in the ZS-SRA Sample were reluctant to assume the risk associated with increasing sales forces. The management teams sized their company's sales forces, on average, at 97 percent of the op-timal size when measured from a three-year perspective but only 83 percent of the optimal size when measured from a five-year perspective. They favored short-term interests over long-term interests.

Decision makers used different rules when increasing and decreasing sales forces. They stopped adding people when the incremental return on their sales-force investment dropped below 50 percent. They could have continued to add people and increased profits but chose this risk-averse cut-off criterion. For downsizing decisions, they required only a positive, incremental long-term discounted contribution. That is, they maximized profits.
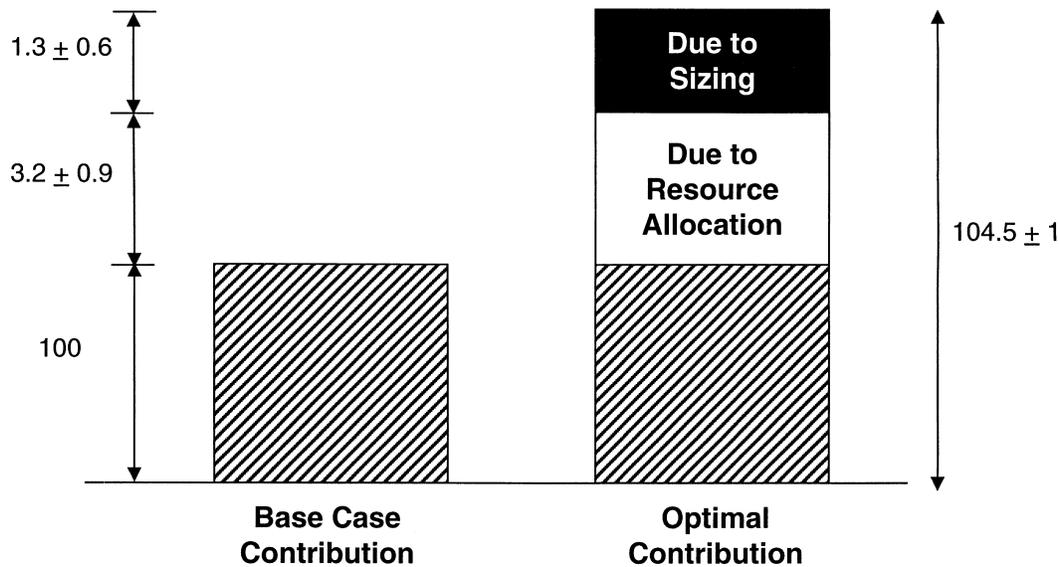
Figure 6: The ZS-SRA Sample compares the impact of improved sales-force sizing and sales-force resource-allocation decisions on company contribution. The joint impact is 4.5 percent with a 95-percent confidence interval of (3.5–5.5 percent); 3.2 percent was due to resource allocation and 1.3 percent was due to sizing.

A 50-percent incremental return-on-investment criterion would have required more severe reductions of the sales forces. If they had interchanged these cut-off criteria they would have expanded their sales forces by more under favorable circumstances and downsized them more in unfavorable environments.

Concerns Beyond Models

In many instances, business processes apart from the model can manage the practical concerns about the output of a model. Sales-territory-alignment models search the space of all possible ways of grouping accounts and geographies into balanced territories for salespeople to cover. Trillions of potential alignments can be developed even for small sales forces. Most companies' alignments are far from optimal. Zoltners and Lorimer [2000] showed that 55 percent of sales territories in a typical company are either too large (impossible to adequately cover all accounts) or too small (salespeople are wasting calls on low-value customers). Most companies can improve sales and profits through better alignment. Yet sales executives are reluctant to revise their alignments because they don't want to disrupt current salesperson-customer relationships.

To shed light on the sales impact of disrupting salesperson-customer relationships, we analyzed empirical data for an industrial distribution sales force that had realigned its territories using an optimization model. We tracked monthly sales prior to and following the realignment. We identified two groups of accounts: a test group and a control group. The test group consisted of about 4,500 targeted accounts whose salesperson had changed.
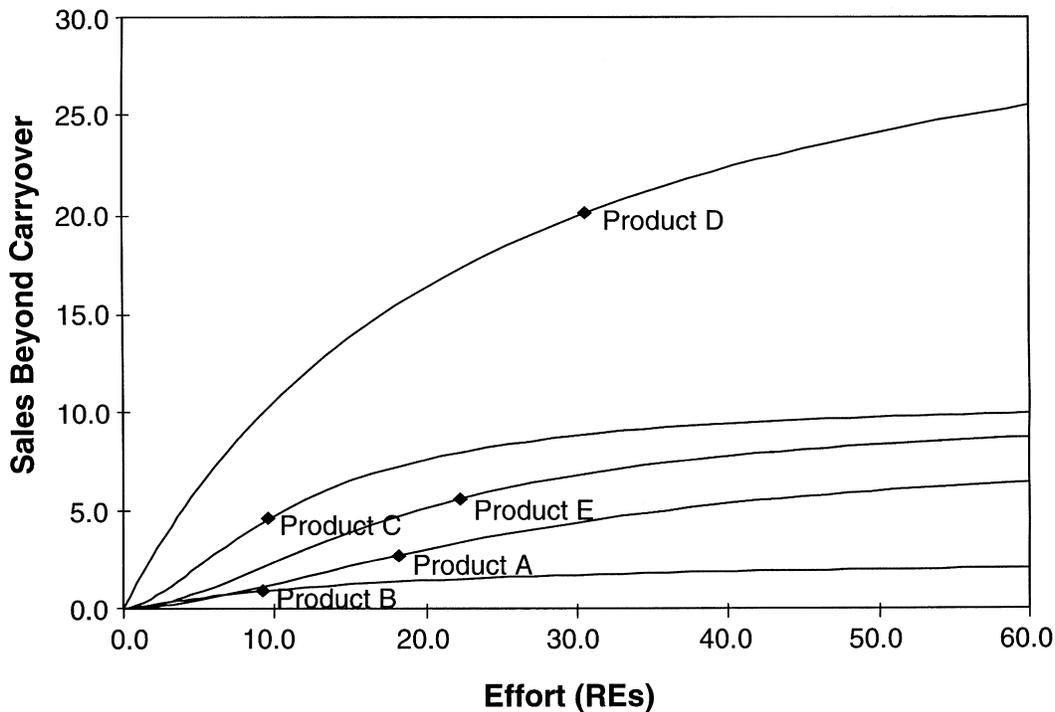
SALES-FORCE DECISION MODELS

Figure 7: These five sales-response functions were derived for the five products sold by a medical-equipment company. The dots represent the planned sales-effort allocation and expected sales. The incremental contribution for each product was calculated by applying the product margin to the incremental sales at the planned effort level. The calculated incremental contributions are for Product A, $164,381; for Product B, $69,245; for Product C, $385,696; for Product D, $270,206; and for Product E, $198,068.

Test-group accounts had maintained a relationship with the same salesperson for at least eight months prior to the realignment and then a different salesperson for seven months following the realignment. The control group consisted of approximately 44,800 targeted accounts not affected by the realignment.

We segmented accounts within each group based on their annual purchasing volume. We created six volume segments: extra-small-volume purchasers ($2,000 to $4,000 per year), small-volume purchasers ($4,000 to $8,000 per year), medium-volume purchasers ($8,000 to $20,000 per year), medium-large-volume purchasers

($20,000 to $50,000 per year), large-volume purchasers ($50,000 to $100,000 per year) and extra-large-volume purchasers (over $100,000 per year). We tracked average monthly sales for each account segment over a 13-month prealignment period and a seven-month postalignment period and then compared results for the control and test groups.

During the prealignment period, the monthly sales trends for the two groups were similar. During the postalignment period, however, some differences between the test and control groups emerged: The large-volume purchasers ($50,000 to $100,000 per year) in the test

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group purchased 20 percent less than those in the control group. These results were statistically significant at the 95-percent confidence level. The estimated total loss in sales at these disrupted accounts was approximately $2 million.

For those purchasing under $50,000 per year and those purchasing over $100,000 per year, there was no significant difference in sales to control and test accounts in the postalignment period (Table 2).

The strength of the relationship between the salespeople and their accounts provides a partial explanation of the results. Salespeople did not have strong relationships with accounts purchasing under $50,000 prior to the realignment. A change in relationship, therefore, had little impact on sales to these accounts. At accounts purchasing over $50,000, however, salesperson relationships before the realignment were stronger, and hence, a change

had a significant impact. At accounts purchasing over $100,000, the sales force took the transition seriously. Exiting salespeople introduced the new salespeople to each account in transition. Both salespeople would share account responsibility and commissions for a specified period of time. Because of this special attention, these accounts showed no sales loss.

In this case, a business process apart from the model solution prevented a loss in sales when salesperson-customer relationships were realigned. The model results were useful and compelling, but the firm relied on a disruption-management process for successful implementation.

Corporate Sponsors Develop Insights About Market Behavior Through the Model-Building and Implementation Process

The repeated application of several normative sales-force-decision models has

	Extra-small accounts	Small accounts	Medium accounts	Medium-large accounts	Large accounts	Extra-large accounts
Annual purchasing volume	$2,000 to $4,000	$4,000 to $8,000	$8,000 to $20,000	$20,000 to $50,000	$50,000 to $100,000	$100,000 +
Total sales volume in millions (percent of total)	$22.1 (2%)	$65.2 (6%)	$220.4 (20%)	$291.7 (27%)	$182.4 (17%)	$306.6 (28%)
Was purchasing affected by a change in salesperson (95% confidence level)?	No	No	No	No	Yes	No
Did strong salesperson relationships exist before realignment?	No	No	No	Somewhat	Yes	Yes
Was relationship-transition program implemented?	No	No	No	No	Somewhat	Yes

Table 2: A study establishing the impact on salesperson-customer relationships after a major model-based sales territory alignment shows that disruption can be managed using business processes apart from the model. An account transition program minimized the disruption for extra-large accounts for an industrial distributor.

produced a series of insights that have lead to a number of valuable sales-force insights.

The Percent-of-Sales Rule

Cost containment approaches for sizing sales forces do not maximize profits. Many companies employ a cost-of-sales percentage calculation for their sales-force-sizing decisions. They like to constrain the ratio of sales-force costs as a percentage of total sales to be smaller than a preset value. The US average is 6.8 percent. This heuristic ignores the principle that sales-force effort drives sales. Sales-force cost ratios and profits are negatively correlated for sales-force sizes less than the profit-maximizing sales-force size (Table 3). Companies that favor small sales-force cost ratios tend to undersize their sales forces.

Timing-of-Sales-Force Impact

Changes in sales-force size, structure, and resource allocation do not always have immediate impact. Carryover is quite strong in many markets. Managers who over-promise when they ask for sales re-sources will be disappointed because the consequence of their strategy will take longer to appear than they anticipate. Managers who reduce their investment will frequently be very pleased with their decision in the short-term because sales will be impacted minimally for six to 18 months. The impact accelerates with time, however.

Phased Growth

Several years ago, a small pharmaceutical firm acquired the rights to market two products in the United States. The company had paid close attention to its financial performance. The sales force had to earn its way, and only significant sales growth would warrant expanding the sales force. The sales force grew as the products succeeded in their markets—one even became the market leader. Executives walked around with smiles on their faces.

The company left hundreds of millions of dollars on the table because it didn't launch hard. It built sales too slowly, didn't take advantage of carryover, and

	Current plan	Expansion	Reduction
Number of salespeople	100	150	50
Sales	$100,000	$120,000	$70,000
Cost of goods sold (20%)	$20,000	$24,000	$14,000
	$80,000	$96,000	$56,000
Sales-force cost	$10,000	$15,000	$5,000
Other marketing cost	$5,000	$5,000	$5,000
Administrative costs	$5,000	$5,000	$5,000
Pretax profit	$60,000	$71,000	$41,000
Sales-force costs as percent of sales	10.0%	12.5%	7.1%
Sales per territory	1,000	800	1,400

Table 3: This example shows why cost-containment approaches are not profit maximizing. Pretax profit and sales-force costs as a percentage of sales are negatively correlated for sales-force sizes smaller than the profit-maximizing sales-force size.

didn't compete aggressively with later market entrants. Many model implementations have shown that phased sales-force growth is suboptimal (Table 4).

Launch Hard; Protect Strengths

When launching new products, companies should launch hard but also protect their existing products. This usually requires adding salespeople.

A successful new product launch usually demands a sizable selling investment. Launching a new product or entering a new market can take 50 to 60 percent of a sales force's time, drastically curtailing the time available to existing products and markets. Assuming that existing products will retain their sales in the absence of selling effort is dangerous. Sales may be maintained due to carryover for a short period but will suffer in the long run even for strong products. Many existing products fail to make their sales targets when companies launch new products.

The only way to launch hard and protect existing products is by expanding the sales force. However, this strategy has a risk of its own. The firm may need the expanded capability during only a short strategic window. Some firms look to alliances or partnerships in these cases; others take a risk, increase their sales forces, and rely on attrition to reduce the sales-force size if capacity is needed for only a short period of time. US sales-force-personnel turnover rates average about 20 percent. This implies that a firm can manage its new product and service opportunity by increasing the sales-force size and then use attrition to systematically bring the field-force size back to a desirable steady-state level.

Focused Strategies

Focused strategies dominate scattered strategies. One company's sales plan called for its 100 salespeople to spend time selling all of its 37 products—"sell everything in the bag". How much time could each product receive? An optimization algorithm recommended the sales force support only eight products. Profit-maximizing strategies focus the firm's resources on many fewer customers and products than marketing managers often recommend.

We performed three types of analyses on a convenience sample of size and resource allocation studies for 14 companies and found support for focused strategies.

Strategy	Sales-force size				1998		3-Year	
	98	99	00	01	Sales	Profit	Sales	Profit
A	300	380	380	380	330	83	1090	351
B	300	350	380	380	315	84	1035	321
C	300	320	350	380	290	87	970	301

Table 4: The short-term and long-term consequences of three expansion strategies for a sales force that was launching several new products shows that phased growth can be suboptimal. Strategy A is the quick-build strategy and Strategy C is the slow-build strategy. Three-year profits for Strategy A are forecast to exceed those of Strategy C by $120 million, while one-year profits for Strategy C exceed those for Strategy A by $4 million. Companies often face trade-offs between short-term and long-term profit maximization when expanding their sales forces.

The different analyses were performed because the size and resource-allocation models developed for the 14 companies were all different and consequently, the resource-allocation decisions were not comparable.

An optimization model for three business-to-business manufacturers recommended that they increase their focus on high-volume accounts (Table 5).

The target audience for the 18 largest products sold by the sales forces from five pharmaceutical companies were also analyzed (Table 6). The optimization models showed that the number of physicians that were targeted by the companies should be decreased by 39.3 percent for 13 of the products if the companies wanted to maximize their profits. The five remaining products were very large products requiring a large customer reach. The optimization models recommended no reduction in the target market for these products. The average decrease across all products was 27 percent.

Examining the products requiring the greatest sales-force effort and determining how many of them consume 50, 67, and 75 percent of total sales-force resources is another way to assess effort concentration. The fewer the number of products, the more concentrated the effort allocation. Optimization analysis across six pharmaceutical sizing and resource-allocation studies showed that effort concentration increased approximately 10 percent (Table 7).

Selling Partnerships

Selling partnerships come in several forms. They can be copromotions in which several firms sell one or more products, or they can be arrangements in which one firm contracts with another organization or series of organizations to provide selling effort for its products. In either case, the selling investment that would optimize overall system profits exceeds the sum of the selling investments that would

	Segment	Segmentation based on volume		Current allocation of effort	Optimized allocation of effort
		Percent of current sales	Percent of accounts		
Company A	1	60%	3%	29%	36%
	2	37%	46%	51%	64%
	3	3%	51%	20%	0
Company B	1	94%	61%	77%	100%
	2	6%	39%	23%	0
Company C	1	76%	35%	52%	60%
	2	17%	28%	30%	31%
	3	4%	15%	7%	9%
	4	3%	22%	11%	0

Table 5: The output of an optimization model demonstrates the degree to which companies need to change how they allocate their resources across volume-based market segments if they want to maximize profits. The three companies are business-to-business manufacturers.

Product	Percent change in the number of physicians that need to be called on (optimized vs. current strategy)
1	−68.5
2	−63.2
3	−61.1
4	−58.3
5	−48.6
6	−40.0
7	−37.8
8	−31.9
9	−28.9
10	−14.9
11	−14.3
12	−9.9
13	−9.3
14	0
15	0
16	0
17	0
18	0

Table 6: The output of an optimization model demonstrates the amount of reduction in the number of physicians that need to be called on if five pharmaceutical firms want to maximize their profits for the 18 largest products that they promote. The reduction ranges between 0 and 68.5 percent and averages 27 percent.

maximize the profits of the individual partners.

The best strategy for each partner is to allocate selling effort across customers and prospects until the marginal return of the selling effort is equal to the marginal cost of the selling effort. The depth of penetration depends upon product margins. With higher margins, a firm can call on more customers and prospects before its calls become unprofitable. Product margins are shared when organizations enter into partnerships giving each partner only a fraction of the total margin. Each partner will stop calling on accounts and prospects that would have been profitable with the higher margin. Neither partner will increase its effort unilaterally beyond its desired level even though the consortium's profits would increase by calling on more customers.

Realignment Overlooked?

Roughly 55 percent of sales territories in the US are either too large to be covered adequately or so small that calls are wasted. How does this happen?

There are trillions and trillions of good alignments. Finding a good alignment of territories is a large combinatorial problem that requires lots of effort. The task is often delegated to local district sales managers burdened with many other responsibilities. Even if the district managers do provide good alignments, the global alignment will be poor if the district boundaries are not optimally designed or if the districts are sized incorrectly.

A second reason for poor alignments is that companies seldom have good definitions of what constitutes a good alignment. Some authors suggest that a good alignment is profit maximizing [Lodish 1975; Skiera and Albers 1996; Zoltners 1976]. Most managers feel that it should be disruption minimizing. In practice, good alignments balance territory workload. The best workload measures are calibrated to account for territory market potential.

Third, sales forces resist change. Many firms retain poor alignments because sales managers want to avoid the risks associated with reassigning accounts among salespeople and because salespeople press to service their established account

	Number of products receiving . . .		
	50% of the sales-force effort	67% of the sales-force effort	75% of the sales-force effort
Current allocation	21	32	40
Optimized allocation	19	29	35
Change	−10%	−9%	−13%

Table 7: The number of products that receive 50, 67, and 75 percent of total sales-force effort for six pharmaceutical firms were examined to see if effort concentration would improve their profitability. Products were ranked in terms of the effort that they received. The ones receiving the most effort were counted until they comprised 50, 67, and 75 percent of the total effort. The fewer the number of products, the more concentrated the effort. The number of products in each column is the total across all six studies. The number of products selected by the optimizer in each of the six studies was either the same or smaller than the number of products sold with the current strategy for each of the three effort categories.

relationships as opposed to establishing new ones. Large realignments can require that salespeople and sales managers relocate. Sales executives fearful of losing good people are reluctant to call for relocations. Finally, realignments can change reporting relationships. Good manager-salesperson relationships may be severed. All of these changes cause stress in the sales force.

Fourth, veteran salespeople obtain favorable alignments. They know that territory potential correlates highly ($0.4 < r < 0.8$) with territory sales—high-potential territories usually have the highest sales. Veteran salespeople do whatever it takes to get and protect desirable accounts, especially when their compensation has a large incentive component. New salespeople either leave or learn how to play the game. Sales managers find it hard to take accounts away from veteran salespeople who resist the change and whose significant sales help the manager achieve his or her sales goal.

Finally, sales executives are not always aware of the value that results from good alignment. Empirical studies [Zoltners and Lorimer 2000] show that sales increase between two and seven percent when sales territories are aligned to optimize customer coverage (Figure 8).

Travel times are reduced by 10 to 15 percent when models are used to align sales territories.

Since territory potential correlates so highly with territory sales, companies with high incentive components in their compensation plans tend to overpay people with rich sales territories when territories are not aligned properly. Rewards and performance evaluation systems are much fairer when sales territories are balanced.

No Plan Pleases All

Every salesperson has an opinion of his or her compensation plan. Some would like to see more salary; some would like higher incentives; some would like to get incentive income before they hit the territory goal; some feel that caps are demotivating; some feel that team incentives feed free-riders; some would like more frequent payouts; some feel that they are rewarded in terms of factors that they cannot control; but almost everyone feels that
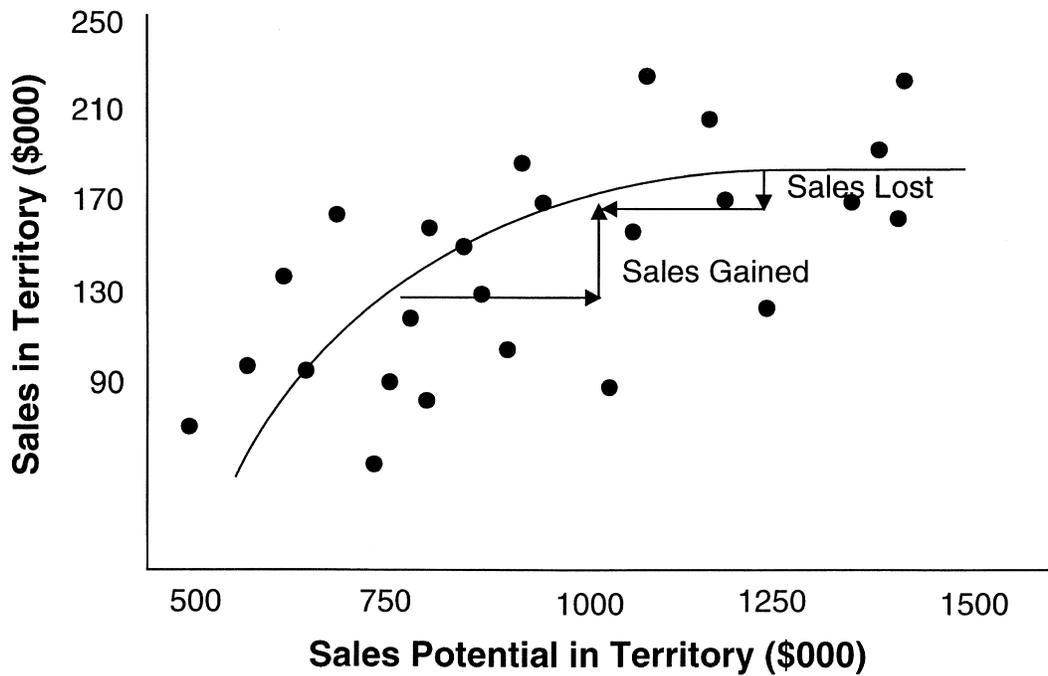
Figure 8: The impact of alignment improvement can be assessed by analyzing the relationship between territory sales and territory market potential. The dots in the graph represent 25 sales territories comprising a pharmaceutical sales region. The sales potential of each territory is measured by adding the sales of the company's products to the sales of all competing products. The data show the positive relationship between territory potential and territory sales while the fitted curve reveals that this relationship has diminishing returns. This is because as potential increases, territory workload begins to exceed a salesperson's capacity, and sales opportunities will be lost because it is impossible to cover all accounts effectively. Because the relationship between sales and market potential shows diminishing returns, the sales lost by reducing large territories will be more than offset by sales gained by increasing small territories. We have performed this analysis for many sales forces and find a typical predicted net incremental gain in sales between two and seven percent.

his or her income should be larger.

Many compensation models assume sales forces are comprised of people with homogeneous preferences. This is never true. The advertising sales force at a large US newspaper was evaluated to assess the degree of preference heterogeneity that exists in practice. The 42-person sales force evaluated seven plan options (Table 8).

None of these plans will satisfy all 42 salespeople (Table 9). Every sales force that we have worked with has exhibited similar heterogeneity in its preferences.

Hidden Salary

A large producer of business forms decided that its sales force lacked motivation. Its compensation plan was mostly salary, and its managers thought that increasing the variable component would increase motivation. They decided that a low salary plus a commission structure starting with the first dollar would really rev up the sales force. Compensation modeling showed that a commission structure

	Thresh-old 1 (payout trigger)	Rate above payout trigger ($/%)	Thresh-old 2	Rate above the second threshold ($/%)	Thresh-old 3	Rate above the third threshold ($/%)	Incentive pay at goal	Indi-vidual weight	Depart-ment weight
Current	95%	$2,500	100%	$4,000	115%	$2,500	$12,500	60%	40%
Option 1	90%	$2,000	95%	$3,000	105%	$2,000	$25,000	60%	40%
Option 2	80%	$1,000	90%	$1,500	110%	$1,000	$25,000	60%	40%
Option 3	70%	$667	85%	$1,000	115%	$667	$25,000	60%	40%
Option 4	90%	$2,000	95%	$3,000	105%	$2,000	$25,000	80%	20%
Option 5	80%	$1,000	90%	$1,500	110%	$1,000	$25,000	80%	20%
Option 6	70%	$667	85%	$1,000	115%	$667	$25,000	80%	20%

Table 8: To assess the level of preference heterogeneity, seven plan options were rank-ordered by members of a newspaper advertising sales force. The plans differed in three features: payout trigger, rate of payout, and the percentage of payout attributable to individual (versus team) performance. The payout trigger was the percentage of goal attainment where the incentive payment was to begin. It could begin at 70, 80, 90, or 95 percent of the territory goal. The rate of payout was the amount of money to be earned for each percentage point above the trigger and subsequent threshold levels. The total incentive was partitioned into a department component and an individual component. The department component was tied to the success of the entire selling team while the individual component was tied to the individual's performance. The individual and department weights specified how the total incentive payout would be split between these two components.

could be derived that would reward salespeople at the appropriate level so that they would not lose income with the new plan.

We analyzed the firm's carryover structure and observed that customer-switching costs were very high. Someone using the company's forms would face significant costs in migrating to another producer's forms. The sales force was in a maintenance mode. About 80 percent of the firm's sales were secure even if salespeople did little selling. Consequently, the high-incentive commission plan was mostly rewarding sales that salespeople could bank on. Modeling efforts in high carryover environments reveal that highly leveraged commission plans rarely put a lot of pay at risk.

The Share Growth Relationship

The assumption that it is harder to grow market share in high-market-share territories than in low-market-share territories is frequently not true. Such assumptions can lead to unfair incentive plans. We surveyed a convenience sample of 91 firms in 32 industries and found that 84 percent of sales-force incentive plans are goal based. Sales managers setting goals for their salespeople believe it is easier to increase market share in low-market-share territories than in high-market-share territories. The analysis of territory-level data suggests that this assumption is frequently false (Figure 9). An excessive increase in quotas for low-market-share territories will penalize those salespeople who have these territories.

Poor Goals Cost Money

About 84 percent of sales forces use goals in developing their incentive com-

	Current	Option 1	Option 2	Option 3	Option 4	Option 5	Option 6
1's	2	14	8	4	9	6	0
2's	5	7	10	4	6	8	1
3's	5	10	12	3	5	5	3
4's	7	1	6	7	5	7	8
5's	4	7	3	4	6	7	11
6's	0	3	3	15	6	8	7
7's	19	0	0	5	5	1	12
Average	5.0	2.7	2.9	4.6	3.7	3.7	5.3

Table 9: Significant heterogeneity in preferences emerged from the rank-order preference survey administered to the newspaper advertising sales force. The rows in the matrix correspond to the respondent's preference levels, where a 1 is most preferred and a 7 is least preferred. The cells in the matrix represent the number of times that each preference level was chosen for each of the compensation options. For example, 14 salespeople ranked plan option 1 as their first preference.

pensation. Many take goal setting for granted. In fact, we rarely see statistical methods used for this purpose. The following examples show that goal setting should not be taken for granted; doing it poorly can add unnecessary costs for a sales force.

A large telecommunications company introduced a new product line. It developed an aggressive compensation plan to motivate the sales force. The line did exceptionally well, providing the sales force with a windfall. Most salespeople attained their quota by midyear and almost tripled their sales forecast by the end of the year. They made a lot of money. Management was pleased because its stock options became very valuable but did not realize it had created a compensation nightmare. The company paid the sales force too much because it did not forecast sales accurately. The product line was terrific. The product sold itself, but the sales force took inappropriate credit for its sales. Not only that, management created an expectation among the salespeople that they would continue to earn an income well above the market rate.

In another example, a health-care company was expecting a sales decline. Hoping to motivate its salespeople, it established stretch goals for them. By October, all the salespeople were certain they would get no incentive pay because their goals were too high. Some of the best quit. Others stopped working and deferred sales into the next year in the hope that goals would be more realistic.

These examples point out the two detrimental consequences of poor goal setting: Salespeople get free money if the goal is too low and lose motivation if the goal is too high.

The next simulation demonstrates how expensive goal-setting errors can be. In this example, a company uses an incentive compensation plan (Figure 10) in which it pays 2.5 percent commission on sales up to a territory goal and pays 7.5 percent commission on sales that exceed this goal. This is a growth-oriented compensation plan in that it aggressively rewards extra effort at a point where extra effort is required. If the salespeople beat the quota,

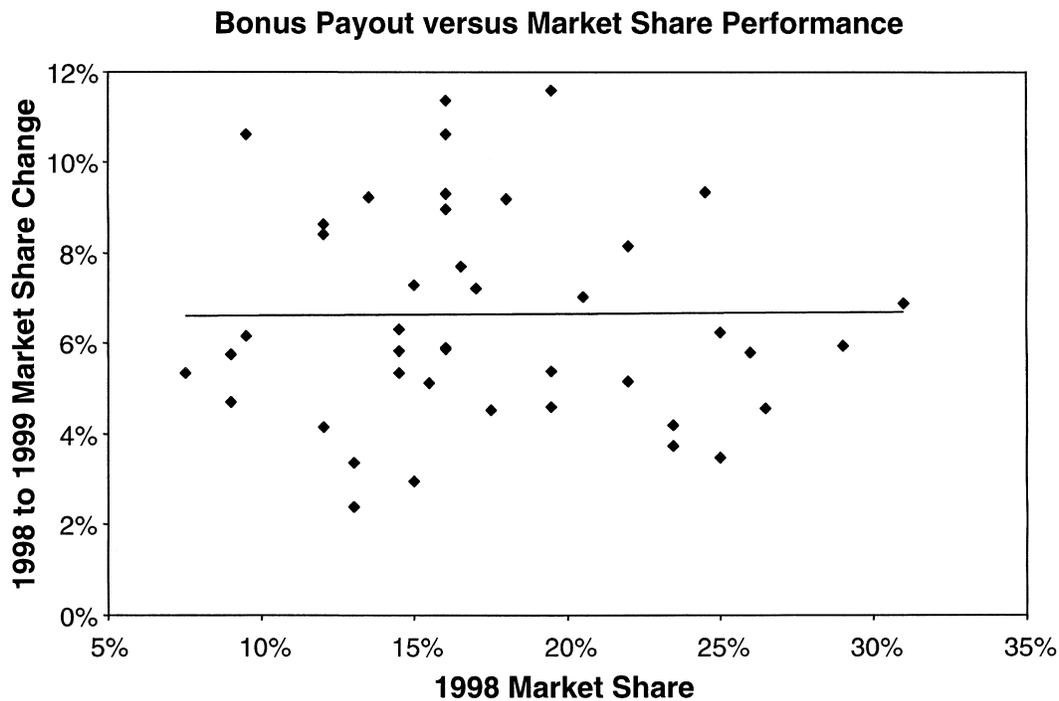**Bonus Payout versus Market Share Performance**

Figure 9: This relationship between market share and market-share growth for a pharmaceutical firm demonstrates that it is dangerous to assume that low-market-share territories have greater opportunity to grow than high-market-share territories. Each dot represents a sales territory. The territories are plotted in terms of their market share at time t and their change in market share from t to $t + 1$. $R^2 = 0.00002$ for this group of territories.

they and the company benefit.

In this example, the plan assumes that a sales territory should sell $1,000,000 if the salesperson puts forth a fair day's work. The perfectly accurate territory goal would be $1,000,000. Quotas above or below $1,000,000 constitute a goal-setting error. An inaccurate goal-setting process would have a wide distribution around $1,000,000, while an accurate goal-setting process would have a small variance around this sales level (Figure 11).

Assume that all the sales territories can sell $1,000,000. The incentive payout depends upon the accuracy of the goal-setting process. Incentive costs can be 24 percent higher than necessary in the low-

accuracy case (90 percent of all territory goals are plus or minus 50 percent of the perfectly accurate territory forecast). Incentive costs can be nine percent higher than necessary in the moderate-accuracy case (90 percent of all territory goals are plus or minus 20 percent of the perfectly accurate territory forecast) (Figure 12). Companies that don't set accurate goals incur higher sales-force costs.

To put things in perspective, the incentive portion averages 40 percent of the total income for a US salesperson and the average annual income for an experienced salesperson exceeds $100,000. US sales-force costs exceed a trillion dollars a year.

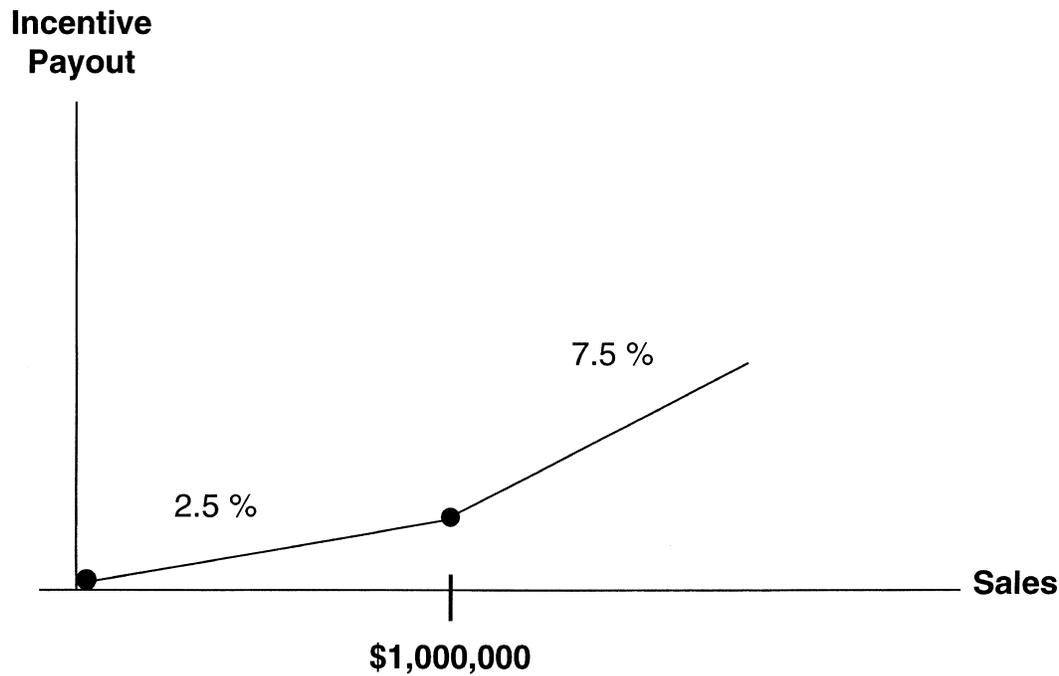**Incentive
Payout**

7.5 %

2.5 %

Sales

$1,000,000

Figure 10: A growth-oriented commission plan is used in the costing simulation. The commission rate up to the territory sales goal is 2.5 percent and 7.5 percent above this goal. The perfectly accurate goal for each sales territory is set at $1,000,000.

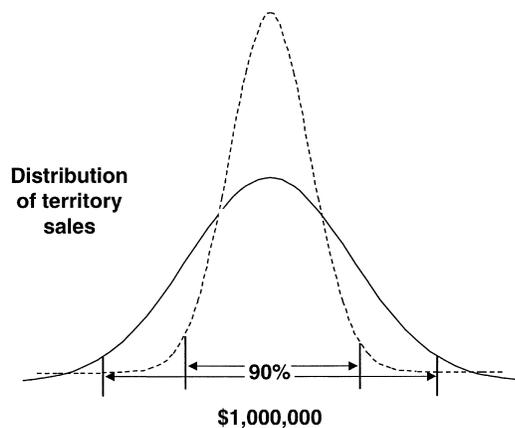**Distribution
of territory
sales**

90%

$1,000,000

Figure 11: The error associated with goal setting can be represented as a distribution around the perfectly accurate territory goal. Inaccurate goal-setting processes will have a wider distribution (solid line) than more accurate goal-setting processes (dashed line).

Insights for Sales Management

The key insights from the ZS-SRA, ZS-TA, and ZS-IC Samples combine to form an advisory for sales management. They can be organized around three topic areas.

The key insights for sales-force size, structure, and resource allocation are the following:

—Sales-force effort drives sales.

—Carryover exists. Sales-force size is understated if its effect is not considered.

—The impact of changes in sales-force size, structure, and resource allocation is not always immediate.

—Company profitability can be flat for a wide range of sales-force sizes.

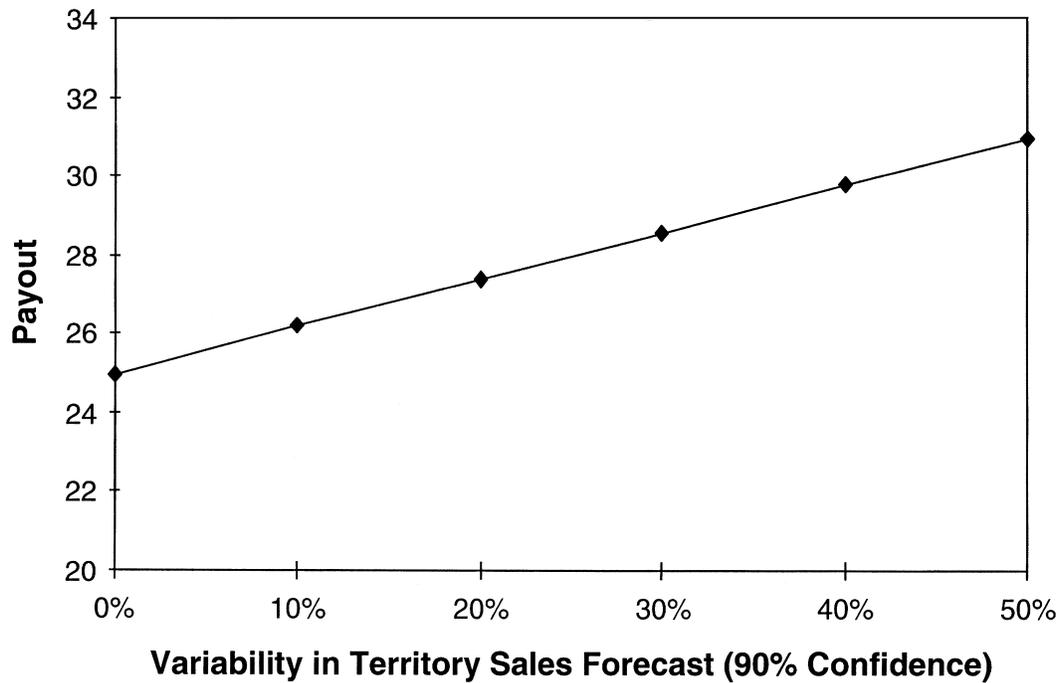—Cost-containment approaches for sizing sales forces are not profit-maximizing approaches.

Figure 12: The impact of goal-setting error on the incentive plan costs for the example in Figure 10 can be calculated. The cost is $25,000 per territory if the forecast is 100 percent accurate. The graph represents the incentive cost when 90 percent of all of the territory goals are plus or minus the value on the horizontal axis. For example, incentive costs can be 24 percent higher than necessary in the low-accuracy case (90 percent of all territory goals are plus or minus 50 percent of the accurate forecast).

—Resource allocation is more important than sizing.

—The largest product elasticities can be eight times larger than the smallest product elasticities.

—Phased sales-force growth is rarely optimal.

—When launching new products, launch hard but also protect strengths. This usually requires adding salespeople.

—Focused strategies dominate scattered strategies.

—Products and services receive insufficient resources when multiple firms enter into a selling partnership.

—Sales-force executives tend to be oriented toward the short term and risk averse when an increase in the sales force is warranted and protective when downsizing is necessary.

The key insights for sales-territory alignment are the following:

—Most sales territories (55 percent) are either too large or too small.

—Good sales-territory alignment enhances customer coverage and increases sales. Sales will increase two to seven percent when sales territories optimize customer coverage.

—Sales-territory alignment affects performance evaluation and rewards. Companies overreward territories and underreward salespeople when alignments are poor.

—Good territory alignment reduces travel time.

—The cost of disrupting a sales force through realignment can be managed with a relationship-transition program.

—Software for optimizing and refining territory alignments saves sales managers hundreds of hours of tedious manual work.

The key insights for sales-force compensation are the following:

—No compensation plan satisfies everyone in a selling organization.

—Commission plans in high carryover environments contain hidden salary.

—The assumption that it is much harder to expand market share in high-market-share territories is frequently not true. Such assumptions can lead to unfair incentive plans.

—Inaccurate goal setting is expensive.

Modeling Provides a Benchmark for How Much Improvement is Possible

When executives review their sales forces, these questions come up repeatedly: Is our sales force the right size? How good is our compensation plan? Are we deploying our resources the right way? How good are our current decisions? Our model implementations reveal how much improvement is possible over current practice.

The model-based analyses for ZS-SRA Sample companies provide a benchmark for the improvement that is possible by re-sizing a sales force and deploying its sales resources differently. The sample showed that on average firms can make a 4.5 percent improvement in three-year profitability. About 28 percent of the improvement can be attributed to sizing.

The ZS-TA Sample suggests that about 55 percent of all sales territories are too large or too small. We classify territories as too large if the salesperson's workload

The estimated total loss was approximately $2 million.

is more than 15 percent above the ideal workload and too small if his or her workload is more than 15 percent below the ideal workload. The percentage of territories that were too large or too small was reduced to 26 percent after we used a model-based alignment process to develop an acceptable alignment for companies in the ZS-TA Sample.

Most companies try to develop incentive compensation plans that pay their salespeople for performance. The degree to which they achieve this goal is measurable. Salespeople for a large industrial distributor were plotted in terms of their performance and incentive payout (Figure 13). Salespeople in the Northwest quadrant were overpaid—they received an above-average incentive payout for substandard performance. Those in the Southeast quadrant were underpaid—they received below-average incentive payout for above-average performance. Of the 1,400 salespeople, 146 were underpaid and 21 were overpaid. These statistics and the correlation coefficient serve as metrics for the degree to which an incentive compensation plan truly pays for performance.

The ZS-IC Sample provides an estimate of the degree to which companies overpay underperformers and underpay over-achievers (Table 10). Companies apparently favor underpaying high performers.
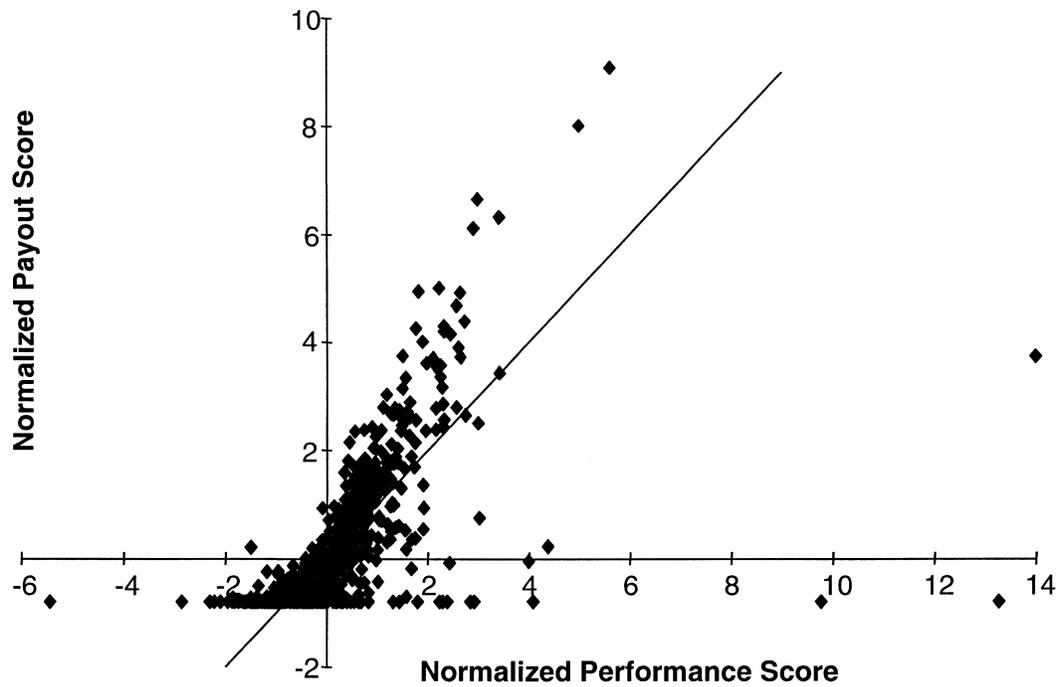
Figure 13: The relationship between the incentive payout and actual performance can estimate the degree to which a company has a pay-for-performance incentive plan. The dots represent 1,400 salespeople selling for an industrial distributor. We defined sales performance as the difference between actual sales and the expected sales derived from a regression model that incorporated the prior year's sales. Both performance and incentive payout are plotted in standard deviations above and below the mean. One hundred forty-six salespeople had above-average performance and below-average incentive pay while 21 salespeople had below-average performance and above-average incentive pay.

This may help explain the high turnover rates that face some selling organizations. An improved compensation plan could better balance performance and pay.

Our conclusions here summarize many studies. We can usually measure how much a firm can improve by changing its sales-force size, resource allocation, territory alignment, or incentive compensation plan after implementing a model customized for the company.

Implementation Insights

The economic value of a model can come from many possible sources, such as reduced uncertainty, increased speed, ac-

curacy, objectivity, and stakeholder involvement. Model-centered thinking frequently focuses on the quantifiable. Models parameterize how customers and markets respond to different marketing-mix decisions. They maximize measures, such as sales, profits, and market share. However, models provide other, more-qualitative sources of value as well.

Mergers and acquisitions require quick integration of multiple selling teams. An unbiased view is desirable since most integration decisions are contentious. Models provide both objectivity and speed.

Models help reduce uncertainty. Many

Industry	Total number of salespeople	Number of salespeople getting		Percentage of salespeople getting	
		overpaid	underpaid	overpaid	underpaid
Animal health	66	13	18	19.7%	27.3%
Consumer health	90	18	10	20.0%	11.1%
Pharmaceutical	61	9	10	14.8%	16.4%
Pharmaceutical	75	6	14	9.8%	23.0%
Newspaper advertising	87	6	19	6.9%	21.8%
Industrial distribution	1,400	21	146	1.5%	10.4%
Eye care	68	3	7	4.4%	10.3%
Weighted average	262	10.9	32.0	4.1%	12.2%

Table 10: A study of seven companies shows the extent to which salespeople are over- or underpaid with their current compensation plans. We define a salesperson to be overpaid if he or she is a below-average performer while receiving above-average incentive pay and underpaid if he or she is an above-average performer while receiving below-average incentive pay.

incentive compensation model builders test their potential plans before making a recommendation, looking at total cost and how much each salesperson is likely to make under each plan scenario. The tests reduce the risk of spending too much on compensation and of overpaying or underpaying individual salespeople.

One multinational organization developed a model-assisted process for annual marketing planning for various countries. A major benefit of the process was the discipline and uniformity required from the countries. Management was able to compare solutions, scenarios, and plans across countries.

Large-stake decisions, such as resizing and restructuring a sales force, require top management involvement. Models that explore environmental assumptions and develop alternative solutions are very engaging to executives, promoting their participation in the decision making and their confidence in the results.

What makes the model valuable can help the modeler establish the scale, com-

plexity, and nature of the modeling effort. For example, if speed is critical, or if trainability and flexibility are important and the process is to be used across many countries, the models need to be simple.

The Invisible Model

The best model is often one the decision maker never sees. A variety of people participate in implementing the typical model: a sponsor, decision makers, the model creator, and the project team.

The sponsor, usually the president of a division or a country manager, insures that the project has sufficient corporate priority and human and financial resources. Acting as a change agent, the sponsor has the leadership and authority to get the project results implemented.

Many authors of *Management Science* articles talk about "the decision maker" as the model user. We have found that decisions are usually made by a group of people. The decision makers could include the project sponsor, the vice president of sales, and several other top-level sales and marketing managers.

The model creator creates a generalizable model that can be used for many situations or companies, does not participate in all model implementations, but is usually available to customize the model if necessary.

The project team is comprised of several members. The project manager assembles the team, plans the project steps, delegates responsibilities, guides the team, and is accountable for completing the project successfully and implementing the results.

The math was right, but the answer was wrong.

The project team is responsible for doing the work. One member, the model builder and user, is responsible for using the model. He or she specifies the model inputs, parameterizes the model, and organizes the model outputs. The model user interacts continuously with other members of the team.

The several roles are often distinct. The decision makers, in particular, rarely perform any downstream functions. They do not have the narrow, deep perspective and skills to be effective model users. Decision makers are valued most for their intuition and judgment. To use complex models that combine factual and judgmental inputs, one needs to combine skills that an infrequent modeler can't develop and context-specific judgment that a modeler can't have.

Decision makers have diverse perspectives and capabilities. In the 2,000 studies concerning sales-force size and deployment that we have done, the decision maker has never also been the model user.

In at least 80 percent of the cases, the project manager and the model user were different, and in over 70 percent, the model user and model creator were different. We find that the combination of context or issue experts and modeling experts creates a powerful synergy and that this kind of specialization is a dominant approach. An alternative is to design the model to be directly accessible to the decision maker. Our narrow but extensive experience has been skewed toward the call-the-doctor model and not the here-is-a-car drive-it model.

Perspectives: Theory and Practice

The objectives of marketing modeling include the following:

—Develop a precise and complete understanding of market behavior.

—Create rigorous and sophisticated estimation and optimization techniques.

The objectives of marketing modeling practice include the following:

—Solve the right problem.

—Build realistic models.

—Build adaptive models.

—Generate implementable solutions.

—Get it done quickly.

In the ideal world, theoretical model advances will continually feed the practical modeling needs of real-time decision makers.

Right Math, Wrong Answer

In an assessment of sales-force size and resource allocation in France, we built a model that suggested that a firm could improve sales and profits by significantly increasing investment in a specific product. When we communicated this result to the project team, the members threw up their hands in bewilderment. Since none of us

understood French, we spent half an hour deciphering what they were concerned about. The product was a memory enhancer, popular with high school students studying for their exams! The medical benefits were dubious, and it would be professionally inappropriate to throw heavy investment at such a product. All that the model focused on was the high sales response to sales-force activity for this product. The math was right, but the answer was wrong.

In other situations, the diagnosis of what needs fixing can be wrong. This leads to addressing the wrong problem. We have often been involved in "incentive compensation projects" only to discover that the problem lies elsewhere. An inappropriate sales-force structure or performance-management system may be the culprit. For example, if a sales force is spending too little time with some products or customers, a manager's first inclination can be to boost the incentive payout for these products or customers. But

Our team members found their PCs locked up.

the real solution may be to create a specialized sales force focusing on the products that are difficult to sell. Changing incentives may not be enough. The incentive model can give a great answer but it doesn't solve the real problem.

Is Wisdom Better than Models?

Model developers find fertile ground with some issues and environments, for example, sales-force analysis in the pharmaceutical industry. The industry has a lot of valuable and reliable data that can be

used to calibrate models for sales-force sizing, resource allocation, and territory alignment. The data is tracked at the physician level and includes monthly prescriptions for every product that every physician uses, as well as monthly call activity and other promotional programs directed at physicians. Sizing, resource-allocation, and territory-alignment models have had a big impact in this industry. One of the earliest documented examples was a project done for Syntex [Lodish et al. 1988]. Syntex's sales force was grossly undersized and its main product was underfunded. By departing from its current strategy, Syntex greatly improved profits. The modeling effort convinced Syntex management to make important changes.

Models provided financial projections for different strategic and tactical alternatives. Financial people love them. Decisions go beyond intuition, and sales managers can be held accountable for achieving the targets established with the help of the models.

However, it is more difficult to develop effective models for other sales-force decisions. The complexity inherent in compensation decisions, for example, makes it very difficult to model well (Figure 14).

Managers make many interdependent decisions. Individual components can be modeled, but it is very difficult to develop a practical comprehensive model. An experienced compensation consultant who knows what works and what does not work will find all of the foibles associated with a model-based solution.

Lack of measurability is another factor that hinders effective model development and implementation. For example, some

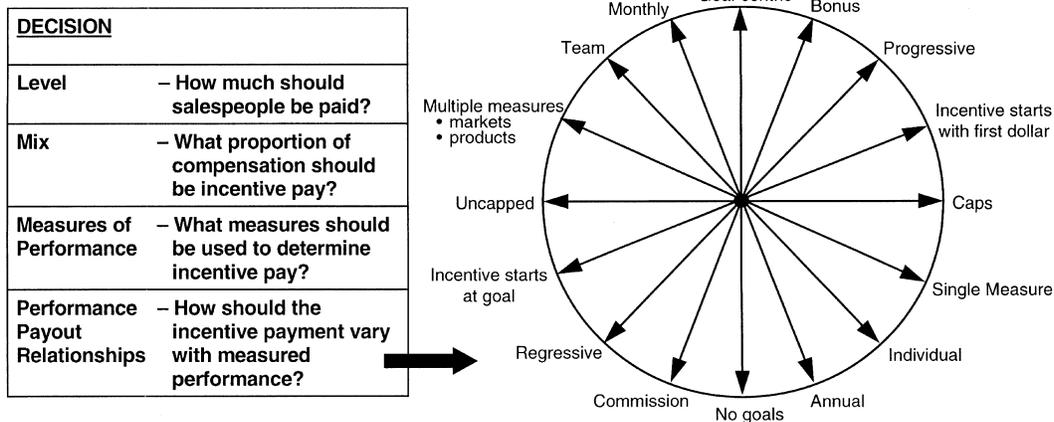| DECISION	
Level	– How much should salespeople be paid?
Mix	– What proportion of compensation should be incentive pay?
Measures of Performance	– What measures should be used to determine incentive pay?
Performance Payout Relationships	– How should the incentive payment vary with measured performance?

Figure 14: Many key decisions must be made to determine an effective compensation plan. The incentive-payment-design wheel enumerates the decisions that need to be made to establish a performance-payout relationship. Such complex decisions can be assisted by models but can't be solved using models.

useful criteria for evaluating sales-force structure choices are the following:
—For customers, the choice should provide responsiveness and continuity.
—For employees, the choice should provide clarity, meaningful work, and low uncertainty.
—For the firm, the choice should enhance efficiency and effectiveness while maintaining adaptability.

Many of these criteria are not measurable or are difficult to measure. Marketing decision models require measurability for success. Consequently, managers must rely on wisdom and good judgment to make sound decisions about sales-force structure.

The two dimensions of complexity and measurability help define where marketing decision models can be implemented (Figure 15). Simple models are appropriate when measurability is high but complexity is low. Such problems are amenable to models that are easy to build, control, and understand. In situations in which com-

plexity is high and measurability is low, experienced managers will dominate models. Processes to organize the managers' judgment are very useful in this decision category.

Various sales-force issues are amenable to modeling to different degrees (Figure 16). Determining sales-force structure is largely qualitative and judgment driven. However, models can be used to determine size and deployment in data-rich industries but not in data-challenged industries.

In designing incentive plans, simple models can be used to estimate the cost of potential incentive compensation plans. But developing a sales-force incentive-compensation structure depends more on the use of judgment and experience (Figure 17). Sophisticated modeling methods are required to assess sales-force preferences and the impact on sales of alternative plans.

The Model is the Tip of the Iceberg
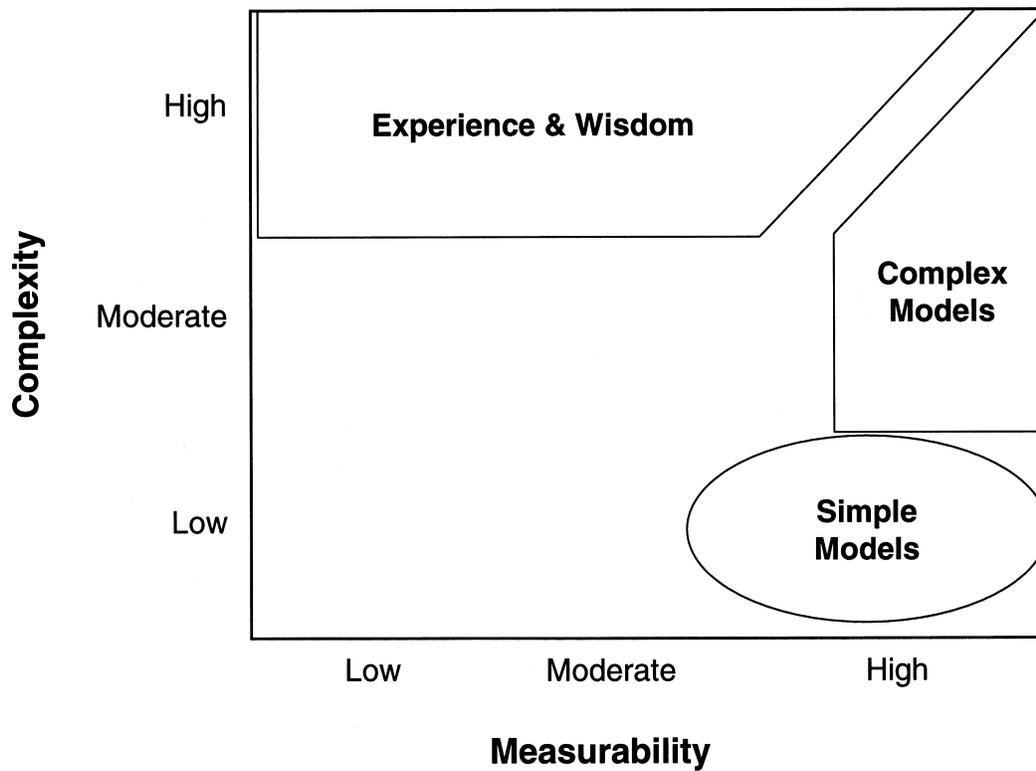
Early in our modeling careers in the

Figure 15: The role of wisdom and models differs for different levels of measurability and complexity. Models are useful in moderate-to-high measurability situations, and the issue complexity drives model complexity. Experience and wisdom are useful in high-complexity, low measurability situations.

1970s, our thinking was centered on models and we believed that the model was a large and prominent part of solving sales-resource-optimization problems. Over the years, we have realized that we spend much more energy on other activities, such as articulating the issues, building databases, and dealing with change management and implementation. For example, in the geographic deployment work we have done, we spend over 95 percent of the time in activities unrelated to model building.

In realigning sales territories, we frequently use a six-step process (Figure 18) with the alignment objectives tailored to the individual sales force. This process is similar to those we use in decisions about sales-force size, structure, resource allocation, and compensation.

The Roles of Models and People

Models provide insights; people make decisions. Arriving at a decision and implementing it tends to be a multistage process in which people use models to gain insights but are really in charge of decisions.

Years ago, we did a sales-force-sizing study for an international subsidiary of a large company. We developed many waves of sizing scenarios as we explored possible states of the future environment.
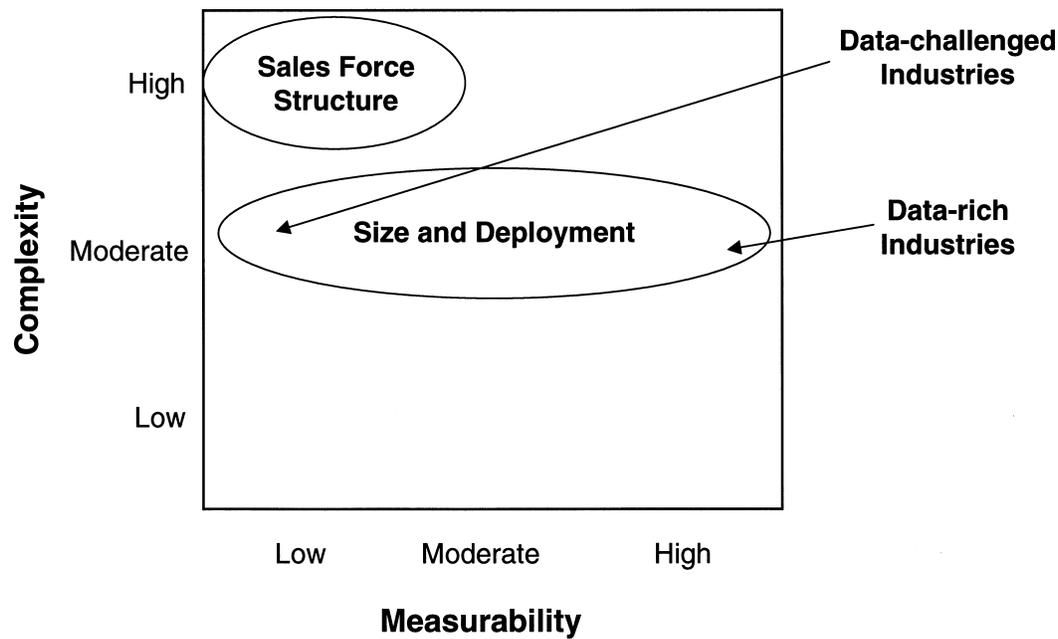
Figure 16: A complexity-measurability characterization of sales-force structure, size, and deployment problems: Sales-force-structure decisions are complex and difficult to quantify. Size and deployment decisions are quantifiable in some industries but not in others.

The results showed that the firm should reduce its sales force even under the most optimistic assumptions. Returning from lunch one day, our project team members found their personal computers locked up. The project sponsor had locked the room to prevent the team from evaluating any more scenarios. He did not like the direction of the results, even though the local sales and marketing managers expected a sales-force reduction. A month later the sponsor presented a recommendation to international headquarters that the firm maintain the current sales-force size. Models provide insights, but people make the decisions.

Having worked with some managers repeatedly over a decade or more, we have observed patterns in the ways managers use consulting assistance and models.

Most begin with an intuitive feeling for the answer: "For the new product launch, I think I may need another sales team," or "There are too many generalists in this organization. We need to specialize." They then use model assistance to quantify the situation, to give precision to the answer, and also to set an expectation of the sales and profit results associated with a change in direction. The decision makers influence the role that the model will play in the decision making. Some are completely open-minded, whereas others begin with precise expectations of the ultimate decision.

Project Examples

Four examples follow of the types of projects from which we gained the insights we have discussed. In them, we organize our descriptions around three topics:
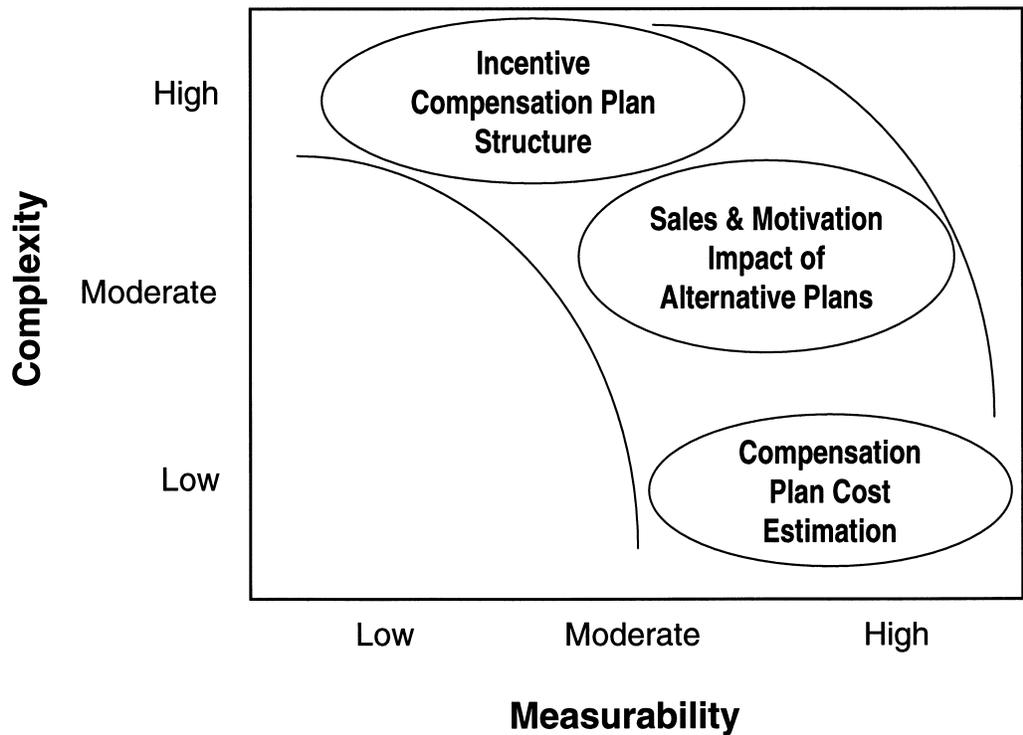
Figure 17: A complexity-measurability characterization of different components of incentive-plan-design problems: Incentive-structure problems are complex and have low measurability, whereas estimating the cost of incentive plans is a quantifiable problem, amenable to modeling. Other incentive issues are in between.

—Background,

—Project description, and

—Results, benefits, and insights.

Example 1: Ensuring Speed and Consistency in a Merger

How do you make a giant fleet of foot? Two major companies faced this challenge as they moved toward a merger. They needed to integrate the sales and marketing strategy of two huge organizations with over 15,000 sales representatives and a presence in every developed country in the world, and they needed to do it quickly to return the company focus to the customer. The new company set itself the ambitious target of developing a shared strategy across its 40 largest affiliates in two months.

With this tight deadline, the project team would have little time to communicate in detail across 40 affiliates once the merger was underway. It would have to ensure consistency of purpose and approach from the outset, reflect specific local issues, and ensure that local management teams supported and implemented the answer.

We designed a project structure based around two key elements—an integrated strategy-development model to ensure consistency, and a team-communication structure to allow for course corrections and local flexibility. The strategy-development model was structured

Project Planning	Database Development	Territory Location Analysis	Territory Design	Territory Refinement	Technology Transfer

Overall Objectives:

▪ Finalize scope, approach, and timeline
▪ Agree on roles and responsibilities
▪ Determine data needs and alignment criteria
	▪ Develop a database to use for location analysis and territory design
	▪ Build MAPS system to model sales force
		▪ Identify territory headquarters cities
		▪ Select region and district boundaries
		▪ Assess personnel matching issues
			▪ Build territories that
			  – have balanced workloads
			  – minimize representatives' travel time
			  – minimize disruption to the organization
			▪ Match personnel to territories
				▪ Refine territory design based on field feedback	▪ Transfer final alignment files
					▪ Transfer alignment systems and provide training
					▪ Transfer territory listing reports, customer lists, maps, etc.

Participants:

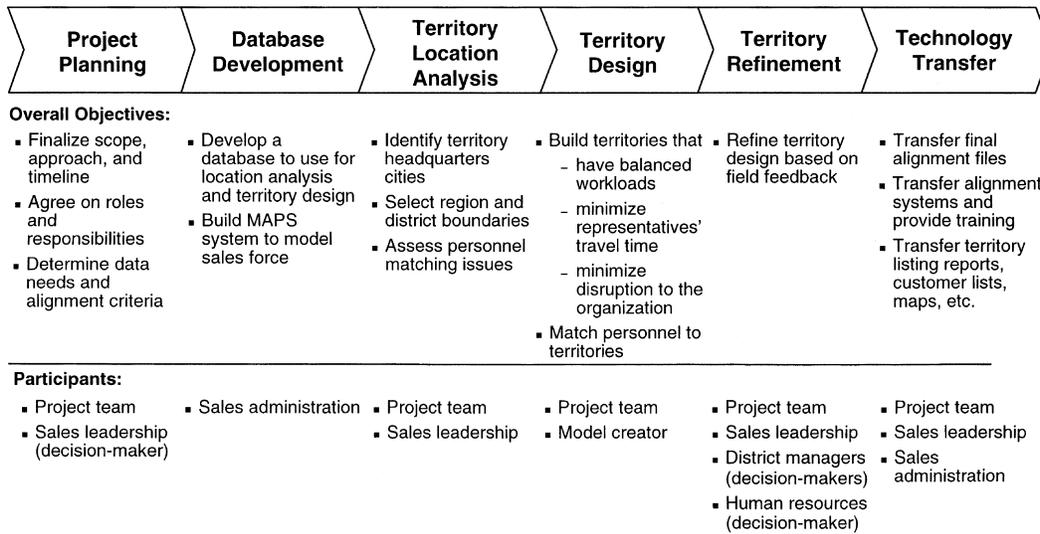|					
▪ Project team ▪ Sales leadership (decision-maker)	▪ Sales administration	▪ Project team ▪ Sales leadership	▪ Project team ▪ Model creator	▪ Project team ▪ Sales leadership ▪ District managers (decision-makers) ▪ Human resources (decision-maker)	▪ Project team ▪ Sales leadership ▪ Sales administration

Figure 18: A typical alignment generally follows a six-step process, but the exact objectives, activities, and participants are tailored to the specific situation.

around four stages.

In the first stage, we used a common framework to capture the existing strategies of the two organizations, formulated before the merger. This enabled the project teams to define strategies in a language shared by both halves of the new organization and to challenge existing assumptions. This baseline was a stable point of reference during a very volatile period, and would later form the basis for comparison with postmerger strategies.

We then focused on what would happen if the firm did something different. Clearly the new, larger company had far more promotional options than each company had had individually. By framing this analysis around an econometric model structure, we were able to share knowledge and insights across joint product-category teams very efficiently. The details of the analysis supporting this modeling varied from country to country to reflect the local environment, but the core model

structure remained common.

We also identified duplicated activities, shared customer interests, and common channels that could be sources of cost synergies. We also targeted activities that were driven by specific products but that increased investment needs.

In the fourth stage, the firm based its final strategic decisions on an econometric evaluation of the incremental return on promotional investment. We consistently applied this metric throughout the organization to find the most valuable use of each dollar that the firm invested in sales and marketing. With a shared format for analyzing the promotional strategies, comparison and assimilation at corporate headquarters was rapid.

A team that was structured to ensure high quality and consistency implemented this process at the global level while enabling local project teams to adapt to local circumstances. A few senior project managers spanned projects in several countries

and communicated with the corporate steering group and with each other.

Using this integrated process, the company developed a worldwide integrated strategy within two months and delivered cost and sales synergies. In over 300 meetings, managers around the globe came together to focus on a common goal, and in the process, they built their knowledge and their teams. Furthermore, because they did this so quickly, it became the first major merger in the industry in which a firm increased its market share during a merger.

The company firmly believed that speed was key to the success of a large merger: "To be fast is more important than to be

Models provide insights, but people make the decisions.

accurate." By driving through this integrated strategy model, the company succeeded in being large and fast and accurate.

Example 2: Creating a Virtuous Modeling-Learning Cycle

We worked very closely for over 10 years with a pharmaceutical company through several restructurings and mergers. During this period, the firm launched many products with varying degrees of success. It also made many changes in top and middle management. Like others in its industry, this company invests heavily in purchasing and organizing data about its customers, competitors, and markets. The value of the investment is routinely questioned, but the value is difficult to establish. In spite of the data investment, managers still made most major decisions

subjectively.

Beginning with projects on specific issues, we developed a relationship with the company whereby we created a systematic process for aiding decisions on sales-force size and structure, customer targeting, segmentation, marketing-resource allocation, and new-product-launch-strategy development.

We created a sales and marketing data warehouse, a centralized repository of customer, competitor, market, and activity information, and established processes for collecting, cleaning, verifying, and organizing the information to make access easy for sales and marketing personnel.

We created a sales decision-support system to help sales representatives and sales managers gain access to information and to make information-based decisions.

The company also uses a systematic resource-planning process annually to assess the market responsiveness of all the company's brands and customer segments. It combines the results with judgmental data to determine investment levels and to allocate sales and marketing resources.

In addition, the company uses models to support periodic decisions. The headquarters team uses information to evaluate new-product-launch strategies and partnership opportunities and to help it make several tactical and strategic decisions. For example, the company uses a market-monitoring mechanism to track new-product launches. As a result, it has made several course corrections that ensured product success.

The core benefit for the company has been its creation of a culture of information-based decision making. As

the headquarters group learned the importance of gathering objective information and analyzing data, it exported the practice to the sales organization.

Today the company plans better for launching new products than it used to and is also more targeted, aggressive, and

The managers saw them as poisoning the answer.

successful in its launches. The entire organization uses a scorecard that includes qualitative and quantitative measures to evaluate its current success and its aspirations for the future.

Over the last 10 years, the company has been in a virtuous modeling-learning cycle.

Example 3: Using Models for Control and Consistency

A global healthcare organization wanted to rationalize its allocation of sales and marketing resources across a diverse set of geographic markets. The president of the firm recognized that he and his immediate advisors lacked the local knowledge they needed to effectively evaluate the competing proposals for resources from over 50 countries.

For this modeling implementation to succeed, the management team in each country had to understand, accept, and implement a modeling approach that was robust, actionable, and tailored to local market conditions and that also enabled cross-country aggregations and trade-offs.

Our firm simplified and tailored a family of proven optimization models based on sales response for use across the customer's countries. We trained sales and

marketing personnel on the concepts, consulting process, and software models. Because the problem of allocating resources recurs annually, the local country teams needed to internalize this knowledge.

We achieved much of the process control and consistency through common training, common tools, and a consistent supply of external resources to help the local teams in implementing the models in times of need. The president's staff also achieved control and consistency by asking similar questions from the managers of the various countries:

—What resources and implementation processes do you think are most suitable for your market? What sales and profit line can you deliver if the company provides these resources?

—If your resource request is cut back by 10 percent, what part of your preferred implementation would you give up? What sales and profit line will you achieve under these circumstances?

—If your resources were limited to the current level, how would your implementation be affected?

This modeling approach, coupled with the implementation process elements, facilitated a transformation in this global firm's decision-making culture. A culture of horse trading was transformed into a culture of commitment. Affiliates committed to outcomes that were transparently connected to resources; the president committed to reduced expectations when reducing resources.

While this modeling approach improved the organization's resource-allocation decisions, the implementation process greatly enhanced the practices of sales and mar-

keting personnel, who adopted a common language and a sense of commitment to promised outcomes.

We gained a very interesting insight from this work. The participants in the process typically accepted the rational and informed nature of the modeling and the importance of accuracy and integrity of model inputs. General managers wanted their sales and marketing managers to

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After a 14-year gap, the company is working with us again.

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provide their best estimates of the sales levels they could achieve at any given resource levels. Likewise, the global headquarters personnel wanted the general managers to put forward their best estimates of the aggregate expectations in their markets. However, from the other direction in the decision chain, each chain member wanted to introduce cushion in the models. They wanted to promise less sales but beat their forecasts. These cushions had the unfortunate effect of reducing the resources allocated to those adding the cushions.

In this situation, models were used to ensure consistency and control in the allocation of scarce resources.

Example 4: Good Models are Not Enough

A company had three sales forces of about 500 salespeople each. The company's products had been divided among the three sales forces, primarily for historical reasons. Each sales force called on similar customers.

The company had decided to redistribute the products among the three sales

teams in a more rational manner and wanted to size the three new sales teams based on the revised product portfolios. A reduction in total sales-force size was expected. Then the company would need to design sales territories for each of the three sales teams and assign the various salespeople from the three old sales teams to a territory in one of the three new sales teams. All unassigned salespeople were to be laid off.

We assembled a large team from our consulting firm to work on this project with a core team of key sales directors from the client.

The joint team first developed sales-response relationships for the products under study, using a combination of historical-data analysis and judgment from the client team and from other client managers. By moving products around among possible team configurations, we identified the configuration that made the most sense in terms of product synergies and customer overlaps and then used the sales-response relationships to size these three new sales teams optimally. The analysis called for a sales-force reduction of 150 people.

For each sales team, we defined the optimal sales-territory locations. We defined a set of business rules to assign the existing salespeople to these new territory centers, using such criteria as past performance, seniority, geographic fit, and prior experience with that new sales team's products. Using these rules, we assigned all the existing salespeople to a new territory or slated them for termination. Second- and third-level sales managers reviewed and refined these assignments.

The company's legal and human resources departments then approved the locations.

Once we finalized the personnel assignments, we designed actual sales territories around these locations for the new salespeople. We essentially created three completely new territory alignments, each covering the entire country for its unique product line. These territories themselves were reviewed and refined at several acrimonious meetings by over 100 first- and second-line sales managers for the three sales teams.

We distributed the information to a variety of functions within the client's company for implementation. The company put the new structure into place, with nearly 1,400 people working in their new roles, with different products, perhaps new bosses, and new territories, in less than five months from when the project was first discussed.

After what seemed to us to be a successful conclusion to a high pressure, stress-filled, fast-paced sales-force-restructuring project, we anticipated that we would be hearing requests for other help we could provide to the company. Instead we heard . . . silence. There were no projects for the next 14 years, and our attempts at contacting the senior managers were rebuffed as well.

Only some years later did we find out, as people in the company eventually came to tell us, that top management had not been as pleased with the results of the project as we had thought. It turned out that senior-most management felt that we had placed too much emphasis in the territory alignment on designing geographically good territories, rather than on

minimizing disruption to existing salesperson-customer relationships. They thought that this had hurt sales performance in the first months after they implemented the new structure. They also

Judgment helps insure that models are implemented successfully.

thought that the core team members from the client side had injected too much judgment into the inputs that drove sales-force sizes, personnel assignments, and territory designs, pulling the recommendations away from what the strictly objective data showed. While at the time we thought these refinements were improvements, afterwards the client's top managers saw them as poisoning the answer.

In short, the client expected us to have driven the process more than we did, relying more on our expertise than on its own people's judgment or on criteria they had devised for us to use. Learning this lesson was perhaps even more valuable than the project itself had been for us.

After a 14-year gap, the company is working with us again. We hope we have become better modelers and problem solvers. This time, we plan to not just model and analyze but to also listen and advise.

A Final Thought

Many years have passed since one of us postulated that models would be used for most business decisions. Models certainly were very useful for the sales-force projects we described. Yet in the entire spectrum of business decision making, formalized models are not very common. Most decisions are based on experience, knowl-

edge, and wisdom. Our own thinking on decision making has moved in this direction as well. As we organized our modeling experiences for this paper, we noticed that our appreciation of experience and judgment, of implementation processes, and of stakeholder involvement has escalated appreciably. Our belief in the power of models is still strong, but our appreciation of the softer elements of problem solving and change management is much stronger than it was before. Models help shape judgment, and judgment helps insure that models are implemented successfully. The combination of modeling and judgment is very powerful.

Acknowledgments

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