

The Impact of Sales Engineers on Salesperson Effectiveness

Jeffrey M. Wilson
University of Tulsa

C. Shane Hunt
Arkansas State University

The role of the sales engineer within the firm is defined and a model is proposed that examines the sales engineer – salesperson performance relationship. A resource based view of the sales engineer is utilized to show the positive impact on salespersons' performance through the mediating influence of better time management, reducing salespersons' role ambiguity, and increasing information effectiveness. Managerial implications associated with sales engineer utilization are presented and future research related to the curvilinear relationship of the firm's performance to sales engineer utilization is discussed.

INTRODUCTION

With the increased emphasis placed on relationship marketing strategies in recent years [Anderson, 1996; Hunter & Perreault, 2006], salespeople have the growing responsibility to serve as a consultant to the customer and to strengthen the buyer-seller relationship by helping to develop the customer's business and achieve customer satisfaction [Liu & Leech, 2001; Hunter & Perreault, 2006]. Salespeople also find themselves in an environment where firms in high-technology markets are growing at twice the rate of the economy as a whole generating potentially lucrative sales opportunities [Dutta, Narasimhan & Rajiv, 1999]. To enhance sales performance in an increasingly technical environment, firms have made substantial investments in training and technology [Shoemaker, 2001]. Unfortunately, these investments continue to result in high failure rates putting sales managers in a position of re-examining their investments [Erffmeyer & Johnson, 2001; Hunter & Perreault, 2006].

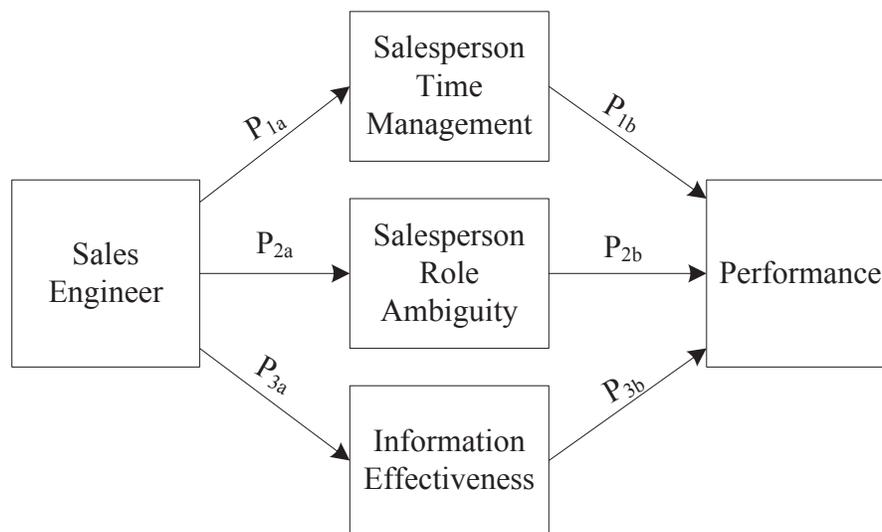
Improving sales performance is a primary goal for firms to increase competitiveness [Marshall, Byrd, Gardiner & Rainer, 2000]. Interestingly, while the extant literature has looked at a number of factors that influence performance, the influence of sales engineers assisting the sales force has been largely ignored. Sales engineering was introduced into the marketing literature as the art of selling equipment and services that require engineering skill in their selection, application, and use [Lee, 1951]. Today, the term sales engineer is generally defined as one who provides the technical expertise needed to make sales [Greenwald & Milbery, 2001]. The United States Bureau of Labor Statistics [2005] states 69,790 sales engineers were employed across wholesale trade, manufacturing, information industries, and professional services. The largest employer of sales engineers is the wholesale trade (thirty-five percent); the second largest is the manufacturing sector (twenty-seven percent). The percentage of firms that employ sales engineers is not known, as is evident by the dearth of related literature, but sales engineering is listed as one of the 50 best jobs in America [Kalwarski, Mosher, Paskin & Rosato, 2006]. Compared to the 13.9

million sales-related professionals employed in the U.S., sales engineers represent only 0.5% of the total sales-related workforce.

The sales engineer plays an increasingly important role as many products and services, especially those purchased by large companies and institutions are highly complex. Sales engineers work with the production, engineering, or research and development departments of their companies, or with independent sales firms, to determine how products and services could be designed or modified to suit customers' needs. They also may advise customers on how best to use the products or services provided.

Our study contributes to the literature on sales engineering by proposing a model by which utilization of sales engineers within a firm increases the performance of salespeople. While no existing study has shown a direct relationship between the use of sales engineers and salespeople's performance, we propose that the use of sales engineers has a direct affect on several important sales management variables that potentially mediate the sales engineer – salesperson performance relationship. We use the resource based view of the firm as the theoretical foundation to suggest that sales engineers increase salespeople's performance by: 1) allowing the salesperson more time to develop/maintain customer relations, 2) reducing the salesperson's role ambiguity by being a constant technical resource, and 3) simultaneously communicating technical features to the customer and effectively communicating the intensions of the sale to complete the order. The means by which the sales engineer influences the performance of the salesperson is depicted in Figure 1.

FIGURE 1
SALESPERSON PERFORMANCE INFLUENCED BY THE SALES ENGINEER



CONCEPTUAL FRAMEWORK

Resource-based theory suggests that competitive advantage originates at the firm (rather than industry) level, specifically in the resources and capabilities of the firm [Barney, 1991; Capron & Hulland, 1999]. Barney [1991] identifies four key resource attributes needed for potential sustainable competitive advantage: value, rarity, imperfect imitability, and substitutability. A valuable resource is one that enables the firm to develop and/or implement strategy that improves its efficiency and effectiveness [Barney, 1991]. Rare resources are those that are not possessed by a large number of firms (both current and potential competitors) [Barney, 1991]. Resources are imperfectly imitable when other firms cannot easily obtain or develop the same resource [Capron & Hulland, 1999]. Finally, substitutability suggests that a firm's resource can be a source of sustainable competitive advantage only if there are not strategically

equivalent valuable resources that are not themselves rare or imitable [Capron & Hulland, 1999; Barney, 1991].

Sales engineers provide both a resource and a capability as they use their technical skills to demonstrate to potential customers how and why the products or services they are selling would suit the customer better than competitors' products. Often, there may not be a directly competitive product. In these cases, the job of the sales engineer is to assist salespeople in demonstrating to the customer the usefulness of the product or service—for example, how much money new production machinery would save.

Sales engineers tend to employ selling techniques that are different from those used by most other sales workers. They generally use a “consultative” style; that is, they focus on the client's problem and show how it could be solved or mitigated with their product or service. This selling style differs from the “benefits and features” method, whereby the salesperson describes the product and leaves the customer to decide how it would be useful. Marketing capability is critical to a technical product's success [Dutta et al., 1999]. Therefore, product knowledge is critical to the sales engineer's effectiveness. Since sales engineers are either classically trained engineers (mechanical, electrical, software, etc.) or individuals that have amassed highly proficient technical skills [Black, 1979; Greenwald & Milbery, 2001], the resource is difficult to duplicate given the technical background required and the product-specific knowledge that is unique to a firm.

While no existing study has shown a direct relationship between the use of sales engineers and salespeople's performance, we propose that the use of sales engineers has a direct affect on several important sales management variables that potentially mediate the sales engineer – salesperson performance relationship. In the following section we use the resource based view of the firm as the theoretical foundation for examining the potential direct effects of sales engineers on salespeople's time management, role ambiguity, and information effectiveness and that those three variables may mediate the sales engineer – salesperson performance relationship.

SALES ENGINEERS AND TIME MANAGEMENT

As competition has intensified [Nonis & Sager, 2003] time management can now be seen as a cluster of behaviors that are deemed to facilitate productivity and alleviate stress [Ahearne, Srinivasan & Weinstein, 2004]. Green [1987] suggests that how salespeople allocate their time across activities directly affects their performance. Weeks and Kahle [1990] summarize that greater allocation of effort will result in greater selling success. We propose that sales engineers may help salespeople be more effective with their time management. Since the relationship between the buyer and the seller is highly complex, sales engineers allow the salesperson more time to work on the buyer-seller relationship. Salespeople's time is not unlimited and has to be allocated across tasks which have differing effects on performance [Ahearne et al., 2004]. We propose that improved time management is a valuable resource that will aid salespeople in developing and implementing strategies that improve efficiency and effectiveness making it a source for potential sustainable competitive advantage [Barney, 1991].

P1a: The use of sales engineers are positively related with salespeople's improved time management.

We also integrate the previous proposition and argue that sales engineers influence salespeople's performance through their effect on salespeople's time management. In essence, to the extent that sales engineers improve salespeople's time management, it will result in an increase in salespeople's performance.

P1b: Salesperson time management mediates the effect of sales engineers on salesperson performance.

SALES ENGINEERS AND ROLE AMBIGUITY

Role stress is inherent to salespeople, because, as boundary spanners they often face multiple and often conflicting expectations from customers and the organization [Jaramillo, Mulki & Solomon, 2006]. Research has shown that organizations are likely to create role stress for salespeople when they fail to adequately communicate their expectations [Jaramillo et al., 2006; Velde & Class, 1996]. Role ambiguity results when salespeople believe that group expectations and demands are incompatible and cannot be simultaneously satisfied [Walker, Churchill & Ford, 1975]. We propose that the sales engineer reduces the salesperson's role ambiguity by integrating customer needs, technical requirements, and sales objectives in a way that satisfies all parties involved. Evidence suggests that salespeople are the most technophobic and resistant to adopt technology of all white-collar workers [Mills, 1995; Parthasarathy & Sohli, 1997]. In-lieu of the salesperson interacting with the firm's engineers/scientists for technical knowledge, a sales engineer offers technical consistency and sales support to the salesperson.

Only a small number of firms are capable of using sales force resources to create a sustainable competitive advantage [Smith & Barclay, 1997]. One reason for this is few firms have the unique cultures, systems, and processes that permit the breakdown of functional and divisional boundaries [Capron & Hulland, 1999]. By definition, sales engineers meld two very different occupations, using their technical skills and problem solving ability as well as their enjoyment of working with people [Nelson, 2001]. These features uniquely position sales engineers to span the highly documented engineering/marketing divisional gaps [Myers & Marquis, 1969]. Since they are technically competent, sales engineers can interface with engineering departments and convey the technical intentions/particulars of a given sale. Conversely, their interpersonal skills afford the ability to effectively communicate technical merits/problems of a sale to salespeople reducing their levels of role ambiguity.

P2a: The use of sales engineers are negatively related with salespeople's role ambiguity.

We also integrate the previous proposition and argue that sales engineers influence salespeople's performance through their effect on salespeople's role ambiguity. The preponderance of investigations have found a negative relationship between role ambiguity and performance [Behrman & Perreault, 1984; Dubinsky, Kotabe, Lim & Moon, 1992]. We propose that to the extent that sales engineers reduce the level of salespeople's role ambiguity, it will result in an increase in salesperson performance.

P2b: Role ambiguity mediates the effect of sales engineers on salesperson performance.

SALES ENGINEERS AND INFORMATION EFFECTIVENESS

Information effectiveness is defined as the value of available information for working with and gaining commitment from customers [Hunter & Perreault, 2006]. For salespeople to be successful, they need to be able to convert large amounts of available data into information that can be used efficiently toward developing solutions that balance sales objectives, customer needs, and technical requirements [Hunter & Perreault, 2006].

The RBV identifies imperfect imitability as a condition necessary for a capability to be an enduring source of competitive advantage [Peteraf, 1993]. The inherent complexity involved in balancing sales objectives, customer needs, and technical requirements makes it very hard to ascertain the exact source of efficiency, thereby making imitation difficult [Dutta et al., 1999]. We suggest that the sales engineer has a positive relationship with information effectiveness during the sales process and order fulfillment. Understanding and integrating the customer needs, technical requirements, and sales objectives is paramount to fulfilling the intention of a particular sale. During the information gathering phase associated to the sale, the sales engineer is able to understand the technical component to the customer's needs. By tailoring the solution to the customer's needs, based on accurately gathered requirements, the sales engineer ensures the order satisfies the buyer's expectations. In the first comparative study of

product success and failure, the Scientific Activity Predictor from Patterns of Heuristic Origins (SAPPHO), five criteria were established to predict sales success of a product [Rothwell, 1972 and 1974]. Sales engineers can positively influence four of the criteria: 1) understanding user needs, 2) attention to marketing, 3) efficiency of development or deployment, and 4) effective use of technology and scientific communication. These four criteria, at the basic level, are controlled by information integrity and effectiveness.

P3a: The use of sales engineers are positively related to information effectiveness

We also integrate the previous proposition and argue that sales engineers influence salesperson performance through their effect on information effectiveness. In essence, to the extent that sales engineers increase the level of information effectiveness, it will result in an increase in salesperson performance.

P3b: Salesperson organizational identification mediates the effect of formal controls on salesperson performance.

MANAGERIAL IMPLICATIONS

Understanding the impact sales engineers has on salespeople's performance provides insight and guidance for managers in optimizing their sales organization. Managers need to tailor their marketing efforts around informing customers of the technological excellence of their firm [Dutta et al., 1999]. To fulfill these marketing efforts, the most efficient allocation of resources would pair salespeople to sales engineers. Since the sales engineer affords the salesperson more time to develop/maintain customer relationships, the time available to contact prospects likely increases. With more prospects engaging in communication with the salesperson, the opportunity to discuss the technological excellence of the firm increases; this affords the opportunity for the sales engineer to convey that excellence.

In addition, the argument can be made that the sales engineer influences the marketing expertise of the firm. Considering marketing expertise as the ability to make better marketing decisions; the sales engineer gives the unique juxtaposition of technological and commercial perspectives when considering marketing decisions. Pasa and Shugan [1996] quantify the value of marketing expertise as being a function, among other factors, as the probability of being mistaken. This probability of being mistaken reduces with increased market/product knowledge. The unusual pairing of technological to commercial perspectives within the sales engineer may assist managers in the decision-making process.

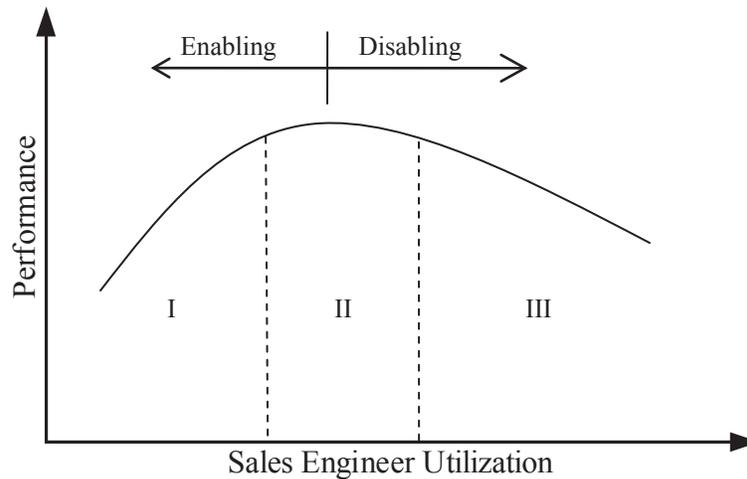
FUTURE RESEARCH

Our proposed model provides several interesting directions for further research. First, it would be beneficial to collect data to examine the quantitative merit of the proposed relationships between the use of sales engineers and salesperson performance. It would also be useful to look at business unit performance in addition to individual salesperson performance. While our model is parsimonious and focuses on information effectiveness, time management, and role ambiguity, in other contexts, the model could be expanded to include other relevant antecedents, technologies, and criterion variables.

Second, it would be helpful for generalizability to examine the definition and role of sales engineers across different industries. What is the role of a sales engineer in a large telecommunications company as opposed to a sales engineer in a medium sized manufacturing company? Understanding the different roles would provide researchers and practitioners with a better understanding of how sales engineers can impact firms that could be beneficial.

Sales performance and technology usage has been shown to have a curvilinear relationship [Ahearne et al., 2004]. Correlating this work to the introduction and usage of the sales engineer in an organization, salespeople's performance is proposed in Figure 2.

FIGURE 2
PROPOSED PERFORMANCE CURVE OF THE FIRM UTILIZING THE SALES ENGINEER



Area I of the curve shows the introduction of a sales engineer to the firm and initial salesperson utilization. In this phase, the potential trust the salesperson has in the sales engineer dictates the level of usage. As the salesperson develops a sense of trust to the technical merits of the sales engineer, as well as the commercial merits, sales engineer utilization increases. Under the performance curve in Area II, the sales engineer is effectively communicating across divisional boundaries within the firm and the salesperson is effectively utilizing their time to develop new business and maintain existing customer relationships to fullest potential. Operations within Area III, however, lead to diminishing returns. Over utilization of the sales engineer can occur by the salesperson or other divisions within the firm (e.g. engineering). Over utilization of the sales engineer can lead to diminished self-efficacy of the salesperson. Similarly, sales engineer over utilization by other divisions can impair the utilization of the sales engineer by the salespeople.

Finally, it would be interesting to look at what impact the decreasing number of engineering graduates in the United States has on domestic sales forces. With the increased offshoring of design and production of a large international labor force, domestic companies may be faced with the question of who will sell the highly technical products going forward and how successful will those efforts be.

REFERENCES

Ahearne, M., N. Srinivasan, and L. Weinstein (2004). Effect of technology on sales performance: progressing from technology acceptance to technology usage and consequence. *Journal of Personal Selling & Sales Management*, 24, 4 (Fall), 297-310.

Anderson, R. E. (1996), "Personal Selling and Sales Management in the New Millennium," *Journal of Personal Selling and Sales Management*, 76 (November-December), 5-15.

Barney, J. B. (1991), "Firm Resources and Sustained Competitive Advantage," *Journal of Management*, 17 (1), 99-120.

Behrman, D. N., and W. D. Perreault, Jr. (1984), "A Role Stress Model of the Performance and Satisfaction of Industrial Salespersons," *Journal of Marketing*, 48 (Fall): 9-22.

- Black, G. (1979), Sales Engineering: An Emerging Profession, Second Edition, Gulf Publishing Company, Houston, TX, ISBN 0-87201-799-0, 6-9.
- Capron, L., and J. Hulland (1999), "Redeployment of Brands, Sales Forces, and General Marketing Management Expertise Following Horizontal Acquisitions: A Resource-Based View," *Journal of Marketing*, 63, 2 (April), 41.
- Dubinsky, A. J. and B. E. Mattson (1979), "Consequences of Role Conflict and Ambiguity Experienced by Retail Salespeople," *Journal of Retailing*, 55, 4 (Winter), 70-86.
- , R. E. Michaels, M. Kotabe, C. U. Lim, and H. C. Moon, (1992), "Influence of Role Stress on Industrial Salespeople's Work Outcomes in the United States, Japan, and Korea," *Journal of International Business Studies*, 23, 1, 77-99.
- Dutta, S., O. Narasimhan, and S. Rajiv (1999), "Success in High-Technology Markets: Is Marketing Capability Critical," *Marketing Science*, 18 (4), 547-568.
- Erffmeyer, R. C., and D. A. Johnson (2001), "An Exploratory Study of Sales Force Automation Practices: Expectations and Realities," *Journal of Personal Selling & Sales Management*, 21, 2 (Spring), 167-175.
- Green, D. H. (1987), "The Effects of Risk Preference on Salesperson Time Allocation: A Critical Review and Integrative Model," in *AMA Educator's Proceedings*, Susan P. Douglas and Michael R. Solomon, eds, Chicago: American Marketing Association, 112.
- Greenwald, R., and J. Milbery (2001), Making the Technical Sale, Muska & Lipman Publishing, Cincinnati, OH, ISBN 0-9662889-9-8, 7-8.
- Henry, P. (1975), "Manage Your Sales Force as a System," *Harvard Business Review*, (March-April), 85-119.
- Hunter, G.K., and W. D. Perreault Jr. (2006), "Sales Technology Orientation, Information Effectiveness, and Sales Performance," *Journal of Personal Selling & Sales Management*, 26 (Spring), 95-113.
- Jaramillo, F., J. P. Mulki, and P. Solomon (2006), "The Role of Ethical Climate on Salesperson's Role Stress, Job Attitudes, Turnover Intention, and Job Performance," *Journal of Personal Selling & Sales Management*, 26, 3 (Summer) 271-282.
- Kalwarski, T., D. Mosher, J. Paskin and D. Rosato (2006), "50 Best Jobs in America," *Money Magazine*, 35, 5 (May).
- Lee, A. M.(1951), "Sales Engineering," *Journal of Marketing (pre-1986)*, 15 (April), 509.
- Liu, A. H., and M. P. Leach (2001), "Developing Loyal Customers with a Value-Adding Sales Force: Examining Customer Satisfaction and the Perceived Credibility of Consultative Salespeople," *Journal of Personal Selling and Sales Management*, 21, 2 (Spring), 147-156.
- Marshall, T. E., Terry Anthony Byrd, Lorraine R. Gardiner, and R. Kelly Rainer, Jr. (2000), "Technology Acceptance and Performance: An Investigation into Requisite Knowledge," *Information Resources Management Journal*, 13 (3), 33-45.

- Menon, A., and P. R. Varadarajan (1992), "A Model of Marketing Knowledge Use Within Firms," *Journal of Marketing*, 56 (October), 53-71.
- Mills, S. (1995), "Maximize the Payoff from Information Technology," *CIO Magazine*, 9, 1 (October), 112.
- Myers, S., and D. G. Marquis (1969), "Successful Industrial Innovations," National Science Foundation, Technical Report NSF 69-17, 1-117.
- Nelson, A. J. (2001), "Sales Engineers," *Occupational Outlook Quarterly*, Fall, 21-24.
- Netemeyer, R. G., Thomas Brashear-Alejandro, and James S. Boles (2004), "A Cross-National Model of Job-Related Outcomes of Work Role and Family Role Variables: A Retail Sales Context," *Journal of the Academy of Marketing Science*, 32, 1 (Winter), 49-60.
- Nonis, S. A., and J. K. Sager (2003), "Coping Strategy Profiles Used by Salespeople: Their Relationships with Personal Characteristics and Work Outcomes," *Journal of Personal Selling & Sales Management*, 23, 2 (Spring), 139-208.
- Parthasarathy, M., and R.S. Sohli (1997), "Salesforce Automation and the Adoption of Technological Innovations by Salespeople: Theory and Implications," *Journal of Business & Industrial Marketing*, 12 (3-4), 196-208.
- Pasa, M., and S. M. Shugan (1996), "The Value of Marketing Expertise," *Management Science*, 42, 3 (March), 370-388.
- Rothwell, R., "Factors for Success in Industrial Innovations," Project SAPPHO – A Comparative Study of Success and Failure in Industrial Innovation, S.P.R.U, 1972.
- , "The Hungarian SAPPHO: Some Comments and Comparison," *Research Policy*, Vol. 3, 1974, pp. 30-38.
- Shepherd, C. D., and L. M. Fine (1994), "Role Conflict and Role Ambiguity Reconsidered," *Journal of Personal Selling & Sales Management*, 14, 2 (Spring), 57-65.
- Shoemaker, M. E. (2001), "A Framework for Examining IT-Enabled Market Relationships," *Journal of Personal Selling & Sales Management*, 21, 2 (Spring), 177-185.
- Singh, J.(1998), "Striking a Balance in Boundary-Spanning Positions: An Investigation of Some Unconventional Influences of Role Stressors and Job Characteristics on Job Outcomes of Salespeople," *Journal of Marketing*, 62, 3 (July), 69-86.
- Smith, J. B. and D. W. Barclay (1997), "The Effects of Organizational Differences and Trust on the Effectiveness of Selling Partner Relationships," *Journal of Marketing*, 61 (January), 3-21.
- Tanner, J. F., M. Ahearne, T. W. Leigh, C. Mason, and W. Moncrief (2005), "CRM in Sales-Intensive Organizations: A Review and Future Directions," *Journal of Personal Selling & Sales Management*, Forthcoming.

Turbe, T. C., and J. M. Collins (2000), "Jackson and Schuler (1985) Revisited: A Meta-Analysis of the Relationships Between Role Ambiguity, Role Conflict, and Job Performance," *Journal of Management*, 26 (1), 155-169.

Velde, M. V. D., and M. D. Class (1994), "The Relationship of Role Conflict and Ambiguity to Organizational Culture," in *Organizational Risk Factors for Job Stress*, Steven L. Sauter and Lawrence R. Murphy, eds., Washington DC: American Psychological Association, 53-59.

Walker, O. C., Jr., G. A. Churchill, Jr. and N. M. Ford (1975), "Organizational Determinants of the Industrial Salesman's Role Conflict and Role Ambiguity," *Journal of Marketing*, 39, 1 (January), 32-39.

Weeks, W. A., L. R. Kahle (1990), "Salespeople's Time Use and Performance," *Journal of Personal Selling & Sales Management*, 10, 1 (winter), 29.