

An escalation of commitment perspective on allocation-of-effort decisions in professional selling

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Abstract:

Salesforce compensation theory assumes that given proper design of the incentive structure, salespeople will rationally allocate effort to maximize returns to their firm and themselves. However, faced with large sunk investments over long selling cycles, salespeople continue to commit resources to opportunities with little or no chance of being won, to the exclusion of viable leads. This article theoretically explores and empirically tests this over-investment effect under four potentially moderating conditions using a large multinational corporation's industrial salesforce. The findings from this field study indicate that escalation of commitment is more likely to occur in non-strategic accounts and accounts not involving channel partners. In addition, salespeople with lower ability demonstrate greater escalation of commitment. The study indicates that without targeted managerial intervention, salespeople will over-invest precious selling resources in unprofitable, unwinnable opportunities.

Keywords: commitment escalation | professional selling | sales management | salesperson performance | cognitive bias | B2B and industrial marketing | managerial decision-making

Article:

Introduction

Few jobs present more governance challenges than managing a salesforce. Outside salespeople operate remotely, often unobserved by their managers, in fluid and highly idiosyncratic environments (Albers 1995; Anderson and Oliver 1987; Spiro et al. 2008). Sales research indicates that salespeople employ behaviors that are highly adaptive to their customers' unique needs and requirements (Jones et al. 2005; Spiro and Weitz 1990; Sujan et al. 1994; Weitz 1981). Today, finding a customer solution requires a salesperson/selling team to do much more than simply present a product/service in a sales call (Piercy 2006; Tuli et al. 2007). Success also depends on the supplying firm's degree of social capital and the quality of the supplier-customer relationship (Palmatier et al. 2006a; Palmatier et al. 2006b). These tasks require the commitment of salesperson time and selling firm resources.

These new selling conditions leave sales managers, attempting to maximize salesperson performance, dependent on aligning their employees' incentives with those of the firm and trusting that they will rationally pursue firm objectives (Ouchi 1979). Sales executives and scholars have supplied increasingly sophisticated control and compensation structures, designed to more precisely marry the salesperson's goals to those of the firm (e.g., Miao et al. 2007; Piercy et al. 2009; Zoltners 2015). Given such alignment, many managers assume that salespeople will work rationally, perform optimally, and accomplish firm objectives.

With long sales cycles with significant investments of time and firm resources to win each customer, the assumption that the effort–outcome relationship is positive (Brown and Peterson 1994; Hughes 2013; Krishnan et al. 2002) may not be correct. Given the growing importance of overseeing a portfolio of sales opportunities (Homburg et al. 2008), sales managers may need to gain a greater understanding of salesperson decision making regarding customer selection and resource commitment (Bonney et al. 2014; Bonney and Williams 2009). That is, managers need to consider the possibility that salespeople may commit unreasonable amounts of time and resources pursuing sales opportunities that have little chance of resulting in a sale.

Research demonstrates that decision makers are subject to systematic biases, which can cause them to sub-optimize (e.g., Hutchinson et al. 2010; Tetlock 2000). Over-committing resources to pursue a specific opportunity may be particularly problematic in a sales setting because salespeople often operate with a considerable degree of individual discretion in activities related to their customers and prospects (Zoltners et al. 2009). Salespeople have vested interests in closing the sale, regardless of whether doing so makes sense for their firms (Bonney et al. 2016).

Acting in their own interests, salespeople can decide to continue to pursue an account, even in the face of negative information, thereby escalating commitment to winning the account. Escalation of commitment refers to a behavior pattern in which individuals or groups continue to rationalize decisions, actions, and investments, even when faced with increasingly negative outcomes, rather than alter their course of action (Keil et al. 2007). In sales settings, salespeople may be confronted with negative feedback with regard to their chances of winning a sale and so must decide whether to continue pursuit—committing additional time, effort, and resources to winning the sale—or withdraw from pursuing that opportunity. All escalation involves “decision making in the face of negative feedback about prior resource allocations, uncertainty surrounding the likelihood of goal attainment, and choice about whether to continue” (Brockner 1992, p. 40).

Salespeople can make myriad types of costly investments through which they escalate their commitment to a non-viable sales opportunity, including costly on-site demonstrations, travel and entertainment of customers, non-recurring engineering costs for the development of customized solutions, and the addition of personnel to the selling team (e.g., senior executives, technical salespeople, channel partner representatives). All of these resources are limited but, when deployed appropriately, can help win a sale. However, salespeople are often under pressure to meet their quotas. Under these circumstances, with a deadline looming, a salesperson without viable prospects may be tempted to throw good resources after bad opportunities. Such additional investments might result in a loss becoming a win, but the more likely result will be

further lost investments. Other high-pressure situations can include high-profile accounts that a salesperson might feel would have a social cost if lost (Bonney et al. 2014). These include accounts that initially sparked senior management attention or those a salesperson had advocated for investments in the past.

While escalation of commitment has received support in other social sciences (Sleesman et al. 2012), scant research has examined this effect in marketing and sales. Exceptions include advertising (Armstrong et al. 1993) and product design (Biyalogorsky et al. 2006; Schmidt and Calatone 2002). In major sales settings, Bonney et al.'s (2014) experimental findings suggest that escalation of commitment may play a significant role in biasing decision-makers.

The current study explores and tests the escalation-of-commitment bias in a field study using different industrial categories: a high-tech, high-dollar industrial capital equipment product and a suite of customized, high-dollar information technology services. Using data from archival records of selling activities from the firm, we hypothesize that the effort–outcome relationship is more complex than previously assumed and is subject to a continuance bias that causes salespeople to over-invest in deals that should have been qualified out much earlier. This study examines sales opportunities that persist in the pipeline to determine whether they represent an escalation of commitment on the part of the salesperson and firm.

In their meta-analysis, Sleesman et al. (2012) call for field studies and longitudinal research on the escalation of commitment, citing a dearth of such research. Our study addresses this call by showing that salespeople with high ability are less likely to escalate their commitment in real-world settings. Our study contributes to extant sales literature by demonstrating the external validity of previous experimental findings (Bonney et al. 2014) that escalation of commitment occurs in business-to-business (B2B) sales settings, and extends them by identifying boundary conditions under which escalation is more likely to occur.

This research finds evidence that the likelihood of escalation is greater for sales involving non-strategic accounts. The additional oversight applied to strategic accounts seems to provide some protection against escalating commitment. By scrutinizing resource allocation requests and explicitly evaluating their cost-benefit attractiveness, inefficient and even self-destructive selling practices may be avoided.

Findings also indicate that if an account is pursued in coordination with channel partners, escalation of commitment is less likely to occur. Having an outside perspective on whether adding additional investment toward winning a sale appears to help reduce the likelihood of continuing to pursue an account when there is little chance of winning.

Our results further demonstrate that salespeople of greater ability tend to be less likely to escalate their commitment to win a sale. Specific managerial attention needs to be given to inexperienced or less effective salespeople to avoid misallocation of resources away from the most winnable opportunities. Findings suggest that escalation of commitment inhibits customers from being won in a cost effective manner.

We also find equivocal evidence that escalation of commitment may be contingent on whether the primary offering is capital equipment, as opposed to service offerings or routine consumables. These findings also have implications for practice, in that they suggest that greater third-party oversight can help reduce escalation of commitment.

Background

Salesforce compensation

Sales compensation theory revolves around the notion that in a B2B context, the sales task is both idiosyncratic across opportunities and largely unobservable. Therefore, behavior-based organizational controls alone may be inappropriate for maximizing performance. Instead, outcome-based controls can be crafted to align the salesperson's motivations with those of his or her organization (Anderson and Oliver 1987; Bergen et al. 1992). Agency theory suggests that salespeople will rationally pursue their own self-interests. Given proper incentives, salesperson motives can be aligned with those of the firm, and if so, the salesperson can gain more autonomy in deciding which prospects to pursue, what selling activities to employ, and how much effort to expend (Coughlan and Sen 1989; Misra et al. 2005).

The effort–outcome relationship is a foundational assumption in sales performance literature. Yet research exploring the nature of this relationship is relatively sparse (e.g., Brown and Peterson 1994; Krishnan et al. 2002; Manchanda and Chintagunta 2004). On the whole, the sales literature has primarily focused on how to align incentives to best influence motivation rather than behavior, and studies on effort expenditure have mainly applied expectancy theory (e.g., Simintiras et al. 1996; Teas and McElroy 1986) and agency theory (e.g., Coughlan and Sen 1989; Misra et al. 2005). Effort itself is typically conceptualized as having two key dimensions: working hard and working smart (Sujan et al. 1994). The latter concept indicates that the elasticity of outcome with respect to effort varies across salespeople, which is tantamount to an “effectiveness coefficient”—one conceptualization of ability. Research has usually treated working smart as a salesperson-level construct rather than a contingent factor (e.g., use of self-efficacy; Sujan et al. 1994).

A positive but decreasing marginal return on effort makes sense; however, a negative marginal return on effort has not been contemplated in the sales literature or specifically examined in a field sales setting. After all, what employee, when appropriately motivated, would expend personal and firm resources to *reduce* his or her return? Yet the notion of escalating commitment suggests that in some situations, this self-destructive selling is precisely what happens in practice (see Fig. 1).

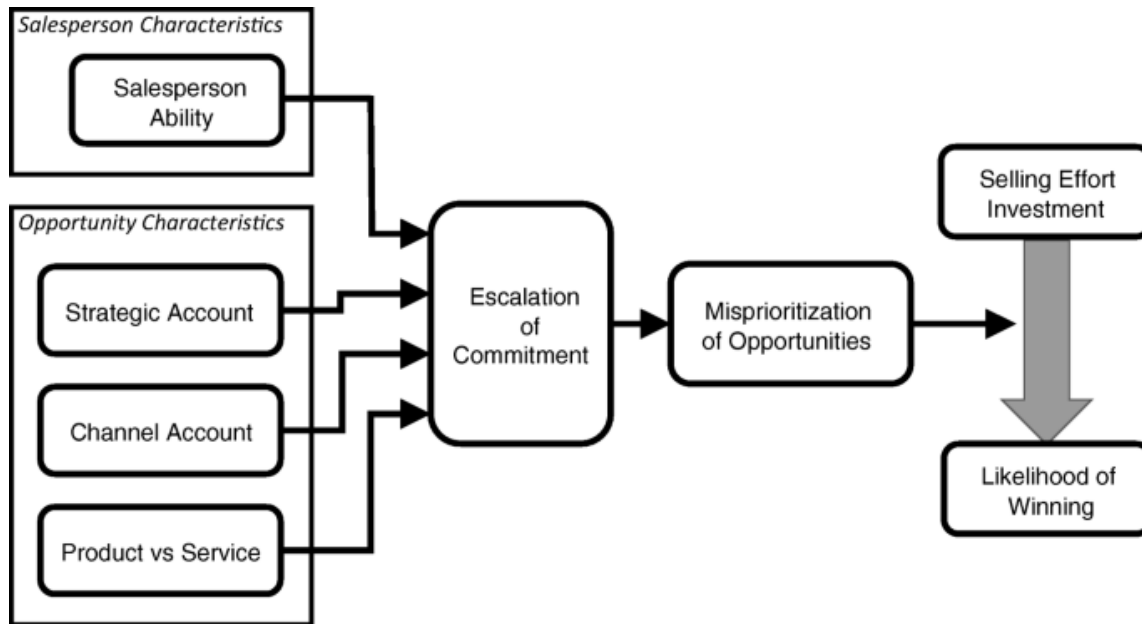


Fig. 1. Moderating effect of escalation of commitment

Escalation of commitment

Under an escalation of commitment, when faced with a continue/abandon decision, decision makers tend to incorporate sunk costs into the project calculation (Staw 1981). Rational economic reasoning argues that unrecoverable sunk costs should not be considered (Whyte 1986); however, in practice, decision makers often do consider these sunk costs, causing them to continue with projects that are likely to fail. That is, decision makers become trapped by their prior commitments and are unable to escape a losing situation.

In his review of extant literature, Brockner (1992) suggests that the escalation of commitment is the result of a confluence of multiple, simultaneous, and mutually reinforcing effects. Subsequent inquiry lends support to Brockner's proposal and demonstrates that the escalation effect is both robust and pervasive in decision making (Sleesman et al. 2012). Experimental research indicates that escalation effects are present even when the decision maker is not personally vested in the decision outcomes, must explain a rational justification for the decision, or is reviewing the decisions of others (Kadous and Sedor 2004). Indeed, according to Wong et al. (2008), simply priming a decision maker with the goal of dispassionately analyzing the continuance decision can actually exacerbate the escalation effect. Conversely, Kadous and Sedor (2004) find that sunk cost biases can be minimized when a third-party reviewer is primed with the task objective of evaluating continuance against losses due to escalation.

Hypotheses

The selling cycle requires continuous investment of salespeople's most elemental and scarce resource—time. For B2B accounts, salespeople make this decision autonomously (Albers 1995). Salespeople examined in the current study were required to call on their active accounts regularly. Therefore, for this study, the go/no-go decision is dichotomous because customers require continuous investments of salesperson time and attention (Marshall et al. 1999), as well

as firm-level resources such as travel funding and possibly technical sales support (Hutt et al. 1985; Johnston and Bonoma 1981). Continuous time investments in a sales opportunity are not merely more expensive on the front end, but they are also less lucrative on the back end because of the time value of money.

Rejection of this logical decision to discontinue sales efforts that do not clearly show progress can lead to escalation effects. Salespeople who have invested a great deal of time in the sales process have developed relationships with their prospects (Palmatier et al. 2006a). As they have qualified the customer, their knowledge of that customer's likelihood to buy might become more calibrated (Jolson 1988), but it also becomes less salient in the face of the large sunk costs invested to earn the customer's business. Attention may be disproportionately given to information supporting their prior belief that a customer is winnable (Jonas et al. 2001), enabling them to defer the anticipated cognitive dissonance associated with abandoning the sales effort. Salespeople also customarily participate in regular pipeline review meetings with their managers—often in conjunction with their peers. As they publicly defend their decision making, their own sense of self-efficacy becomes bound to the success of an account because of the investment made in pursuing it, regardless of its actual likelihood to close (Arkes and Hutzel 2000). Finally, salespeople can frame the invest/abandon decision as a sure loss versus a chance for either a loss or a gain, treating the unrecoverable time investment as still relevant to the continuance decision (Whyte 1986).

As with any factor of production, time investments in a selling cycle are subject to the law of diminishing returns. Initially, the effort–outcome relationship is positive (Brown and Peterson 1994). Very early in the selling cycle, marginal returns are positive and increasing, a period which we refer to as the “bluebird” stage in reference to the term of art used by some salespeople to describe opportunities which close immediately due to customer urgency, with minimal or no investment of selling skill on the salesperson's part. When the first derivative of the effort/win likelihood function becomes zero, the marginal return on effort becomes positive-but-decreasing—the usual state of affairs in a selling situation (Coughlan and Sen 1989). Eventually, the marginal return on selling effort reaches zero, and then becomes negative. In other words, further investments are associated with a lower likelihood of success. Salespeople with an opportunity in this stage should rationally discontinue investing effort in winning the deal. However, if a salesperson escalates her/his commitment to winning the account, they will continue investing effort long after its marginal return becomes negative. Chasing accounts that are not definitively dead but are also not really alive, prompts us to describe this stage of the sales cycle as “zombie hunting.” If a salesperson is behaving rationally, the point at which marginal returns change from positive to negative should lay well outside the typical range of sales opportunities. On the other hand, selling effort under escalation of commitment—even when this investment has a negative return—would be common within the normal range of opportunities (see Fig. 2).

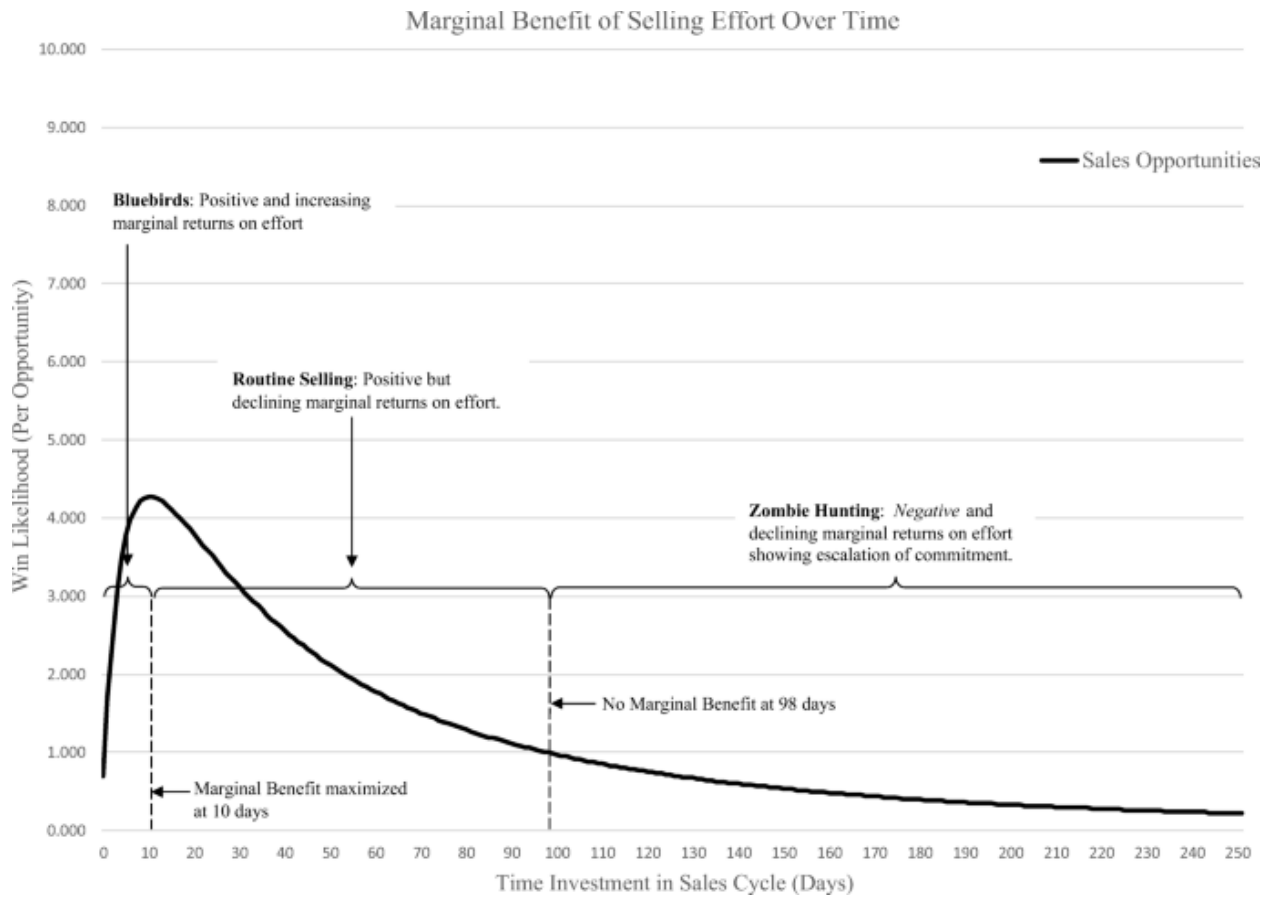


Fig. 2. Product sales time investment

Therefore, we propose the following:

H1: *Ceteris paribus*, salespeople's time investment has an inverted U-shaped relationship to the likelihood of winning the sales opportunity, such that the effort–win likelihood relationship is first positive and increasing, then positive and decreasing, and finally negative and decreasing.

Across multiple sales settings, many factors can moderate salespeople's propensity to escalate commitment to a sales opportunity. These include salesperson characteristics, such as ability, and opportunity characteristics, such as classification as a strategic account, the use of a channel partner, and product sale versus service sale.

We define a salesperson's ability as the possession of the knowledge and skills that allow her or him to operate more effectively and efficiently during the selling process (Zoltners et al. 2009). Ability helps a salesperson recognize and abandon selling efforts toward unqualified customers who are unlikely to buy (Jolson 1988). While sales ability is highly complex and derives from many different competencies, superior salespeople should be better equipped to allocate their efforts optimally, especially considering that less effective salespeople underperform and are eliminated from the work pool (Johnston and Futrell 1989). Moreover, salespeople with higher

ability will likely have larger, richer pipelines, with more lucrative prospects, and should be less resistant to abandoning a suspect and long-simmering deal (Fox et al. 2009).

Establishing profitable relationships with customers is a critical task for salespeople in most selling environments (Anderson and Narus 1990; Palmatier et al. 2006b). A salesperson maintains a pipeline of sales opportunities at varying levels of completion. The salesperson does not know *ex ante* whether a given potential customer relationship will be consummated. Thus there is a need for effective prospecting and qualifying, which are elements of salesperson ability (Carter et al. 2014).

The salesperson estimates the optimum allocation of selling resources required to maximize the return on the pipeline. At every stage, salespeople have a chance to make an invest-or-abandon decision, depending on their revised estimates of the probability of closing the deal. According to escalation-of-commitment theory, in cases when this information is negative, salespeople will be biased toward discounting the negative information and continuing to invest in losing sales opportunities (Staw and Ross 1978). Salespeople with greater ability will be more effective at accurately evaluating positive and negative information, and estimating their likelihood of eventual success. Thus:

H2: The time investment–win likelihood relationship will remain positive for longer in the case of opportunities pursued by salespeople with higher ability than those pursued by lower-ability salespeople.

In addition to the ability of the salesperson, we also look at whether escalation is contingent on the selling context. Three streams in the selling literature focus on specific broad categories of sales setting. These include strategic accounts (e.g., Bradford et al. 2012), sales involving channel partners (Rackham and DeVincentis 1999; Walsh 2007), as well as sales opportunities that involve services vs. products (Lovelock and Wirtz 2007; Oliva and Kallenberg 2003). The focal firm's breadth of offerings provides an opportunity to determine if selling context moderates the relationship between investment in an account and the likelihood of winning the sale.

Strategic key accounts are critical to the success of the selling firm (McDonald et al. 2000; Sheth and Sharma 2008) and, as such, have sparked considerable research (e.g., Bradford et al. 2012; Richards and Jones 2009). These accounts are essential because both the suppliers and customers engaged in strategic key accounts aim to increase the efficiency and effectiveness of their relationships and create value (Homburg et al. 2002; Ryals and Davies 2013; Sullivan et al. 2012). One way to accomplish this is for buyers to engage in long-term relationship exchanges with suppliers (Tuli et al. 2007). Programs focused on retaining and growing strategic accounts aim to proactively work with these important partners to achieve mutually rewarding goals (Gounaris and Tzempelikos 2014; Workman et al. 2003). Strategic accounts are more customer oriented than regular large accounts and are important to the seller's overall market strategy (Ryals and Davies 2013).

These accounts' importance means that strategic account managers can draw on additional resources from their organizations, but they are also subject to additional attention, and

oversight, from upper level management to ensure they are effective (Capon et al. 2008; Guesalaga 2014; McDonald et al. 2000). Thus:

H3: The time investment–win likelihood relationship will remain positive for longer in the case of strategic account opportunities than conventional accounts.

Whether the account was pursued in concert with a channel partner represents another potential moderating effect. Dealing with channel partners represents a different type of challenge than that involved in selling directly to an account (Rackham and DeVincentis 1999) because the partner firm, not the supplier's salesperson, typically owns the relationship with the final customer (Walsh 2007). Channel partners in the current study are almost exclusively value-added resellers (VARs), which sell to customers whom the manufacturer does not deal with directly. These customer relationships can help protect VARs by balancing their power with that of the manufacturer (Heide and John 1988). Since VARs value their relationships with suppliers, they also may limit alternatives presented to their customers to gain better terms for preferred suppliers (Ray et al. 2016).

When working with a channel partner, a manufacturer's salesperson must operate in an environment of especially limited information and control (Kalyanam and Brar 2009), but is still held accountable by his or her firm for the success of the selling effort. The salesperson perceives the account through the representations of the VAR, which is subject to escalation effects. If the VAR requests sales support from the focal firm, that request is reviewed by the salesperson before they make any additional commitment of resources. While not truly objective, the salesperson does gain a greater degree of objectivity regarding the opportunity and its likelihood of success. Independent oversight of a continuance decision can reduce escalation tendencies (Kadous and Sedor 2004). Thus:

H4: The time investment–win likelihood relationship will remain positive for longer in the case of channel accounts than accounts being pursued directly by the manufacturer.

The final potential moderator involves whether the sales opportunities are for a product or service. Substantial literature details the differences between purchasing products and purchasing services (Zeithaml et al. 1985). Services often require a different approach to selling because they are more relationship based, while products tend to be more transaction based (Lovelock and Wirtz 2007; Oliva and Kallenberg 2003). Building relationships can be a time-consuming process involving both effort and other resources (Palmatier et al. 2006a; Tuli et al. 2007). Yet having a relationship with a potential customer does not guarantee a sale, especially for big-ticket items (Friend et al. 2014).

Another difference between products and services in a B2B context is that services tend to be customized (Zeithaml et al. 2009). Client meetings and sales efforts surrounding the services provided by the focal firm involve highly customized, intangible products. To pursue a service sale, a salesperson may require additional resources, such as a technical salesperson, a software specialist, or some other combination of resources beyond what might be required in a product-based sale. Firms that can provide a full range of options to address a complex service for the target market may believe they have a competitive advantage (Neu and Brown 2005), and as

such, they may be more likely to pursue an opportunity for a longer period and with greater resource commitment.

Given the intangible, often co-produced nature of services, the potential for greater risks of making a bad decision can lead customers to approach their purchase differently from products (Brown et al. 2012). Therefore, salespeople pursuing service opportunities may exhibit a higher degree of escalation of commitment in an attempt to overcome buyer resistance or hesitancy. Thus:

H5: The time investment–win likelihood relationship will remain positive for longer in the case of capital equipment sales than enterprise services sales.

Methods

Data

The data came from a major high-tech industrial manufacturer that provides products ($N = 1846$) and related high-end services ($N = 1436$) to companies across North America. Consumables are bundled as part of product and service deals, in addition to being sold on their own ($N = 2373$). While the services and products involve major sales efforts, the consumable category is often a lower-level, order-taking type of sale. The data follow a cohort of sales opportunities ($N = 5377$) opened within a one-year period and evaluated over a three-year period. Descriptive statistics are provided in Table 1.

Table 1. Study constructs and measures

Continuous Variables							
<i>Name</i>	<i>Units</i>	<i>Mean</i>	<i>StDev</i>	<i>Max</i>	<i>Min</i>	<i>Skew</i>	<i>Kurt</i>
Time Invested	Days	139.68	221.11	1789	0	2.22	6.10
Ability	Standardized	0.164	0.940	4.06	-1.10	1.20	1.25
Revenue*	Dollars	119,790	323,599	7,885,000	-180,000	8.85	126.58
Past Account Value**	Dollars	228,251	1,332,882	43,790,357	-24,679	26.76	851.20
Dichotomous Variables***							
Won (DV)		36.8%					
Sales Engineer Used**		40.6%					
Employed Prior Year		41.0%					
Strategic Account		15.7%					
Channel Partner Used		39.6%					
Product Sales		34.3%					
Service Sales		26.7%					

*Revenue and Past Account Value reflect accounts where net currency exchange is to the customer

**Past Account Value and Sales Engineer are listed despite not having been included in the model, for context

***% of opportunities in each category

Salespeople working for this firm pursue sales opportunities within their regionally assigned territories. Sales teams help supplement sales representatives' own skills with subject-matter expertise, all under the direction of the account executive, who manages the opportunity and makes resource allocation decisions. Deal sizes range from more than US\$100,000 to contracts of several million dollars for both products and services, which the sales force can sell separately

or together. Revenue is distributed approximately log-normally. Salesperson turnover was approximately 15% during the study period. Time investment in sales opportunities varies significantly, following an approximate log-normal distribution. Sales opportunities are typically concluded (win or lose) within a year. This firm has pursued opportunities for six years and more; however, only 6% of those evaluated had not reached some resolution by the end of the study.

We gathered the data from a salesforce automation (SFA) system (Erffmeyer and Johnson 2001; Hunter and Perreault Jr 2007), which tracks individual opportunities and all activities reported by the salesperson in pursuit of an opportunity. These include the date when the opportunity is opened (and, if applicable, closed), forecast revenue, product category, time investment in the sales opportunity, selling activities pursued, current stage in the sales cycle, whether the sale was closed, and unique identifiers for sales team members. Cost and margin data were not available.

Nearly all the data are recorded by members of the sales team, typically the account executive. The data are self-reported, rather than behavioral data, even though they are derived from a managerial control system. As noted previously, salespeople tend to operate with a high degree of autonomy. Sales managers have only a few windows available to them to monitor their employees, one of which is the SFA system. Such a system necessarily has strong demand effects. Similar to managers, researchers must apply a critical eye to the salesperson's representations of his or her pipeline and its progress. For example, salespeople often withhold information from their managers to protect their own unique knowledge and maintain their intra-organizational power (Wang et al. 2009). They may also attempt to maintain an information monopoly to secure salesperson- rather than firm-directed loyalty from customers (Palmatier et al. 2007). For these reasons, we selected the variables used in the study to minimize bias.

We analyzed the data using binary logistic regression. The dependent variable was the log odds ratio of win—the successful or unsuccessful close of a sales opportunity. We chose a dichotomous variable because the quantity of interest is the likelihood that a selling investment will pay off, which in turn drives the continuation decision, rather than the magnitude of the payoff (we control for the size of the opportunity subsequently).

The overall model is

$$\ln\left(\frac{p(\text{Win})}{p(1 - \text{Win})}\right) = \beta_0 + \boldsymbol{\beta}\mathbf{X} + \varepsilon,$$

where \mathbf{X} is an $n \times 26$ matrix of the main effect (sales cycle investment) and its quadratic term, the five moderating effects and their 18 interaction terms, and the control (opportunity size and its two interaction terms). The $\boldsymbol{\beta}$ vector of coefficients corresponds to the five hypothesized relationships posited.

Moderating effects

Time investment

Time investment captures the length of time a salesperson has put into the sales opportunity (in days). The distribution of sales opportunity length of time is approximately log-normal; we added 1 to the time investment to avoid problems associated with taking the log of zero. We also included a quadratic term to test the hypothesized curvilinear relationship.

Ability

Ability may affect the relationship between the time invested in the sales effort and the win rate. Prior research has operationalized salesperson ability to include a variety of constructs (e.g., Drollinger and Comer 2013; Giacobbe et al. 2006; Kidwell et al. 2011). Ability is positively related to sales performance (Gopalakrishna et al. 2016), and therefore we use standardized prior-year sales performance to proxy overall salesperson ability relative to peers. Due to turnover related to substandard performance, the range of ability in this study was skewed toward higher-performers; therefore high ability is defined as two standard deviations above the mean, while low ability is defined as one standard deviation below the mean. (Results were tested and are robust for other cut-off points.) We added an interaction term for prior-year employment to control for any salespeople who were not employed (0) at the focal firm in the previous year. While differences in market potential between sales territories might cause a salesperson's ability to be over- or under-estimated in other contexts, in this case the focal firm regularly rebalances its territories to ensure that each salesperson has the same quota and the same revenue opportunities. Other studies have also employed similar sales volume assessments as a measure of ability (Gopalakrishna et al. 2016).

Strategic account status

Strategic account status was a designation supplied by the sponsoring firm to the accounts that management deemed strategic in nature. In this study, the firm labeled 15.7% of opportunities as strategic accounts. The selling firm assigned a strategic account manager to these customers. As with most of these types of accounts, strategic accounts were the primary focus of the managers' attention.

Channel partners

Sales involving channel partners were designated in the SFA system as operating through a reseller or other type of channel partner. For the focal firm, these sales are quite important because they represent 39.6% of all sales opportunities.

Product sale versus service sale

The designation of a product or a service sale was based on the sales opportunity and was categorized according to the listing of the sales opportunity in the SFA system. Opportunities categorized as product sales specifically exclude consumables related to the operation of existing customer installations; rather, these are new installations of high-tech industrial equipment.

Results

Table 2. Regression results

Regression Results	Logistic Regression			Skewed Logit (Scobit)		
	Coefficient	exp (β)	Sig	Coefficient	exp (β)	Sig
<i>Main Effect (H1)</i>						
Ln(Time Investment)	1.648 **	5.196	0.000	1.198 **	3.315	0.000
Ln(Time Invested) ²	-0.317 **	0.728	0.000	-0.232 **	0.793	0.000
<i>Moderator: Ability (H2)</i>						
Ability	-0.573 **	0.564	0.000	-0.457 **	0.633	0.000
Ability * Ln(Time Investment)	0.633 **	1.883	0.009	0.436 **	1.546	0.010
Ability * Ln(Time Invested) ²	-0.077	0.926	0.110	-0.046	0.955	0.195
Employed Prior Year	0.499 **	1.647	0.000	0.392 **	1.480	0.000
Employed Prior Year * Ln(Time Investment)	-0.156	0.855	0.440	-0.118	0.889	0.390
Employed Prior Year * Ln(Time Invested) ²	0.009	1.009	0.821	0.005	1.005	0.847
Ability * Employed Prior Year	0.576 **	1.779	0.001	0.462 **	1.588	0.000
Ability * Employed Prior Year * Ln(Time Investment)	-0.807 **	0.446	0.002	-0.571 **	0.565	0.002
Ability * Employed Prior Year * Ln(Time Invested) ²	0.117 *	1.124	0.024	0.077 *	1.080	0.042
<i>Moderator: Strategic Account (H3)</i>						
Strategic Account	0.745 **	2.107	0.000	0.570 **	1.768	0.000
Strategic Account * Ln(Time Investment)	-0.281	0.755	0.075	-0.323 **	0.724	0.001
Strategic Account * Ln(Time Invested) ²	0.068 *	1.070	0.022	0.073 **	1.075	0.000
<i>Moderator: Channel Account (H4)</i>						
Channel Account	0.195 *	1.215	0.019	0.153 *	1.165	0.019
Channel Account * Ln(Time Investment)	0.341 *	1.406	0.014	0.166	1.181	0.067
Channel Account * Ln(Time Invested) ²	-0.060 *	0.941	0.023	-0.030	0.971	0.103
<i>Moderator: Product / Service (H5)</i>						
Product Opportunity	-0.722 **	0.486	0.000	-0.609 **	0.544	0.000
Product Opportunity * Ln(Time Investment)	-0.180	0.835	0.188	0.006	1.006	0.956
Product Opportunity * Ln(Time Invested) ²	0.055 *	1.057	0.035	0.017	1.018	0.369
Service Opportunity	-0.459 **	0.632	0.000	-0.401 **	0.670	0.000
Service Opportunity * Ln(Time Investment)	-0.097	0.908	0.489	0.069	1.071	0.540
Service Opportunity * Ln(Time Invested) ²	0.032	1.033	0.225	0.000	1.000	0.994
<i>Controls</i>						
Opportunity Size	0.000 **	1.000	0.000	0.000 **	1.000	0.000
Opportunity Size * Ln(Time Investment)	0.000	1.000	0.269	0.000	1.000	0.255
Opportunity Size * Ln(Time Invested) ²	0.000	1.000	0.855	0.000	1.000	0.753
<i>Diagnostics</i>						
(Constant)	-0.853	0.426	0.000	-15.740	0.000	0.979
ln(alpha)	(1)			14.727	2,487,786	0.981
# Observations	5377			5377		
X ²	954.948	(df= 26)	0.000	972.360	(df= 27)	0.000
-2 * Log Likelihood	6122.366			6107.18		
Nagelkerke R ²	0.222					
Cases Correctly Assigned	70.8%			70.7% †		

p < 0.05* *p* < 0.01** † See text

The overall fit of the model (all opportunities) was highly significant ($p < .001$). The Nagelkerke R-square is 0.222 (70.8% of cases assigned correctly). Full regression results are reported in Table 2. Consistent with H1, the coefficient for the quadratic time investment term was negative ($p < .01$), and the linear term was positive ($p < .01$). After an initial period in which greater

investment of time has a positive effect on sales outcomes (i.e., rational application of the sales effort improves the odds of a positive outcome), the sales atrophy effect dominates, and the effort–outcome relationship becomes negative. Using the estimated model, the net marginal effect of an additional day of selling effort drops below 1.0 (that is, no net effect) at 98 days in the sales cycle.

This negative effort–outcome relationship is not merely a case of diminishing returns on time investment (see Fig. 2). If we take the first derivative of the likelihood function with respect to the time invested, the maximum marginal return on time invested is at 10 days (the “bluebird” stage of the selling effort), after which marginal returns decrease but remain positive (the routine-selling stage). The marginal effect of time investment on the likelihood of winning drops to zero at 98 days, after which it becomes negative. This drop is not simply an artifact of the inverted U shape of the relationship. The selling opportunities for which the return on additional time invested became negative included more than 20.4% of the company’s active sales portfolio for that year. We therefore refer to this period in the selling cycle, when applicable, as the “zombie-hunting” stage, during which salespeople fruitlessly invest costly firm resources in an effort to chase deals that are not definitively dead but are not really viable either.

Note also that the point at which opportunities enter this zombie-hunting stage is not the financial breakeven point. The focal firm does not measure the cost of sale on a per-opportunity basis; therefore, we classify returns on effort conservatively, under the assumption that time is a freely available resource. In practice, time is expensive. It is associated with travel and entertainment expenses, compensation for the salesperson, and the opportunity cost of not pursuing other, more potentially viable accounts. Given these costs, the actual in-practice range of negative marginal returns from a financial perspective will encompass an even larger proportion of the opportunities in our sample.

Ability

The interaction terms that represent the moderating effect of salesperson ability on the time investment–win likelihood relationship were, net, negative in their linear effect and positive in their quadratic terms. Most of these terms were significant ($p < .05$). The effort-outcome relationship became negative at 95 days for low-ability ($-\sigma$) but didn’t become negative until 108 days for high-ability ($+2\sigma$) salespeople. Therefore, H2 is supported (see Fig. 2). Returns on the selling investments of salespeople with higher ability remain positive longer than those of salespeople with lower ability.

It is important to note that the marginal benefit of time investment by a lower-ability salesperson during the bluebird and routine selling phases is higher than that of a high-ability salesperson. While this seems counter-intuitive, it is important to note the unit of analysis for this study, which is the opportunity and not the salesperson. High ability is indicative of both “working smart” and “working hard” (Sujan et al. 1994). Therefore, higher-ability salespeople can have lower per-opportunity win rates and still perform better overall because they are pursuing more accounts overall. In this sample, high-ability salespeople pursue more than 50% more opportunities than low-ability salespeople.

Strategic accounts

The interaction terms representing the moderating effect of strategic account status on the time investment–win likelihood relationship were negative and positive for the linear and quadratic terms, respectively ($p < .05$ for the higher-order coefficient). This means that more of the selling cycle is spent in the productive stages of the selling cycle, with marginal benefit of effort on win likelihood not becoming negative until 210 days, as opposed to only 98 days for conventional accounts (see Fig. 3). Therefore, H3 is supported.

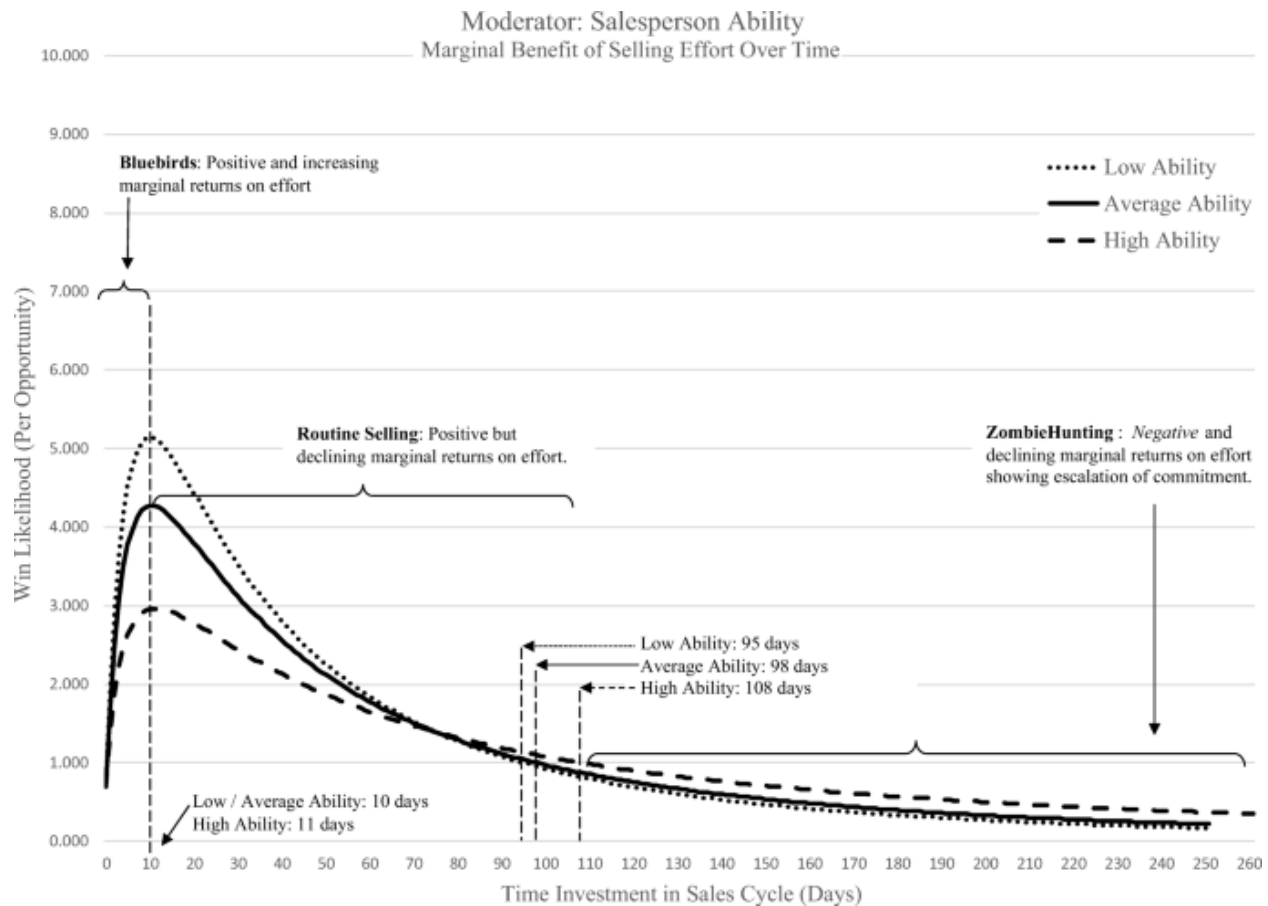


Fig. 3. Moderating effect of salesperson ability

Channel partner accounts

The linear and quadratic terms for the interaction between channel account status and the time investment–win likelihood relationship were positive (linear) and negative (quadratic) ($p < .05$ for both coefficients). This result indicates a more pronounced inverted U-shaped relationship; however, the main effect of channel partner status serves to keep the effort–outcome relationship positive for longer than non-channel accounts (132 days, as opposed to 98 for normal accounts; see Fig. 4). Therefore, H4 is supported.

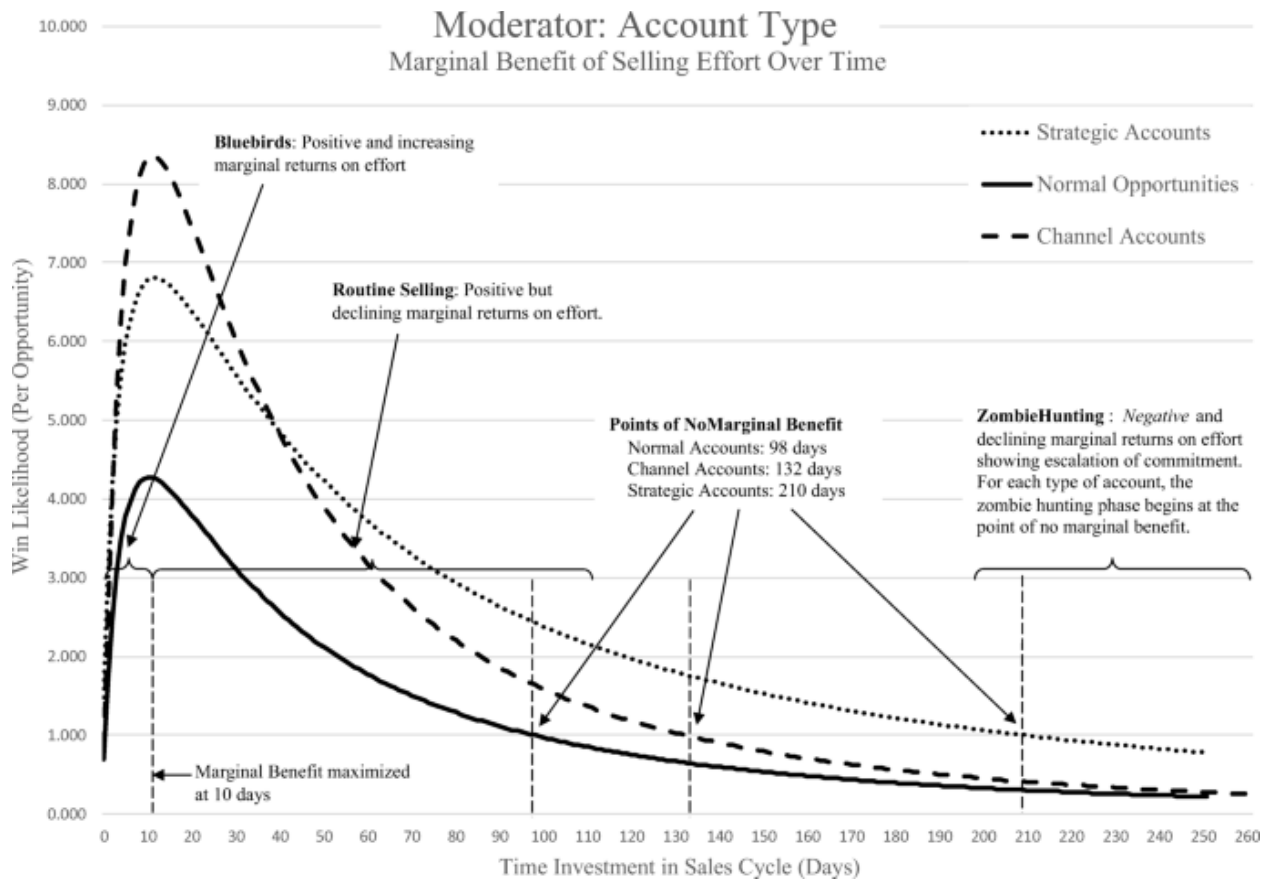


Fig. 4. Moderating effect of account type

Product versus service sale

In this study, the services the firm sold were major purchases and were customized to each customer's specification, which made for a complex sale (Neu and Brown 2005). Given the differences between service and product sales at the focal firm, we hypothesized that services would be subject to escalation of commitment to a greater extent than products.

Comparing product sales with service sales required two sets of interaction terms, due to the existence of a third category (consumables). The interaction terms associated with sales of enterprise services did not meaningfully differ from those of consumables (i.e., the coefficients were non-significant). However, in the case of product sales, the interaction terms were negative (linear) and positive (quadratic), with the highest order coefficient being significant at the 5% level. H5 is not supported, because the main effect serves to make the marginal effect of additional time investments in product sales negative after only 63 days. The subsequent robustness check using a skewed logit model confirmed the lack of a significant difference between services and consumables and failed to support a distinction between any of these three categories.

Confusion matrices are available for all models (see Table 3). Overall fit was acceptable, but because of the higher number of losses than wins, the estimation tended to favor coefficients that provided better fit to lost sales than successful sales. Given the large number of factors that drive

a successful transaction, a predictive model would have to draw on more explanatory variables than those relevant solely to a hypothesis-testing model measuring escalation-of-commitment effects.

Table 3. Confusion matrices

Confusion Matrices							
Logistic Regression	Predicted			Skewed Logit Model	Predicted		
Observed	<i>Lost</i>	<i>Won</i>	<i>% Correct</i>	Observed	<i>Lost</i>	<i>Won</i>	<i>% Correct</i>
<i>Lost</i>	3017	379	88.8%	<i>Lost</i>	3028	368	89.2%
<i>Won</i>	1190	791	39.9%	<i>Won</i>	1205	776	39.2%
Overall			70.8%	Overall			70.7%*

All cutoffs are at 0.500

*Scobit fit is less due to rounding; see text

To test the robustness of our binary logistic model, we fit the same specification to a skewed logistic (scobit) model (Nagler 1994).¹ Scobit relaxes the assumption of logistic regression that the influence of independent variables is strongest at $F(X\beta) \approx .5$, and adds a parameter (α) to account for this skewness; errors are Burr-10 distributed. Where $\alpha = 1$, the model reduces to a conventional binary logistic form; the nested relationship permits log likelihood ratio test to check for the significance of adding this additional parameter. The scobit model is of the form:

$$F(\beta X; \alpha) = \frac{1}{(1 + e^{-\beta X})^\alpha}$$

The result of the likelihood ratio test comparing the skewed logistic regression to conventional logistic regression (that is, constrained to $\alpha = 1$) is $X^2_1 = 9.33$ ($p = .002$), supporting the use of the scobit technique. Note that the assignment accuracy of cases is actually slightly lower for the scobit model than the logistic regression model (70.7% vs. 70.8%). This difference is a result of rounding errors in the estimation process; however, the fact that these models are similarly successful in their classifications shows robustness against the skewed nature of the dependent variable.

The results, listed in Table 2, were broadly similar: coefficients for H1 remained the same in direction and significance. All nine coefficients related to H2 (ability) remained the same. For H3, the results were directionally the same, but significance for all coefficient estimates improved to the $p < .01$ level. The results for H4 were directionally the same but significant at only the $p < .10$ level for the higher-order interaction term, indicating that the results for this hypothesis should be considered preliminary. The product/service moderating terms (H5) all became non-significant. Thus, the reversed product/service relationship found in our binary logistic model may be a consequence of the skewness of the win/loss rates.

Alternatively, in Nagler's (1994) original paper, Monte Carlo simulations comparing logit and scobit estimations for randomly generated data with known parameters showed much higher standard errors for scobit estimations than logit. The higher standard errors naturally have an impact on the significance of results, "a price to pay in using scobit" to account for skewness.

¹ We thank a reviewer for suggesting this approach.

However, Nagler goes on to caution that, “if one could not reject with some high level of confidence the hypothesis that $\alpha \neq 1$, then one would probably prefer to use the logit estimates” (Nagler 1994). That is the case in this study.

Discussion

The results indicate that salespeople’s cognitive biases have a considerable impact on their decision making regarding allocation of effort. Study findings support and extend those of previous research examining escalation of commitment in a sales setting. In an experimental setting, Bonney et al. (2014) find that escalation of commitment occurs in B2B sales. They also report that disclosing that a sales opportunity is being pursued to other individuals in the salesforce can increase escalation of commitment. The current research, based on field salesperson behavior, verifies that escalation of commitment occurs when sales opportunities are disclosed—in our case, via the SFA system used by the firm.

In addition to supporting the existence of escalation of commitment in a sales environment, the findings shed further light on how the phenomenon manifests in real-world settings. Investments of firm resources can continue far beyond the normal sales cycle. Salespeople will even continue to pursue a sale when the extra efforts and attention given to the sales opportunity actually decrease the likelihood of ever closing it. Our results show, however, that this effect is not uniform across the salesforce. Salespeople with higher ability tend to invest their selling efforts more effectively. Though still subject to the escalation of commitment, the marginal impact of the efforts of high-performing salespeople stayed positive for a longer period than that of low-performing salespeople.

The findings also indicate that strategic accounts are less likely to be subject to the escalation of commitment. As these accounts tend to be very large and visible within the firm, it might be expected that escalation of commitment would be an even larger problem with these customers than with regular accounts. However, the nature of strategic accounts makes them subject to additional levels of oversight, which in turn helps prevent salespeople from throwing additional resources at these sales opportunities without approval from higher-level management. The additional layers of approval and oversight often required by the structuring of strategic accounts help ameliorate the temptation to overinvest in winning them. In the focal firm, this was a multi-step process and involved obtaining approval from executives who were not directly involved in the sale and were not incentivized to close any one specific strategic account sale.

While additional scrutiny and information related to strategic opportunities helps prevent escalation, the same is also true for complex channel-selling situations. Selling with a channel partner appears to reduce the likelihood of a salesperson escalating their commitment. Salespeople in these situations were somewhat less likely to over-invest in non-viable sales opportunities. The additional attention paid to resource allocation in the channel accounts, combined with the manufacturer’s greater degree of objectivity results in reduced escalation of commitment. These findings indicate the importance of additional, objective evaluation of sales opportunities.

The mixed support for escalation in product versus service selling situations leaves this an open question deserving further investigation. On the one hand, many of the theoretical perspectives on the mechanism by which escalation of commitment occurs do not distinguish between factors involved in the product–service dichotomy (Whyte 1986). On the other hand, ample research has demonstrated important differences between these two kinds of offerings (e.g., Zeithaml et al. 1985). A better understanding of this potentially moderating effect might help resolve underlying questions related to the theoretical mechanism by which escalation of commitment occurs.

Improved managerial scrutiny appears to help reduce escalation of commitment. Outside sales organizations employ managerial control systems that emphasize outcome-based controls, due to the opacity of selling activities (Coughlan and Sen 1989). However, alignment of incentives only goes so far in the face of irrational tendencies on the part of account executives. In this case, raising the stakes did nothing to ameliorate the tendency to double down on a losing deal, as demonstrated by the near-zero effect size associated with deal size (see Table 2). Sleesman et al. (2012) find a similar result for making opportunity costs salient by increasing the negative impact of personal investment in the decision, indicating that the greater degree of managerial oversight applied to strategic accounts reduces the tendency to escalate commitment. Applying additional, third-party reviews of ongoing sales opportunities—especially those taking atypically long to close—appears to be one way to reduce salespeople’s desire to continue pursuing these deals. Having the sales manager alone review sales opportunities may still result in escalation of commitment because he or she may also have incentives to keep the opportunity active long past a reasonable time limit.

SFA systems provide a new opportunity to monitor and manage investments in the selling process, if used properly to give greater oversight to investments in a sales opportunity. For example, when a sales cycle drags on for much longer than usual and so shows symptoms of potentially negative marginal returns on effort, a system can warn salesperson and manager alike. This would prompt them to scrutinize whether the deal is winnable, while managing the selling investments made toward that prospect. However, they may also have the unintended effect of promoting greater escalation of commitment because, by including their prospects in the SFA system, salespeople disclose the opportunity and now must save face by closing the deal (Bonney et al. 2014). Additionally, it is important when using SFA-derived analytics to understand the context of the models that produced them. The models used in the current research was specified for the purpose of hypothesis testing; they include potentially moderating factors but are not intended to predict the success or failure of a particular selling occasion. Given the skewness of the win/loss data, the fit is good for this research purpose. However, neither model is recommended as a forecasting tool.

Few companies directly track the cost of sale on a per-opportunity basis. However, the results strongly suggest that salespeople will not effectively self-manage their allocation of selling resources. By exercising independent, critical judgment on their subordinates’ pipelines, managers can help their team apply a dispassionate eye to losing efforts and prune dysfunctional opportunities. Managers should also be skeptical about proposed investments in opportunities that continue to drag out and explicitly build this oversight and counter-escalation into their

pipeline-review process lest they themselves succumb to escalation effects (Bush et al. 2010; Kadous and Sedor 2004; McNamara et al. 2002).

One way to decrease escalation of commitment is to determine the normal amount of time a salesperson should invest in a successful selling effort and apply more stringent guidelines for allocating resources to potential deals that have lingered longer than the normal time range. To keep an account open beyond this point, salespeople should be required to build a case for why this account should continue to be pursued. The longer the time past a normal closing date, the tougher the test should be for justifying continued investment in the account. Requiring that prospects meet this threshold should result in greater rationality about the most fruitful opportunities to pursue.

Limitations and further research

As with any study, this research has limitations. First, we lacked profitability data on a per-opportunity basis and thus examined only its magnitude as measured by revenue. Prior research suggests that there is no reason to expect an association between revenue and profitability of relationships (Rangan et al. 1992); however, in this case, the use of profitability data would have defeated the purpose of diagnosing bias in the face of incentives because the studied salesforce is compensated on the basis of revenue, not profit.

Second, this study measures investments in the opportunity via time investments by the salesperson. Other research such as Manchanda and Chintagunta (2004) measure selling effort via individual customer contacts (e.g., visits, e-mails, phone calls). Such data were unavailable for this study; the company in question does not track this information on a per-opportunity or per-account basis, which is typical of many sales organizations. Tracking cost of sales directly provides a more nuanced view of the investment in the sales opportunity and superior management of the salesperson's pipeline. However, the sales policy of the focal firm is to require regular personal contact with prospective customers; a salesperson cannot simply "leave the account open" in the computer system. Time therefore serves as a proxy of effort, albeit in a manner that does not completely capture the intensity or nature of the effort.

In addition to time, other major investments on the part of salespeople come in the form of discounts and price concessions (Hansen et al. 2009; Mantrala et al. 2010). The focal firm does not systematically track salespeople's discounting behavior. Nevertheless, interviews with key informants in the firm's finance group indicate that discounts are commonly used to rescue failing opportunities or to "pull forward" opportunities likely to close in future periods to rescue a quota likely to be missed in the current period. While the accounting system can track discounting behavior for successful deals, it cannot track unobserved offers made to prospects who subsequently decline. The escalation of commitment model described herein suggests that the discount-win probability relationship is much weaker than might be expected from a strict utility-maximizing perspective.

The notion that salespeople may be subject to cognitive biases and overinvest in sales that in hindsight should have been recognized as lost begs the question: how can these losing sales be diagnosed *ex ante*? Identifying the customer- and opportunity-specific characteristics that

engender viable deals is exactly what sales qualification is intended to accomplish; yet the results of this study suggest great potential to advance the state of the art. In particular, the proliferation of salesforce automation applications is a sea change in sales management that provides an opportunity to revisit the tools, routines, and best practices used in the qualification process.

Finally, this study analyzed sales performance on an opportunity-level, win/lose basis because of the nature of the hypotheses being tested and the characteristics of the focal firm. The model was designed and calibrated to test hypotheses, rather than for the purpose of forecasting specific sales results. In addition, other key outcomes can be used to measure salespeople, including revenue and profitability on the opportunity, relationship, and salesperson levels. We did not examine these factors or organizational citizenship behaviors, because our focus was on immediate opportunity-specific sales outcomes. Future studies on these outcomes could help elucidate the drivers of performance.

Conclusion

The performance of industrial salespeople is critical to the performance of B2B organizations. Yet sales executives operate autonomously, largely unobserved by managers. Sales managers rely on salespeople to manage themselves by aligning their incentives with those of the company. This study demonstrates that this alignment of incentives is not enough—the salesperson’s cognitive biases are a strong obstacle standing in the way of optimum behavior. Managerial involvement in the selling process can help salespeople identify and curtail escalating investments in losing opportunities. Our work suggests that new information technologies provide both the data that enhance this effect and a possible avenue through which the effectiveness of a firm’s selling resources can be deployed for maximum effect.

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