Study of sales force management in Great Falls, Montana| A multiple regression analysis

Henry Lee Milledge

The University of Montana

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A STUDY OF SALES FORCE MANAGEMENT IN GREAT FALLS, MONTANA: A MULTIPLE REGRESSION ANALYSIS

By

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B.S., Southern Illinois University, 1968

Presented in partial fulfillment of the requirements for the degree of

Master of Business Administration

UNIVERSITY OF MONTANA

1974

Approved by:

[Signatures]

Chairman, Board of Examiners

Dean, Graduate School

Date
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CHAPTER I

INTRODUCTION

Purpose

This research paper has been developed to satisfy a need to explore the problems and practices that are peculiar to the management of sales forces based in Montana. Information obtained was compared to a theoretical base whereby new implementations may be generated to aid companies utilizing a sales force.

Scope and Research Methods

Due to the vast amount of data available in the area of sales management, this research was limited to an in-depth study of Great Falls area based companies, their approach to and utilization of sales forces within the confines of the State of Montana. Data base for the research was supplied primarily through interviews and company statistics while background material was obtained from numerous publications on marketing and sales management.

Development of Sales Management

As long as there exist companies that produce commodity items for use by consumers, whether they be services or finished goods, there will be a need for the salesman. He is the
primary link between the company and the ultimate consumer. As sales forces grow and expand, there becomes a requirement—management of these sales forces. The sales executive within the management structure has a twofold problem. While sales executives have a social responsibility to satisfy the consumer's needs and wants they also have responsibilities to the firm and its owners.¹ A company that is unable to generate adequate revenue is destined to become one of the thousands of companies that must cease production altogether. While the company sales personnel must remain consumer oriented in all aspects of operations, the management must strive for an acceptable sales volume profit-wise. The company cannot remain in business if stockholders withdraw due to a declining profit picture.

According to Stanton and Buskirk's Management of the Sales Force, sales or marketing management has evolved through a four-stage development process. Although marketing management has progressed steadily since the Industrial Revolution, very few of today's companies are organized in such a way as to be considered at the most advanced developmental stages of marketing management. Briefly, the four stages of development are as follows: stage one is primarily small and simply designed. There is probably a small sales force headed by a

sales manager; however, marketing concepts such as advertising, sales analysis, etc. are relatively unused. In this first stage however, we catch glimpses of departmentalization either by geographic territories, product lines or customer groups (see Fig. 1). During the second stage of development such practices as product servicing, sales training, and sales analysis begin to evolve (see Fig. 2). In the third stage of development, integration within sales management begins to unfold. The corporation top level structures now include the marketing department along with executives in production, finance, and personnel (see Fig. 3). The fourth stage is one in which the company has developed a fully integrated marketing program. The company has progressed in this stage to the point where the entire company functions for marketing. It is this stage where company executives act and react from a marketing point of view (see Fig. 4).

Although these four stages were brought forth to emphasize the evolutionary process that has taken place in marketing, we must realize that there are companies at every level or stage of development even in today's business world. Many internal problems and specific practices exist within each company concerning sales forces and their management techniques in Montana. Specifically, such basic marketing practices including structuring of the sales organization, selection of salesmen for positions within the company, how the sales forces are based upon sales forecasts, and the
different ways in which sales territories are developed and reasons for their structure will be covered in this paper.

Due to the size of the state and the great distances involved in traveling among the populated areas, emphasis was placed upon geographic problems encountered, including routing of salesmen, transportation and the State of Montana divisions or territorial assignments.
Fig. 1. Company Organization in Which Marketing Activities are Fragmented

Fig. 2. Company Organization Where Sales Management is Beginning to be Viewed More Broadly

Fig. 3. Company Organization, Embracing Concept of Marketing Management

SOURCE: Stanton and Buskirk, Management of the Sales Force, p. 11.

SOURCE: Stanton and Buskirk, Management of the Sales Force, p. 12.
Fig. 4. The Sales Management System

CHAPTER II
SALES MANAGEMENT

As pointed out in the previous chapter, the analysis of sales forces in Montana shall be confined to Great Falls area based companies although geographically they will encompass a major portion of the state. Since little information has been assimilated in this fashion, much of the comparative issues was between the company and a theoretical base. There was really no attempt to compare the company’s policies with each other. Due also to the time involved, no attempt was made to draw on information from other companies outside the state for comparative purposes. The initial phase of this study was one of establishing a theoretical basis or foundation from which to analyze the problems and practices of the companies involved.

Structure

The most basic beginning for any firm is probably its organizational structure. As pointed out in Chapter I, sales management has blossomed from very meager beginnings to one in which the sales manager, now called the marketing manager, is considered to be part of upper level management. It is this third phase of sales development that we find most of today’s organizational charts (see Fig. 3). However, some
of the companies may still be in phase two of our discussion whereby Fig. 2 would be a more accurate depiction of their organizational structure.

The sales organization charts of most companies "indicate that most organizations essentially can be classified in one of the following three basic categories: (1) the line organization, (2) the line and staff organization, (3) the functional organization."¹ (See Figs. 5, 6, 7) However as Kotler's Marketing Management points out, a sales force can be organized around company territories, products, customers or some mixture of the three. For our analysis, we will assume this latter alternative.

Sales by Territory

"In the simplest sales organization each salesman has an exclusive territory in which he represents the company's full line."² For the smaller company, this structure has distinct advantages. The salesman has no competition from other salesmen in his firm, he can also establish a one-to-one-relationship between the company he represents and the customer. Establishing a good rapport with the customer is essential for good selling and company image. The company can also make accurate evaluations on the salesmen's performance as compared to the territorial sales potential, if this

¹Stanton and Buskirk, Management of the Sales Force, p. 67.

is known to be accurate. Of course salesmen would not be judged against each other simply due to the territorial variations involved, see Fig. 8.

Fig. 5. Line Organization in the Sales Department

![Diagram of Line Organization in the Sales Department]


Fig. 6. Line and Staff Sales Organization

![Diagram of Line and Staff Sales Organization]

Fig. 7. Functional Sales Organization

SOURCE: Stanton and Buskirk, Management of the Sales Force, p. 72.

Fig. 8. Territorial Sales Organization

SOURCE: Stanton and Buskirk, Management of the Sales Force, p. 75.
Sales by Type of Product

"The type of product sold is another frequently used basis for dividing the responsibilities and activities within a sales department." Specialization of the sales force is particularly warranted when the products are highly technical or complex, where the company sells many thousands of products, or where the company has many unrelated product lines. One can readily surmise that there is much duplication of effort as more than one salesman must visit a customer to sell the individual product lines. This overlapping effect is disadvantageous by causing greater expenses and possible customer ill will. Fig. 9 shows typical sales organization with product-operating specialization.

Fig. 9. Sales Organization with Product-Operating Specialization

SOURCE: Stanton and Buskirk, Management of the Sales Force, p. 78.

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3Stanton and Buskirk, Management of the Sales Force, p. 77.
Sales by Customer Type

Having touched upon two of the major forms of sales organizations, we now introduce the last one of division by type of customer. This division process may be by type of customer, size, channel of distribution or company. This basis of organization is closely related to the division by product and in fact the division by product was accomplished because each product went to a different customer. The sales force has one obvious advantage in that each salesman can become acutely aware of each customer's needs. As Fig. 10 shows, departmentalization by type of business for example, each sales manager is involved in selling to a particular customer whether it be the railroad or construction industry. As with the other division specialties, this process also has some disadvantages. Principally, "it makes for overlapping of territorial coverage and, in this respect, is costly." 4

The analysis to this point may have led one to believe that each company at its inception sets forth its specific sales organization policy in whether to organize by customer, product-line, etc. However, as pointed out in Chapters III and IV, this may not be the case in practice. The number of combinations is substantial, the problem is adopting one that is best suited to the company policies and goals.

4 Ibid., p. 84.
The companies selling a wide variety of products over a large geographical area such as Montana will often combine many sales principles of sales force structures to best suit their needs. "The structure of a sales force no matter how effective
it may originally be, is always in danger of antiquation in
the course of time." One purpose of this paper was to include
an analysis of Great Falls companies to determine whether or
not their sales structures suit their needs in today's market.

Selection Process

The sales organization structures as shown in the
previous section will function correctly only through judicious
planning and selection of the sales force. It is the purpose
now to convey the more common thoughts on the total selection
process.

Recruiting

"At the heart of a successful sales-force operation
is the selection of good salesmen." Analysis readily shows
that if good hiring practices are used at its inception, the
company will benefit in the long run. "A survey of over 500
companies revealed that 27 per cent of the salesmen brought
in over 52 per cent of the sales." Of course the selection
and recruiting process is no easy matter and should be under­taken with the greatest care. "A real key to sales success is
the firm's ability to recruit men not only when wanted and in
the numbers wanted, but with the kinds of qualifications

\[^{5}\text{Kotler, Marketing Management, p. 712.}\]
\[^{6}\text{Ibid., p. 717.}\]
\[^{7}\text{Ibid.}\]
As Stanton and Buskirk pointed out, the selection process includes three major activities each of which may be further divided: (1) Determine the number and type of men wanted. This may involve a job description analysis to fully understand who and how many. Many authors dealing with this subject have adopted the systems approach to the total selection process. Specifically, the Goodwin Model is an excellent example of what a systems design is. How it is used is the manager’s choice. Fig. 11 depicts this model. It is general enough in design to be used in a variety of analyses. One might only be required to ask: What do I want the system to do; or, What results am I looking for? (2) Recruit a number of applicants. This process involves locating good sources from which salesmen can be chosen. This can be construed as a development of candidates. Downing’s *Sales Management* brings forth the following list of sources from which candidates may be sought:

A. The company itself. Many of the salesmen that would be best for the job can be found internally. This has an advantage of cost while the individual selected will probably be fairly knowledgeable of how the company works.

B. Advertising. Professional personnel journals, newspapers and trade magazines are a good contact source.

C. Educational institutions.

D. Employment agencies.

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E. Professional associations.
F. Customers.
G. The present sales force.

(3) Process the recruits or actually select the qualified salesmen. Although the recruiting and selection processes are intertwined, selecting the best candidate can prove to be difficult and would certainly not be in the best interests of the company if handled incorrectly. The general tendency is to work through a step by step process which moves systematically from the initial application form to a preliminary interview to testing and evaluation to a final interview resulting in the ultimate decision and placement of the salesman. Fig. 12 illustrates this process.

**Fig. 11. The Goodwin Model**

Fig. 12. Flow Model of Recruit-Hire-Train-Deploy Process


Testing

What type of tests shall be administered? This is a difficult question and can only be answered by evaluating the specific job to be filled and what type of individual you want to fill it. "Although test scores are only one information element in a scheme that includes personal characteristics, references, past employment history, and interview reactions, they are weighted quite heavily by some companies." Proponents of the testing procedures as an evaluation process feel

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that this technique has resulted in a drastic reduction of turnover. Highly specialized skill areas are particularly subject to batteries of tests. There are many tests available to measure intelligence, interests, sales aptitude and so on. Since there is really no one solution as to the type of tests that can and should be used, it will suffice to mention that this process is available to the employer and can be used at his convenience. It is really beyond the scope of the paper to delve too deeply into this subject; however, we should briefly discuss some of the more common types of tests.

The standard or general-use tests were originally designed to measure extreme behavior characteristics. One of the more popular tests is the Minnesota Multiphasic Personality Inventory (MMPI). Although this test was designed with psychiatry as a basis, many found this test to be of little value as a discriminator. Psychologists are under the impression that universal tests of this type are not as valuable as tailor-made tests designed for use in a specific instance or to accomplish the desired task. This approach is extremely useful in many instances. However, if the company is small or sells a variety of products where salesmen, even though they work for the same company, are not related at all, such a luxury would be very costly. The tests are no better than the individuals who evaluate them. Many times the test evaluators are the same individuals who designed them, thus becoming
somewhat narrow-minded in their approaches. Most often, problems will arise when the answer-maker reflects his own biases or experiences in the "correct" answers on a test.

The five basic types of psychological tests that may be of use to a sales manager are as follows: (1) intelligence or mental ability tests, (2) sales aptitude tests, (3) interest tests, (4) personality tests, (5) mechanical aptitude tests. The individual tests used should be evaluated in more depth when the study is applied to the techniques used by the companies evaluated. This should not conjure up the false impression that tests are always used and always beneficial. In fact a recent showing revealed the following results: "About two years ago a manufacturer of branded consumer items with a sales force of several hundred began using psychological tests in selecting new salesmen. Turn-over was reduced by about 40 per cent."\(^{10}\) However, as another study conducted during the same time frame points out, it cannot be assumed that training is always beneficial. "About the same time a similar company with a larger sales force decided to discontinue tests which they'd been using for years. Turnover went down about 40 per cent."\(^{11}\)


\(^{11}\)Ibid.
Training

The sales selectee has now progressed from the initial hiring phase including recruitment and testing and selection. The next step to be taken by the company is to adequately train him to become a successful salesman. The purpose of this section on training will be to explore the hows and whys of training and its usefulness to the company. We will cover the following types of training programs: (1) initial or indoctrination training, (2) refresher courses, and (3) continuous training programs.

Why is training done? This answer may be obvious to most; however, many companies tend to overlook this basic question. Aside from the obvious benefits training may have, "other possible benefits are a higher level of morale, better control over the men, better customer relations, and lower selling costs."\(^{12}\) The new salesman entering the business world is replete with deficiencies, one being that of practical experience gained through actual selling of a product. If the individual is not properly trained, the chances for discouragement and/or failure are greatly increased. However, if the salesman has a proper background through training, he will know what to expect and will probably not become remorseful with his first disappointing sale. The new man must have confidence in his trainer and be willing to heed the more

\(^{12}\)Stanton and Buskirk, *Management of the Sales Force*, p. 244.
experienced individual's advice. If the training program is conducted properly, the extra effort required during the initial phases will enhance individual morale which increases the overall benefit to the company through lower selling costs and better customer relations.

If the company decides to let the individual jump directly into selling, providing for a somewhat abrupt beginning, some type of continuous training or refresher training is a must. Also, the sales personnel who have been hard at work and are unable to keep current with possible innovative techniques could use continuation or refresher training. This training technique should be handled with care. Problems arise as to when and where the training should take place. The salesman must carefully allot his time to concentrate on areas where he will do the most good both for himself and for his company. There is no one correct solution to this problem. If the salesman reaction is one of self-improvement and the training is designed as such there will probably be no ill feeling toward conducting the meetings during off-duty time. However, as stated, this is an individual company problem. According to Stanton and Buskirk's *Management of the Sales Force*, the largest percentage of training should be conducted in a decentralized fashion. Unless specific reason can be found for centralized instruction, decentralization either on the job, office instruction, or traveling sales clinics are the best answer for updating salesmen on the latest practices.
In order for the recruitment, testing and selection process to function properly, the company's sales department must have some knowledge of what the sales potential is for their product. Awareness of market, current and future trends will determine how many salesmen will be required to perform the job satisfactorily.

Predicting Sales

Although the terms sales potential and sales forecast may be used interchangeably, it should be emphasized that a sales forecast may not reflect the sales potential in some cases. Factors such as plant capacity may be a constraint in the forecast. For the purpose of this research, the definition put forth by the American Marketing Association will be used. A sales forecast is an estimate of dollar or unit sales for a specified future period under a proposed marketing plan or program. The forecast may be for a specified item of merchandise or for an entire line; it may be for a market as a whole or for any portion thereof. Sales forecasting is the essence of all plans made for future company growth and expansion. This critically important phase in the total business picture must be accurate since forecasting errors will affect financing, production, as well as personnel. This research will emphasize forecasting from a personnel position; however, the other areas of business are intertwined and may be included for purposes of clarification and exemplification.
"The sales forecast, a primary ingredient in the budgeting process, is also considered essential in planning the company's marketing and sales programs allocating sales and other resources . . . ." Primary responsibility for sales forecasting generally rests with the company sales department. It shall be their duty to determine the sales potential for the product as well as forecasting future company growth in sales.

Forecasting Methods

Sales forecasting methods can cover a wide variety of topics and the specific type(s) chosen by a company for its use will depend on many internal variables. The purpose here is to convey and explain some of the methods used in today's market. Very few, if any, firms will rely on just one forecasting method. Systems of checks and balances can be obtained when more than one method is used and they contain common information. The more common sales forecasting methods include jury of executive opinion method, sales force composite method, survey of user expectation method, time series projection method, and mathematical models.

The jury of executive opinion method combines and obtains the varied opinions of company executives for a multi-opinionated solution. The sales force composite method is

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useful in situations where results are based upon individual territories. The company relies upon the judgments of those in the field consequently the personnel must be competent enough to complete the task successfully. The decentralization which occurs in this approach will emit individual biases that stem from a lack of understanding of the entire scope of company policy. If such biases are duly noted and compensated for, the results of this method can be extremely useful. The surveys of users expectation method can be utilized in situations where there are few potential customers. This technique will base a forecast directly upon the needs and desires of the customers. If the customers know in advance what their needs and desires are, the forecasts can be fairly accurate. As stated, this technique would be disadvantageous to a market that employs numerous users. The time series projection trend is based upon historical trends which, when projected into the future, make a useful tool for both long run and short run forecasts. Two possibilities to be aware of when using this analysis are to be careful not to believe that business is cyclical; i.e. assuming that there is a regularity in the business activity and trying to project a forecast using a seasonal index adjustment of present sales too far into the future. Monthly or quarterly estimates can be useful; however, any projection past this time period will probably be erroneous. As noted, there are various alternatives available to the company and the choice of which to use is a decision to
be made by the sales management department or its executives. This research will emphasize a variety of techniques which will forecast both the long term and the short term expectation by consumers, for the products of the companies used in the research. The series of tables that follow depict the five methods previously discussed.

Table 1 relates the types of forecasts to each other. The jury of executive opinion along with the sales force composites are the two most widely used techniques overall. Table 2 indicates how much emphasis is placed on each technique used. Again, heavy reliance is placed upon both the jury of executive opinion as well as the sales force composite. Tables 3, 4, 5 indicate that 58 per cent of the companies queried prepared sales force costs annually and 24 per cent revised them monthly. Companies need and use the forecasts prepared. However, the forecast is an ongoing problem and shouldn't be discontinued once formulated. The most accurate forecast is one continually updated with the most recent information available. Table 6 and 7 (manufacturing companies only) relate percentage differences between actual sales and those forecast at the year's outset. The largest share, 81 per cent, of companies reported indicate a forecast error less than 10 per cent while almost half, 47 per cent, indicated less than a 5 per cent difference between actual sales and forecast sales. It is the premise of this research that accurate sales forecasts, when used judiciously, can provide
a basis for sound sales force management. Once the company is aware of or at least has an accurate picture of future needs, both long and short term, then the company can attempt to build a satisfactory sales force. The next chapter will explain further the techniques which will be used in this analysis. The next section will cover sales territories, how they are formed and some of the more prevalent practices and techniques used.

"A sales territory is a number of present and potential customers located within a geographical area and assigned to a salesman, branch dealer, or distributor."\(^\text{14}\)

Sales Territories

Do companies divide their regions among the sales force employed? The answers to this question are numerous. Some of the standard solutions follow.

A salesman is apt to work harder if he feels a sense of ownership of a particular geographical area. If he is interested in the outcome of the sales effort based on sales potential, his overall effectiveness will have a greater likelihood of success. He becomes obligated to both the company and the customers and through feedback can determine whether or not he is achieving his goals. Restriction of salesmen to a predetermined area is also a good method for determining performance. Cost reduction and improved customer relations are also some benefits included.

\(^{14}\)Stanton and Buskirk, Management of the Sales Force, p. 521.
<table>
<thead>
<tr>
<th>Forecasting Method</th>
<th>Per Cent of All Companies Reporting</th>
<th>Per Cent of Industrial Products Manufacturers Reporting</th>
<th>Per Cent of Consumer Products Manufacturers Reporting</th>
<th>Per Cent of Service Companies Reporting</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Value Rated 1st or 2nd</td>
<td>Value Rated 3rd to 5th</td>
<td>Value Rated 1st or 2nd</td>
<td>Value Rated 3rd to 5th</td>
</tr>
<tr>
<td>Jury of executive opinion</td>
<td>54%</td>
<td>36</td>
<td>50%</td>
<td>39</td>
</tr>
<tr>
<td>Sales force composite</td>
<td>56%</td>
<td>32</td>
<td>62%</td>
<td>30</td>
</tr>
<tr>
<td>Survey of users' expectations</td>
<td>29%</td>
<td>55</td>
<td>35%</td>
<td>53</td>
</tr>
<tr>
<td>Time-series projection</td>
<td>30%</td>
<td>39</td>
<td>24%</td>
<td>40</td>
</tr>
<tr>
<td>Mathematical models</td>
<td>15%</td>
<td>51</td>
<td>14%</td>
<td>47</td>
</tr>
</tbody>
</table>

Note: Based on information from 161 reporting companies—93 industrial products manufacturers, 39 consumer products manufacturers, and 29 service firms (insurance, banking, transportation, utilities). Many respondents did not give ratings for all five methods, usually because their companies make no use of some of them.

### TABLE 2

**DEGREE OF COMPANY RELIANCE ON MAJOR SALES FORECASTING METHODS**

<table>
<thead>
<tr>
<th>Forecasting Method</th>
<th>Per Cent of All Companies Reporting</th>
<th>Per Cent of Industrial Products Manufacturers Reporting</th>
<th>Per Cent of Consumer Products Manufacturers Reporting</th>
<th>Per Cent of Service Companies Reporting</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Heavy Reliance</td>
<td>Moderate Reliance</td>
<td>Very Little or No Reliance</td>
<td>Heavy Reliance</td>
</tr>
<tr>
<td>Jury of executive opinion</td>
<td>48%</td>
<td>32</td>
<td>20</td>
<td>47%</td>
</tr>
<tr>
<td>Sales force composite</td>
<td>42%</td>
<td>33</td>
<td>25</td>
<td>50%</td>
</tr>
<tr>
<td>Survey of users' expectations</td>
<td>18%</td>
<td>30</td>
<td>52</td>
<td>22%</td>
</tr>
<tr>
<td>Time-series projection</td>
<td>25%</td>
<td>32</td>
<td>43</td>
<td>23%</td>
</tr>
<tr>
<td>Mathematical models</td>
<td>15%</td>
<td>19</td>
<td>66</td>
<td>12%</td>
</tr>
<tr>
<td>Jury of executive opinion</td>
<td>53%</td>
<td>24</td>
<td>23</td>
<td>42%</td>
</tr>
<tr>
<td>Sales force composite</td>
<td>27%</td>
<td>24</td>
<td>50</td>
<td>35%</td>
</tr>
<tr>
<td>Survey of users' expectations</td>
<td>10%</td>
<td>27</td>
<td>63</td>
<td>17%</td>
</tr>
<tr>
<td>Time-series projection</td>
<td>29%</td>
<td>29</td>
<td>43</td>
<td>25%</td>
</tr>
<tr>
<td>Mathematical models</td>
<td>11%</td>
<td>24</td>
<td>66</td>
<td>32%</td>
</tr>
</tbody>
</table>

Note: Based on information from 161 reporting companies—93 industrial products manufacturers, 39 consumer products manufacturers, and 29 service firms (insurance, banking, transportation, utilities). Details added across, for each category of companies, may not always add exactly to 100% due to rounding.

**SOURCE:** Pokempner and Bailey, *Sales Forecasting Practices*, p. 10.
### TABLE 3

**FREQUENCY OF SALES FORECAST PREPARATION**

<table>
<thead>
<tr>
<th>Forecasts Are Prepared</th>
<th>Percentage of Forecasts(^1)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>All Companies Reporting</td>
</tr>
<tr>
<td>Annually</td>
<td>58%</td>
</tr>
<tr>
<td>Semiannually</td>
<td>4</td>
</tr>
<tr>
<td>Quarterly</td>
<td>20</td>
</tr>
<tr>
<td>Monthly</td>
<td>14</td>
</tr>
<tr>
<td>Other(^2)</td>
<td>4</td>
</tr>
<tr>
<td>Total</td>
<td>100%</td>
</tr>
</tbody>
</table>

**Note:** Based on information from 161 reporting companies — 132 manufacturers and 29 service firms (insurance, banking, transportation, utilities).

\(^1\) Percentages are for forecasts made at all levels of product detail.

\(^2\) Includes "as needed," bimonthly, weekly, seasonally, bimonthly, and irregularly.

**SOURCE:** Pokempner and Bailey, *Sales Forecasting Practices*, p. 21

### TABLE 4

**FREQUENCY OF SALES FORECAST REVISION**

<table>
<thead>
<tr>
<th>Forecasts Are Revised</th>
<th>Percentage of Forecasts(^1)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>All Companies Reporting</td>
</tr>
<tr>
<td>Monthly</td>
<td>24%</td>
</tr>
<tr>
<td>Quarterly</td>
<td>29</td>
</tr>
<tr>
<td>Semiannually</td>
<td>12</td>
</tr>
<tr>
<td>Annually</td>
<td>20</td>
</tr>
<tr>
<td>As needed</td>
<td>7</td>
</tr>
<tr>
<td>Other(^2)</td>
<td>8</td>
</tr>
<tr>
<td>Total</td>
<td>100%</td>
</tr>
</tbody>
</table>

**Note:** Based on information from 161 reporting companies — 132 manufacturers and 29 service firms (insurance, banking, transportation, utilities).

\(^1\) Percentages are for forecasts made at all levels of product detail.

\(^2\) Includes daily, weekly, bimonthly, and a few irregularly timed revision periods.

**SOURCE:** Pokempner and Bailey, *Sales Forecasting Practices*, p. 22.
### TABLE 5

**LEVEL OF PRODUCT DETAIL FOR WHICH SALES FORECASTS ARE PREPARED**

<table>
<thead>
<tr>
<th>Level of Product Detail Forecast</th>
<th>Per Cent of All Companies Reporting</th>
<th>Per Cent of Manufacturing Companies Reporting</th>
<th>Per Cent of Service Companies Reporting</th>
</tr>
</thead>
<tbody>
<tr>
<td>Level 1: By individual product or service item only</td>
<td>5%</td>
<td>6%</td>
<td>0%</td>
</tr>
<tr>
<td>Level II: By product line or class of service only</td>
<td>5</td>
<td>6</td>
<td>21</td>
</tr>
<tr>
<td>Level III: By total for all sales only</td>
<td>4</td>
<td>2</td>
<td>11</td>
</tr>
<tr>
<td>Both Levels I and II</td>
<td>8</td>
<td>10</td>
<td>4</td>
</tr>
<tr>
<td>Both Levels I and III</td>
<td>6</td>
<td>6</td>
<td>4</td>
</tr>
<tr>
<td>Both Levels II and III</td>
<td>8</td>
<td>5</td>
<td>21</td>
</tr>
<tr>
<td>Levels I, II and III</td>
<td>64</td>
<td>69</td>
<td>39</td>
</tr>
<tr>
<td>Other</td>
<td>13</td>
<td>16</td>
<td>4</td>
</tr>
</tbody>
</table>

Note: Based on information from 156 reporting companies - 128 manufacturers and 28 service firms (insurance, banking, transportation, utilities).

1 Includes companies that simply aggregate lower-level forecasts into higher levels, as well as those who forecast all indicated levels independently.

2 Includes forecasts covering "peak demand," geographical areas, user markets, technological groupings, rentals vs. sales, distribution channel groupings, various models, new vs. mature products, and the like. Since such forecasts are in addition to those covering product (or service) detail levels, column totals add to more than 100%.

**SOURCE:** Pokempner and Bailey, *Sales Forecasting Practices*, p. 22.
<table>
<thead>
<tr>
<th>Percentage Difference between Actual Sales and Forecast at Year's Outset</th>
<th>Percentage of All Companies Reporting</th>
<th>Percentage of Manufacturing Companies Reporting</th>
<th>Percentage of Service Companies Reporting</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Most Important Product Line or Service</td>
<td>Total Company Sales</td>
<td>Most Important Product Line</td>
</tr>
<tr>
<td>0.1% to 1.5%</td>
<td>15%</td>
<td>16%</td>
<td>11%</td>
</tr>
<tr>
<td>1.6% to 4.5%</td>
<td>32</td>
<td>36</td>
<td>30</td>
</tr>
<tr>
<td>4.6% to 10.0%</td>
<td>34</td>
<td>41</td>
<td>39</td>
</tr>
<tr>
<td>10.1% to 20.0%</td>
<td>12</td>
<td>5</td>
<td>12</td>
</tr>
<tr>
<td>Over 20.0%</td>
<td>7</td>
<td>2</td>
<td>8</td>
</tr>
<tr>
<td>Total</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
</tr>
</tbody>
</table>

| Median % difference reported                                  | 5%                              | 4%                              | 5%                             | 4%                             | 2.1%                           | 3.75%                           |
| Range of % differences reported                               | 0.1-50%                         | 0.1-40%                         | 0.3-50%                        | 0.1-40%                        | 0.1-22.5%                      | 0.3-15.2%                      |
| Number of companies reporting                                 | 151                             | 145                             | 124                            | 121                            | 27                             | 24                             |

Note: Percentage errors are as reported without regard to sign (+ or -). For most companies, period referred to is calendar 1968. A few reported results for their fiscal year ending in 1969, and a very few, reporting late in 1969, gave projected errors for 1969.

### TABLE 7

Differences Between Actual Sales and Forecast Made at Year's Outset, For the Company's Total Sales and Its Most Important Product Line, Manufacturing Companies Only

<table>
<thead>
<tr>
<th>Percentage Difference Between Actual Sales and Forecast at Year's Outset</th>
<th>MIPL</th>
<th>TCS</th>
<th>MIPL</th>
<th>TCS</th>
<th>MIPL</th>
<th>TCS</th>
<th>MIPL</th>
<th>TCS</th>
</tr>
</thead>
<tbody>
<tr>
<td>By Annual Company Sales (Millions)</td>
<td>Under $100</td>
<td>$100-$500</td>
<td>Over $500</td>
<td>Durable</td>
<td>Nondurable</td>
<td>Consumer</td>
<td>Industrial</td>
<td></td>
</tr>
<tr>
<td>MIPL</td>
<td>TCS</td>
<td>MIPL</td>
<td>TCS</td>
<td>MIPL</td>
<td>TCS</td>
<td>MIPL</td>
<td>TCS</td>
<td>MIPL</td>
</tr>
<tr>
<td>0.1% to 1.5%</td>
<td>6%</td>
<td>13%</td>
<td>18%</td>
<td>20%</td>
<td>9%</td>
<td>23%</td>
<td>5%</td>
<td>7%</td>
</tr>
<tr>
<td>1.6% to 4.5%</td>
<td>28</td>
<td>32</td>
<td>23</td>
<td>30</td>
<td>43</td>
<td>40</td>
<td>27</td>
<td>30</td>
</tr>
<tr>
<td>4.6% to 10.0%</td>
<td>49</td>
<td>47</td>
<td>36</td>
<td>43</td>
<td>27</td>
<td>30</td>
<td>44</td>
<td>51</td>
</tr>
<tr>
<td>10.1% to 20.0%</td>
<td>11</td>
<td>16</td>
<td>7</td>
<td>9</td>
<td>7</td>
<td>12</td>
<td>8</td>
<td>12</td>
</tr>
<tr>
<td>Over 20.0%</td>
<td>6</td>
<td>6</td>
<td>16</td>
<td>7</td>
<td>9</td>
<td>7</td>
<td>12</td>
<td>4</td>
</tr>
<tr>
<td>Total</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
</tr>
</tbody>
</table>

**Median % difference reported:** 6% 5% 5% 4.7% 4.5% 3% 7% 5% 4% 2.1% 4.4% 2.1% 5.7% 5%

**Range of % difference reported:**
- **Low:** 1.0% 1.0% 0.6% 0.2% 0.3% 0.1% 0.6% 0.6% 0.3% 0.1% 0.3% 0.1% 0.6% 0.1%
- **High:** 50% 40% 25% 12.4% 30% 20% 50% 40% 25% 10% 15% 12% 50% 40%

**Number of companies reporting:** 47 47 44 44 33 30 75 73 49 48 35 34 89 87

**Note:** Percentage errors are as reported without regard to sign (+ or -). For most companies, period referred to is calendar 1968. A few reported results for their fiscal year ending in 1968, and a very few, reporting late in 1968, gave projected errors for 1969.

**source:** P. Kempner and Bailey, *Sales Forecasting Practices*, p. 29.
The easiest division of the sales market into territories will of course occur when all the districts are equal in both sales potential and work load. Since business is by no means a perfect science, the many variations and alternatives involved will make this situation virtually unattainable. Many organizations that are small, such as Phase II of our discussion in Chapter I, have made no attempt at establishing territories. In this phase, where divisions were assigned, no systematic process was used. One plan used for establishing territories is found in the following step analysis.

1. Select a base or control unit for territorial boundaries.
2. Analyze salesmen's work loads.
3. Determine basic territories, considering the sales potential and the call patterns.
4. Establish a route plan for the salesmen.
5. Conduct territorial sales and cost studies on a continuing basis.\(^5\)

As the designer proceeds through these steps, one must keep in mind that "Exclusive territorial distributorships have been around for years--but that doesn't alter the fact that

\(^5\)Stanton and Buskirk, Management of the Sales Force, p. 525. The steps listed above are by no means a consensus. According to Alton Doody and William G. Nickels in MSU Business Topics, the assignment of sales personnel to territories is an outdated concept. Strategic selling is necessary to meet the needs of the relatively small percentage of business, 11.6 per cent, that accounts for 90 per cent of the nation's total sales receipts.
the Justice Department and FTC consider them to be illegal.\footnote{16} Many recent court hearings on the subject indicate a tightening of the law in this area and should be considered a factor when territory divisions are accomplished. The initial step in the process is to determine what is to be used as the division point. Should it be the state, county or city. The type used will be determined principally by the size of the company and the work loads involved. Preferably, the size of the territory should be small enough to enable the salesman to complete an effective job of selling. A small unit will also enable management to complete minor changes from area to area or salesman to salesman with the least amount of difficulty. "A popular territorial base, especially for firms that sell to or through wholesalers or retailers is the trading area. This control unit is a geographical region that consists of a central city, which dominates the market, plus the surrounding area whose trade normally flows to the hub city."\footnote{17}

The sales management force is dependent upon the executive decisions made in relation to the territories assigned. It is important that the work loads involved are identified and analyzed to effect the proper sizes. If the

\footnote{16} Excluding the Exclusives," \textit{Sales Management}, October 1972, p. 3.  

\footnote{17} Stanton and Buskirk, \textit{Management of the Sales Force}, p. 527.
type of selling involves considerable missionary work, along with actual selling, the size of the territory should reflect this slant. Other factors or constraints limiting territory size include the nature of the product, the channels of distribution used, and the ability of the salesman assigned.

Territories may take the form of a variety of shapes. They may be circular with the salesman stationed in the center; they may be cloverleaf-shaped with the salesman stationed in the center traveling in a series of loops around his territory, or they may be wedge-shaped, employed in large metropolitan areas where the area is too large for one salesman to effectively cover. See Fig. 13 for illustration.

Fig. 13. Types of Call Patterns

Circle  Cloverleaf  Wedge

The call patterns in the number of calls or the frequency with which each account should be visited is an

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18Webster's Third New International Dictionary, 1961 ed., s.v. "missionary salesman." Performance of a manufacturer's sales representative sent into a territory to stimulate sales of a product through special promotions or public relations.
important factor to consider when designing a territory.\(^19\) (See footnote \(^20\) for mathematical interpretation.) Closely related to call patterns is the assignment of accounts. Because the average number of calls varies from district to district, each must be computed individually. Table 8 illustrates the differences that could be possible between two areas and three customer classes.

**TABLE 8**

**EXAMPLE OF CALL FREQUENCY FOR DIFFERENT CUSTOMER CLASSES**

<table>
<thead>
<tr>
<th>Customer Class</th>
<th>Call Frequency</th>
<th>Trading Area X</th>
<th>Trading Area Y</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Number Accounts</td>
<td>Number Calls per Year</td>
</tr>
<tr>
<td>A</td>
<td>2 per month</td>
<td>10</td>
<td>240</td>
</tr>
<tr>
<td>B</td>
<td>1 per month</td>
<td>25</td>
<td>300</td>
</tr>
<tr>
<td>C</td>
<td>1 every 2 months</td>
<td>15</td>
<td>90</td>
</tr>
<tr>
<td>Totals</td>
<td></td>
<td>50</td>
<td>630</td>
</tr>
</tbody>
</table>

**SOURCE:** Stanton and Buskirk, *Management of the Sales Force*, p. 536.


\(^20\)Mathematically,

\[
N = \frac{\sum_{i=1}^{n} C_i F_i}{P}
\]

\(N\) = desirable number of salesmen.
\(C_i\) = number of customers in size class \(i\).
\(F_i\) = the desirable number of annual calls to make to the customer in size class \(i\).
\(P\) = the annual average number of calls made by a salesman.
\(n\) = the number of customer size classes.
The fourth step, routing of the salesmen, is included to help the salesmen determine the optimal plan for customer contact. "Routing is the managerial activity that establishes a formal pattern for a salesman to follow as he goes through his territory."²¹ Often, the easiest route the salesman takes is not the best. "Left to their own routing devices, they will backtrack and crisscross in a territory in order to be home several nights a week."²² Studies indicate that there is a distinct line that can be drawn outlining the area in which a salesman can begin and end at home daily, just by purusing his sales versus sales potential charts. Inside the outer edge, sales are satisfactory, outside the boundary is a grey or marginal sales area where actual versus potential is below average. To sell effectively beyond this range the salesman is forced to travel. This is duly noted by a satisfactory sales volume versus potential outside the grey area. The proper route to be employed should be analyzed and continually updated on a territorial basis. As market conditions change, the routes or even the entire territory structure may need to be modified.

Two of the more important sales force management responsibilities requiring concentrated attention are the evaluation of performance in sales territories and the establishment of benchmarks for future performance. As previously

²¹ Stanton and Buskirk, Management of the Sales Force, p. 539.
²² Ibid., p. 540.
discussed, the sales territory may be defined in terms of geographical areas, similar groupings of customers, product lines or some combination. The table shown explains where the market forecasts or potentials, as developed in the last section, functions in relation to workload in evaluating overall sales territory performance.

Sales territories can be measured in a variety of ways. Sales by product line, territory profits, or total unit sales are examples. Total unit sales will be used as the basis for purposes of development. Chapter III contains the detailed description which shall be drawn on for the company analysis.

The fifth step of our analysis of sales forces and assigned territories is an ongoing problem that must be continually evaluated and if deemed necessary acted upon. Reorganization of the sales force to assume new territories and/or products is a drastic move and should be accomplished with long range goals in mind. Sales problems that evolve in the short run can be temporarily improved; however, continued use of this approach may cloud the ultimate long range goals. For example, if sales drop prices can be cut in order to increase volume. This may suffice to obtain short run profits; however, continued use would rapidly deplete all resources. It seems senseless to pursue this trend of thought when a sales force reorganization would provide the company with a better profit picture ultimately. "The key factors
in executing any reorganization are three: (1) establishing the structure of the new organization, (2) establishing the position descriptions of the jobs required by the structure, and (3) communicating both the structure and the position descriptions to the people who ultimately have to make the reorganization work."\(^{23}\)

**Summary**

It has been the purpose of this chapter to define and explore some of the theoretical and practical aspects of management of the sales force. The technique employed here was to familiarize the reader with the purposes behind management, concerning sales forces, while attempting to build a platform from which a common interpretation of the following material can be based. The problem of organizational structure was presented to acquaint the reader with the different types of organization charts that can be found in today's businesses. Such specifics as line, line-staff and functional organizations were emphasized. Division of a company sales force by territory, products, customers or some mixture of the three was also considered. Once the company organization structure has been reviewed, the question of recruiting, hiring and training the salesmen must be dealt with. The pros and cons of testing were discussed and generally the type of test used is determined by the position to be filled. Tests

can help, however, if not used with discretion, they could turn away a potentially successful salesman. The chapter also covers forecasting of sales potential for the firm. The number of salesmen hired is directly dependent upon the marketability of the product. Various methods of forecasting were discussed briefly. Some popular techniques that are used in this type of analysis will be developed in Chapter III.

Practices and techniques involving sales territories were also discussed. Why companies divide their market areas and how they do so were questions answered. A stepwise analysis was explained to demonstrate a fairly straightforward approach to the overall territory distribution and routing.
CHAPTER III

TECHNICAL ASPECTS OF THE RESEARCH

It is the purpose of this chapter to define the technical aspects of the research, specifically, to relate Chapter II, which provided the groundwork of this paper to Chapter IV which will include the actual analysis of Northern School Supply, Coca Cola Bottling Company, Graham & Ross, Northwestern National Life Insurance Company, and Uke's Sports. The objectives included determination of the sales potential of the products sold by the aforementioned companies, determination of the territory size and orientation, and an analytical approach for evaluation of the sales territory performance. The techniques to accomplish these objectives will be exponential smoothing, computed trend line, and multiple regression analysis.

Figuring sales potential as discussed in Chapter II is a useful tool in sales and should be considered highly when determining the size of a sales force. For purposes of this research, the analysis will include only those techniques pertinent to the discussion. An example of forecasting short-run and long run will be discussed first.

Customer service in an economical and effective manner calls for the anticipation of demand for merchandise, so that orders can be filled without undue delays because of stockouts. . . . When a
large number and variety of items are sold, it becomes impossible to make individual forecasts of anticipated demand on the basis of personal judgment.¹

**Exponential Smoothing**

For the purpose of determining a short-run demand situation for a product, a popular technique used today is exponential smoothing. "Smoothing refers to the fact that each forecast really represents an averaging out of past experience, based on the weighting of past demand and of forecasts."² The following example and explanation will be adapted to the analysis presented in Chapter IV. In Table 9, Column B contains the actual demand for the product in units. Column C is the product of Column B and a smoothing factor of .2 denoted by α. This factor is 20 per cent in the example. This means 20 per cent importance or weight is given the old forecast judged against actual sales for each period. Column D is the weighted old forecast; i.e., .8 x 70 = 56 Period 1. E, the new forecast, is the addition of the weighted old forecast. Column F is the forecast error. Of course this technique is most accurate when the mean absolute deviation (MAD) is the least. Table 10 is included for purposes of comparison. As the α increases, the lower is the MAD. The decision as to the most appropriate

²Ibid., p. 15.
smoothing factor depends upon trial and error. For demand patterns that show marked upward or downward trends, smoothing factors between .5 and .9 will tend to be optimal; but, for relatively level trends a factor of .1 or .2 may be the best. To interject another constraint, the limited availability of computer time will somewhat limit the exactness and length to which a trial and error method can be used.

For this research, a continuing smoothing update is not required and suffice it to say that this technique is most useful to management when a computer is available. Fig. 14 illustrates a comparison of forecasts using an \( \alpha \) of .8 and an \( \alpha \) of .2.

**TABLE 9**

**PERIOD-TO-PERIOD DEMAND FORECAST BASED ON EXPONENTIAL SMOOTHING, WITH A SMOOTHING FACTOR OF 0.2**

<table>
<thead>
<tr>
<th>Time Period</th>
<th>Actual Demand, in Units</th>
<th>Weighted Actual Demand, ( b \times 0.2 ), in Units</th>
<th>Weighted Old Forecast, ( e \times 0.8 ), in Units</th>
<th>New Forecast, ( c + d ), in Units</th>
<th>Amount by Which Forecast Is High (+) or Low (−), ( e ) of Prior Row Minus ( b ) of Current Row, in Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>prior</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>1</td>
<td>80</td>
<td>16</td>
<td>56</td>
<td>72</td>
<td>−10</td>
</tr>
<tr>
<td>2</td>
<td>90</td>
<td>18</td>
<td>58</td>
<td>76</td>
<td>−18</td>
</tr>
<tr>
<td>3</td>
<td>110</td>
<td>22</td>
<td>61</td>
<td>83</td>
<td>−34</td>
</tr>
<tr>
<td>4</td>
<td>95</td>
<td>19</td>
<td>66</td>
<td>85</td>
<td>−12</td>
</tr>
<tr>
<td>5</td>
<td>105</td>
<td>21</td>
<td>68</td>
<td>89</td>
<td>−20</td>
</tr>
<tr>
<td>6</td>
<td>120</td>
<td>24</td>
<td>71</td>
<td>95</td>
<td>−31</td>
</tr>
<tr>
<td>7</td>
<td>105</td>
<td>21</td>
<td>76</td>
<td>97</td>
<td>−10</td>
</tr>
<tr>
<td>8</td>
<td>130</td>
<td>26</td>
<td>78</td>
<td>104</td>
<td>−33</td>
</tr>
<tr>
<td>9</td>
<td>125</td>
<td>25</td>
<td>83</td>
<td>108</td>
<td>−21</td>
</tr>
<tr>
<td>10</td>
<td>135</td>
<td>27</td>
<td>86</td>
<td>113</td>
<td>−27</td>
</tr>
<tr>
<td>Total</td>
<td>1,095</td>
<td>219</td>
<td>703</td>
<td>922</td>
<td>216</td>
</tr>
<tr>
<td>Average</td>
<td>110</td>
<td>22</td>
<td>70</td>
<td>92</td>
<td>22</td>
</tr>
</tbody>
</table>

**SOURCE**: Enrick, Market and Sales Forecasting, p. 9.
### TABLE 10

**PERIOD-TO-PERIOD DEMAND FORECAST BASED ON EXPONENTIAL SMOOTHING, WITH A SMOOTHING FACTOR OF 0.8**

<table>
<thead>
<tr>
<th>Time Period</th>
<th>Actual Demand, in Units</th>
<th>Weighted Actual Demand, $b \times 0.8$, in Units</th>
<th>Weighted Old Forecast, $e \times 0.2$, in Units</th>
<th>New Forecast, $c + d$, in Units</th>
<th>Amount by Which Forecast is High (+) or Low (−), Minus $b$ of Current Row</th>
</tr>
</thead>
<tbody>
<tr>
<td>prior</td>
<td>−</td>
<td>−</td>
<td>−</td>
<td>−</td>
<td>−</td>
</tr>
<tr>
<td>1</td>
<td>80</td>
<td>64</td>
<td>14</td>
<td>78</td>
<td>−10</td>
</tr>
<tr>
<td>2</td>
<td>90</td>
<td>72</td>
<td>16</td>
<td>88</td>
<td>−12</td>
</tr>
<tr>
<td>3</td>
<td>110</td>
<td>88</td>
<td>17</td>
<td>105</td>
<td>−22</td>
</tr>
<tr>
<td>4</td>
<td>95</td>
<td>76</td>
<td>21</td>
<td>97</td>
<td>+10</td>
</tr>
<tr>
<td>5</td>
<td>105</td>
<td>84</td>
<td>19</td>
<td>103</td>
<td>−8</td>
</tr>
<tr>
<td>6</td>
<td>120</td>
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<td>84</td>
<td>23</td>
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<tr>
<td>8</td>
<td>130</td>
<td>104</td>
<td>21</td>
<td>125</td>
<td>−23</td>
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<td>Total</td>
<td>1,095</td>
<td>876</td>
<td>202</td>
<td>1,078</td>
<td>124</td>
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<tr>
<td>Average</td>
<td>110</td>
<td>88</td>
<td>20</td>
<td>108</td>
<td>12*</td>
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</tbody>
</table>

* Mean absolute deviation (MAD).

**SOURCE:** Enrick, *Market and Sales Forecasting,* p. 13.
Computed Trend

For long-run forecasts, the use of exponential smoothing which dealt from period to period will usually be inadequate. It is in the long term forecast that a blend of mathematical analysis and managerial judgement is a must if the forecast is to be of significant value. This research utilized the computed trend line technique for analyzing long range data.

Fitted to past years' actual data, the computed trend line is then extended to future years. "Experience and judgement, properly exercised by management to temper, modify, and
adjust the mechanical extrapolations, will lead to the type of forecast that can serve in planning.”

The following example will serve to illustrate the details involved in this forecasting technique. Fig. 15 and the accompanying Table 11 on the following pages show calculations and a plot of the actual sales and the mathematical trend lines. Column A shows the years the product has been in existence; Column B is the corresponding sales and volume. Column C is the years from the central year, in this example, year 4. Column D is the cross product of B and C and Column E is the squared years of Column C. The slope of the trend line will represent the rate at which the line is increasing (positive slope) or decreasing (negative slope). Once the slope and the pivot lines are determined, the mathematical trend line can be plotted. Progressing from year 4 each successive year should be increased by one, the slope of this line. In other words, the trend should be six units for year 5, seven units for year 6 and eight units for year 7. The dotted lines represent the forecasted years. Note that in this case the

\[ \text{Pivot} = \frac{\text{total of sales volumes}}{\text{number of years}} = \frac{35}{7} = 500 \text{ units} \]

\[ \text{The slope} = \frac{\text{Cross-Products Total}}{\text{Squared-Years Total}} = \frac{26}{28} = 1 \text{ Approx.} \]
extrapolated forecast is lower than the optimistic forecast. These lines could reverse themselves to where the extrapolated forecast could become the optimistic forecast. The forecast is valid if the following assumptions are upheld:

1. The computed trend relationship is an accurate description of the many historical forces producing the trend lines.

2. There is good reason to expect that these forces will continue to behave in essentially the same way as in the past.

3. No new factors are expected to operate that would tend to significantly modify, alter, or otherwise disturb the projected trend.

Data from at least twenty years should be used if available to eliminate as much as practicable the cyclical fluctuations.

<table>
<thead>
<tr>
<th>TABLE 11</th>
</tr>
</thead>
<tbody>
<tr>
<td>COMPUTED TREND</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>a</th>
<th>b</th>
<th>c</th>
<th>d</th>
<th>e</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Years Since Product Was Introduced</strong></td>
<td><strong>Sales Volume in 100's of Units</strong></td>
<td><strong>Years from Central Year</strong></td>
<td><strong>Cross-Product, b x c</strong></td>
<td><strong>Squared Years, c x c</strong></td>
</tr>
<tr>
<td>1</td>
<td>1</td>
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<td>9</td>
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<td>7</td>
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<tr>
<td><strong>Total</strong></td>
<td><strong>35</strong></td>
<td><strong>0</strong></td>
<td><strong>26</strong></td>
<td><strong>28</strong></td>
</tr>
</tbody>
</table>


---

6Enrick, *Market and Sales Forecasting*, p. 22.
Long term trends and cyclical fluctuations should include allowances for seasonal variations. In order to objectively analyze the data accumulated, peaks and troughs, associated with seasonal variations should be duly noted. Plotting sales volume in relation to successive months in each year in question will demonstrate any seasonal variation month by month. Year by year analysis will reveal whether the seasonal peaks and troughs occur at different times of the year. Fig. 16 shows an example of four years of sales and illustrates also that from year to year, the seasonal variations were relatively stable.

SOURCE: Enrick, Market and Sales Forecasting, p. 21.
Plot of actual sales. A seasonal pattern is revealed, with peaks in May–June and October–November.

SOURCE: Enrick, Market and Sales Forecasting, p. 33
Forecasting sales data is a valuable tool for management to use. It has been pursued at length here to determine just what effect the sale of a product or products will have on the determination of the problems facing the management concerning sales force decisions.

Once the company has accurately determined future sales, how does it utilize this wealth of information to effectively analyze the number of salesmen required for the job? This research has approached the problem as an evaluation of sales territory performance. It is the premise here that a salesman is only as effective as his past performance has demonstrated. The methodology presented was used in the actual company analysis to reveal any problem areas pertaining to sales force management in Montana. Of course as stated previously the research continued to be limited to Great Falls area based companies. "Two of the more important sales force management responsibilities requiring concentrated attention are the evaluation of performance in sales territories and the establishment of benchmarks for future performance." Although experience and judgement are vital to effective decision making, it can be supplemented with methods to analyze territory information to improve management's ability to evaluate and set goals for future territory performance.

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Regression

The sales territory is an area of the company sales effort assigned usually to a single salesman. As previously mentioned, it could be divided in terms of geographical area, a specified group of customers, products or product lines or various combinations of these. Several factors influence sales territory performance; however, for this research the analysis included territory workload, longevity, advertising, motivation and effort, market share, and industry sales. (See Appendix II and III.) Specifically, multiple regression analysis utilized a model and employed each of the predictor variables together and separately. The reason this approach was used instead of simple regression analysis is due to the available computer time in which to run a more lengthy approach. An example of what extended possibilities are available to researchers dealing with multiple regression analysis is contained in a flow chart found in the Appendix. For this research, we utilized predictor variables in a multiple regression model through the following multi-stage approach:

1. Selection of appropriate measures of sales territory performance. For this research actual sales is used.

2. Development of operational measures of factors believed to be determinants of sales territory performance.

3. Analyze the determinants using empirical data.
4. Determine relationship between predictor and criterion variables which best fits the territories evaluated.

5. Determine performance benchmarks for each sales territory.

6. Evaluate territories in conjunction with more conventional techniques including executive judgement of performance.

"The mathematical procedures involved in identifying the nature of the relationship between two or more variables by estimating the constants in an equation describing the relationship is called regression analysis. Relationships involving two or more variables (a dependent variable and one independent variable) are called multiple regression relationships." The model used in the regression analysis in this research is based on the relationship that sales territory performance (Y) is a function of the total number of calls, total number of accounts, motivation and performance of the salesman, market share, industry sales, length of time with company, and the advertising put forth in a given territory such that \( Y = f(X_1, X_2, \ldots, X_k) \). The method that was used for gathering this information was primarily direct data accumulation. The procedure will be discussed later. Territory workload will also be a predictor variable to define aggregate sales within the territory. Travel requirements, customer geographical dispersion, size and number of customers,

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and customer service requirements are measurements generally used to define workload. Specifically, the average workload per account derived from the volume of purchases per account and the geographical concentration of accounts was the basis for measurement.

The multiple linear regression model \( Y = \alpha + B_1X_1 + B_2X_2 + B_3X_3 + B_4X_4 + B_5X_5 + B_6X_6 + B_7X_7 + E_i \) will be used to expand the aforementioned approach. The desired end result is to measure and compare predicted sales to actual sales for the territories involved. Solving for \( Y \) in the regression equation will determine predicted sales. The equation utilizes the different predictor variables specifically for comparative analysis and to lend greater credibility toward the regression approach. The basic assumption to be remembered throughout the analysis is that the estimated regression curve \( Y = \alpha + b_1X_1 + b_2X_2 + b_3X_3 \ldots b_nX_n \) will be used and considered accurate as estimators of the parameters outlined.

In order to demonstrate the relationship between the variables involved, a technique defined as correlation analysis was used. The reliability that can be placed in a regression equation depends on two factors: (1) the extent to which past trends and relationships may be expected to hold in the future

\( Y = \) sales territory performance; \( \alpha \) = constant intercept term in the model; \( B \) = slope; \( E \) random error amount. Basic assumptions about the error amount are: (1) random variable with normal distribution; (2) mean of \( E = 0 \) \( \text{E}(E) = 0 \); (3) standard deviation of \( E \) is \( \sigma_T \); \( X_i \) and (4) error terms are independent of one another.
and (2) the amount of correlation present in the data. The first factor is subject to personal judgement and experience, while the second can be evaluated quantitatively using the correlation coefficient. The analysis will illustrate the probability level of from .6 to 1.0 in which .9 is very good; .8 is good, .7 is fair and .6 is borderline. Anything below .6 is relatively poor correlation but still can easily be statistically significant. To determine the correlation coefficient between the dependent and independent variables the following step by step procedure will be exemplified:

1. Determine the average of the variables, Y and X1 through X7.

2. Individual measurements are then compared to the average to determine deviations from average.

3. The deviations for each measurement are then squared.

4. Total each squared deviation to find the sum of the squared deviations for each variable.

5. Multiply the deviations of the dependent variable with the deviations of the independent variables.

6. Add the resultant cross products.

7. The correlation coefficient \( r = \frac{\text{cross product} \div \sqrt{\text{product of the squared deviations}}}{\text{the answer is the correlation coefficient. It is then categorized according to the generally accepted guidelines to indicate the probability level.}} \)

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10 Enrick, Market and Sales Forecasting, p. 58.
This rather involved effort was undertaken primarily to demonstrate the level at which the predicted sales, determined by solving for the territory sales performance in the regression equation, relates to other factors. If the correlation is in fact high, then predicting sales on the basis of the predictor variables used is a valid argument. The following section will describe the procedure that was used in compiling the empirical data for the analysis.

By way of additional background, the underlying reason for the research is to evaluate sales forces that are used by companies in Montana. A further refinement limits the empirical data to those companies in the Great Falls area that have sales forces and territories throughout Montana. The companies were selected on the basis of these criteria as well as their receptivity to assistance in the collection process. Five companies were considered to be sufficient and represent five different product areas. The companies represent a convenience sample on the basis that their data would be readily available and the sales managers or owners were willing to participate in the observations. The benchmarks for future performance are going to be based on the factors relating to actual sales versus predicted sales and to the future trends based on forecasts using techniques previously mentioned. The regressions, correlation coefficients, and significance level of predictor variables will be explained in a table.
The method of data collection that was used consisted primarily of information gathered through interviews. A cover letter addressed to each of the companies surveyed explained the reason for the research and the desired learning outcome. Whether the sales managers decide to utilize the results was not the issue. As stated, the research hoped to demonstrate whether proper practices are being employed in sales force management in Great Falls, and if not, what territories are deficient and could be corrected. The success of the research should not be measured on the extent of implementation but on the validity of the results obtained. See the Appendix for the cover letter and specific interview questions that were to be used with each of the companies.

Chapter III has focused upon the specific methodology with which the desired results shall be obtained. The performance is a good indicator of just how effective the management has been in assigning salesmen. Past performance over a period of time compared with accurate predictions of the same period of time for each territory will show good and bad management practices used. While past performance is a good determinant of past practices, the result is a benchmark for future performance through possible modification of effort. The forecasting, both long run and short run, will determine potential for the company product(s). The techniques demonstrated in this chapter are not the only ones that could be used. They are merely some of the more common and proven
reliable indicators of future performance. Analytical approaches may prove to be more appropriate for some firms than others. The relationship determined by data for all the territories measured for a given time period is an average relationship. Thus the predictor variables are assumed to be relatively stable across the territories. Realistically, however, the predictor variables employed may in fact not be the best determinants of sales performance for some territories. It is included in the scope of this research to determine the contribution and the degree of correlation between the independent variables and the dependent variables. In general, determined of course on the actual amount of past data available, the regression analysis was built on at least three or four past years in order to determine the stability of the relationship between the predictor variables and sales.

Requirements for the measures of these predictor variables included the following: the measure should be valid, i.e., should describe the variable as it exists in each territory, the reliability should be confirmed through generation of data over an acceptable time period, and the demands for data should be available from within the company data bank.

Summary

In conclusion, this chapter has utilized an analytical approach that can be used to supplement, not replace, executive judgement. Application of the multiple regression analysis and forecasting techniques to the five Great Falls area
based companies, Graham & Ross, Northern School Supply, Uke's Sports, The Coca-Cola Bottling Company and Northwestern Life Insurance Company attempted to measure sales performance within each territory formed by each company to determine whether sales force changes, sales territory changes or new performance benchmarks for territories should be considered. The model is flexible enough to be used for other determinants; however, this research was limited to the above factors. The ultimate sales force decision is, of course, left to the company, whether this research is employed or not will be determined by company executives.
CHAPTER IV

ANALYSIS AND FINDINGS

Chapter III illustrated various techniques that management is able to use to predict sales. Various forecasting techniques were introduced which are designed for both short-run and long-run use. It was also pointed out that in any forecasting approach, certain seasonal variations also may become evident. The focus of this paper was to design and implement an approach which could be useful to management in various decisions about sales forces. Discussion has centered around actual sales as a measure of sales territory performance, since the company must convert actual sales to a profit margin through the judicious use of marketing expenditures among other factors. The forecasting approaches, namely exponential smoothing and the computed trend line, were discussed to indicate that there are various approaches besides regression analysis that could be employed to forecast future sales or sales territory performance. By far, in this writer's opinion, the potentially most detailed and accurate approach is the regression analysis. Because of the fairly complex network of associative data that could predict sales, a multiple regression analysis was chosen as the method for the data analysis in this study. The regression routine utilized
was a step-wise regression in the Statistical Program for Social Sciences (SPSS) package at the University of Montana.

As explained in Chapter III, actual sales is a function of certain other variables which can be used in forecasting sales. This research employed seven independent variables with which sales were considered to be associated. Multiple regression analysis is the appropriate model to determine the mathematical relationship between these variables. The model explaining the relationship between sales and the chosen predictor variables is as follows: actual sales = constant + total number of calls + total number of accounts + advertising + industry sales + market share + motivation + longevity, or

\[ Y = a + b_1X_1 + b_2X_2 + b_3X_3 \ldots b_nX_n \]

The model was developed in a step-wise fashion via the routine in the SPSS package which identifies the most significant predictor variable first, the next most significant variable second and so on until the least significant variable enters. The user is allowed to set his own default (alpha) level. Table 12 shows the results of the analysis.

Prior to the actual analysis through the computer program, scatter diagrams were completed to determine whether the relationships between sales (Y) and each independent variable appear linear. All variables indicated a linear relationship. Other variables, not included in the analysis, may not have proven linear; however, various transformation
procedures are available in order for researchers to utilize
the multiple linear regression approach, only if there is
some pattern. There could be no relation between Y and X,
log_{10}X, log_eX, X_2, and so on. The intercorrelation between
independent variables was not measured by the analysis and
is presumed not to be a factor to the research.

Empirical data were obtained from the five previously
mentioned companies. These were unrelated by product and were
selected on the basis of their availability and receptivity
to the research project. The actual data collected should
be considered a convenience sample which does in fact serve
the purpose of this research. From the five companies a
total of 146 observations were made. It was deemed imperative
that a fairly large number of observations be collected
and thus five companies were used in the analysis due to the
small size of any one company’s sales force. It should be
re-emphasized here that the procedure was not designed to
predict the sales of any individual company but rather
to determine a relevant analytical approach by which sales
in general can be predicted; i.e., to determine appropriate
independent variables.

Relationship

The multiple correlation coefficient (R) between
actual sales and the aforementioned variables was \(0.96182\)
while the coefficient of multiple determination (\(R^2\)) was \(0.9251\).
This indicates that 92 per cent of the variation in territory
sales was explained by the variables used in the analysis. The
correlation coefficient indicates that the relationship between
actual sales and the predictor variables is fairly strong. The
variables that were used appear to be sufficient for forecast­
ing actual territory sales.

The computer analysis yielded the following equation,
$$Y = -210807 + .658X_6 + 149476X_5 + 11.16X_7 - 2994X_3 + 228.6X_4 +
87.6X_1 - 260.43X_2.$$ Y is total sales per territory and $X_1$
through $X_7$ are the variables listed in Table 12. The figures
in the equation are found in the B column. The table indicates
industry sales is the variable with the highest $R^2$ so noted by
the change in $R^2$ column and greatest level of significance.
Thus the variables have been listed in the table in order of
the contribution each one made to the overall relationship.
Note also the negative relationship between total accounts
and the dependent variable sales, which may be due to incorrect
data or in fact shows higher sales through fewer and larger accounts.

The collection of the empirical data from Graham &
Ross, Uke's Sports, Coca-Cola Bottling Company, Northern
School Supply, and Northwestern Life Insurance was recorded
on call sheets and salesman performance sheets. The Appen­
dix contains all the information which was issued to the sales
managers. The variable concerning salesman motivation was
measured by the salesman performance questionnaire also
issued to the sales manager and also found in the Appendix.
The data collection process was considered somewhat difficult to administer in this writer's opinion due primarily to the lack of time that the sales managers could spend on the project. Although the questionnaire and call sheet were self-explanatory, constant monitoring and supervision was necessary throughout the data collection period. Chapter V will consider some of the implications of this analysis which can prove to be an important tool for the sales manager in his complicated judgement process to determine sales force allocations.
## TABLE 12
### FINDINGS OF EMPIRICAL DATA

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<th>Entry Level</th>
<th>Independent Variables</th>
<th>$R$</th>
<th>$R^2$</th>
<th>Increase in $R^2$</th>
<th>Simple $R$ $(Y \text{ to } X_n)$</th>
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<td>7</td>
<td>$X_2$ Total Accounts</td>
<td>.96182</td>
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Dependent Variable (Sales)
Constant (-210807)
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CHAPTER V

SUMMARY

The purpose of this research was to explore problems and practices that are factors in designing the sales force structure in companies that do business in Montana. The research was limited to the Great Falls area and five companies were involved in order to gain a sufficient number of observations to provide an effective analysis. Background material was introduced to provide an effective basis for which further analysis could be designed.

The developmental process of sales management proceeds through four stages from the most basic structure to a totally integrated sales management system. Various line, line-staff, and functional structures exist as pointed out in Chapter II. Management must decide which is best suited for its company and integrate the system. Within the sales or marketing area, salesmen may be assigned to their jobs according to geographical requirements, product-operating, or customer orientation. This again is an executive decision and experience will determine which is the most profitable alternative.

The solution process involving recruiting, hiring, training, and motivating the salesman was covered in depth because this is a vital step to the company's success in
selling its product. The best salesman in one area may be totally ineffective in another area. The processes are integrated and as pointed out in Chapter II are also quite involved and complicated. An analysis was explained to illustrate a straightforward approach to the problem associated with territory distribution and routing.

Chapter III presents some technical aspects toward analyzing a particular sales force. The problems inherent in predicting actual sales and the basic assumption that a salesman's performance can be judged by the actual dollar sales he makes per period was the primary factor for using sales in this judgement process. All of the techniques introduced are effective tools to forecast sales and although multiple regression analysis was used in this research, the other procedures should not be completely discounted.

Exponential smoothing, a useful forecasting technique for determining short-run demand for a product was illustrated in Tables 9 and 10. Comparative smoothing factors were introduced to demonstrate the variations involved.

The computed trend line is useful in predicting long-run forecasts. This approach utilizes a blend of mathematical analysis and managerial judgement and as the trend line is fitted to past year's data it can then be projected to future years. Fig. 15 and the accompanying Table 11 serve to illustrate this type of forecast. Management must also be aware of any seasonal variations that may influence forecasting techniques.
Multiple regression analysis as used in this paper was designed to explain the relationship between sales and certain selected independent variables. The variables used in this approach are by no means the only variables that could be used. The multi-stage approach listed on page 52 was followed to arrive at a solution of relationship between independent variables and the dependent variables territory sales. The computer program Statistical Program for Social Sciences was utilized in part. The multiple regression analysis portion of the package provided a step-wise interpretation indicating the variables and their separate contributions to the relationship. Table 12 provides summarization of the analysis.

Implications of the Research

The multiple regression analysis can provide sales managers with many alternatives that can assist them in determining sales territory performance. Now that management has been provided with this information, how can it be utilized to assist in the judgement process? Each criterion or predictor variable was measured per period per territory salesman. If the sales manager wished to evaluate one of the territories in his company, he could evaluate the territory through the variables. In other words, management could match actual sales with those predicted sales that can be determined by solving the regression equation \( Y = a + b_1X_1 + b_2X_2 \ldots b_nX_n \) for \( Y \), applying the data from the particular
territory to the equation. This comparison will readily indicate any problem areas through plus or minus deviations. These deviations are peculiar to areas that could require further management attention. The analysis could include all territories to give management a good representation of just how actual sales are proceeding throughout the company. The plus and minus deviations should be reported as a percentage of sales. For example if a territory being evaluated had actual sales of $6,000 for a period and the regression equation, when solved, indicated a sales prediction of $9,000, then management could readily determine a trouble spot within the organization. The difference in the example would be evaluated as 67 per cent of predicted sales. This figure is not to be construed as the only determinant of the territory performance, but as an aid to management in the evaluation process. This relationship is not going to fit each territory exactly and should be considered a supplement rather than a replacement for management decisions.

A legitimate question might be whether this method is superior to the readily accepted quota method commonly used by sales management to analyze salesman performance. In this writer's opinion, yes it is simply because the variables listed are closely aligned with sales and can give a better analysis of factors underlying performance than the quota method. Of course experience in utilizing the multiple regression approach for a period of years will be the ultimate proof of its effectiveness.
The regression analysis is an average relationship across the territories observed. The likelihood of an accurate description of an individual territory will depend upon how closely aligned the predictor variables are to that territory. Problems that could be encountered throughout the analysis include those of obtaining appropriate measures of the independent variables. Some of the important requirements to be considered are validity of the measures, reliability, and availability of data from the company's records.

Other uses of the multiple regression analysis include determination of territory size by using a predetermined actual sales/salesman figure and forecasting territory sales by estimating the dependent variables for successive periods. As one can easily surmise, the multiple regression approach offers a wide variety of decision-making alternatives. It is for this reason that this research has utilized this approach to evaluate sales forces in Montana based in the Great Falls area. An analysis of each of the companies actual versus predicted sales was not attempted and was not considered to be relevant to the basis for which this research was made. Results of the research will be forwarded to the companies contributing data for their own implementations.
Dear Sir:

I am writing to introduce Captain Henry L. Milledge, a graduate student in the School of Business Administration at the University of Montana, Malmstrom A.F.B. extension. He is currently in the process of gathering information for a study of sales forces based in the Great Falls area for his M.B.A. professional paper. Attached is a more complete explanation of Capt. Milledge's research project. All information gathered and used in the analysis will be strictly confidential and will be used only with your approval. We would certainly appreciate your cooperation. Thank you.

Sincerely,

Thomas J. Steele, Ph.D.
Associate Professor
University of Montana

April 2, 1974
APPENDIX II

EXPLANATION OF THE RESEARCH

The purpose of this research is to analyze selected companies in the Great Falls area in terms of their sales force and territories. The attempt will be to build a model predicting sales for the territories in terms of certain variables. The following list of variables have been chosen for their apparent availability and presumed correlation to the outcome.

Territory workload—will be measured by two types of data, (1) total number of calls per territory per period measured, and (2) total number of accounts per territory per period.

Salesman's experience—will be measured by the length of time a particular salesman has spent with the company for the period measured.

Motivation and effort—will be an opinion variable in which you as supervisor will rate the salesmen you employ on the basis of their performance on the job. A rating scale on the following page will be used for the variable.

Company past experience—will be measured by analyzing the historical market share in each territory per period measured. From this variable, we will be able to determine average and change in market share.

Market potential—will be measured by the actual sales industry wide within each territory per period measured. This variable will assist in obtaining market share also.

Company effort—the last variable to be measured will utilize the promotions or advertising effort within the territory per period measured.

Actual sales data—will also be collected per territory per period in order to utilize some forecasting techniques predicting short-run and long-run future sales.
<table>
<thead>
<tr>
<th>Territory/Salesman</th>
<th>Actual Sales</th>
<th>Total # of Calls</th>
<th>Total # of Accounts</th>
<th>Motivation and Effort</th>
<th>Length of Time With Company</th>
<th>Company Market Share</th>
<th>Total Industry Sales</th>
<th>Company Adver./Promotions</th>
</tr>
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APPENDIX IV

Performance Of Salesman

1. **Integrity** - High standards of business conduct; adherence to principle and right rather than expediency; complete honesty, fairness, and loyalty.

2. **Judgment** - Thinking logically, analytically and comprehensively; recognizing and accurately evaluating risks, reaching sound, practical conclusions.

3. **Emotional Stability** - Ability to make sound decisions under pressure, to avoid anxiety and remain even-tempered; good personal relationships and a steady output of work under varying and trying conditions.

4. **Accepting Responsibility** - Straightforwardness in saying what he thinks and standing up for what he believes; willingness to take risks, to admit mistakes, to correct errors and accept criticism.

5. **Drive and Will To Succeed** - Setting high goals of achievement and putting forth the extra effort, energy and determination to reach them.

6. **Getting Things Done** - Planning and organizing time and work; exerting the initiative to get things done without undue assistance or prodding and irrespective of obstacles and difficulties; producing good quantity and quality of work.

7. **Personal Acceptance** - Ability to sell his ideas; having the confidence and high regard of others so they are willing to work with him and place responsibility in him.

8. **Resourcefulness and Originality** - Seeking new and better ways of doing things and keeping abreast of new ideas and new developments; coming up with new ideas of his own or alertness to adopt ideas of others as contrasted with merely continuing with previous practices.
APPENDIX V

A CONCEPTUAL MODEL OF DETERMINANTS
SALES TERRITORY PERFORMANCE

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