Spring 5-1-2016

Antecedents of Sales Lead Performance: Improving Conversion Yield and Cycle Time in a Business-to-Business Opportunity Pipeline

William R. Bradford
Georgia State University

PERMISSION TO BORROW

In presenting this dissertation as a partial fulfillment of the requirements for an advanced degree from Georgia State University, I agree that the Library of the University shall make it available for inspection and circulation in accordance with its regulations governing materials of this type. I agree that permission to quote from, copy from, or publish this dissertation may be granted by the author or, in his absence, the professor under whose direction it was written or, in his absence, by the Dean of the Robinson College of Business. Such quoting, copying, or publishing must be solely for scholarly purposes and must not involve potential financial gain. It is understood that any copying from or publication of this dissertation that involves potential gain will not be allowed without written permission of the author.

William R. Bradford

NOTICE TO BORROWERS

All dissertations deposited in the Georgia State University Library must be used only in accordance with the stipulations prescribed by the author in the preceding statement.

The author of this dissertation is:
William R. Bradford

1060 Signal Pointe
Alpharetta, GA 30005

The director of this dissertation is:

Wesley J. Johnston

Department of Marketing
J. Mack Robinson College of Business
Georgia State University
35 Broad Street, Suite 1306
Atlanta, GA 30303

Antecedents of Sales Lead Performance: Improving Conversion Yield and Cycle Time in a Business-to-Business Opportunity Pipeline

By

William R. Bradford

A Dissertation Submitted in Partial Fulfillment of the Requirements for the Degree

of

Executive Doctorate in Business

In the Robinson College of Business

Of

Georgia State University

GEORGIA STATE UNIVERSITY

J. MACK ROBINSON COLLEGE OF BUSINESS

2016

ACCEPTANCE

This dissertation was prepared under the direction of William Bradford's Dissertation Committee. It has been approved and accepted by all members of that committee, and is has been accepted in partial fulfillment of the requirements for the degree of Executive Doctorate in Business Administration in the J. Mack Robinson College of Business of Georgia State University.

Richard Phillips, Dean

DISSERTATION COMMITTEE

Dr. Wesley J. Johnston (Chair)

Dr. Danny N. Bellenger

Dr. Denish Shah

ACKNOWLEDGEMENTS

I could never have completed this work without the help and support of several individuals throughout my post graduate studies. I would like to thank my dissertation advisor, Dr. Wesley Johnston for his thought leadership and motivation, as well as my committee members, Dr. Danny Bellenger and Dr. Denish Shah. I'd like to also acknowledge the outstanding staff and faculty of the Executive Doctorate in Business program, which provided an outstanding learning atmosphere, and the wonderful cohort, whose spirit and sharing made the program both stimulating and fun. A special thanks to Shalini Gopalkrishnan for her tireless support and encouragement.

I would also like to thank Dan McCranie, a mentor who triggered the research question, Jay Kilby who worked to provide me with usable data for this research, and the late Dr. Bill Kahl who inspired me down this doctoral path. My supportive family deserves my special appreciation, including my three daughters: Katie, with her intellectual curiosity, who showed interest in my research, Meagan who motivates me to teach and to reach, and Erin who has been studying along with me and constantly perseveres. I could not have even considered this effort without the continued love, support and encouragement from my best friend and wife, Kathy, who has always been my biggest cheerleader. I dedicate this work to the memory of my dad, Robert Bradford, and his lifelong commitment to education.

In the same way, let your light shine before others, so that they may see your good works and give glory to your Father who is in heaven. Matthew 5:16

Totus Tuus

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

ABSTRACT

Antecedents of Sales Lead Performance: Improving Conversion Yield and Cycle Time in a Business-to-Business Opportunity Pipeline

By

William R. Bradford

May 2016

Committee Chair: Lars Mathiassen

Major Academic Unit: J. Mack Robinson College of Business

Identifying new potential customers and developing opportunities until converted to sales is a critical function of a sales organization. In most industrial business contexts, opportunities are monitored within a sales pipeline or funnel, to track the status and progress from the initial stage until the sale is completed, often using sales force automation tools, such as customer relationship management (CRM) systems to manage the process. While much is written about the adoption, usage, and failures of CRM, little empirical research exists to fully examine the levers to improve the conversion performance of sales leads, particularly in a business-to-business (B2B) industrial context. The research based view (RBV) of the firm suggests that competitive advantage is gained from a company's distinct resources, and that in technology and other fast-paced markets, success is further determined by fast adaptation, in what is know as dynamic capability theory. This research examined certain key sales capabilities, within the high technology industrial B2B sector, to understand the impact of sales effort, sales ability and lead source, on sales lead conversion yield and cycle time. By studying the extensive CRM data base of a large semiconductor company, along with various human resource records, a quantitative study was performed to address this research, while providing useful value to sales managers seeking to improve the lead conversion

performance of their organizations. Sales effort, as measured by number of sales calls made per week, and percent of time spent on selling activities was shown to modestly accelerate sales cycle times, but have no effect on the percentage of opportunities that result in wins. Sales ability, measured by annual performance ratings, prior year quota attainment and years of experience showed no effect on cycle time, nor win percentage. The most notable contribution of this research is the illumination of sales effort effects on cycle time, as previous studies of sales cycle time influences have been inconclusive. Against the backdrop of a general lengthening of industrial sales cycle times, understanding that salesperson effort can reduce the time that it takes to win an opportunity can drive meaningful improvements in salesforce efficiency and productivity.

I CHAPTER I: INTRODUCTION

Companies succeed because of the various advantages they hold over their competitors, in the form of resources, according to the resource based view (RBV) of the firm (Wernerfelt, 1984). In industries represented by technology and rapid change, these resources, or capabilities, must adapt to address evolving situations, as dynamic capabilities are needed to sustain competitive advantage (Teece, 1997). The semiconductor industry epitomizes the competitive world of technology, where developments in complex physics drive evolving breeds of integrated circuits with transistors 1000 times smaller than a human hair, quality defects measured in parts per million, and single percentage gains in manufacturing yields or fabrication capacity causing dramatic swings in profitability. Leverage also exists in sales performance; as incremental revenue gains can increase factory utilization rates resulting in a disproportionate gain in profit. Sales performance is obviously critical to any business success, particularly the discovery, effective management, and efficient conversion of sales opportunities, or leads, into new revenue for the company. However, despite its importance in driving new revenue growth, new opportunity acquisition is a relatively neglected area of research (Söhnchen & Albers, 2010). Sales person time is a finite resource and therefore managers must try to maximize the sales leads that convert to sales by ensuring leads are qualified and prioritized such that sales people can focus on the highest probability and highest potential opportunities to convert (D'haen & Van den Poel, 2013). The faster sales people can convert leads, the more leads they can process. And the more leads that are successfully converted into sales, as a percent of the total opportunities in the funnel (the sales lead conversion yield), the more revenue the sales

person can produce. Using evidence based management, sales organizations can improve their performance by understanding the factors that effect the speed and yield through the sales funnel, allowing them to better allocate resources, qualify future leads, and predict and achieve future revenues. The theory explored in this work is that sales effort, sales ability and marketing lead generation programs are all dynamic capabilities that, when possessed and employed by industrial companies, affords them sustainable competitive advantage in the sales lead conversion process. By demonstrating that these factors can explain even minor sales lead conversion yield and cycle time variances, sales managers can have the means to effect greater sales and profitability for their companies, while increasing fields sales efficiency. The study sought to show that an increase in effort, or more sales calls made and more time spent on selling activities, can increase the percentage of active leads that convert to wins, and speed up the cycle time to get to a win. Similarly, the research examined the sales ability measures of experience and previous performance to likewise assess their impact on the two measures of sales lead conversion performance. Finally marketing capabilities to generate leads that can exhibit better conversion performance measures were evaluated.

As sales processes have shifted from transactional to relational models, information technology (IT) tools have been introduced to foster sales force automation (SFA) in an effort to better manage the customer relationship by effectively disseminating customer information throughout the firm. Customer Relationship Management (CRM) tools cover a broad gamut of activities, from the sharing of customer information to the promoting of learning in a marketing orientation culture, to lead or opportunity management; and the literature on the subject is highly fragmented

(Zablah, Bellenger, & Johnston, 2004). The topic of sales gets relatively little coverage in the academic marketing literature overall (Zoltners, Sinha, & Lorimer, 2008), and, among the body of CRM research that does exist, little focus is put on industrial business to business (B2B) marketing applications. This, despite the fact that the multi-stage sales funnel is widely used by sales managers to actively shepherd prospects through the multiple stages of the industrial sales process (Yu & Cai, 2007). Narayandas and Rangan (2004) cite the increasing complexity of buyer-seller relationships in industrial B2B markets; while they may be evolving from more transactional to more relationship driven, they are seldom fully either, with little empirical research or longitudinal studies to enlighten the field. Complex industrial sales involve influencing customer selection and purchase of a vast array of manufactured materials, components, subsystems, and technological solutions, often involving the lengthy negotiation and resolution of design specifications and performance standards. Sales forces must keep up with rapidly growing customer information as well as constantly changing product offerings, and it is this complexity that increases the challenge of sales success (Virtanen, Parvinen, & Rollins, 2015). In selecting a multibillion-dollar semiconductor manufacturer for this research, the resultant analysis is expected to simulate those of many other industrial component manufacturers with complicated sales processes.

This dissertation employed a style composition summarized in Table 1.0 (Mathiassen, Chiasson, & Germonprez, 2012), with each element being further elaborated and discussed in the later sections. The study examined factors that accelerate and improve the yield of leads converting to sales in an industrial context by evaluating the sales funnel data and salesperson characteristics in a multibillion-dollar

semiconductor company. Specifically, it examined the salesperson effort measures of sales calls made per week and the percentage of time spent on selling activities, as well as the salesperson ability measures of as their management performance rating, performance to quota, and experience level. Different performance resulting from the source of the lead was also examined. The problem setting was the increasingly complex sales process, with limited sales resources, requiring efficiency in how sales leads are identified, qualified and closed. The area of concern was sales force automation, especially CRM systems and lead management in a complex industrial B2B market context. The research question was:

> RQ: What are the effects of marketing programs, sales effort and sales ability on sales lead conversion performance?

This quantitative research examined the problem through the lens of the resource based view of the firm (RBV) and dynamic capabilities theory. Evidence based management leverages science and knowledge to help managers respond to uncertain circumstances, utilizing large datasets of observations (Rousseau, 2012). By analyzing a sizable opportunity database to determine which factors have the greatest impact on sales-lead-closure-rates and sales cycle time, much needed robust empirical evidence has been provided to help managers and academics alike to better understand this critical business objective of converting sales opportunities to revenue.

Table 1 Research Design Summary
(Mathiassen et al., 2012)

P (Problem setting)	Industrial B2B company need to convert more sales leads in less time
A (Area of concern)	Sales force automation / CRM and lead management in complex industrial B2B context
RQ (Research Question)	What are the effects of marketing programs, sales effort and sales ability on sales lead conversion performance?
F (Conceptual Framework)	Resource base view of the firm (RBV) and Dynamic Capabilities Theory
M (Research Method)	Quantitative
CA (Contribution to A)	A: Empirical validation of the antecedents of sales lead conversion in complex B2B context P: Guidance for management to improve sale lead conversions and predict revenue from sales lead funnel

II CHAPTER II: LITERATURE REVIEW

This chapter provides a review of the major streams of scholarly literature in the field of sales opportunity funnel management.

II.1 Sales Process and Opportunity Funnel

Industrial firms use a sales funnel or pipeline approach to manage a flow of leads through various stages of the sales process, at which some opportunities are eliminated, while others continue through to successful closure, resulting in revenue for the firm (Söhnchen & Albers, 2010), as depicted in Figure 1. The customer life cycle begins with the critical role of customer acquisition, and while retention is important in certain mature markets, acquisition of new customers is critical for startups, or businesses entering new market segments, geographies, or product categories (Ang & Buttle, 2006). One sales model considers three stages with concrete outcomes, consisting of the generation of new leads, the conversion of these leads to appointments, and the subsequent conversion of the opportunities to closed sales, with the sales closure rate as a fundamental sales performance metric (Smith, Gopalakrishna, & Chatterjee, 2006).

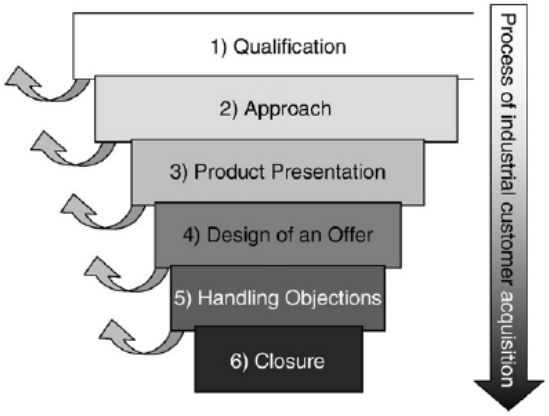

Figure 1 Industrial Sales Pipeline (Söhnchen & Albers, 2010)

II.2 Sales Force Automation

Sales technologies were created to enable sales organizations to better manage customer relationships by automating routine tasks so more time could be spent with, and serving the needs of customers, as well as gathering and disseminating market intelligence within the firm (Ahearne, et al., 2008; Erffmeyer & Johnson, 2001). Sales force automation includes applications such as contact management, time management, and prospect or lead management and analysis (Schillewaert, et al., 2005). Salespersons who utilize IT tools into their sales tasks show improved performance, as well as efficiency and productivity gains (Ahearne, Hughes, & Schillewaert 2007; Rapp, Agnihotri, & Forbes, 2008; Stoddard, Clompton, & Avila, 2002). Some of the factors examined include frequency of technology usage, amount of usage of the full suite of application capabilities, level of integration of multiple technological tools, and usage of the tools for analysis; but causality could not be conclusively demonstrated due to the cross-sectional nature of these studies. Such improvement in sales performance by sales force technology adoption was also supported by Mathieu, Ahearne, and Taylor (2007) and Hunter and Perreault (2006). Schillewaert, et al. (2005) examine the various factors that foster sales automation technology adoption, though they relied on self reported perceived behaviors, rather than actual adoption data. CRM usage has also been linked to firm performance (Boulding, et al., 2005; Krishnan, et al., 2014), and sales force automation significantly benefits relationship selling by enabling increased customer interaction, enhanced relationship quality (Boujena, Johnston, & Merunka, 2009; Eggert & Serdaroglu, 2011), and the meeting of sales objectives (Jelinek, et al., 2006). Technology has also been found to enhance sales performance, as measured by

attainment to sales quotas (Ahearn et al., 2008), lead closure rates, and customer satisfaction (Stoddard, Clompton, & Avila, 2002). Yet many CRM initiatives fail (King & Burgess, 2008) and the success of CRM efforts depends on the sales organizations' desire and capability to adopt and utilize IT tools, especially in B2B sales situations (Ahearne, Hughes, & Schillewaert, 2007). The opportunity funnel for B2B firms is more complex and time consuming than for B2C enterprises (D'Haen & Van den Poel, 2013). Multiple researchers note the need for more empirical studies on the effects of sales force automation (Ahearne, et al., 2008; Hunter & Perrault, 2006), including the need for longitudinal research to prove causality (Boulding, et al., 2005). Much of what is written for sales management practitioners to improve performance is opinion and lacks evidence based research.

II.3 Customer Relationship Management

Customer Relationship Management systems are used to help sales organizations and their support groups to identify and cultivate sales prospects, tailor customer business proposals, counter objections and handle post-sales support issues (Agrawaal, 2003), with the CRM construct elements summarized as relationship initiation, maintenance and termination (Reinhartz, Krafft, & Hoyer, 2004). CRM can assist in managing the complex series of dyadic communications and inter-organizational processes between various members of both the buying and selling teams in industrial firms (Johnston & Bonoma, 1981). It allows sales teams to better manage tasks and improve communication across the organization, enhancing collaboration and sales performance (Rodriguez & Honeycutt, 2011), and improving effectiveness (Sharma & Seth, 2010). This collection and dissemination of customer information, is a core component of

market orientation (Jaworski & Kohli, 1993). To be effective, sales and marketing organizations must align on prospects, assessing their needs while coordinating the response to advance the lead (Sabnis, et al., 2013). Good CRM practices require process management orientation and customer orientation, and when executed well, can create competitive advantage for the firm (Zabiah, Bellenger & Johnston, 2004). Lead follow up by sales was found to be most effective when leads were prequalified, dispensed in a controlled fashion, and handled by experienced and able sales people (Sabnis et al., 2013). The large amount of data captured within CRM systems allows companies to data mine for customer trends and to help predict future revenues based on opportunity conversion statistics, using regression techniques (Ngai, Xiu, & Chau, 2009). A key element of CRM is customer targeting, or finding the prospects within a sales funnel, most likely to become customers (Yu & Cai, 2007). There are many examples of CRM implementation failures in both the commercial and academic literature, with up to 70% of firms implementing CRM either failing outright or not realizing any obvious benefit (Reinhartz, Krafft, & Hoyer, 2004). Certain benefits have been found in the early stages of identifying leads and maintaining customer relationships, but the organizational structure and rewards systems must be in place to sustain a successful CRM deployment (Reinhartz et al., 2004). Sales departments are in the best position to leverage IT advances to build organizational and customer knowledge, and the more effectively they implement and utilize adopted sales force automation tools, the more successful the firm can be (Pullig, Maxham, & Hair, 2002). IT, in the form of CRM, also helps with the challenge of managing and qualifying a large number of leads (Peterson & Krishnan, 2011). CRM has been shown to not only increase opportunity conversion rates, but also

achieve revenue quicker (Erffmeyer & Johnson, 2001; Chen, 2001), and salesperson utilization of CRM has been linked to sales performance in self reported measures (Rodriquez & Honeycutt, 2011).

II.4 Lead Management

Lead management is the process of developing prospects into clients, and the first step of prospecting or identifying potential customers is the most critical in the sales process (Peterson & Krishnan, 2011; Ngai, Xiu, & Chau, 2009). Because retaining a customer is easier than gaining a new customer, the CRM literature largely neglects the topic of customer acquisition in favor of retention or cross-selling (Ang & Buttle, 2006; Söhnchen & Albers; 2010, D'Haen & Van den Poel, 2013). While under-represented in academic literature, management of the sales funnel is a critical practice for companies to convert sales leads to closed sales (Cooper & Budd, 2007). The qualification of leads is essential to protect sales personnel from the onslaught of unproductive leads (Hise & Reid, 1994). If a sales force works at full capacity to follow up, qualify, and attempt to close sales leads, a system that can help to improve lead quality and increase the conversion yield, is the best way to closing more sales (D'Haen & Van den Poel, 2013) An effective sales process drives short-term successes by analyzing sales leads and improving their conversion into sales (Stoddard, Clopton, & Avila, 2002). Many companies employ lower cost support personnel to aid in this effort, by screening the leads, qualifying the prospects and scheduling appointments to allow the sales people to spend more time actually selling to their customers, as that activity is the most crucial to sales productivity and must be tightly managed (Cooper & Budd, 2007; Moncreif & Marshall, 2005). Similarly, time spent pursuing bad leads, caused by improper

qualification and selection of prospects, hampers sales productivity, since this activity cuts into their finite time for selling to customers (D'Haen & Van den Poel, 2013).

II.5 Lead Conversion

The sales process is a numbers game; sufficient leads are required to generate enough conversions to sales, known as the lead conversion rate, to support the company's business plan. Modeling lead conversion is an important task for sales managers to better forecast sales, assign and allocate resources, and structure marketing and promotional efforts. However, there exists no strong academic consensus for a lead conversion theory and few validated quantitative tools to help managers predict the conversion yield of sales leads (Monat, 2011). Such quantification and qualification of leads is an ongoing challenge for sales management. Leads begin as prospects, or potential customers, and if their requirements can be met by the seller's product and they are prepared to purchase, then they are considered a qualified lead or prospect (Jolson, 1988). Leads are typically scored over a continuum until they are considered a customer. One simple sales process models a sequence of stages with discrete outcomes, consisting of lead generation, conversion and closure. They cite closure, or rate of conversion, as a key sales performance metric (Smith, Gopalakrishna, & Chatterjee, 2006). While efforts have been made to model industrial sales lead conversion rates, no models have been empirically validated (Monat, 2011). Firms use data mining techniques, such as logistic regression to better predict which leads will convert and the types of leads that will result in profitable customers (D'Haen, Van den Poel, & Thorleuchter, 2013). Data mining is a sophisticated method of search, using statistical algorithms to uncover patterns within the data, so that predictions can be made (Rygielski, Wang, & Yen, 2002). One of the difficulties in

performing conclusive empirical studies is in gaining access to sufficient industrial sales lead pipeline data.

II.6 Sales Cycle Time

Sales people have a finite amount of time to sell, and yet find many activities competing for their attention, including customer retention and selling more to existing customers, acquiring new customers by following leads, and non-sales administrative activities. The way they ultimately spend their time among these three categories is a significant factor in their performance (Sabnis, et al., 2013). With the increased complexity of industrial business transactions, the average length of the sales cycle continues to increase (Trailer & Dickie, 2006), making lead generation a critical activity. With an estimated 20% of sales person time spent on prospecting, having a robust flow of new leads can offer higher quality prospects for sales to pursue (Trailer & Dickie, 2006). The research of Peterson and Krishnan (2011) did not support accelerated sales cycle times as a result of effective CRM use, suggesting that customers, not sales processes, will dictate the decision timing. However, they allowed that cycle times, in the case of complex multi-cycle sales efforts, may be accelerated by CRM. One of the purported benefits of Sales force technology (SFT), such as CRM, is to make sales and marketing personnel more effective and efficient in the sales process (Sharma & Seth, 2010).

II.7 Lead Sources

The sales forces of industrial companies require proactive approaches to garner leads from multiple sources (Hise & Reid, 1994), which can fall into one of three general categories. First, there are those leads generated by the company, typically the marketing

department. Second is when the prospects initiate the contact on their own. Finally, the salesperson can initiate their own leads through their individual efforts (Jolson, 1988). This prospecting effort can be very time consuming and nonproductive, robbing the sales person of critical time needed to close sales with qualified prospects (Jolson & Wotruba, 1992). Managers that utilize CRM in this effort to qualify leads and manage prospects will achieve improved sales outcomes, including the conversion of more leads to customers (Peterson & Krishnan, 2011). Marketing has an important part in securing new, and retaining existing, customers to drive firm success (Rust, et al., 2004). By leveraging integrated marketing communications (IMC), marketing invests in coordinated marketing messages, using various media, to enhance the effectiveness of each other (Smith, Gopalakrishna, & Chatterjee, 2006). Each such message or encounter with the customer is a unique chance for the company to sell itself, buttress its product offerings and either enhance or damage customer satisfaction, and can be optimized with technology utilization (Bitner & Brown, 2000).

II.8 Sales Effort and Ability

Marketing leads are frequently not followed up by sales (Sabnis, et al., 2013), so sales effort is a key variable to examine. Sales effort has been measured by self reported terms, including overall effort in completing sales tasks, the number of hours worked and number of sales calls made (Brown & Peterson, 1994). For best performance, effort, or working hard, must be augmented by working smart, or working in an adaptive fashion. This comes from developing and using knowledge of various sales situation (Sujan, Weitz, & Kumar, 1994), suggesting experience will enhance success-producing ability. Management performance ratings of sales people tend to overweight effort in their

appraisals, and underweight task difficulty (Brown, Jackson, & Mowen, 1981), but these appraisals can be augmented with objective criteria. There are many unbiased sales success constructs, with the measure of sales to quota achievement being perhaps the most objective (Ahearne, et al., 2008). Many researchers, however, have used self-reported data of certain factors, such as customer retention and customer satisfaction, as success metrics for customer relationship performance (Jayachandran, et al., 2005), or achievement of sales objectives (Jelinek, et al., 2006).

II.9 The Resource Based View of the Firm and Dynamic Capabilities

Many potential factors come into play which determine the success of a company, and specifically of a sales organization, to perform in the market place. The advantages of a company may include its sales organization, its marketing capability, and its various systems and processes. This resource based view of the firm (Wernerfelt, 1984) suggests that the combination of these factors are what provides competitive advantage for companies. Barney (1991) suggests that the resource based view compliments earlier external environment driven perspectives of strategy by leveraging a firm's unique resources, going on to define the criteria for competitive advantage sustainability as value, rareness, imitability and substitutability. These resources should be adaptive, particularly in fast-paced markets, in what are know as dynamic capabilities (Teece, 1997). Technology by itself is insufficient. Zablah, Bellenger & Johnston argue that CRM is a technology, a strategy, a process, a philosophy and a capability, all of which work together to provide the firm advantages in the market (2004). Hunt (1997) expands the concept of resources to include anything having a capacity to enable, including relationships, in the resource-advantage theory of competition. Other resources can

include employee training. A link was discovered to exist between training and performance; the more knowledge documents a salesperson reads, the more likely they will exceed their sales quota. (Ko & Dennis, 2004). Training was also found to be a critical factor in the initial success of CRM implementations (Speier & Venkatesh, 2002). Citing the resource based view (RBV) of the firm, Rapp, Trainor and Agnihotri (2010) note that IT alone is insufficient for success, and must be complimented by all of a firm's assets, knowledge and processes to be truly effective. Strong organizational backing of the CRM system can result in the closure of more sales leads by the sales force through allowing them to more effectively address and resolve customer issues (Peterson & Krishnan, 2011). Such a holistic set of marketing capabilities, or customer orientation, leads to improved customer relationships, which in turn can boost customer loyalty, and avoid the high failure rate of CRM implementations.

II.10 Summary of Research Gaps

While sales lead management process and performance is extensively researched, a need exists for more empirical studies around CRM implementations and sales funnel activity (Ahearne, et al., 2008; Hunter & Perrault, 2006). This may be due, in part, to the difficulty of obtaining detailed sales funnel data for analysis, and particularly data that is complete, as many companies may lack the rigor and discipline of comprehensive compliance to sales funnel data entry and maintenance by field sales staff members, causing CRM initiatives to fail (King & Burgess, 2008). Much of the topical sales research is on business-to-consumer activities, and the complex industrial B2B situation is less understood (Yu & Cai, 2007). In particular, few tools or theories regarding industrial sales lead conversion are available in the literature (Monat, 2011). With the

cycle time of industrial sales opportunities lengthening (Trailer & Dickie, 2006), factors effecting accelerated industrial sales cycles have been suggested by some (Erffmeyer & Johnson, 2001; Chen, 2001) but have not been definitively identified, suggesting that the sales cycle times can only be influenced by the customer (Peterson & Krishnan, 2011). This study addresses several of these research deficiencies by analyzing the detailed sales funnel database of a large industrial technology company, to examine factors effecting sales lead management and conversion performance. This is summarized below in Table 2.

Table 2 Current Research Gaps and Study Focus

Research Gaps	Study to Address
Empirical sales funnel studies lacking	Access to extensive company sales funnel data base
Industrial sales process relative to lead management less understood than consumer	Study focuses on an industrial company with rigorous CRM / Funnel deployment
Lack of tools and theories to predict sales lead conversion	Research question to address this specifically
Factors influencing industrial sales cycle time indeterminate	Time recorded events allows for the study of sales cycle time

III CHAPTER III: RESEARCH METHODOLOGY

III.1 Introduction

This research explored critical factors that affect sales lead conversion performance, as measured by yield and cycle time. Specifically, the sales lead funnel of a large industrial B2B company was analyzed and sales person effort and ability characteristics were evaluated. The specific marketing programs associated with lead identification were also considered. The variables indicating sales effort were from self-reported time surveys revealing the percentage of time spent on selling versus non-selling activities, and the number of sales calls made per week. Sales ability was indicated by years of industry experience, sales performance to quota measures, and performance review ratings by managers. Leads can come from sales people themselves, customers contacting the company, or be generated by one of several specific defined marketing programs.

III.2 Background

This research was executed with the cooperation and data of a multibillion-dollar public semiconductor company. Following a recent merger, and with the development of an expanded broad market product portfolio, the company was dramatically expanding its customer base to over 20,000 companies. They were shifting from being primarily a major account focused sales organization to becoming a broad market supplier. The company sells technical industrial integrated circuits, in a complex sales cycle characterized by long cycle times, with multiple decision makers within each customer. The company has a very disciplined culture around CRM and Lead Management,

utilizing "killer software," which times out and temporarily blocks critical applications for non-compliance, to drive system usage to produce a clean and up-to-date database, providing a unique ability to analyze sales pipeline results empirically. They have devised several marketing vehicles or lead sources to create, capture and nurture leads and have captured over 80,000 opportunities in their sales funnel, taxing the sales team's ability to follow up. Leads can be uncovered or discovered by sales, or through one of a number of marketing programs, and begin as prospects. Once they are nurtured and qualified they become a marketing qualified lead (MQL). A sales accepted lead (SAL) is then investigated and if customer interest in a product is discovered, the lead becomes an active opportunity. The opportunities are then managed through the sales process until they are either won and moved to production, or lost/cancelled. The lead management process is outlined below, in Figure 2.

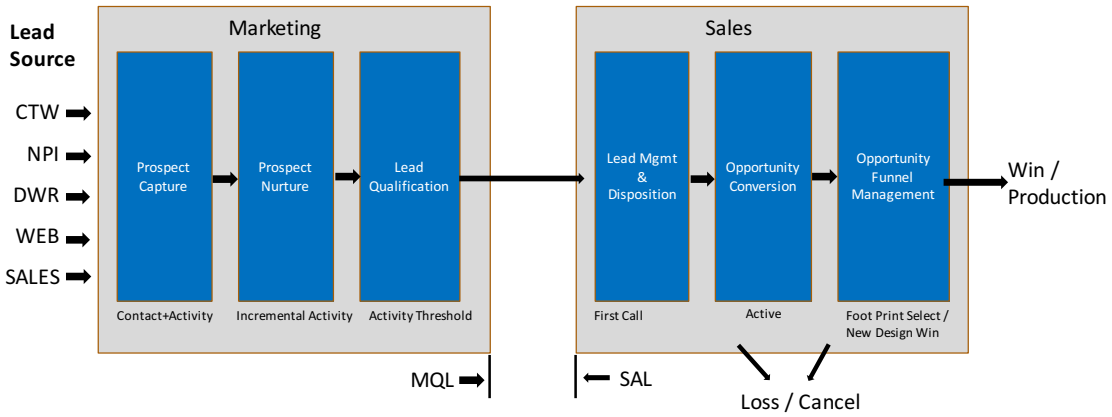

Figure 2 Company Lead Management Process

III.3 Research Design

The study utilized regression and other statistical analysis tools to investigate the impact of sales effort and sales ability on resultant sales lead management performance,

using the opportunity as the unit of analysis. Additionally, it examined the lead management performance by various sources of leads. The conceptual research model is shown in Figure 3, which depicts indicators of sales effort and sales ability each positively influencing sales lead management performance, as well as describing the sales lead management performance by various lead source.

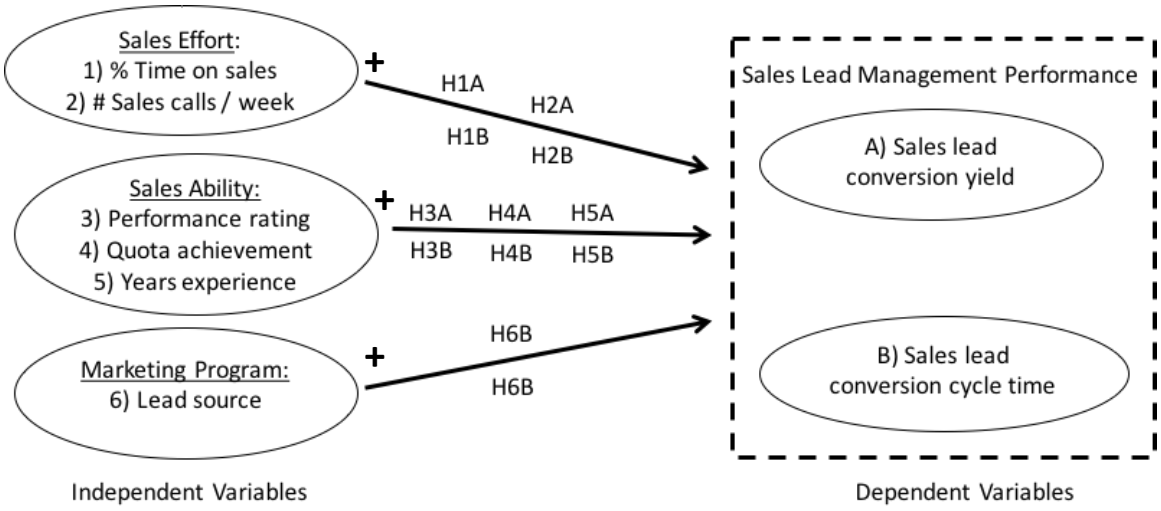

Figure 3 Research Model

III.4 Dependent Variables

Consideration was first given to the construct of sales lead management performance, indicated by the dependent variables of sales lead conversion yield and sales lead conversion cycle time. As previously stated, understanding the antecedents to increase the percentage of leads in the opportunity funnel that convert to wins can make a sales force more efficient at producing sales for the company. Similarly, factors that can be shown to reduce the cycle time of the lead conversion process will allow the sales

organization to convert more leads in the same amount of time. Two distinct dependent variables to define sales lead management performance were analyzed:

1) Sales lead conversion yield: The percent of the total closed opportunities in the funnel that converted to wins. For purposes of this study, a win means the end customer has selected the proposed device and is actively designing it into their production system. The term at the company for this stage is "Foot Print Select" or FPS. Following this stage, the opportunity converts to "New Design Win" or NDW, when first orders are placed for the device. Finally, "Production" is the stage where the device is shipping to the customer in full production mode. Thus any of the statuses: FPS, NDW or Production, signify a win, with FPS being the earliest indicator. The unit of analysis in this study is the opportunity, and only opportunities that have closed, meaning they have either resulted in a win or a loss/cancel, are analyzed. Opportunities that are currently active in the sales funnel are ignored, since their eventual status can not be determined. Inactive opportunities are also ignored. Closed opportunities were coded as 0 for loss/cancel or 1 for win.
2) Sales lead conversion cycle time: Time in days from an opportunity become active until it is converted to a win. Each stage of the opportunity funnel is date-stamped. Therefore, the time from an opportunity becoming active, until the time it is a win can be easily computed. This time frame is referred to as the lead conversion cycle time and is an important measure of performance as it can tell managers how efficient and effective the selling team is at closing opportunities. For each win, a sales lead conversion cycle time was computed, by taking the difference, in days, between the

opportunity active date and win date. For leads from designated marketing programs, a discovery date is also captured, allowing us to measure the time from initial lead discovery to becoming a qualified active opportunity, and on to a win.

III.5 Independent Variables

Independent variables indicative of sales effort and ability were chosen. Sales effort was indicated by two variables:

1) Number of sales calls per week: The self-reported number of sales calls a salesperson makes to customers, on average, each week, from an internal field sales survey.
2) Percent Time Allocation: The self-reported percent of the sales person's time spent on prospecting for new customers, identifying new opportunities at existing accounts, and preparing for and conducting sales calls. This is a continuous variable measured as a percentage.

Sales ability will be indicated by examining three independent variables:

3) Performance Rating: Each person's performance in the sales organization is assessed annually through a human resource administered performance management process. Each is given an overall numeric rating from their manager, ranging from (1) - "Doesn't Meet Expectations" (DM) to (5) - "Exceeds All Expectations" (EA). This ordinal variable is a subjective performance measure assessed by managers.
4) Quota Achievement: This is a quantitative measure of the sales person's percent attainment to their assigned annual revenue quota, for the previous year. The

higher the percentage, the better the sales person performed against his or her assigned sales target. This continuous variable is reported as a percentage.

5) Years Experience: This variable will be recorded as the number of years of experience each sales person has within the industry, a record that is maintained by the human resources department.

Finally, the researcher examined sales lead conversion performance by the marketing program that generates the lead.

6) Lead Source: This is a nominal variable to record which of several various defined activities is utilized to first capture an opportunity, or prospect and introduce it into the system. These events could include a marketing outreach campaign, or capturing a prospect that contacts the company through various means. Leads were classified as either High or Low Engagement. High engagement leads include targeted customers for new products, or replications of a similar win, and having customers attend a technical workshop on the product. Low engagement leads include responding to advertisements, attending a tradeshow, coming through a purchased marketing list, or visiting the company website. The defined marketing programs designated in the CRM as lead sources are shown below in Table 3, followed by the summary of variables in Table 4.

Table 3 Marketing Program Lead Sources

Marketing Program	Description	Engagement
Advertisement (AD)	Prospects responded to a company sponsored advertisement.	Low
Customer Technical Workshops (CTW)	Prospects have attended a company sponsored workshop to learn technical details about a product.	High
Design Win Replication (DWR)	Prospects were identified as being similar to other known customer successes.	High
Trade Show or Industry Event (TS/EVT)	Prospect has visited a company exhibit at an event and provided their details.	Low
Marketing List (List)	Prospects were identified through a purchased contact list.	Low
New Product Introduction (NPI)	Prospects are identified as potential targets for a new product.	High
Referral (Ref)	Prospects are referred to the company by another party.	-
Web	Prospect has self selected the company by visiting the company website and registering themselves.	Low
Other	Prospects that do not come from an identified marketing program, generally identified by sales.	-

Table 4 Summary of Variables

Variable	Type	Description	Source
Yield	Dependent Variable	Sales Lead Conversion Yield: The percentage of closed opportunities that converted to wins (vs. loss/cancel)	Company CRM Database
Cycle Time	Dependent Variable	Sales Lead Conversion Cycle Time: Number of days until an active opportunity converts to a win	Company CRM Database
Sales Calls Per Week	Independent Variable; A measure of Sales Effort	The number of sales calls a salesperson reports to make per week, on average	Employee Survey
Pct Sales Time	Independent Variable; A measure of Sales Effort	The percentage of a salesperson time each week spent on prospecting, identifying opportunities, preparing for & conducting sales calls	Employee Survey
Perf Rating	Independent Variable; A measure of Sales Ability	An annual salesperson (1-5) rating assigned by managers to assess performance	Company HR Records
Quota Pct	Independent Variable; A measure of Sales Ability	The salesperson's percent attainment of previous year's revenue quota	Company Sales Operations Records
Years Experience	Independent Variable; A measure of Sales Ability	Number of years of experience the salesperson has within the industry	Company HR Records
Lead Source	Independent Variable	The marketing lead generating program identified as the source of a lead	Company CRM Database

III.6 Data Sources and Hypotheses

The dependent variables used to describe sales lead conversion performance were extracted from the company's proprietary lead management database. Each opportunity is an individual record within this database with a defined progressive status or milestone as shown in Table 5. The database extract contained over 80,000 entries, made between 2009 and the end of 2015. Data was cleaned for obvious outliers, and several fields were

coded to enable statistical analysis. Individual identifiers were removed prior to receipt and coded to allow the survey results and individual records to be merged into the master data file, taking every effort to ensure confidentiality.

Table 5 Lead Management Milestones

Lead Management Database Milestone	**Description**
Discovery	The initial raw lead.
Active	Sales person is working on the lead and the customer has a need.
Footprint Select ("Win")	Decision made by the end customer to select the product and they are actively designing it into a funded production system.
New Design Win	The customer design has completed and first $1000 of revenue has been achieved.
Production	The product is in full production with the end customer.
Lost / Cancelled	At any time in the process that the customer has elected not to use the product and the opportunity goes inactive.

With the CRM dataset, dates are recorded for each milestone such that time between milestones, and total time from active to win (sales lead conversion cycle time), could be computed. Furthermore, the number of opportunities that have reached win, as a percent of the total, was used to derive sales lead conversion yield. For purposes of this research, the analysis was limited to closed leads that have either transitioned to win (FPS, NDW or Production) or have been lost/cancelled; approximately 70,000 entries. This allowed sales lead conversion yields to be computed and, since each stage within the CRM database is date-stamped, sales lead conversion cycle times as well. Sales lead conversion yield and sales lead conversion cycle time represent our dependent variables in this study, and collectively represent the construct of sales lead management performance.

III.7 Sales Effort

Results from a company administered survey, used to evaluate their existing sales model, were utilized as indicators of sales effort. The survey was administered by the company in February, 2016, to all members of the sales organization, approximately 400 people, and 156 people responded. Fifty-eight of the approximately 100 direct field sales people with sales opportunity funnel responsibility responded. Responses were coded to protect identities. Respondents were asked to assess the percent of time spent doing various activities, including:

- Prospecting or calling on new customers
- Cross selling or finding new opportunities at existing customers
- Preparing and conducting sales calls
- Post sales activities
- Customer support issues
- Meeting or working with partners (distributors or manufacturer reps)
- Training
- Administrative and documentation activities

It was expected that sales people that spend more time in the first three selling activities will convert a greater percentage of their opportunities and have faster average opportunity conversion times than those sales people that get burdened with more post sales, support, unrelated meetings, training and administrative work. Survey responses were coded and linked to the opportunity funnel data, providing sales time allocation data for each opportunity linked to a survey respondent. The first two hypotheses are thus:

> H1A: The greater the percentage of time a salesperson spends on prospecting, cross-selling, and preparing or conducting sales calls, the higher the sales lead conversion yield.
>
> H1B: The greater the percentage of time a salesperson spends on prospecting, cross-selling, and preparing or conducting sales calls, the shorter the sales lead conversion cycle time.

Respondents to the same survey indicated how many sales calls they made, on average, each week. It is assumed that more sales calls made would likely result in more leads converted in total, but the percentage of opportunities won was examined here. It is expected that conversion yield will increase with more sales calls, as the sales person will be better positioned, vis-à-vis the competition, by making more sales calls, and will thus improve the chances of converting opportunities. Peterson and Krishnan (2011) found that the customers, not the sales person actions, determine the speed of the sales cycle. However, that study allowed that complex industrial sales may be different. This study hypothesized that more sales calls will result in faster cycle times, as the more available and present the sales person is to the customer, the more likely that they can remove barriers quickly and reduce the sales conversion cycle time. Therefore, the next two hypotheses are:

> H2A: The greater the number of average sales calls made by a sales person per week, the higher the sales lead conversion yield.
>
> H2B: The greater the number of average sales calls made by a sales person per week, the shorter the sales lead conversion cycle time.

The sales ability measures consist of subjective and objective performance criteria, along with experience. Human resource records contain the subjective annual performance management rating for each employee. 2014 HR records were made available for this research for all 400 people in the sales organization and linked to the master data file without individual identity information. The assumption here is that sales people, highly rated by their managers, will be better at moving opportunities through the sales process toward successful closure, and so the next hypotheses are:

H3A: The greater the performance rating of a salesperson, the higher the sales lead conversion yield.

H3B: The greater the performance rating of a salesperson, the shorter the sales lead conversion cycle time.

Another important sales ability variable is performance to quota. This objective measure of how well a sales person performs in achieving revenue goals is a basic and instrumental sales performance metric (Rapp, Agnihotri, & Forbves 2008; Sabnis, et al., 2013; Ahearne, et al., 2008). Sales quota achievement for each sales person in the organization, from the previous year, was made available for this research in the form of reports from the company's sales operations department. This data was also coded to allow it to be merged to the master file while protecting individual identities. The hypotheses for quota achievement are:

H4A: The greater the prior year quota achievement of a salesperson, the higher the sales lead conversion yield.

H4B: The greater the prior year quota achievement of a salesperson, the shorter the sales lead conversion cycle time.

Additionally, it is expected that years of experience will enable a sales person to more effectively manage his sales funnel, better qualify potential leads, and improve the sales funnel performance. The number of years of experience in the semiconductor sales for all employees of the sales organization was made available for this research from the company's human resources department.

H5A: The more years of experience a salesperson has, the higher the sales lead conversion yield.

H5B: The more years of experience a salesperson has, the shorter the sales lead conversion cycle time.

The lead source variable, or the description of the marketing program that first captured the prospect, was extracted from the CRM lead management database. Some activities tend to be related to a higher level of engagement and commitment from the customer than others. For example, attending an all day customer technical workshop, would show more commitment and potential willingness to buy, than visiting a booth at a tradeshow. Therefore, a differences in the lead conversion performance based on the type of lead is to be expected. The most effective marketing programs for generating high quality leads, will most likely most often convert to sales.

> H6A: Leads from different sources will have different sales lead conversion yield.
>
> H6B: Leads from different sources will have different average sales lead conversion cycle time.

III.8 Summary

To summarize, the overall research question and hypotheses are stated below in Table 6 and a summary of the data sources in Table 7. Note that the number of data points, N, varied with each statistical analysis performed, as various data points are used for different tests, depending on the specific items we are measuring in each test. For example, when measuring lead conversion cycle time, only opportunities that have converted to wins are considered.

Table 6 Summary of Research Question and Hypotheses

RQ:	What are the effects of marketing programs, sales effort and sales ability on sales lead conversion performance?
H1A	The greater the percentage of time a salesperson spends on prospecting, cross-selling, and preparing or conducting sales calls, the higher the sales lead conversion yield.
H1B	The greater the percentage of time a salesperson spends on prospecting, cross-selling, and preparing or conducting sales calls, the shorter the sales lead conversion cycle time.
H2A	The greater the number of average sales calls made by a sales person per week, the higher the sales lead conversion yield.
H2B	The greater the number of average sales calls made by a sales person per week, the shorter the sales lead conversion cycle time.
H3A	The greater the performance rating of a salesperson, the higher the sales lead conversion yield.
H3B	The greater the performance rating of a salesperson, the shorter the sales lead conversion cycle time.
H4A	The greater the prior year quota achievement of a salesperson, the higher the sales lead conversion yield.
H4B	The greater the prior year quota achievement of a salesperson, the shorter the sales lead conversion cycle time.
H5A	The more years of experience a salesperson has, the higher the sales lead conversion yield.
H5B	The more years of experience a salesperson has, the shorter the sales lead conversion cycle time.
H6A	Leads from different sources will have different sales lead conversion yield
H6B	Leads from different sources will have different average sales lead conversion cycle time.

Table 7 Data Sources

N	Data Description	Source	Time Period
83,236	Total opportunities in the database for analysis	Company CRM Database	2009-2015
70,623	Closed opportunities (win or loss/cancel status)	Company CRM Database	2009-2015
47,780	Closed opportunities served by direct company sales people (rest by independent reps and distributors)	Company CRM Database	2009-2015
47,734	Direct closed opportunities matched to sales person HR records	Company CRM Database	2009-2015
34,330	Direct closed opportunities matched to company time allocation survey	Company CRM Database	2009-2015
398	Total people in the sales organization	Company HR Records	Dec, 2015
156	Sales organization survey respondents (Time allocation & Sales calls per week)	Company Survey	Feb, 2016
106	Direct sales people with opportunity funnel responsibilities (Coded HR Rating, Quota Performance & Years Experienced obtained)	Company HR Records	Dec, 2015
57	Direct sales people with opportunity funnel responsibilities that responded to time survey	Company Survey	Feb, 2016

IV CHAPTER IV: ANALYSIS AND RESULTS

The purpose of this chapter is to describe the analytical framework used and the methods applied in the study, along with the results of the analysis.

IV.1 Data Analysis

Throughout the data management process every effort was made to ensure confidentiality of the participants. Following the cleaning and merging of the datasets, the data was carefully screened for nonsensical outliers, such as averaging 100 sales calls per week, or winning an opportunity before it was discovered (negative cycle times), as multiple regression is extremely sensitive to outliers. Descriptive statistics, correlations and regression techniques were utilized to test the hypotheses, utilizing IBM SPSS v23.0, with the dependent and independent variables described previously.

IV.2 Summary descriptive statistics of key variables

Descriptive statistical analysis was also used to test the assumptions, as these measures of mean and standard deviation are useful to represent sets of numbers to examine relationships (Pallant, 2013). Of the total 70,623 closed opportunities, the conversion yield to wins was 38% (38% of all closed opportunities were wins as opposed to losses or cancelled), as shown below in Table 8.

Table 8 Total Sales Lead Conversion Yield

Opp Status	Frequency	Percent
Losses	43,673	62%
Wins	26,950	38%
Total	70,623	100%

Of the 26,950 wins 21,499 had valid captured cycle times, or the time lapse in days from active status to FPS, with a mean of 127 days, or about 18 weeks, a normal cycle time for complex semiconductor products, with some varying widely from that figure (Standard Deviation of 157).

The sales person characteristic independent variables for effort and ability were then evaluated with descriptive statistics. Some variables were then examined for controls including whether the opportunity was covered by a direct company sales person, or an independent representative or distributor, the geographic region of the opportunity, the product division, and the customer category. These are described below, along with their frequencies, in Table 9. Analysis of the first ten hypotheses all involve direct sales person characteristics, so only the subset of opportunities covered by direct sales (Dir) was utilized except for the final evaluation of lead source.

Table 9 Subgroup Definitions and Descriptives

Control Variable	Description	Variable	Freq	Pct	Yield	Cycle Time	CT Std Dev
Dir: Sales Person Type	Dir is a full time employee, while Rep is an independent representative.	**Rep**	22,844	32.2%	45%	152	192
		Dir	47779	67.3%	35%	111	127
Geo: Geographic Region	The region of the opportunity: Americas, Asia, Europe, Japan or Korea	**AMR**	18453	26.0%	45%	132	167
		APAC	29146	41.1%	28%	102	101
		EMEA	12654	17.8%	49%	180	215
		JAP	7081	10.0%	42%	98	95
		KOR	3289	4.6%	38%	76	78
Div: Product Division	Product Division A, B, C, D	**A**	179	0.3%	31%	119	136
		B	11923	16.8%	30%	133	160
		C	25048	35.3%	52%	126	161
		D	33472	47.2%	31%	126	150
Cust Cat: Customer	Cat A: Top ~200 assigned key customers, >$1M rev/yr potential (75% of rev.) Cat B: <$200K yr, unassigned customers. (25% of rev.)	**Cat B**	49188	69.3%	34%	135	169
		Cat A	21435	30.2%	47%	115	136

IV.3 Analysis of Sales Lead Conversion Yield

With regards to the research question, sales effort and ability factors effecting sales lead conversion yield were considered, which make up hypotheses H1A, H2A, H3A, H4A and H5A. The correlations among the variables were evaluated, in Table 10, below, only considering opportunities associated with direct company sales people (the population for which there is ability data).

Table 10 Sales Lead Conversion Yield Correlations

Correlations	Yield	Sales Calls/Wk	PCT Sales Time	Perf Rating	Quota Pct	Yrs Exp	Lead Engage	Cust Cat
Yield	1							
Sales Calls/Wk	-.090**	1						
PCT Sales Time	-.030**	.245**	1					
Perf Rating	.024**	-.128**	.240**	1				
Quota Pct	-0.003	.374**	.447**	.166**	1			
Yrs Exp	.089**	-.172**	-.343**	-.091**	-.290**	1		
Lead Engage	.180**	-.068**	-.022*	.089**	.035**	.101**	1	
Cust Cat	.149**	-.149**	-.025**	.133**	-.194**	.161**	.024*	1

** Correlation is significant at the 0.01 level (2-tailed)
* Correlation is significant at the 0.05 level (2-tailed)

It was noted that all of the independent variables, except for quota performance, showed small but significant correlations with sales conversion yield, though the sales effort variables negatively correlated. The variables were evaluated for multicollinearity by noting no correlations among the independent variables, and by running collinearity diagnostics with no assumption violations.

Direct logistic regression was performed to assess the impact of a number of factors on the likelihood of an active opportunity converting to a win. The model contained dummy control variables for geography, to show the relative impact on yield from Asia Pacific, Europe, Japan and Korea as compared to the Americas, and for

product division, to show the relative impact on yield from Divisions A, B and D relative to Division C. The model also contained control variables for customer categorization (Cat A or Cat B), as well as the independent variables, Sales Calls / Wk, PCT Sales Time, Perf Rating, Quota PCT, Years of Experience and Lead Engagement. The full model containing all predictors was statistically significant x^2 (14, N = 8980) = 498.55, $p < .001$, indicating that the model was able to distinguish between wins and losses. The model as a whole explained between 5.4% (Cox and Snell R square) and 8.6% (Nagelkerke R square) of the variance in lead conversion yield, and correctly classified 80.3% of cases. As shown in Table 11, concerning geographic region, only Japan was significant, relative to the Americas. Both Divisions B and D were significant relative to Division A (which had no significance due to its very small number of DivA cases). Customer categorization was also significant as were the independent variables in the model. Two controls, Product Division and Customer Categorization and the three independent variables of Sales Calls / Wk, PCT Sales Time, and Lead Engagement made a unique statistically significant contribution to the model. The strongest predictor of lead conversion yield was Lead Engagement, recording an odds ratio of 3.20. This indicated that leads from high engagement lead sources were over 3 times more likely to convert to a win than those from low engagement sources. Opportunities with Cat A accounts, with an odds ration of 1.74 were 1.7 times more likely to convert to wins as Cat B accounts. The sales effort variables had nominal effects.

Table 11 Logistic Regression Predicting Sales Lead Conversion Yield

Variable	B	S.E.	Wald	df	Sig.	Odds Ratio	95% C.I.for Odds Ratio	
							Lower	Upper
APAC	-0.78	0.50	2.49	1	0.11	0.46	0.17	1.21
EMEA	0.07	0.54	0.02	1	0.90	1.07	0.37	3.11
JAP	-0.95	0.51	3.51	1	0.06	0.39	0.14	1.05
Kor	-0.97	0.95	1.03	1	0.31	0.38	0.06	2.46
DivA	-20.17	16368.06	0.00	1	1.00	0.00	0.00	.
DivB	-0.62	0.08	61.10	1	0.00	0.54	0.46	0.63
DivD	-0.67	0.06	110.78	1	0.00	0.51	0.45	0.58
Cust Cat	0.55	0.07	55.26	1	0.00	1.74	1.50	2.01
Sales Calls/Wk	-0.01	0.00	13.96	1	0.00	0.99	0.98	0.99
PCT Sales Time	0.01	0.00	12.16	1	0.00	1.01	1.00	1.01
Perf Rating	0.02	0.04	0.17	1	0.68	1.02	0.94	1.09
Quota Pct	0.00	0.00	0.39	1	0.53	1.00	1.00	1.00
Yrs Exp	0.00	0.01	0.01	1	0.93	1.00	0.99	1.01
Lead Engage	1.16	0.07	274.55	1	0.00	3.20	2.79	3.67
Constant	-0.54	0.54	1.00	1	0.32	0.58		

The summary of the findings regarding sales lead conversion yield are contained in Table 12 below.

Table 12 Sales Lead Conversion Yield Hypotheses Summary Results

No.	Hypothesis	Result
H1A	The greater the number of average sales calls made by a sales person per week, the higher the sales lead conversion yield.	This hypothesis was *not* supported, as Sales Calls / Wk made a negligible (though significant) contribution to the model.
H2A	The greater the percentage of time a salesperson spends on prospecting, cross-selling, and preparing or conducting sales calls, the higher the sales lead conversion yield.	This hypothesis was *not* supported, as PCT Sales Time made a negligible, though significant, contribution to the model.
H3A	The greater the performance rating of a salesperson, the higher the sales lead conversion yield.	This hypothesis was *not* supported. Perf Rating did not make a unique statistically significant contribution to the model.
H4A	The greater the prior year quota achievement of a salesperson, the higher the sales lead conversion yield.	This hypothesis was *not* supported. Quota PCT did not make a unique statistically significant contribution to the model.
H5A	The more years of experience a salesperson has, the higher the sales lead conversion yield.	This hypothesis was *not* supported. Yrs Exp did not make a unique statistically significant contribution to the model.
H6A	Leads from different sources will have different sales lead conversion yield	This hypothesis was supported as the model showed the lead engagement level was a significant predictor of sales lead conversion yield.

IV.4 Analysis of Sales Lead Cycle Time

The factors effecting sales lead cycle time were next evaluated, namely hypotheses H1B, H2B, H3B, H4B and H5B. Again, the analysis begins with an examination of the correlation table, for cycle time, in this case selecting just cases of opportunities that have converted to wins, with the results shown below in Table 13.

Table 13 Sales Lead Conversion Cycle Time Correlations

Correlations	Cycle Time	Sales Calls/Wk	PCT Sales Time	Perf Rating	Quota Pct	Yrs Exp	Disc Time	Lead Engage	Cust Cat
Cycle Time	1								
Sales Calls/Wk	-.104**	1							
PCT Sales Time	-.131**	.250**	1						
Perf Rating	-.022*	-.094**	.193**	1					
Quota Pct	-.098**	.325**	.495**	.121**	1				
Yrs Exp	.070**	-.135**	-.392**	-.103**	-.330**	1			
Disc Time	.589**	-.072**	-.069**	-0.014	-.066**	.045**	1		
Lead Engage	-.055*	0.02	0.006	.098**	.064**	.121**	0.002	1	
Cust Cat	-.026*	-.102**	.038**	.155**	-.145**	.085**	-.062**	0.021	1

** Correlation is significant at the 0.01 level (2-tailed)
* Correlation is significant at the 0.05 level (2-tailed)

These results show that the first four independent variables (Sales Calls/Wk, PCT Sales Time, Perf Rating, Quota Pct) all correlate to shorter cycle times, while years of experience correlates to longer cycle times. Significance is at the 0.01 level for all but performance rating, which is at the 0.05 level. A very strong correlation of discovery time with cycle time was noted, indicating the faster a lead is qualified the faster it will convert to a win. Lead engagement and customer category both correlated to cycle time at the 0.05 level. Multiple regression was then performed to assess the ability of sales effort, ability, and lead source, to predict sales lead conversion cycle time, while controlling for geography. Preliminary analyses were conducted to ensure no violation of normality, linearity, multicollinearity and homoscedasticity. The two groups of independent variables representing effort and ability were first entered, followed by the level of lead engagement, the new variable of interest, discovery to active time, and the control variables. Because there was no meaningful contribution to the model from product division or customer category, those variables were dropped from the model, so that only geography was controlled for, through the utilization of dummy variables for each geographic region. The results are summarized in in Table 14.

Table 14 Sales Lead Conversion Cycle Time Regression

Regression	Adj R Sq	R Sq Change	Sig
PCT Sales Time	0.017	0.017	0.000
+Sales Calls/Wk	0.022	0.005	0.000
+Quota Pct	0.023	0.000	0.050
+Lead Engage	0.023	0.000	0.526
+Disc Time	0.358	0.335	0.000
+Geo	0.365	0.008	0.000
Coefficients	β	t	Sig
PCT Sales Time	-0.040	-3.682	<0.001
Sales Calls/Wk	-0.021	-2.187	0.029
Quota Pct	-0.004	-0.411	0.681
Lead Engage	-0.017	-2.018	0.044
Disc Time	0.573	66.67	<0.001
Japan	-0.098	-7.861	<0.001
APAC	-0.131	-9.271	<0.001
KOR	-0.041	-4.739	<0.001
AMR	-0.036	3.367	0.001

Sales effort indicators, percent of time spent on sales activities (β = -0.040, p < .001), and calls per week (β = -0.021, p = .029) combined to explain 2.2% of variance, F (2, 8796) = 101.65, p < .001, while the only sales ability variable used by the model, quota performance (β = -0.004, p = .681) was not significant. The total variance of sales lead conversion cycle time explained by the model as a whole was 36.5%, F (9, 8789) = 562.48, p < .001. Years of experience and salesperson performance rating did not contribute to explained variance of cycle time. As pointed out earlier, the time to qualify a lead to move it from discovery to active is highly correlated with lead conversion cycle time, and provides an explained variance of 33.5%, F change (1, 8793) = 4585.76, p < .001l, the vast majority of the models explained variance. Lead engagement level (β = -.017, p = .044) explained virtually none of the variance of cycle time, F change (1, 8794)

= 0.401, p = .526. This lack of significance is possibly due to the high number of non-classified cases of lead engagement. For this reason, a separate analysis of lead engagement was performed and is discussed in the following section. In the model, geography explained 0.8% of the variance, F change (4, 8789) = 26.15, p < .001, with the beta values for the dummy variables of geographic regions shown in the table. The analysis finds support for the effects of sales effort on sales lead conversion performance, but insignificant support for the sales ability factors, as summarized in Table 15.

Table 15 Sales Lead Conversion Cycle Time Hypotheses Summary Results

No.	Hypothesis	Result
H1B	The greater the number of average sales calls made by a sales person per week, the shorter the sales lead conversion cycle time.	This hypothesis was supported, with the number of sales calls explaining 0.05% of the cycle time variance (β = -0.021, p < .001)
H2B	The greater the percentage of time a salesperson spends on prospecting, cross-selling, and preparing or conducting sales calls, the shorter the sales lead conversion cycle time.	This hypothesis was supported with explained variance of 1.7% (β = -0.040, p = .029).
H3B	The greater the performance rating of a salesperson, the shorter the sales lead conversion cycle time.	This hypothesis was *not* supported. No meaningful relationship exists between the performance rating of the salesperson and the sales lead cycle time.
H4B	The greater the prior year quota achievement of a salesperson, the shorter the sales lead conversion cycle time.	This hypothesis was *not* supported, based on the insignificance of the relationship (β = -0.004, p = .681).
H5B	The more years of experience a salesperson has, the shorter the sales lead conversion cycle time.	This hypothesis was *not* supported. No meaningful relationship exists between years of experience and the sales lead cycle time.

IV.5 Analysis of Lead Source on Sales Lead Performance

For the final two hypotheses concerning the variation of sales lead conversion yield and cycle time by the marketing lead source a separate analysis was performed to evaluate leads by specific lead source program. For this analysis all closed lead data points (direct and representative sales, regardless of controls) were examined. Initially, descriptive statistics were utilized to examine the number of wins as a percentage of closed leads for the various lead sources. The percentage sales lead conversion yield did vary by lead source as predicted, with Customer Technical Workshops (CTW) and New Product Introduction targets (NPI) leading with 51.5% and 50.6% respectively, compared to the overall average of 38.2%. Advertisements (AD) and Trade Show attendees (TS) lagged with yields of 16.3% and 17.5%. Self selection by the customer visiting the website (Web) was also much lower than the overall average, at 23%.

A one-way between-groups analysis of variance was conducted to explore the impact of different lead sources on sales lead cycle time performance. The results of these analyses, along with graphs of the means, are summarized in Table 16, and Figures 4 and 5 below.

Table 16 Summary of Sales Lead Conversion Performance by Source

Lead Source	Closed Leads	Wins	Yield	Cycle Time	Std Dev
AD	7983	1304	16.3%	147	151
CTW	277	143	51.6%	91	87
DWR	4310	1704	39.5%	113	113
TS	1461	256	17.5%	111	106
List	1357	324	23.9%	94	78
NPI	1,688	854	50.6%	109	91
Referral	3924	1157	29.5%	115	130
Web	561	129	23.0%	152	181
Other	49062	21079	43.0%	130	168
Total	70623	26950	38.2%	127	157

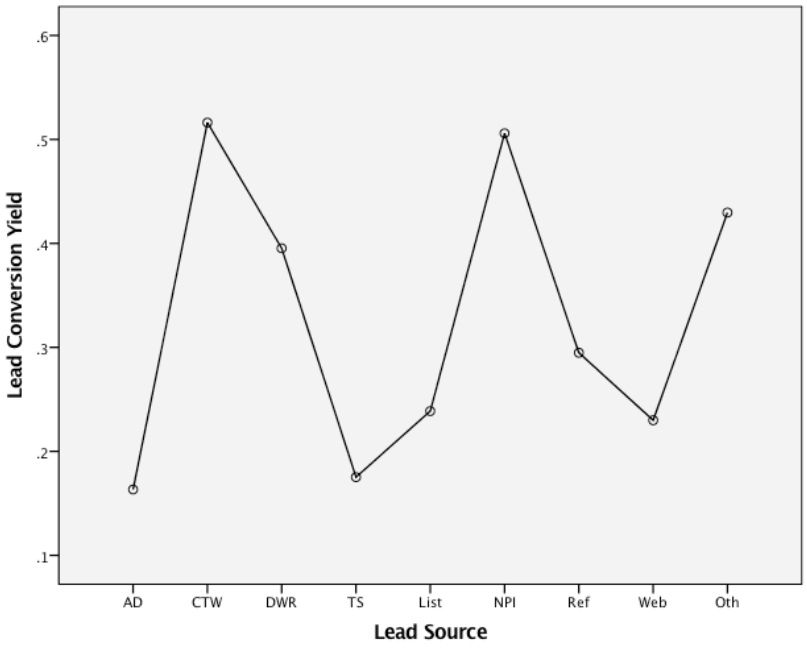

Figure 4 Sales Lead Conversion Yield Means by Lead Source

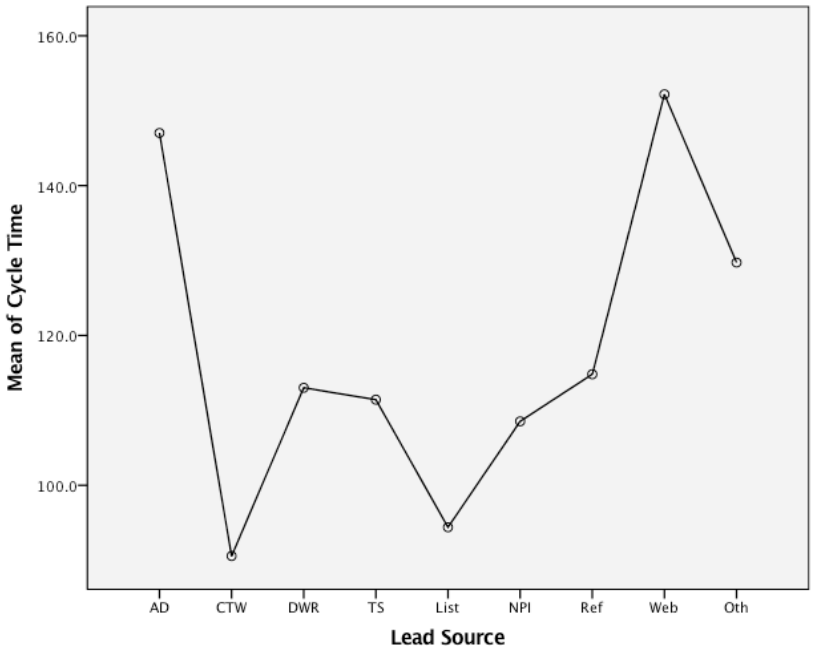

Figure 5 Sales Lead Conversion Cycle Time Means by Lead Source

There was a statistically significant difference at the $p < .05$ level, using the Welch tests (since the Lavene test for showed the assumption of homogeneity of variance was violated): F (8, 21458) = 10.7, $p < .001$. Post-hoc comparisons using the Tukey HSD test indicated that the mean cycle time scores among source were significantly different from one another in one third of the cases, as shown in Table 17. While CTW was expected to have shorter cycle times, and the mean of 91 days is the shortest, it is only significantly different from AD and Web.

Table 17 Tukey HSD Post Hoc Test

Lead Source	Lead Source	Mean Diff	Std. Error	Sig.	Lead Source	Lead Source	Mean Diff	Std. Error	Sig.
AD	CTW	56.4646*	13.806	0.001	NPI	AD	-38.4907*	6.909	0.000
	DWR	34.0097*	5.7671	0.000		CTW	17.9739	14.1657	0.940
	TS	35.6036*	10.7313	0.026		DWR	-4.481	6.5819	0.999
	List	52.6358*	9.7287	0.000		TS	-2.8871	11.1903	1.000
	NPI	38.4907*	6.909	0.000		List	14.1452	10.2327	0.905
	Referral	32.2071*	6.3758	0.000		Referral	-6.2836	7.1212	0.994
	Web	-5.1597	14.4654	1.000		Web	-43.6503	14.809	0.078
	Other	17.2925*	4.5175	0.004		Other	-21.1981*	5.5199	0.004
CTW	AD	-56.4646*	13.806	0.001	Referral	AD	-32.2071*	6.3758	0.000
	DWR	-22.4549	13.6452	0.779		CTW	24.2575	13.9134	0.719
	TS	-20.861	16.3736	0.939		DWR	1.8026	6.0198	1.000
	List	-3.8287	15.7347	1.000		TS	3.3965	10.8692	1.000
	NPI	-17.9739	14.1657	0.940		List	20.4288	9.8806	0.496
	Referral	-24.2575	13.9134	0.719		NPI	6.2836	7.1212	0.994
	Web	-61.6243*	19.031	0.033		Web	-37.3667	14.5679	0.202
	Other	-39.1721	13.1659	0.072		Other	-14.9146	4.8359	0.053
DWR	AD	-34.0097*	5.7671	0.000	Web	AD	5.1597	14.4654	1.000
	CTW	22.4549	13.6452	0.779		CTW	61.6243*	19.031	0.033
	TS	1.5939	10.5237	1.000		DWR	39.1693	14.312	0.135
	List	18.6262	9.4992	0.571		TS	40.7632	16.9333	0.280
	NPI	4.481	6.5819	0.999		List	57.7955*	16.3163	0.012
	Referral	-1.8026	6.0198	1.000		NPI	43.6503	14.809	0.078
	Web	-39.1693	14.312	0.135		Referral	37.3667	14.5679	0.202
	Other	-16.7172*	3.9993	0.001		Other	22.4522	13.8557	0.794
TS	AD	-35.6036*	10.7313	0.026	Other	AD	-17.2925*	4.5175	0.004
	CTW	20.861	16.3736	0.939		CTW	39.1721	13.1659	0.072
	DWR	-1.5939	10.5237	1.000		DWR	16.7172*	3.9993	0.001
	List	17.0323	13.1201	0.932		TS	18.3111	9.8943	0.648
	NPI	2.8871	11.1903	1.000		List	35.3433*	8.7967	0.002
	Referral	-3.3965	10.8692	1.000		NPI	21.1981*	5.5199	0.004
	Web	-40.7632	16.9333	0.280		Referral	14.9146	4.8359	0.053
	Other	-18.3111	9.8943	0.648		Web	-22.4522	13.8557	0.794
List	AD	-52.6358*	9.7287	0.000	* The mean difference is significant at the 0.05 level.				
	CTW	3.8287	15.7347	1.000					
	DWR	-18.6262	9.4992	0.571					
	TS	-17.0323	13.1201	0.932					
	NPI	-14.1452	10.2327	0.905					
	Referral	-20.4288	9.8806	0.496					
	Web	-57.7955*	16.3163	0.012					
	Other	-35.3433*	8.7967	0.002					

Our hypotheses related to lead source impacts on sales lead conversion performance were supported, as summarized in Table 18:

Table 18 Summary of Lead Source Hypotheses Results

No.	Hypothesis	Result
H6A	Leads from different sources will have different sales lead conversion yield	This hypothesis was supported as conversion yields varied from <20% for the low touch activities: advertisements and tradeshows; to over 50% for the high touch activities: customer technical workshops and targeted new product introductions.

V CHAPTER V: DISCUSSION, IMPLICATIONS & LIMITATIONS

V.1 Discussion of Results

Through the lens of the resource based view of the firm, and more specifically, dynamic capability theory this study sought to better understand the influence of salesperson effort and ability factors, as well as prospect sourcing programs, on sales lead closure rates and cycle times. Recognizing the contribution of these differentiating capabilities toward sales lead conversion performance furthers the research on industrial sales lead pipeline management and can help industrial companies optimize their sales organizations.

Consideration was given to three sets of antecedents to measure the effects on sales lead cycle time performance, as measured by yield and cycle time. The summary of the hypotheses and results is contained in Table 19.

Table 19 Summary of Sales Lead Conversion Performance Hypotheses and Results

No.	Hypothesis	Result
H1A	The greater the number of average sales calls made by a sales person per week, the higher the sales lead conversion yield.	This hypothesis was *not* supported, as Sales Calls / Wk made a negligible (though significant) contribution to the model.
H1B	The greater the number of average sales calls made by a sales person per week, the shorter the sales lead conversion cycle time.	This hypothesis was supported, with the number of sales calls explaining 0.05% of the cycle time variance (β = -0.021, $p < .001$)
H2A	The greater the percentage of time a salesperson spends on prospecting, cross-selling, and preparing or conducting sales calls, the higher the sales lead conversion yield.	This hypothesis was *not* supported, as PCT Sales Time made a negligible, though significant, contribution to the model.
H2B	The greater the percentage of time a salesperson spends on prospecting, cross-selling, and preparing or conducting sales calls, the shorter the sales lead conversion cycle time.	This hypothesis was supported with explained variance of 1.7% (β = -0.040, p = .029).
H3A	The greater the performance rating of a salesperson, the higher the sales lead conversion yield.	This hypothesis was *not* supported. Perf Rating did not make a unique statistically significant contribution to the model.
H3B	The greater the performance rating of a salesperson, the shorter the sales lead conversion cycle time.	This hypothesis was *not* supported. No meaningful relationship exists between the performance rating of the salesperson and the sales lead cycle time.
H4A	The greater the prior year quota achievement of a salesperson, the higher the sales lead conversion yield.	This hypothesis was *not* supported. Quota PCT did not make a unique statistically significant contribution to the model.
H4B	The greater the prior year quota achievement of a salesperson, the shorter the sales lead conversion cycle time.	This hypothesis was *not* supported, based on the insignificance of the relationship (β = -0.004, p = .681).
H5A	The more years of experience a salesperson has, the higher the sales lead conversion yield.	This hypothesis was *not* supported. Yrs Exp did not make a unique statistically significant contribution to the model.
H5B	The more years of experience a salesperson has, the shorter the sales lead conversion cycle time.	This hypothesis was *not* supported. No meaningful relationship exists between years of experience and the sales lead cycle time.
H6A	Leads from different sources will have different sales lead conversion yield	This hypothesis was supported as conversion yields varied from <20% for the low touch activities: advertisements and tradeshows; to over 50% for the high touch activities: customer technical workshops and targeted new product introductions.
H6B	Leads from different sources will have different average sales lead conversion cycle time.	This hypothesis was supported, as the highly engaged activity of a customer technical workshop produced average cycle times of 91 days, compared to over 145 days for customer visiting the web site or responding to an advertisement.

The findings can be summarized in a simpler fashion by the following matrix in Table 20, which shows whether or not there were significant effects of the various factors on the two measures of sales lead conversion performance.

Table 20 Summary of Findings

		Yield	Cycle Time
Sales Effort	Sales Calls per Week	none	+
	Percent of Time on Sales Activities	none	+
Sales Ability	Performance Rating	none	none
	Percent Quota Achieved	none	none
	Years of Experience	none	none
Lead Source	High Customer Engagement	+	+

Sales effort factors included self reported salesperson time allocation on sales activities, and the number of sales calls made per week (Brown & Peterson, 1994), and it was hypothesized that both would correlate with lead conversion performance. In this research those variables were only found to predict lead conversion cycle time, not yield. In fact, other variables were shown to influence the model for conversion yield, including most notably, lead source engagement and customer category. So rather than sales effort and ability being able to predict closure rates, whether or not a prospect was encountered through a highly engaging lead source program, such as attending a customer technical workshop, or being the target customer for a new product introduction, made that lead three times more likely to convert to a win, than a low engagement lead, such as the customer visiting the website, attending a trade show, or responding to an advertisement. This demonstrates the importance of strong marketing programs that engage prospects, and providing highly qualified leads for salespeople to pursue. Also, customers that were classified as a category A account, and thus had dedicated assigned resources and focus,

were 1.7 times more likely to have opportunities convert to wins, that category B customers that were the vast collection of unassigned accounts. This suggests that sales people are more efficient with customers that are known, prioritized and appropriately resourced. They likely have opportunities that are better understood and qualified than do the unassigned customer base, allowing them to focus on the most likely to win opportunities. This also suggests the need for better lead qualification mechanisms among the category B customers to enable the salesperson to make more sales calls to close opportunities and less exploratory sales calls to qualify opportunities. Sabnis, et al. (2013) highlights the issue of marketing leads that frequently don't receive sales follow up. The sales effort required to do so may not be worth the effort. The Cat A focus customers have opportunities that are better understood, have more resources available, and thus have higher conversion performance overall. Hypotheses H1B and H2B regarding the sales effort impact on lead conversion cycle time were supported with a combined 2.2% of explained cycle time variance, suggesting that more sales calls and more time spent selling could in fact result in shorter conversion cycle times. This may further boost the argument that better lead qualification is required, because more sales activity does not result in a higher win rate, but more activity does mean quicker cycle times when they do win. This small but significant result is an important contribution to the academic discussion of whether or not it is only the customer that can dictate industrial sales cycle time (Peterson & Krishnan, 2011).

Turning to sales ability, it was found that none of the three variables impacted sales lead conversion performance, suggesting that years of experience and prior measures of performance, both objective and subjective, do not predict conversion

performance, when controlling for geographic region, customer category and product division. This was verified with both the logical regression model to predict conversion yield and the linear regression model to predict cycle times.

Finally, as expected, the source of the lead had a fair amount to do with the conversion rate and cycle time, supporting hypotheses H6A and H6B. Customer Technical Workshops had the highest yield (52% vs average 38%) and shortest cycle time (91 days vs average 127 days), as might be expected. Attending a full day workshop is a significant time investment and demonstrates commitment from the customer to use the product. The education that takes place, by design, is intended to help the customer achieve a shorter design cycle. The other lead source that predicts high conversion performance is targeted New Product Introductions (50.6% yield and 109 days cycle time). This is a defined set of customers identified by marketing as being a very good fit for a newly defined and introduced product, with features that address specific customer requirements. New products are created with target customers in mind, so one would expect the win rate to be highest among these targeted customers, if the product was properly defined. The target customers are often early adopters which would also explain the shorter cycle times. The worst performers of conversion yield are the mass marketing generated leads from advertisements (16%) and tradeshows (18%). Ad cycle times were 147 days. Tradeshows, interestingly, had relative short cycle times of 111 days. If customers found the company through the company web site, they only converted to wins 23% of the time and had the longest cycle times at 152 days.

An interesting observation that emerged from the data was the impact of discovery time, the time between finding a prospect and determining a potential fit as an

active opportunity, on overall cycle time. This variable explained 33% of the cycle time variance, suggesting that early lead qualification is the most impactful thing that a salesperson can do to shorten cycle time. Early qualification consists of quickly assessing the lead, typically contacting the prospect to understand if a need exists that can be addressed by the company's product, and in determining that there is an opportunity, declaring the lead to be active. One explanation for the correlation to total cycle time is that customers that act with urgency with a relatively quick overall cycle time will more immediately show need and contribute to the lead qualification process. However, this may also be an additional artifact of salesperson effort; that by prioritizing the lead qualification process and quickly attempting to determine if the prospect is a real lead, they can speed up the overall sales cycle. More analysis must be done to better understand the impact of discovery time on lead conversion performance.

V.2 Managerial Implications

Industrial sales pipeline management is an important topic for sales executives and a better understanding of the factors that impact and predict sales lead conversion performance can aid managers in hiring, training and statistical sales forecasting. Such forecast improvements can promote better overall company coordination and assist in staffing and territory assignments. The findings of this study should be relevant to sales organizations in a variety of industrial component companies with complex and lengthy sales cycles. Improved sales lead conversion performance, even minor improvements, drives higher levels of both revenue and profitability. While the explained variance from the sales effort and ability factors might seem small, a 2% improvement in cycle time can have major impact on a company's financial performance. For a two billion-dollar,

capital intensive, high fixed cost, industrial components company, where 80% or more of each incremental revenue dollar falls to the net income line, this can mean a profitability improvement of over $30 million per year! The semiconductor industry is constantly focused on fractional gains in manufacturing yields, fractional gains in assembly output, fraction gains in quality levels, fractional gains in product development cycle times. Fractional gains, when highly leveraged, will drive financial performance. This empirical analysis suggests that sales effort does matter, but must be carefully managed and balanced to ensure that inefficiencies of excessive sales calls are not counterproductive in converting sales leads to wins. This may be mitigated by ensuring qualified leads are provided to sales. Certain lead generation programs, particularly events that are highly engaged with the customer, provide the strongest link to conversion performance. Sales managers should ensure these leads get prioritized by salespersons. Marketers must strive to engage customers in the most proactive programs possible, while using the various levels of engagement to help qualify leads so sales can increase their conversion yields by following up on more likely-to-close opportunities. The objective measure of previous year quota performance, the subjective management performance rating and the salesperson level of experience do little to help a manager predict future lead conversion performance, which should inform managers in the performance feedback they provide to their employees. During the annual performance review, managers should look at overall sales lead cycle time, and also ensure that the salesperson is demonstrating adequate levels of sales effort if lagging in this measure. The discovered relationship between early lead qualification (the time from a prospect being discovered to becoming an active opportunity) and total win cycle time is significant and should inform sales people and

managers alike of the importance of engaging the customer early to determine if there is a fit between the product features and the customer's requirements. Sitting on leads for an extended period of time means slower overall sales lead conversion cycle times. In the case of sales lead abundance, the prioritization of leads, with input from the manager should be used to first address the leads most likely to close as wins, and to do so quickly.

V.3 Theoretical Implications

This study provides support for the idea that sales effort and marketing lead generation activities, as company dynamic capabilities, can impact sales lead conversion performance. Competitive advantage of the firm can be realized by understanding these influences, and they can contribute to the construction of sales lead conversion theories and models. To date, such empirical studies with timely and robust industrial company CRM sales pipeline data have been lacking and difficult to address, due to the struggle of academic researchers to access data from a company that has institutionalized a rigorous discipline around CRM funnel management. Systems that have forced the sales organization to maintain the database and keep opportunities from becoming stale, served this research well by offering an accurate and up-to-date database, with sufficiently large N, to detect small but significant relationships. The most ground breaking contributions of this study are the associations discovered with sales lead conversion cycle time. Existing literature has been inconclusive in its assessment of sales activities that can influence sales lead conversion cycle time, as some have espoused that this time period is dictated solely by the customer. This research has shown, however that sales effort indicators of sales calls per week and percentage of time spent on sales activity can

impact sales lead conversion cycle times. Marketing lead sources can also impact the cycle time of a new sale, particularly if it actively engages the customer.

V.4 Limitations and Future Research

This study was conducted with a single industrial semiconductor company and, while it is expected to be representative of many large complex industrial component businesses, the results should be validated with other industrial companies. While the database used was large, with over 70,000 closed opportunities, and many of the results were significant to $p < .001$, the correlations, betas and explained variances were fairly small. With only one third of the hypotheses supported and low levels of explained variance, it suggests further research is needed to better understand the other contributors to the variance in sales lead conversion performance. That being said, a 2% gain in cycle time would be very significant for a company in a highly competitive industry like semiconductors. One specific area for additional research is the impact of the cycle time of earlier stages of the sales process on the overall sales lead conversion cycle time. As noted in this study, the time from discovery of a prospect to qualifying an active opportunity significantly correlates with the active to win cycle time. More studies are needed to determine if this early stage qualification can be addressed by focused sales efforts, or if it merely suggests that shorter conversion cycle times tend to have shorter times in each stage, including discovery time, because the timeline is being driven by the customer. One limitation of the dataset for this study is the granularity of the sales lead milestones. Capturing more activities in the CRM, particularly activities from early in the sales cycle, would allow for a richer understanding of what happens during the sales lead conversion cycle contributing to performance. In particular, understanding what

meetings were held, collateral provided, phone calls made, at what stage in the process, can give better insights into what activities by the salesperson can truly move the needle. The company is working to add that capability and requirement to their sales funnel system. Capturing loss codes would also inform future research as to the factors that prevent lead conversion yield.

Further studies are also required to identify additional causal factors of sales lead conversion performance, to better explain the variances noted. Specific areas to explore include industry, cyclicality, and seasonality, all influential forces in the semiconductor market. Whether the customer is an automotive manufacturer with inherently long design cycle times and qualification periods, or a small, nimble consumer products company racing to get a product to market will shape the conversion performance results. Semiconductors tend to have a heavy seasonal component depending on how much consumer product sales they support. There are also significant cyclical influences tied to the macroeconomy as well as unique to the semiconductor industry that will influence lead conversion performance, and additional studies should control for and seek to understand those influences.

REFERENCES

Agrawal, M. L. (2003). Customer relationship management (CRM) & corporate renaissance. *Journal of Services Research*, *3*(2), 149-171.

Ang, L., & Buttle, F. (2006). Managing for successful customer acquisition: An exploration. *Journal of Marketing Management*, *22*(3-4), 295-317.

Ahearne, M., Hughes, D. E., & Schillewaert, N. (2007). Why sales reps should welcome information technology: Measuring the impact of CRM-based IT on sales effectiveness. *International Journal of Research in Marketing*, *24*(4), 336-349.

Ahearne, M., Jones, E., Rapp, A., & Mathieu, J. (2008). High touch through high tech: The impact of salesperson technology usage on sales performance via mediating mechanisms. *Management Science*, *54*(4), 671-685.

Barney, J. (1991). Firm resources and sustained competitive advantage. *Journal of management*, *17*(1), 99-120.

Bitner, M. J., Brown, S. W., & Meuter, M. L. (2000). Technology infusion in service encounters. *Journal of the Academy of marketing Science*, *28*(1), 138-149.

Boujena, O., Johnston, W. J., & Merunka, D. R. (2009). The benefits of sales force automation: a customer's perspective. *Journal of Personal Selling & Sales Management*, *29*(2), 137-150.

Boulding, W., Staelin, R., Ehret, M., & Johnston, W. J. (2005). A customer relationship management roadmap: What is known, potential pitfalls, and where to go. *Journal of Marketing*, *69*(4), 155-166.

Brown, S. P., & Peterson, R. A. (1994). The effect of effort on sales performance and job satisfaction. *The Journal of Marketing*, 70-80.

Brown, S. W., Jackson Jr, D. W., & Mowen, J. C. (1981). Cognitive biases in sales management evaluations. *Journal of Personal Selling & Sales Management*, *1*(1), 83-89.

Chen, I. J. (2001). Planning for ERP systems: analysis and future trend. *Business process management journal*, *7*(5), 374-386.

Cooper, Marjorie J., and Charlene Spoede Budd. "Tying the pieces together: A normative framework for integrating sales and project operations." *Industrial Marketing Management* 36.2 (2007): 173-182.

D'Haen, J., & Van den Poel, D. (2013). Model-supported business-to-business prospect prediction based on an iterative customer acquisition framework. *Industrial Marketing Management*, *42*(4), 544-551.

D'Haen, J., Van den Poel, D., & Thorleuchter, D. (2013). Predicting customer profitability during acquisition: Finding the optimal combination of data source and data mining technique. *Expert systems with applications*, *40*(6), 2007-2012.

Eggert, A., & Serdaroglu, M. (2011). Exploring the Impact of Sales Technology on Salesperson Performance: A Task-Based Approach. *Journal of Marketing Theory and Practice*, *19*(2), 169-186.

Erffmeyer, R. C., & Johnson, D. A. (2001). An exploratory study of sales force automation practices: expectations and realities. *Journal of Personal Selling & Sales Management*, *21*(2), 167-175.

Hise, R. T., & Reid, E. L. (1994). Improving the Performance of the Industrial Sales Force in the 1990s. *Industrial Marketing Management*, *23*(4), 273-279.

Hunt, S. D. (1997). Competing through relationships: Grounding relationship marketing in resource-advantage theory. *Journal of Marketing Management*, *13*(5), 431-445.

Hunter, G. K., & Perreault Jr, W. D. (2006). Sales technology orientation, information effectiveness, and sales performance. *Journal of Personal Selling & Sales Management*, *26*(2), 95-113.

Jaworski, B. J., & Kohli, A. K. (1993). Market orientation: antecedents and consequences. *The Journal of marketing*, 53-70.

Jayachandran, S., Sharma, S., Kaufman, P., & Raman, P. (2005). The role of relational information processes and technology use in customer relationship management. *Journal of Marketing*, *69*(4), 177-192.

Jelinek, R., Ahearne, M., Mathieu, J., & Schillewaert, N. (2006). A longitudinal examination of individual, organizational, and contextual factors on sales technology adoption and job performance. *Journal of Marketing Theory and Practice*, *14*(1), 7-23.

Johnston, W. J., & Bonama, T. V. (1981). Purchase process for capital equipment and services. *Industrial Marketing Management*, *10*(4), 253-264.

Johnston, W. J., & Lewin, J. E. (1996). Organizational buying behavior: Toward an integrative framework. *Journal of Business research*, *35*(1), 1-15.

Jolson, M. A. (1988). Qualifying sales leads: the tight and loose approaches. *Industrial Marketing Management*, *17*(3), 189-196.

Jolson, M. A., & Wotruba, T. R. (1992). Selling and sales management in action: Prospecting: A new look at this old challenge. *Journal of Personal Selling & Sales Management*, *12*(4), 59-66.

King, S. F., & Burgess, T. F. (2008). Understanding success and failure in customer relationship management. *Industrial Marketing Management*, *37*(4), 421-431.

Ko, D. G., & Dennis, A. R. (2004). Sales force automation and sales performance: Do experience and expertise matter?. *Journal of Personal Selling & Sales Management*, *24*(4), 311-322.

Krishnan, V., Groza, M. D., Groza, M. P., Peterson, R. M., & Fredricks, E. (2014). Linking customer relationship management (CRM) processes to sales performance: The role of CRM technology effectiveness. *Marketing Management*, 162.

Mathiassen, L., Chiasson, M., & Germonprez, M. (2012). Style Composition in Action Research Publication. *MIS quarterly*, *36*(2), 347-363.

Mathieu, J., Ahearne, M., & Taylor, S. R. (2007). A longitudinal cross-level model of leader and salesperson influences on sales force technology use and performance. *Journal of Applied Psychology*, *92*(2), 528.

Monat, J. P. (2011). Industrial sales lead conversion modeling. *Marketing Intelligence & Planning*, *29*(2), 178-194.

Moncrief, W. C., & Marshall, G. W. (2005). The evolution of the seven steps of selling. *Industrial Marketing Management*, *34*(1), 13-22.

Narayandas, D., & Rangan, V. K. (2004). Building and sustaining buyer–seller relationships in mature industrial markets. *Journal of Marketing*, *68*(3), 63-77.

Ngai, E. W., Xiu, L., & Chau, D. C. (2009). Application of data mining techniques in customer relationship management: A literature review and classification. *Expert systems with applications*, *36*(2), 2592-2602.

Pallant, J. (2013). *SPSS survival manual*. McGraw-Hill Education (UK).

Peterson, R. M., & Krishnan, V. (2011). CRM and sales pipeline management: Empirical results for managing opportunities. *Marketing Management*, 60.

Pullig, C., Maxham, J. G., & Hair, J. F. (2002). Salesforce automation systems: An exploratory examination of organizational factors associated with effective implementation and salesforce productivity. *Journal of Business Research*, *55*(5), 401-415.

Rapp, A., Agnihotri, R., & Forbes, L. P. (2008). The sales force technology–performance chain: The role of adaptive selling and effort. *Journal of Personal Selling & Sales Management*, *28*(4), 335-350.

Rapp, A., Trainor, K. J., & Agnihotri, R. (2010). Performance implications of customer-linking capabilities: Examining the complementary role of customer orientation and CRM technology. *Journal of Business Research*, *63*(11), 1229-1236.

Reinartz, W., Krafft, M., & Hoyer, W. D. (2004). The customer relationship management process: Its measurement and impact on performance. *Journal of marketing research*, *41*(3), 293-305.

Rodriguez, M., & Honeycutt Jr, E. D. (2011). Customer Relationship Management (CRM)'s Impact on B to B Sales Professionals' Collaboration and Sales Performance. *Journal of Business-to-Business Marketing*, *18*(4), 335-356.

Rousseau, D. M. (2012). *The Oxford handbook of evidence-based management*. Oxford University Press, 5.

Rust, R. T., Ambler, T., Carpenter, G. S., Kumar, V., & Srivastava, R. K. (2004). Measuring marketing productivity: Current knowledge and future directions. *Journal of marketing*, *68*(4), 76-89.

Rygielski, C., Wang, J. C., & Yen, D. C. (2002). Data mining techniques for customer relationship management. *Technology in society*, *24*(4), 483-502.

Sabnis, G., Chatterjee, S. C., Grewal, R., & Lilien, G. L. (2013). The Sales Lead Black Hole: On Sales Reps' Follow-Up of Marketing Leads. *Journal of Marketing*, *77*(1), 52-67.

Schillewaert, N., Ahearne, M. J., Frambach, R. T., & Moenaert, R. K. (2005). The adoption of information technology in the sales force. *Industrial Marketing Management*, *34*(4), 323-336.

Sharma, A., & Sheth, J. N. (2010). A framework of technology mediation in consumer selling: Implications for firms and sales management. *Journal of Personal Selling & Sales Management*, *30*(2), 121-129.

Sharma, S., Durand, R. M., & Gur-Arie, O. (1981). Identification and analysis of moderator variables. *Journal of marketing research*, 291-300.

Smith, T. M., Gopalakrishna, S., & Chatterjee, R. (2006). A three-stage model of integrated marketing communications at the marketing-sales interface. *Journal of Marketing Research*, *43*(4), 564-579.

Söhnchen, F., & Albers, S. (2010). Pipeline management for the acquisition of industrial projects. *Industrial Marketing Management*, *39*(8), 1356-1364.

Speier, C., & Venkatesh, V. (2002). The hidden minefields in the adoption of sales force automation technologies. *Journal of Marketing*, *66*(3), 98-111.

Stein, A. D., Smith, M. F., & Lancioni, R. A. (2013). The development and diffusion of customer relationship management (CRM) intelligence in business-to-business environments. *Industrial Marketing Management*, *42*(6), 855-861.

Stoddard, J., Clopton, S., & Avila, R. (2002). Salesforce automation: An exploratory study on sales professionals' perceptions of performance benefits. *Marketing Management Journal*, *12*(2).

Sujan, H., Weitz, B. A., & Kumar, N. (1994). Learning orientation, working smart, and effective selling. *The Journal of Marketing*, 39-52.

Teece, D. J., Pisano, G., & Shuen, A. (1997). Dynamic capabilities and strategic management. *Strategic management journal*, *18*(7), 509-533.

Trailer, B., & Dickie, J. (2006). Understanding what your sales manager is up against. *Harvard Business Review*, *84*(7/8), 48.

Virtanen, T., Parvinen, P., & Rollins, M. (2015). Complexity of sales situation and sales lead performance: An empirical study in business-to-business company. *Industrial Marketing Management*, *45*, 49-58.

Wernerfelt, B. (1984). A resource-based view of the firm. *Strategic management journal*, *5*(2), 171-180.

Yan, J., Gong, M., Sun, C., Huang, J., & Chu, S. M. (2015). Sales pipeline win propensity prediction: a regression approach. *arXiv preprint arXiv:1502.06229*.

Yu, Y. P., & Cai, S. Q. (2007). A new approach to customer targeting under conditions of information shortage. *Marketing intelligence & planning*, *25*(4), 343-359.

Zablah, A. R., Bellenger, D. N., & Johnston, W. J. (2004). An evaluation of divergent perspectives on customer relationship management: Towards a common understanding of an emerging phenomenon. *Industrial marketing management*, *33*(6), 475-489.

Zoltners, A. A., Sinha, P., & Lorimer, S. E. (2008). Sales force effectiveness: A framework for researchers and practitioners. *Journal of Personal Selling & Sales Management*, *28*(2), 115-131.

VITA

Bill Bradford resides in Alpharetta, GA with his wife Kathy. They have three daughters, Katie, Meagan and Erin. Bill is a 30-year veteran of the semiconductor industry, where he has run worldwide sales organizations for multi-billion dollar public enterprises and was CEO of a privately held assembly and test company. He is currently the managing partner of Impact Technology Advisors, a strategic management consulting firm, focused on evidence based solutions to sales, marketing, business development and strategic challenges of technology companies.

Bill graduated with a BS in Electrical Engineering from Rose-Hulman Institute of Technology, an MS in Management from the University of Alabama, and recently completed his Executive Doctorate in Business at Georgia State University. He enjoys reading, biking, golfing, kayaking and wine collecting.