TRANSFORMING THE NATURE AND SCOPE OF STRATEGY FORMULATION: A LONGITUDINAL STUDY MEASURING THE EFFECTS INDUSTRY CLOCKSPEED BENCHMARKING HAS ON BLUE OCEAN STRATEGY

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Abstract

The focus of this study is the management challenges associated with introducing products in industries where the evolution of product life cycles is relatively fast. The primary business problem stems from large investments in product introduction whose payoff barely meets, or in some cases does not meet, the needed duration of time required to get a significant return on investment. The study builds on companies whose leaders are pursuing blue ocean strategies to introduce products and correlate the speed at which industries evolve products, processes, and organizational variables to the time duration these blue ocean strategy products will remain uncontested. The study uses a longitudinal event methodology to measure abnormal security returns over the period observed, and to determine if the abnormal returns extend beyond the 24-month period observed in fast-clockspeed industries, while also observing if the products measured align with a medium-clockspeed industry in the automobile segment. The purpose of the study is to determine if periods of abnormal returns occur past the 24-month horizon not seen in fast-clockspeed industries and to answer the research question: Is there a significant increase in the value of a company after the introduction of a product that meets the blue ocean strategy framework? The conceptual framework thus identifies companies whose leaders have introduced products that meet the blue ocean strategy criteria and considers the corresponding events by correlating the price of the publicly traded companies' security to that of the market index, while also providing insight into the abnormal returns observed using the event study methodologies market model approach. The primary sources of data are the U.S. Securities and Exchange Commission's 10-k filings database and Yahoo.com Finance. All the information was public financial data for U.S.-based automobile manufacturers. The findings contribute to the strategic, finance, and supply chain disciplines, especially for strategy formulation and development,

thereby providing a new perspective on improving the strategic planning process in terms of corporate and line-of-business strategy.

Dedication

In the name of God, the Most Gracious, the Most Merciful—without Whom this research would not have been a possibility. To my wife, who has encouraged and supported me and thus made this quest a possibility. To my son, who lost countless hours waiting to play with me while I worked to complete this research. To my parents, who never stopped believing in me, who never doubted my abilities, and who gave me the confidence to complete this tremendous life goal.

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Table of Contents

List of Tables

List of Figures

CHAPTER 1. INTRODUCTION TO THE PROBLEM

Introduction

Industry clockspeed benchmarking (ICB), a phenomenon introduced by Charles H. Fine, refers to the notion that each industry operates at distinctive measurable speeds of change or life cycles (Fine, 1998). Understanding the clockspeed theory and its effect on industry life cycles is pivotal when integrating business operations vertically in an effort to achieve certain corporate objectives (Chavez, Fynes, Gimenez, & Wiengarten, 2012). The clockspeed theory also encompasses general business strategy, which refers to the need for measurable product, process, and organizational evolution while identifying the inner-core competency of an organization in which the measurements of such organizational variables align with setting general strategy based on a market's needs and organizations' capabilities (Fine, 1998, 2000). Such analysis is also important for assessing current capabilities, as well as competitive advantages and disadvantages. Companies in the electronics industry have supply chains designed and structured in a way that helps drive agility and adaptability. These organizations support customization and quick product changes to adapt to changing market conditions. The hypercompetitive environment in the electronics industry, also known as a fast-clockspeed environment, requires significant strategic agility (Lewis, Andriopoulos, & Smith, 2014). Strategic agility requires organizational leaders to develop strategies that are scalable, changeable, and adaptable to quickly changing market conditions. When an organization's leadership is aware of its competitive advantages and understands the clockspeed at which the industry it competes in

operates, the leadership can focus on strategies that help develop the needed capabilities and thus dominate a certain market segment (Buisson & Silberzahn, 2010).

Organizational leaders pursuing uncontested market space, also known as blue oceans, will invest significant time and resources in research and development (R&D), as well as marketing and sales campaigns, focused on entering niche markets where competition is irrelevant or nonexistent (Kim & Mauborgne, 1999). When organizations pursue blue ocean strategies in fast-clockspeed environments, the importance of understanding the time duration of potential sociocultural shifts in consumer wants and the competitive environment become critical in developing the right strategy. A focus on providing resources to R&D departments while allowing a healthy return on investment becomes challenging, especially in industry segments where evolving product lines change rapidly and must match with changing market needs to be successful (Prajogo, McDermott, & Goh, 2008).

During the introduction of a new product in an uncontested market space, the time duration the product will be uncontested, and thus the highest possible returns the new product will generate before competitors introduce similar products and imitate the original product in the new market, is critical information. Shaping general business strategies and entering or pursuing new markets without a clear understanding of the speed at which product, process, and organizations evolve can be problematic.

Background of the Study

Within a multitude of strategy frameworks and research on the topic of strategy, there still lacks one commonality among the alignment of scope (markets chosen) and advantage (operational capabilities needed for execution) and the speed at which both need to move to provide sustainable competitive advantages in the years to come. Within strategy and operational

capabilities, clockspeed benchmarking introduces a focus on industry standards, such as product, process, and organizational evolution, that are moving at a certain rate measured in years and generally termed either slow or fast relative to their industry (Mendelson & Pillai, 1999). In slow-clockspeed industries, an example in operational execution would consider the frequency of product introductions, which tend to be less common; and due to less common product introductions, changes to existing operational capabilities, thus, highly unlikely, costly and slow (Carrillo, 2005). ICB can be observed as the life cycle of a certain industry; as technological, process, business model and design breakthroughs occur, the speed at which change happens can significantly increase in different industries (Mankins & Steele, 2005).

Regarding the use of the value innovation framework as proposed by Kim and Mauborgne (1999), the authors argued that blue ocean creation comes from significant changes in product attributes; companies that make product changes where certain product standards are lowered and other product standards are raised tend to attain a blue ocean market, and in such instances, competitors cannot easily replicate products and penetrate the newly attained markets. Within the blue ocean framework is additional empirical evidence to suggest that ICB plays an even bigger role, as proposed by Souza, Bayus, and Wagner (2004), where product development, production, and inventory costs were determining variables in sustaining a competitive advantage. In addition, both theories, ICB and blue ocean, contain variables that are observable using quantitative outcomes relative to the stock performance of publicly traded companies.

Within the context of the blue ocean theory, Kim and Mauborgne (1999) noted that uncontested market space remains uncontested for a prolonged period of time. However, Barwise and Meehan (2012) contended that there is no such thing as prolonged uncontested market space (blue oceans). Rather, Barwise and Meehan noted there is a brief moment in which a business is

uncontested even with disruptive or highly innovative product offers, and shortly thereafter, organizations that attain a blue ocean market must compete with others who enter these markets later as a result of reverse engineering and replication.

Research in the automobile industry addresses the gap between Kim and Mauborgne's (1999) theory on blue ocean strategy (BOS) and the notions presented by Barwise and Meehan (2012) that blue ocean market space remains uncontested only for a brief period of time. Focusing on a medium-clockspeed industry (automobile industry) as characterized by Fine (1998), and using quantitative measures to observe the stock performance after the introduction of a product meeting the criteria for BOS as presented by Pitta and Pitta (2012), this study measures the effect of abnormal returns for a company that attains a blue ocean.

Background of the Problem

Kim and Mauborgne (1999) introduced the notion of uncontested market space known as blue ocean. For a company to enter such a space, an organization's new product requires significant changes to the various elements of the customer value proposition by identifying and addressing gaps in an industry sub-segment and realigning goods and services focused on bringing about strong product demand (Kim & Mauborgne, 1999). Barwise and Meehan (2012) argued against Kim and Mauborgne, in that uncontested market space or blue oceans are nonexistent and conducted a study using cell phone manufacturers as an example to create a new framework for reaching what they termed *at best purplish oceans*.

The research conducted by Barwise and Meehan included limited insights, and the authors concluded that in the cell phone industry, uncontested market space is short lived. Barwise and Meehan focused on companies in the smartphone market; however, a gap appears in their research specific to the industry to which they applied Kim and Mauborgne's BOS

framework. Observing the Barwise and Meehan study (2012) through the ICB lens, the variability of ICB shows the cell phone market is attributable to a fast-clockspeed industry in which uncontested market space may not subsist for a long duration of time, in part due to the fast evolution of products as is presented by Fine (1998). Thus, adding this additional dimension to the study of business strategy, and connecting the speed of the external environment and evolution to the time it may take for the intended strategy to be executed, could be the determining cause for why certain blue oceans are not uncontested for prolonged periods of time. The importance of understanding the effect ICB has on creating and sustaining uncontested market space is a pivotal part of the initial strategic planning process when determining blue oceans to pursue.

In the context of strategic planning and strategy deployment as it pertains to fast-clockspeed industries, a specific problem arises. For example, cell phone manufacturers invest significant amounts of time and money in R&D, in an effort to provide a product superior to that of their competitors, to compete in an industry where the product lasts only about 12 months before an improved or new product launches (Giachetti & Marchi, 2010, p. 1133). Within the introduction of a new functionality, it is only 9-12 months before competitors replicate the functionality and before the uncontested market space that one firm had initially entered (blue ocean) is under attack (Giachetti & Marchi, 2010, p. 1140). Giachetti and Marchi (2010) further validated Fine's notion that cell phone manufacturers, like semiconductor and personal computer manufacturers, best align with a fast-clockspeed industry. When pursuing an uncontested BOS in fast-clockspeed industries, especially where significant investment is necessary for technological breakthroughs, the ICB needs to be understood to avoid pitfalls associated with immediate competitive replication.

Statement of the Problem

The specific problem for this study is companies pursuing BOSs in fast-clockspeed industries do not hold blue ocean market space uncontested for a prolonged period of time. Understanding whether a correlation exists between clockspeed and the time blue ocean markets are uncontested can be beneficial in determining whether to pursue radical or incremental innovation. ICB, or clockspeed, is a theory that introduces the idea that sub-segments of industries and certain industries operate at different clock cycles (speeds) and presents the notion that when certain industries operate in fast cycles, the competitive landscape is changing more rapidly (Fine, 1998). Within organizations, this evolution or life cycle is dependent on external technological changes in the industries where their products, substitute products, processes, and organizational evolution participate and thus affects the maturity of an organization overall (Fine, 1998). Providing a correlation within the variables of technological change specific to a medium-clockspeed industry and the time the product in a blue ocean is uncontested can help provide additional insights on whether to pursue blue oceans in slow, medium or fast-clockspeed industries.

Purpose of the Study

The aim of this study was to build on the blue ocean framework by establishing whether distinctions of time that a market is uncontested exist when observed through the clockspeed lens. The intention behind this study was to contribute to the BOS pursued by so many organizations globally. The study not only built on the pursuit of a BOS but also identified operational capability requirements, the estimated time of uncontested market space, and whether an incumbent should pursue radical or incremental innovations.

The purpose of this study was to examine the BOS framework by using the clockspeed lens. One immediate gap in the research presented by Kim and Mauborgne (1999) emerged from a study conducted by Barwise and Meehan (2012), who contended that the uncontested market space that Kim and Mauborgne (1999, 2005) argued for did not actually exist. Evidence that the blue ocean theory exists is apparent in Kim and Mauborgne's research; however, the arguments and research presented by Barwise and Meehan also hold clout. As an example, Barwise and Meehan showed that uncontested market space in the smartphone area was only uncontested briefly, which drove competitors to replicate products and introduce their own versions and brought the industry back to a hypercompetitive landscape in which price is the key competitive driver. The research presented in this dissertation looked at ICB in order to determine whether or not ICB was the independent variable that drives the time duration a new entrant will compete in an uncontested market space. The dissertation also provides insight into what dependent variables influence prolonging blue ocean penetration and what measures could shed light onto better financial analysis when entering into new markets.

Rationale

Kim and Mauborgne (1999, 2005, 2015) addressed explicit research regarding the blue ocean theory. Gaps within the blue ocean framework have also emerged, as noted by Barwise and Meehan (2012). Throughout both blue ocean research findings, key variables such as time and the speed at which distinctive industries evolve, as presented by Fine (1998, 2000), were not addressed. Mendelson and Pillai (1999) presented the framework for determining the variables that shape the time at which industries evolve, and Souza et al. (2004) noted the ways ICB affected product development. Researchers have not effectively addressed the ways ICB affects the time products remain uncontested in blue ocean markets relative to the value the product

generates for shareholders as a measure of success. This study is relevant to providing the correlation between an industry's clockspeed and the time organizations' product innovations allow a product to remain uncontested and, as a result, the time an organization generates above-average returns due to prolonged market dominance.

By integrating the clockspeed theory into the study of blue ocean attainment, scholars and practitioners can learn that the fundamental rationale behind blue ocean theory, centered on the value innovation framework, does not necessarily equate to a sustainable competitive advantage. Furthermore, this dissertation identifies an additional variable from which scholars and practitioners can gather insights and, more importantly, make better decisions relative to industry dynamics shaping slower clockspeed industries. In his conceptual essay on ICB, Fine (1996) identified that the measure of speed can lead to numerous uses, including one focused on better segmenting industries and another that would address cross-industry benchmarking analysis:

> Biologists study the "fast-clockspeed" fruit fly species to observe many generations in a short time period and build models of genetic dynamics that are then applied to moderate-clockspeed mammals or glacial-speed reptiles. . . . Similarly, industry analysts can observe fast-clockspeed industries (e.g., electronics) to build models of industry dynamics that can then be applied to slower-moving industries. (p. 4)

The study and relative implications of fast-clockspeed industries and dynamics have helped shape decision making within supply chain design; however, little direct research exists that integrates this research into blue ocean attainment and the advancement of the strategic discipline. Utilizing the research from this dissertation, scholars and practitioners can draw conclusions that allow them to place higher emphasis on product returns in fast-clockspeed industries while taking lower returns in slower clockspeed industries with the understanding that these returns would be sustainable over a longer period of time.

The notion of segmenting industries relative to their clockspeed is an additional value from which scholars and practitioners can benefit. Organizations with varying degrees of clockspeed relative to their business units could underperform in fast-clockspeed segments due to their product, process, or organizational clockspeed capabilities. Divestment or investment in process, product, and organizational evolution then becomes apparent and is integrated into the segmentation of industries relative to the markets in which a business is competing.

Research Questions

The literature review identified gaps in fully validating that BOSs are successful in all industries. This study involved applying the clockspeed theory to data from December 31, 2011, to December 31, 2015, which included focusing on stock price movement relative to a major stock index and industry peer performance in the automobile industry over this same period using trend analysis. The focus was to measure the effects on value using above-normal market returns as measured using the market model to see the effect that attainment of a blue ocean has on stock price appreciation and time. To answer the research question and accompanying propositions, the sample included all U.S.-based publicly traded automobile manufacturers within the medium-clockspeed industries. The focus of the study was therefore answering the following research question: Is there a significant increase in the value of a company after the introduction of a product that meets the BOS framework?

Propositions

The following propositions are derived from the research question.

Proposition 1: The behavior of a stock price following the introduction of a product that meets the BOS criteria in a medium-clockspeed industry is affected positively.

Proposition 2: There is no effect on stock price relative to the general market index for an equity that has introduced a product that meets the BOS criteria in a medium-clockspeed industry.

Proposition 3: The behavior of a stock price following the introduction of a product that meets the BOS criteria in a medium-clockspeed industry, when positive, is limited to a time frame of less than 24 months.

Significance of the Study

As shown throughout the literature review, researchers continue to conduct studies in isolated contexts relating to both blue ocean theory and the clockspeed theory. The two disciplines differ in that the clockspeed theory is more of a supply-chain discipline, and the blue ocean theory is more of a strategy discipline. Their interconnectedness has not yet been fully correlated, and thus research challenging the blue ocean strategy has been presented but lacks any evidence of clockspeed integration. The focus of the study was therefore bridging the gap between two distinct disciplines to integrate the importance of supply-chain management into the commercially critical role of creating uncontested market space. The focus was also on using the clockspeed theory as a lens when identifying uncontested market space to provide organizational leaders with insight on the duration of time a product might remain uncontested.

This study has practical implications, primarily for those in strategic planning functions, as well as those in scholarly roles focused on developing existing theories in strategy or supply chain management. For practitioners, if the study finds a correlation between an industry's

clockspeed and the relative time a product spends in a blue ocean, the correlation can shape the path from everything in financial modeling to the segments that companies decide to pursue to attain blue oceans. As an example, leaders in industries that require significant capital investment but that compete at a fast clockspeed may choose to outsource core functions in an effort to implement scalability and flexibility in both product and service offerings.

Definition of Terms

In an effort to alleviate vagueness and provide clarity, the following definitions may better define each words or abbreviations used throughout the study:

Blue ocean. A blue ocean is a term used to describe uncontested market spaces that are attained through the elimination or significant improvement of certain product attributes and thus enhance customer value proposition (Kim & Mauborgne, 1999).

Industry clockspeed benchmarking (ICB). ICB is the measure of the evolutionary life cycle, which captures the dynamic nature of an industry (Carrillo, 2005). ICB constitutes three variables: product, process, and organizational evolution. It is at times referred to as a slow-, medium-, or fast-clockspeed industry or industries.

Assumptions and Limitations

Assumptions and limitations affected this study. Assumptions are statements offered by researchers about certain aspects perceived as truths within research. Limitations refer to the inadequacies of research over which a researcher may not have any control. Research limitations can be due to the research methodology, analysis, and conclusions.

Assumptions

Several assumptions influenced the study. The researcher spent many years developing strategies that have helped organizations in which he worked by attaining blue oceans, and these

successes or failures may have affected the researcher's bias toward blue ocean attainment. The researcher believed that clockspeed benchmarking plays a vital role in shaping BOS attainment and that respondents or participants would answer both honestly and objectively. The researcher believed that the sample selected would truly represent the population or would be applicable only to the industries identified. The researcher did not introduce bias or research error and made sure to conduct the research in a controlled manner so that the results would be credible. The researcher did his best to conduct the research in an ethical and acceptable manner.

Limitations

As a result of selecting a quantitative approach to the research and sampling, the study was limited to investigating a phenomenon that may be occurring solely in the automobile industry using key financial, operational, and organizational factors that helped support the need for using clockspeed theory as presented by Mendelson and Pillai (1999). The study included several limitations: the results were not transferable to the population and the research methodology constrained the outcomes of the research and might have validated the wrong phenomenon. Furthermore, the time limitations might not have provided a significant glimpse into the variables affecting organizational outcomes during a certain period.

Nature of the Study

To determine the effect an ICB has on the time the newly introduced product spends in a blue ocean, time, as well as the extent of an innovation (radical or incremental), had to be understood. The focus of the study was on the automobile industry, within the context of time, as well as products' innovation (see Figure 1). The research therefore involved measuring stock price appreciation as a result of a new product introduction in a medium-clockspeed industry, as defined by Fine (1998). A medium-clockspeed industry, which has a 4- to 6-year cycle, was

studied to see the effects on stock price and other benchmarking relative to peers after such a product was introduced over the course of time.

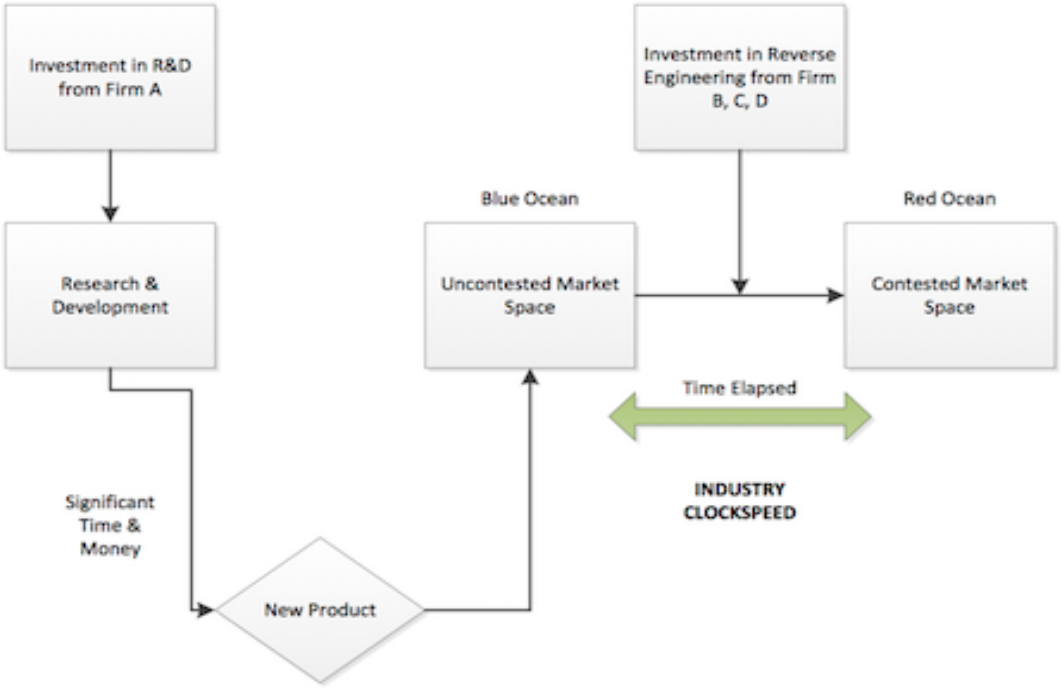

Figure 1. Conceptual framework of study.

As Figure 1 reflects, the time between the new product entering an uncontested market space and the duration the product is uncontested could be pivotal in understanding whether to pursue a BOS. The research question and propositions thus linked the independent variable (time) with dependent variables such as industry and innovation with regard to the six paths framework presented in Chapter 2. The study involved using a longitudinal event study approach, secondary data, and the market model to determine whether a relationship exists

between a medium-clockspeed industry and the time a product innovation is uncontested in a blue ocean while observing the blue ocean effect on the value of the firm.

Ethical Considerations

The considerations of ethics in research continue to important. Psychological, financial, and social harm can result from research where interactions that occur between researcher and participants inadvertently, even though they may have been unintended, ultimately lead to one or more of the risks posed by research occurring. The primary focus of this research was using the longitudinal event study method while relying on quantitative secondary data to validate the research hypotheses. Regardless of the intent, there may be a need for further qualitative validation, where persons may be necessary to substantiate initial research. In such circumstances, the study conducted will need to address any potential harm, ethical standards, possible negative effects, inappropriate behavior, and potential lawsuits that could stem from the design of the study.

Summary

The concept that an industry operates at varying and distinctive speeds is not new, as the first proposition for such a concept emerged from Jack Welch, chief executive officer (CEO) of General Electric, who is widely credited as identifying this phenomenon. Acting upon his proposition for the concept of clockspeed, Welch placed a comprehensive set of new initiatives at GE that radically altered business processes during his tenure as CEO (Mendelson & Pillai, 1999). Despite this recognition for the emergence of altering strategic planning processes in an effort to cope with accelerating ICB, it was not until Fine's (1996) conceptual essay that developed the framework and its implications in supply chain design that the theory started to take shape. Mendelson and Pillai's (1999) measurement of clockspeed using quantitative

analysis and development of a framework shaped the prerequisite for quantifying the effects of clockspeed on general business operations. To some extent, strategy was incorporated by Fine and by Mendelson and Pillai, but only at a functional level (e.g., operations or supply chain). With the introduction of the value innovation framework and BOSs as presented by Kim and Mauborgne (1999, 2015), the application of clockspeed theory and blue ocean theory followed separate paths. This study included the introduction of a new notion focused on combining clockspeed theory with blue ocean theory to address research gaps in the blue ocean framework.

Organization of the Remainder of the Study

This chapter included an introduction to the study, along with the background, problem statement, purpose, rationale, significance, nature, and other considerations. The remainder of the study includes Chapters 2-5. The focus of Chapter 2 is on the general literature review, which includes the seminal and scholarly works on both clockspeed theory and blue ocean theory, as well as event studies conducted to measure abnormal stock return measures to assess organizational value changes resulting from blue ocean product introductions and the effect in medium-clockspeed industries. Chapter 3 presents the research methodology, research approach, instruments, sample size, and variables. The focus of Chapter 4 is on data collection and analysis using statistical modelling to determine whether the duration of abnormal returns is longer than 24 months relative to the BOS product competitors and market index. Chapter 5 presents the study findings, conclusions, and future research recommendations.

CHAPTER 2. LITERATURE REVIEW

Historical Review

This section starts with some of the first seminal works conducted by Schupeter, Utterback, or Abernathy in the 1950s through the 1970s relative to product innovation, economic frameworks that drive business behavior and theories relative to competitive strategies, formalized corporate and business strategies, and industry life cycles. The researcher uses the practitioner approach to provide examples of company success and failures while integrating relevant bodies of theoretical literature pertaining to possible causes of failure or successes. The objective is to present the vast amount of theory through a lens applicable and relevant to practitioners. Other objectives of the historical review include setting the scope of the research purpose within this study, which includes the need to incorporate clockspeed research into the strategic planning process, especially at a product development level, while understanding the implications of such actions as measured by the value of stock price performance relative to revenue and profit growth using the event study approach. The historical views on business strategy go back as far as the 1950s, economic- and security-related seminal literature goes back as far as the 1930s, and concepts such as clockspeed and the BOS framework are from more recent literature starting in the late 1990s.

Business Strategy and Clockspeed Conceptual Framework

With endless demand for higher quality and better performing products at lower costs, the digital era has entailed the acceleration of technologies, which has driven change in

organizations at the product, process, and organizational level. The notion that industries are evolving at an ever-growing and faster rate is widespread. The concept of evolving technological advancements stems from Moore's law, which predicts that computer speeds as a result of semiconductor evolution will double every two years (Poeter, 2015). By 2014, a cellular phone had more processing power than the Space Shuttle that took the first men to the moon in 1969 (Nick, 2014). The concept of evolving technologies in computer space continues to be a frequent topic of study; however, research on the effect of technological evolution on the business world from a strategic planning standpoint has gaps. A good example of this phenomenon is the shorter tenure of CEOs in business. In 2000, the average tenure of CEOs was 10 years; by 2012, this number had decreased to 8.1 years (Feintzeig, 2014). One plausible reason that CEO tenure decreased may be the speed at which a market evolves relative to the organization. With ever-growing market demand (external), managers are struggling to develop capabilities internally to match these needs, straining to develop sustainable business strategies, and failing to move at the pace of external market evolution.

Jack Welch understood the importance of needing to evolve faster than the market, which led him to shed hundreds of business units and reorganize General Electric. Welch was quoted as saying, "If the rate of change on the outside exceeds the rate of change on the inside, the end is near" (Allison, 2014, para. 6). Although Welch may have been aware of the importance of evolving faster than the external market, very few industries have remained unaffected by faster technological evolution, in part due to the faster processing power of computers, greater access to the Internet, and a growing adaption of technology by all age groups (File & Ryan, 2014).

Hofer (1975) provided early guidance relative to strategic planning depending on the evolution of an industry and industry life-cycle correlation. Hofer introduced the need for

strategy formulation depending on variables associated with the stage of an industry's life cycle. Though elements of Hofer's theory are still in use, Hofer shaped the way to correlate strategic planning with the evolution of an industry's life cycle.

Organizational leaders can either introduce disruptive innovations and shape an industry's life cycle from mature to growth due to a sociocultural shift that results in the new technology or introduce incremental growth in innovation by complying to the nature of an industry's life cycle where a mature life cycle calls for value-enhancing innovation while sustaining or lowering costs (Camillus, 2001). Although research continues to evolve in the strategic planning phase, assessing and measuring the evolution of an industry is pivotal to strategic planning (Bourgeois & Eisenhardt, 1988). Bourgeois and Eisenhardt (1988) introduced the idea of market evolution and strategic planning, they based their study on the microcomputer industry, and called market evolution *industry velocity*. In doing so, Bourgeois and Eisenhardt found that firms who were able to assess industry information effectively were also able to develop and execute strategic plans more effectively, which Hofer and Schendel (1978) and Porter (1980) also validated in earlier research conducted on other industries.

In 1989, Eisenhardt studied additional organizations in fast-clockspeed industries and found that, relative to their slow-clockspeed colleagues, managers in fast-clockspeed organizations relied on more data, used multiple alternatives, and tended to use a two-tiered advice process to make strategic decisions (Eisenhardt, 1989); however, it was not until 1996 that Fine introduced the notion of clockspeed (e.g., industry velocity) to describe and measure industries and sub-segments within industries to quantify the speed of evolution in an industry (Fine, 1996). In 1996, much of what researchers knew about clockspeed and the criticality thereof to success in strategic planning was only credited qualitatively, as researchers had done

little to quantify and introduce clockspeed, as well as the effects of ICB on organizations in a quantitative design, in an academic setting.

In 1999, Mendelson and Pillai first introduced the correlation between an industry's clockspeed and a firm's internal capabilities, which consists of product evolution, process evolution, and organizational evolution. Mendelson and Pillai found a strong correlation with the industry's environment (fast or slow) as well as the pace at which a firm competing in such a market had to evolve. Quantitatively assessing an industry sub-segment and its relative pace is instrumental, especially when developing strategic plans focused on sustaining a competitive advantage. To measure clockspeed, Mendelson and Pillai used three components: (a) the percentage of total revenue derived from new products (e.g., products introduced in the preceding 12 months), (b) the amount of time passed for a product's life cycle, and (c) the rate at which input material prices decline.

Using the product life-cycle curve with a primary focus on the coefficient of innovation and the coefficient of imitation allows researchers to model the percentage of total revenue derived from new products. In 1969, Bass introduced a widely used mathematical model that measures the life cycle of a product using diffusion theory. The model was expanded in numerous ways; however, for the research presented here, the focus is on a products' cumulative life-cycle curve. In Bass's (1969) original model

$$F(t) = \frac{1-e^{-(p+q)t}}{1+\left(\frac{q}{p}\right)e^{-(p+q)t}} \quad , \qquad (1)$$

where $F(t)$ is the fraction of the total market for the product that has penetrated by time t, usually measured in years. The other two parameters, p, which is the coefficient of innovation, and q

which is the coefficient of imitation, serve to determine product line freshness (Mendelson & Pillai, 1999).

Product line freshness is critical to determining the stage of an industry's life cycle. Organizations that typically market multiple products during the same period of time, and for which the majority of revenue stems from products introduced recently, are thus in an industry where there is a strong market demand for innovative products. In other industries where competition is fiercer, such markets stem from customer clusters where innovation is critical to the success of the firm and thus new products are favored over older products. The degree to which revenue mix will be presented will also be in favor of newer products in industries where innovation is favored. Leaders of larger organizations in mature and fast-clockspeed industries use revenue mix indicators to track revenue stemming from newer products versus older, as innovation could be incremental or radical and the degree to which competition is innovative and the degree to which customers are accepting of the new products affect the top-line growth rate (Mendelson & Pillai, 1999).

To measure product line freshness, it is best to measure products introduced in the past 12 months from the observed time of measurement. According to Bass's model, the fraction of total revenue a product delivered relative to the total lifetime sales that occur within the first year after the product has been launched is the *first-year fraction*, calculated as follows:

$$\left[1 - e^{-(p+q)}\right] / \left[1 + \left(\frac{q}{p}\right) e^{-(p+q)}\right]. \quad (2)$$

Using the first-year fraction formula (2), it becomes apparent that any time the innovation parameter *p* is increased, there is a larger fraction of lifetime sales that occurs in the first year. As *p* gets larger, then *q*, which is overall sales, starts to decrease due to competitive imitation and customer preferences for more innovative products (Mendelson & Pillai, 1999).

The product life-cycle curve and product freshness establish the context for effectively measuring and scoping the industry for clockspeed measurement. Product life is the third variable used and typically measured in terms of time or the time interval from when the product is first shipped to the market and the time a product is no longer shipped. The product life-cycle curve corresponds to the market life or catalog life of the product (Cox, 1967). The correlation between product life and clockspeed is due in part to the speed at which organizations have to adapt to innovative products when the product life cycle is short. An organization that competes in a market where the average product life cycle is 16 months must continuously evolve and introduce new products to sustain or grow market share. Companies that operate in markets where the average product life cycle is 20-30 years have significantly more time and do not have to necessitate internal changes as frequently.

Change in the Price of Input Materials

A related measure to measuring an industry's clockspeed is the annual change of raw material input prices used. In 1992, Williams conducted a study in which industry classifications emerged based on their industry velocity. Williams would go to classify these as slow cycle, standard cycle, or fast cycle, typically driven in part by the whether the input of raw materials were positive, close to zero, or negative year over year (Williams, 1992). Williams (1992) also found that the annual percentage decline in raw material prices of electronic items was primarily due to inputs from manufacturing, which is a supply-side measure to technological change. The study highlighted that where faster input price decreases were apparent, managers would need to modify or redesign products more frequently, sometimes as a requirement to stay competitive, to improve the price-to-performance ratios in the market (Mendelson & Pillai, 1999). As a result, the change of input prices provides an added measure of determining industry clockspeed. Input

prices alone, however, have limitations and must be weighed against product freshness as well as products life cycle.

Effectively Measuring Clockspeed

Following the research conducted by Mendelson and Pillai (1999), the primary research surrounding clockspeed benchmarking consisted of supply-chain-oriented studies that call for designing internal capabilities to keep up with external evolution. These consisted of effects on supply chain design (Chavez et al., 2012; Fine, 2000; Fine, Vardan, Pethick, & El-Hout, 2002; Meijboom, Voordijk, & Akkermans, 2007; Peng, Verghese, Shah, & Schroeder, 2013; Voordijk, Meijboom, & Akkermans, 2003), whereas others focused on other aspects within the supply chain, such as outsourcing and plants (Peng et al., 2013; Perrons & Platts, 2005). Relative to strategic integration and ICB, Souza et al. (2004) introduced elements in a study focused on the correlation of product development and ICB and found that more frequent incremental product innovations are more optimal in fast-clockspeed industries.

Carrillo (2005) introduced similar research as Souza et al. (2004) while expanding on clockspeed and showed that an association exists between ICB and the rate of new product development. Because industries are broad and consist of multiple sub-segments with varying degrees of products and general market scope, for the purpose of this dissertation and research, it was best to focus on separating the business units into industry segments according to the primary product group they produced. As described by Fine (1998) the automobile industry, which was the focus of this study and is categorized as a medium-clockspeed industry, the study focuses on observing an industry slower than cell phone manufacturers, and correlates the industries ability to achieve abnormal returns over a period lasting longer than 24-months. For

this study, the researcher used Fine's (1998) ICB framework and identified the automobile industry as a medium-clockspeed industry.

Business Strategy and Blue Oceans

Seminal research on business strategy is vast and includes various focuses on structure, operations, new product development, competition, industry forces, technology, and many other variables, depending on the time and industry. Relative to blue ocean and clockspeed, it is good to consider the works of Miller (1986), and the review of Hofer and Schendel (1978), Miles and Snow (1978), Henderson (1979), Porter (1980), Hambrick (1983a, 1983b), and Dess and Davis (1984), in which all authors had shared conclusions, which indicated that marketing differentiation, product or service innovation, breadth (niche vs. related diversification), and cost control (low cost or cost leadership) were among the key themes present throughout their studies on strategy. The purpose of this literature review is not to argue for a limited perspective on business strategy by deliberating that the conclusions drawn in these seminal works are the only dimensions of strategy, but to show that these seminal studies have gained prominence throughout strategic research. It is also not plausible to go into depth when reviewing all elements of strategy by focusing on vertical integration, production, and financial strategy, as the study pertains to business level rather than corporate strategy.

One strategic dimension considered at line of business level would be marketing differentiation, in which organizations strive to create customer loyalty by uniquely meeting specific customer needs. Psychological variables influence the perception of value by driving product appeal using market segmentation, prestige pricing, and, as a result, targeted marketing (Miller, 1987). The result is that certain managers do not necessarily deploy a better product, but rather they focus on selling harder (Porter, 1980).

The breadth dimension relates to another element in strategic planning primarily oriented toward the scope of the market to which managers want to cater. Managers can make the determination to expand into adjacent geographies or products, the variety of products, and the variety of customers in the breadth dimension, which most authors in strategy have discussed (Chandler, 1962; Porter, 1980; Rumelt, 1974).

The focus of the conservative control dimension is on the cost leader or defender strategy. This dimension includes tight cost controls and limited spending on marketing and innovation, as well as discounts on standard products. Operational efficiencies and economies of scale allow these managers to protect their position in a given market; the topic received significant review by Henderson (1979), Hambrick (1983b), and Porter (1980) in their observation of cost leaders.

The dimension of complex innovations refers to the focus of introducing major new products or services that are not simple or cosmetic departures from previous offerings. The existence of these organizations in the early 21st century resulted from Apple's invention of the iPhone, Quicken's introduction of software for personal finance, Home Depot's do-it-yourself market, and many others. The innovations that stemmed from these firms are complex and typically involve engineering and R&D personnel at the conception of the development. Miles and Snow's (1978) and Hambrick's (1983b) prospectors, Porter's (1980) differentiators, and Kim and Mauborgne's (1999) BOS are the types of firms most given to pursuing this type of strategy dimension.

Value Innovation

The roots of BOS were in the general business strategies discussed above, but more important, in a concept known as value innovation. Value innovation researchers seek to

understand the conventionally defined boundaries that comprise the competitive landscape by looking at substitute industries, strategic groups, complementary product and service offerings, and the functional-emotional orientations of an industry; they also look across time to obtain a full picture of what opportunities exist (Kim & Mauborgne, 1999). Researchers must consider that companies do not only compete with organizations in their own industries. The five forces shaping the industry are not only competition, but also substitute products, supplier and buyer power, and the threat of new entrants (Porter, 2008). Across substitute industries, buyers of a certain service or product could have two or three alternatives, and a clever marketing campaign by one of these substitute product categories can have a significant effect on buyers' purchase decisions. As they are not a direct competitor, these substitute industries products or tactics may go unnoticed in the realm of the organization seeking to understand its own competitive landscape. Substitute industries represent opportunities for BOS, as new market opportunities may exist, but no one has created them yet.

Strategic groups address another dimension. Although this literature review introduces various types of strategies to deploy, such as differentiation, breadth, cost leadership, or innovation, the underlying premise lies in two key dimensions related to price and performance. In the general market space, each increase in price for a certain product will generally lead to a corresponding increase in performance. As a result, strategic groups focused on these two dimensions and provided another opportunity to create uncontested or new market spaces (Kim & Mauborgne, 1999).

Complementary product and service offerings are an additional dimension in the value innovation framework. The barriers to someone buying a product are the focus in this dimension. Untapped value lies in ease of access, and in such cases, it is best to think about the process of

before, during, and after a customer purchases a particular product. Marketing a product to teenagers involves considering discretionary income as key; however, a teenager's ability to gain access to a product may reveal that transportation is an obstacle. Complementary product and service offerings require organization leaders to define the total solution buyers seek and to focus on the variables that detract from the value of their own product and address them (Kim & Mauborgne, 1999).

Buyer appeals are also two dimensional in the case of value innovation, as they primarily refer to either rational buyers who consider the utility of a product and as a result make a decision to purchase a product or customers who are emotion focused and as a result focus on the experience to determine which product to purchase (Kim & Mauborgne, 1999). When considering the chain of buyers, where most industries have identified the common target customer, managerse must also consider those indirectly involved in purchasing. For example, purchasers pay for the product, and users use the product. Influencers also play an important role in managing perceptions, and in some cases the three overlap, although they typically differ from one another. If there is overlap in the three groups identified, their perception of value will vary, as corporate procurement teams will have a higher emphasis on costs, and the users will focus on the ease of use (Kim & Mauborgne, 1999).

The market space is overcrowded, and business leaders in many industries understand that sustainable growth in the digital age results from creating a market or identifying uncontested markets. Although the value innovation framework highlights opportunities for creating a new market space, BOS encompasses additional variables.

Four Actions Framework and the Strategy Canvas

Kim and Mauborgne (2015) expanded on the product development framework and previous research regarding considerations that go into the development of a new product. In 1991, Clark and Fujimoto wrote a book in which they exemplified and integrated various seminal works and from which it appears that Kim and Mauborgne built their four actions framework. Clark and Fujimoto explained that three key themes underlie the development of products. The process of development should entail and consider simulating future production and consumption. From a competitive standpoint, product development needs to entail consistent processes that consider internal capabilities and link these to the external environment (Clark & Fujimoto, 1991). To address the competitive nature, Clark and Fujimoto noted that product integrity is a key driver, although other variables address overall competitiveness. It appears Kim and Mauborgne built on elements of Clark and Fujimoto's theory by introducing four key variables in establishing a niche segment relative to product development.

The emphasis in creating new value stems from four key variables: which factors of the product should be raised well above an industry's standard, which factors of a product should be offered that the industry segment has not done before, which factors of the products' attributes should be eliminated, and which factors should be reduced (Kim & Mauborgne, 2015). To provide clear insight into the four actions framework, Kim and Mauborgne introduced the strategy canvas in order to illustrates how the four actions framework relates to reshaping an entire industry segment.

Using the strategy canvas an existing fashion retailer whose relative price is high compared to peers, may also offer very high ambience, marketing expenditures, service, and assortment in order to differentiate itself. Furthermore, the fashion retailer may be introducing

features or services none of the remaining fashion retailers offer. One example is Clothing Vault who integrated the four actions framework into its service offering, reducing all variables that the general fashion retailer are high on to significantly below the industry average and raised new factors such as social networking and selection convenience. Clothing Vault introduced two new variables that general fashion retailers had not considered part of their product offering and make-up, thus creating a new market space within an existing industry (Pitta & Pitta, 2012).

The Six Paths Framework

The six paths framework, which is a summary of the elements discussed in the value innovation framework, four actions framework, and strategy canvas, is a comprehensive representation of the opportunities organizational leaders are pursuing in new markets and offerings used in entering or creating these new markets. The focus of the first boundary is looking at alternatives within industries. Alternatives within industries could stem from the type of transportation used when going to and from work. Markets where automobile ownership is expensive are more inclined to have public transportation, and although the utility of such an alternative is different from a personal automobile, the outcome is the same (Kim & Mauborgne, 2015).

The second boundary involves looking at strategic groups of customers. In line with the initial example of automobiles, within utility (having an automobile), there are buyers who want added features, such as performance, design, luxury, or economy, and for each group of buyers, these variables have different value associations. In an existing industry, there may only be three groups of customers: economy, normal, and luxury. Economy includes those focused on cheap vehicles with decent quality and good fuel economy. Normal includes those with a medium price, good quality, and above-standard features, such as air conditioning and leather seats.

Luxury customers want the fastest, safest, and best quality vehicles with accompanying service requirements. Strategic groups of customers may exist between each group and could lead to new markets (Kim & Mauborgne, 2015).

The third path involves addressing the true customers. Although the purchaser of an automobile may be important, users who can have a strong influence on purchasers need to be considered as well. As a result, the industry-defined buyers may not be the actual buyers, and as such, unless industry-defined practices remain unquestioned, such an assumption may create opportunities for uncontested market spaces. An example could be pharmaceutical companies, who focus not on the buyers of drugs (patients) but on the influencers (doctors). Companies in the automobile industry may contend with similar instances in certain cases. An example is Novo Nordisk, a Danish insulin manufacturer who moved away from focusing products on doctors and started creating products focused on the patients (users). Novo Nordisk leaders understood that dealing with insulin in vials, syringes, and the general administration of insulin presented significant challenges in the administration of their drug. To address these issues, Novo Nordisk leaders introduced NovoPen. This new product was intended not for the influencers, or general industry customers (doctors), but for the users to address their needs around transportation, administration, and ease of use (Kim & Mauborgne, 2015).

The fourth path is the scope of product and services that affects a company's existing products. People make purchasing decisions based on discretionary income, but also consider the hassle of acquiring said service or product. As such, potential customers may be reluctant to go to a nice restaurant if they know they have to hire a babysitter. The babysitter service thus becomes part of the scope (Kim & Mauborgne, 2015). In the automobile industry, dealing with dealerships might create a discouragement for purchasers of a vehicle. BMW and other high-end

manufacturers understand that some of their customers do not have the time to schedule a service for their vehicle, bring the vehicle into the dealership, and wait for the service to be complete. As a result, telematics pings dealerships when the preset mileage for service is near, which triggers dealership staff to call BMW owners to schedule appointments. If owners are unavailable, the dealership offers to pick vehicles up, take them in for service, and return the vehicles within a set schedule. As a result, the value proposition of BMW extends beyond the initial scope of the product (purchase of a BMW) and becomes integral to the lifestyle of their clients (Pitta & Pitta, 2012).

The focus of the fifth path is on the two orientations of customers: emotional and functional. The focus of incremental innovation for products in industries known as functionally oriented industries is on the price performance factor. In such industries, customers are unconsciously educated on what to expect, and as a result, each new product introduction should have a corresponding increase in performance. Emotionally oriented industries compete on feelings and appeal, and like their function- and utility-focused counterparts, trap themselves into the same cycle of unconsciously educating customers what to continue to expect. Automobile manufacturers such as General Motors (GM) or Ford Motor Company primarily focus on customer segments looking for utility. As such, each new introduction of the Ford F-150 pickup truck has better utility and functionality. In contrast, the focus at Ferrari is solely on the emotional appeal, with each new introduction being more limited than the previous. This exclusivity appeal draws customers who care less about the amount of space they have and more about the feeling when they pull up in a Ferrari (Pitta & Pitta, 2012).

The sixth path considers time, not in the sense presented above that involved using ICB for industry segments, but rather in the sense of sociocultural shifts that create new opportunities

over time. Trends such as crowdsourcing, the legalization of marijuana in Colorado, or the migration of data to the cloud are examples of time in the context of BOS. The importance of time in the sixth path thus focuses on changing values for those looking to purchase products. Environmentally friendly products in the 1990s were less important to those looking to purchase automobiles; as a result, the introduction of an all-electric vehicle may have been a difficult sell, primarily because it would not address the needs of customers at that time. Prior to the 2008-2009 recessions, the price of gasoline and negative effects on the environment were not making mainstream news in the way they have since. As a result, influential celebrities, programs, and governmental regulation have shifted sociocultural norms to consider the environment as a key issue for future generations. These changes resulted over time, as the time that passed created new trends and opportunities (Kim & Mauborgne, 2015).

The six paths, encompass the key elements of the BOS framework as presented by Kim and Mauborgne (2015). Company leaders who pursue BOSs could exhibit pieces of the framework or multiple paths at once. It is important to notice the key distinctions given to each variable, where organizations in the red ocean focus on rivals, while those in the blue ocean look for alternative industries. The resulting outcomes of companies in each case is different: the leaders of those organizations focused on blue oceans are always looking to create new levels of value, whereas those in the red oceans are always looking at their competitors to create incremental value in already established market spaces.

The U.S. Automobile Industry

The automobile industry is a large and mature market comprised of a variety of subindustries, but in general consisting of the assembly and chassis manufacturing for compact, subcompact, large, luxury, and mid-size automobiles. Similar industries consist of sport-utility

vehicles (SUVs), light trucks, vans, trucks, busses, trailers, and motor homes. Some of the companies, such as Ford or GM, participate in some of the similar industries discussed, but the core business is automobile manufacturing and assembly (Oston, 2016). Although over 100 car manufacturers existed from the late 1800s through the 2000s, only a few U.S.-based and publicly traded automobile manufacturers remain. In the United States, the current market share leaders are GM with 12.3% market share, Ford with 11.1%, Toyota Motor Corporation with 9.4%, Fiat Chrysler Automobiles with 8.7%, Honda Motor Co. Ltd. with 6.3%, Hyundai-Kia Automotive Group with 6.2%, Nissan Motor Company with 4.7%, Volkswagen AG with 4.5%, and Tesla Motors with 3.1% market share in 2016 (Oston, 2016). Of these major players, only GM, Ford and Tesla are U.S. based; Fiat purchased Chrysler in 2014 (Ebhardt & Clothier, 2014). The remaining U.S.-based automobile manufacturers consist of niche players focused on custom or reiterations of existing vehicles to enhance performance or appeal to certain customer groups. The following pages will thus consider the product introductions of the remaining U.S.-based publicly traded automobile manufacturers, GM, Ford, and Tesla, by looking at their automobile introductions, models, and brands to identify models that align with the six paths framework.

The supply chain within automobile manufacturing is also an important aspect to consider, as automobile manufacturers are not always fully integrated. Some industries that support automobile manufacturers, and that may or may not provide incremental product advantages as highlighted in the six paths framework, are the battery manufacturing industry, iron and steel manufacturing industry, paint manufacturing industry, automobile engine and parts manufacturing industry, the automobile steering and suspension manufacturing industry, the automobile brakes manufacturing industry, the automobile transmission manufacturing industry, and the automobile interior manufacturing industry, as well as others (Oston, 2016). These

industries in mass or custom levels may or may not be producing on behalf of the automobile manufacturers discussed. To identify product advantages within automobile manufacturers, these industries may need further evaluation to determine if any of the advantages stem from something other than what the manufacturer is doing internally, and if they do, whether those products are being marketed to others.

General Motors Corporation

GM is headquartered in Detroit, Michigan, and operates its business in about 157 countries worldwide. GM generated $152 billion in revenue at the end of 2015, with $15 billion thereof stemming from the United States, and has about 215,000 employees globally. The major brands that GM has retained over the years in the U.S. market are Chevrolet, GMC, Buick, and Cadillac. From 2010 to 2015 for its compact, subcompact, large, luxury, and mid-size automobiles, Chevrolet offered nine models. The Aveo was a subcompact car manufactured from 2002 through 2011. It is the smallest and least expensive car in Chevrolet's lineup, within an estimated U.S. Environmental Protection Agency (EPA) rating of 24 miles per gallon (mpg) in the city and 34 mpg on the highway ("2008 Chevrolet Aveo," 2017). The fifth-generation Camaro, which was offered from 2010 to 2015 and is categorized as a muscle car, came in three trim levels, the LS, LT, and SS, which all had different engine and performance metrics (Siler, 2009). The Cobalt is a compact car and was offered from 2005 through 2010. The Cruze succeeded the Cobalt, and the first generation was in production from 2008 through 2016 (Colias, 2016). From 2010 to 2015, two generations of Corvettes were introduced. The Corvette is an American icon, and the sixth generation (C6) was in production from 2005 to 2013. The seventh generation (C7) has been in production since 2014. The Corvette is a sports car, and although the introduction of the C6 faced significant criticism by car reviewers, mostly due to the

lack of redesign and enhancement, the new C6 included minor updates, with the LS3 engine displacement increasing and overall performance improving (Berg, 2004). The C7 was a more significant update to design and performance, but most importantly the focus was on attracting a younger audience; the performance only varied slightly from the C6, primarily because the weight of the C7 increased over the C6 models (Webster, 2013).

One of Chevrolet's best selling cars is the Impala. The Impala has been around since the 1950s, and Chevrolet's ninth-generation Impala, which was in production from 2006 through 2014, had minor upgrades to the engines offered as well as minor design updates. The 10th-generation Impala was introduced in 2012 and saw a significant surge in sales, capturing 14.7% of the full-size sedan segment, driven primarily by good marketing, value, and affordability (McEachern, 2014). The Malibu is a mid-size car first introduced in the mid-1960s. The seventh-generation Malibu, which was in production from 2008 to 2012, came in multiple trim levels intended to compete with Japanese rivals Honda Accord and Toyota Camry. The Malibu was well received in 2008, and for a short time was offered in a hybrid model capable of 26 to 34 mpg. The hybrid Malibu was dropped after the 2010 model year (Ulrich, 2009). The eighth-generation Malibu was offered from 2012 to 2016, with minor design and engine improvements from its predecessor. In 2012, *Car and Driver* testers tested the Chevrolet Malibu Eco hybrid, which came in sixth place out of six cars (Phillips, 2012). From 2010 to 2015, five new models were introduced, some as stand-alone platforms and others as successors to outgoing models. The Cruze, which was a successor to the Cobalt, saw the first generation run through 2015 targeted at the compact segment; the Cobalt had significant design and safety modifications and was well received in the market. The second generation Cruze was announced in 2013 and officially launched in 2015, primarily due to engineering modifications (Klayman &

Seetharaman, 2013). Aside from aesthetic upgrades, engine and platforms remained relatively the same with engines and variants geared for some customization depending on the markets targeted.

A new platform for Chevrolet in 2011 was the Volt. Unlike other hybrids, which use a mix of electric and gas power, the Volt operates using only a battery until the battery drops to a certain threshold, at which point an internal combustion engine will start to extend the vehicle's range. The Volt had a 30- to 40-mile electric-only range for the first model introduction. GM refused to call the Volt a plug-in hybrid, which caused confusion with customers and car shoppers; furthermore, many assumed that the cost of recharging the vehicle each night would cost as much as buying a gas-powered automobile (Voelcker, 2014). The Volt is truly a plug-in hybrid, and the U.S. EPA rated the 2013-2015 models with an estimated mpg of 62. The second-generation Volt improved on the existing battery platform and thus increased the all-electric range to about 53 miles, which pushed the combined EPA estimates to 106 mpg. The second generation Volt was introduced in 2015 and launched in 2016. Aside from aesthetic and improved battery range, the Volt had limited deviations from the first-generation model. However, the new Volt was priced between $7,000 and $10,000 less than the first-generation model at a starting price of around $33,000 before any governmental incentives were included (Voelcker, 2015). The Sonic, which is a rename for the Aveo, was introduced in 2011 and is a continuation of the subcompact car category for Chevrolet. Aside from some aesthetic upgrades to design and economical fuel engine options, the Sonic has different trim levels intended to appeal to a wide global customer base (Lavrinc, 2011). The Spark was released to the United States in 2013 in California and Oregon. It is GM's first all-electric passenger car since 2010 and was available in international markets as a nonelectric variant for many years before (Garrett,

2012). At a retail price of about $13,000 for the nonelectric version and $25,995 for the electric variant, the Spark is a robust contender in the subcompact all-electric segment (Chevrolet Pressroom, 2016). The electric-vehicle (EV) version of the Spark has an estimated range of 82 miles and a fuel economy of 119 mpg (Chevrolet Pressroom, 2016).

The Chevrolet SS, introduced to the United States in 2013, is from the GM Holden division and is an executive car known as the Holden Commodore. The Chevrolet SS retails for about $44,700 and comes in only one variant (Ross, 2013). The Cadillac is a GM brand that targets the higher end segment of automobile manufacturers and consists of three primary automobile models. In 2010, the Cadillac brand carried the CTS, the DTS, and the STS. The DTS and STS brands were discontinued after 2011 and the newer ATS and XTS were introduced. For a brief period, the ELR was introduced as well, which added a hybrid offering to the model range in 2014, but it was not offered again in 2015 (Logan, 2016).

The Cadillac CTS is a mid-size luxury car or executive car. The first generation was introduced in 2003 and was available until 2007. In 2008, the second-generation CTS was introduced with a bigger size, better aesthetic appeal, lower weight, and improved engine power output (Pimpo, 2011). The CTS has a few different variants, including a coupe and sport wagon. In 2014, the third generation was introduced, which used a smaller turbocharged engine and was closer in size to the STS (Ewing, 2013). The STS, which was in production from 2004 to 2012, is also a mid-size luxury sedan and was a successor to the Cadillac Seville. The STS was Cadillac's highest priced sedan (in the STS-V model) and GM gradually adjusted the remaining STS offerings to limit the line-up to only V-6 engine trims (Ganz, 2011). The STS was dropped in 2011, along with the Cadillac DTS, which was Cadillac's full-size luxury sedan, and both were integrated into an all-wheel drive model known as the XTS (Ganz, 2011). The XTS, which is

smaller than the DTS but larger than the STS, began production in 2012 (GM Corporate Newsroom, 2011c). The Cadillac ATS, which is a compact luxury sedan that began selling in 2012 as a 2013 model, was developed primarily to focus on competing with international brands such as BMW's 3-series and the Mercedes C-Class (GM Corporate Newsroom, 2011c).

The Buick lineup of GM consists of three models, similar to Cadillac. The Lucerne was in production from 2006 to 2011. It was a replacement to Buick's LeSabre and the division's flagship, Buick Park Avenue. It is a full-size upscale sedan offered at a price below the Park Avenue (Brooks, 2011). The Buick LaCrosse, which is a large to mid-size luxury sedan, has been in production since 2005. The second generation was introduced in 2010 and is marketed as Buick's flagship large premium sedan starting at $32,990. The second-generation LaCrosse was completely redesigned and had improved performance, which brought a new group of buyers to the Buick brand and reestablished its reputation, putting it in the same category as its higher end Lexus ES 350 rival (Lockner, 2015). The Buick Regal is an upscale mid-size automobile that GM initially introduced in 1973. The Regal was discontinued in 2004 but was brought back in 2011 as the fifth-generation model (GM Corporate Newsroom, 2011b). The Regal came in a few different model variants, with primarily turbocharged combustion engine options. A hybrid-like model, known as the eAssist, was offered in 2011, which integrated a lithium-ion battery to improve overall fuel efficiency (GM Corporate Newsroom, 2011b). The smallest contender in the Buick lineup is the Verano. It is an entry-level luxury compact car and was first introduced in 2011 as a 2012 model. The Verano is linked to GM's standard powertrain 2.4-L Ecotec engine and generates 180 horsepower at 6,700 rpm. The Verano has the ability to use flex-fuel, which gives customers an option of using the E85 ethanol or regular gasoline. The EPA estimates for the Verano are 21 mpg for city and 32 mpg for highway use (U.S. Department of Energy, 2017).

Other vehicles under the GM brand include the Holden, Wuling, Vauxhall, Jiefang, Baojung, and GMC and are not further broken out either because they are country- or market-specific models sharing the same design and configurations as mainstream brands or because the vehicles have a nonautomobile classification, such as SUVs and light trucks (GM Brands, 2017).

Ford Motor Company

Ford is headquartered in Dearborn, Michigan, and generated $140 billion in global revenue at the end of 2015, with $14 billion thereof stemming from the U.S. market. Ford employs about 164,000 people and owns a minority stake in Mazda, an automobile manufacturer based in Japan, as well as Aston Martin, based in the United Kingdom. Ford operates two major brands: Ford and Lincoln. Fords models include the Focus, Fusion, Taurus, Mustang, Fiesta, and C-Max. The Lincoln brands include the MKS, MKZ, and Town Car. These were the automobile offerings for Ford and Lincoln from 2010 to 2015 in the U.S. market (Oston, 2016).

The Ford Focus has been around since 1998; the second generation was introduced in 2004 and offered through 2011. In 2011, Ford introduced the third-generation focus, which came in a few variants, including a new hatchback model (Gluckman, 2011). The Fusion comes in various engine configurations that share similarities across other combustion-powered models. The highlight of the new Focus is the all-electric version, with an estimated 93 mpg; it is comparable to the Chevrolet Volt (Gluckman, 2011). The first-generation model lasted from 2003 to 2010, while the second-generation model was introduced in 2011. The Ford C-Max comes in a hybrid variant as well and is most relatable to the Ford Focus ("Ford C-Max Hybrid," 2017). The Ford Fusion is a mid-size sedan and is relatively new to the Ford lineup. The first generation, which ran from 2006 to 2012, came in three trims and two combustion-based engine variants (Bedard, 2005). In 2013, the new Ford Fusion was introduced with a wider range of

engine configurations, better fuel economy, and improved design, bigger size, and longer wheelbase. The second-generation Fusion came with 12 different trim levels in 2017, including two hybrid variants (Ford, n.d.).

The Taurus is one of Ford's oldest running models; originally introduced in 1989, it is a full-size sedan. Ford introduced the 2010 sixth-generation Taurus at the Detroit International Auto Show in 2009 and received good remarks by car reviewers for the standard model (Roy, 2009a). The three variants offered are SE at the base level, a mid-grade option as the SEL, and a top-level model known as the Limited. The Taurus also comes as a super-high output and in a high-performance all-wheel drive trim (Roy, 2009b). The Ford Mustang was first introduced in 1965, is considered a Pony car, and competes with the Chevrolet Camaro, described above. The Mustang has had six generations of models. The fifth was in production from 2005 to 2014, and the sixth generation was introduced in 2015. The fifth generation Mustang came in multiple variants, with the base models using 210-horsepower-output combustion-based engines, and the top-of-the-line GT500 model using a 550-horsepower combustion-based engine (Gillies, 2010). The sixth-generation Mustang was introduced in 2015 and included a wider body and new grill, colors, and designs. Ford also added new engines, including a more fuel economical 2.3-L EcoBoost, which had a power output of 310 horsepower. A 3.7-L put out 300 horsepower, and the 5.0-L had a 435-horsepower V8 (Turkus, 2013).

Ford Fiesta is a subcompact car in Ford's lineup; it dates back to 1977, and has had eight generations of models. The seventh generation has been around since 2008 and is geared toward low fuel consumption and smaller vehicle markets ("The Star," 2007). The Fiesta has various sedan, hatchback, and van variants. The Fiesta also has various engine configurations, starting

with a 59-horsepower 1.2-L Duaratec and going to a ST version with a 1.6-L turbocharged version with 180 horsepower (Burt, n.d.).

The Ford Lincoln lineup, though smaller and consisting of only three automobiles, plays an important role for Ford. The MKS is Lincoln's full-size sedan and has been in production since 2009. The MKS shares its platform with the Taurus, but from a design and performance perspective, there are some key differences. The overall internal design is clean and well laid out, the rear area is thermally enhanced, and the steering has no dead spots (Abuelsamid, 2008). Engine configurations are similar. The top model uses the same 3.5-L EcoBoost V6 producing 365 horsepower, while the entry-level 3.7-L V6 produces 273 horsepower. The MKS costs about $10,000 more than the Taurus (Mays, 2015). The Lincoln MKZ is the medium-size sedan offered by Lincoln and originally replaced the Lincoln Zephyr. The MKZ shares Ford's Fusion lineage and was originally introduced in 2006. The second generation MKZ was introduced in 2012 and came out as a 2013 model year. The MKZ comes in a few different variants, including a hybrid with a 45-mpg combined rating. The 2013 model shares some engine configuration with the MKS, but more so with Ford Fusion lineup, using the same 3.7-L V6 that produces 300 horsepower, as well as the 2.0-L V4 that produces 240 horsepower. The hybrid uses a 2.0-L V4 engine (Blanco, 2012).

The third model in Lincoln's lineup was the Lincoln Town Car, which was a full-size luxury sedan. The Town Car was first introduced in 1981, with the third-generation model discontinued by 2011. Three trim levels were offered in the third-generation models, and one engine was available, producing 239 horsepower using a 4.6-L V8 engine (Speroforum, 2006). Ford also owned Mercury, but this brand was discontinued in mid-2010, and the Mercury vehicles are not representative of any significant deviations, including technology or design, that

would drastically alter the review of the models under which Ford currently operates its brand of automobiles (Folger, 2010).

Tesla Motors

Tesla, Inc. formerly known as Tesla Motors, was founded in 2003 and is focused on the production and assembly of automobiles, as well as the design and development of energy innovation ("Tesla," 2017). Tesla is based in Palo Alto, California, and was generating an estimated $4 billion in revenues at the end of 2015 and $7 billion at the end of 2016, which included the acquisition of its sister company Solar City in November 2016 (Deagon, 2016). Tesla became a public company on June 29, 2010, with an initial share offering of 13.3 million priced at $17 per share (Investopedia, 2015). As of 2017, Tesla had become a diversified and backward-integrated energy company, with primary research focused on its electric-vehicle business and primarily the automobile product lineup.

Tesla has two products in its automobile business: the Model S is a higher end sedan and a Model 3 scheduled for release in mid-2018. The third model is an SUV known as the Model X. Tesla initially gained significant attention through the Tesla Roadster, which was the first electric sports car, released in 2008 (Abreu, 2010). The Roadster played a vital role in Tesla's longer term strategy and skewed the perception of electric vehicles by moving them from tiny or low-range, slow, and monotonous experiments to sleek and well-performing vehicles that could be driven on highways.

The Roadster was originally introduced in 2006, but with a price tag of $109,000, it never garnered mass demand, as it was well outside most people's price range. The Roadster showed that electric vehicles are capable of doing what combustion-engine-powered vehicles have done for many years, which is get around cities in an eloquently designed vehicle without sacrificing

performance (Schwartz, 2011). The Roadster was the stepping stone for what Tesla really wanted to do, which was to produce affordable electric vehicles for the mass market.

The Model S, which is a full-sized all-electric five-door luxury sedan, was introduced in June 2012 (Boudreau, 2012). The first Model S was priced between $57,400 and $77,400 before any government rebates and had an initial range of 160 to 300 miles (Boudreau, 2012). Five years after the first Model S was delivered to customers, the P100D variant of the Model S was introduced, with *Motor Trend* tests giving it a rating of the fastest production vehicle in the world, with a 0-60 miles per hour (mph) speed of 2.27 seconds, which beat exotic vehicles such as the Ferrari, Porsche, and McLaren (Markus, 2017). The Model S has multiple variants, including an all-wheel-drive version introduced in 2014 that received *Motor Trend's* 2013 Car of the Year while garnering a five-star safety rating from the U.S. National Highway Traffic Safety Administration (NHTSA; "Tesla," 2017). In 2016, Tesla unveiled Model 3, which is a four-door compact sedan that will have a starting price of $35,000 before government incentives and is intended for the mass market. The Model 3 will come with a 215-mile range and has been designed to achieve the five-star safety rating ("Accelerating Sustainable Transport," 2017)

Measuring Organizational Performance Using Abnormal Returns

The performance of an organization can be measured in various ways. Organizational leaders typically receive rewards based on financial performance metrics over short and longer term periods. In such situations, the performance of an organization is linked to future financial objectives driven by their performance in the market and assessed against the organization's key rivals through various stakeholders. As such, shareholders measure publicly traded companies with traded securities through buying or selling said securities. Using event studies, managers can start to focus on the effects of firm-specific events, such as the introduction of a new

disruptive product that exhibits one of the six paths discussed earlier in the chapter to enter a blue ocean: the performance of the organizations securities. Observed stock return data exhibit a few variables. Macroeconomic factors drive the performance of a publicly traded security; thus, Brown and Warner (1980) argued for the deployment of one of two models in the quest to determine an organization's performance using securities. The first model, known as the market model, is suitable for estimating the normal return from which a researcher can then build abnormal performance into the data to observe value generated above the normal rate of return. In the second model, the mean-adjusted returns model, the researcher can compute the normal return as a constant based on the average return over a specified period of time observing a security (Brown & Warner, 1980).

Event Studies

The focus of event studies is the effects certain types of organizational occurrences have on the affected firm's securities price. Event studies are prevalent, as they also provide a direct test of market efficiency. Using financial market data, the researcher can use an event study to evaluate the effects on the value of a firm after a specific event. Unlike direct productivity-related measures, which may require months or years to be observed and reflected in pricing of securities due to the rationality in the marketplace, the effects of an event can be observed immediately (MacKinlay, 1997). Using event studies to measure stock performance dates back to the 1930s, when Dolley (1933) assessed the effects of stock splits on the price and effective value of common shares. Stock splits are not the only events from which to assess the value of a firm using an event study. Researchers have used mergers and acquisitions, earnings announcements, trade deficits, and issuances of new debt or equity in accounting and finance. Event studies regarding the value of a firm stretch beyond finance. Additional event studies

pertain to regulatory changes (Schwert, 1981), as well as assessing damages in legal liability cases (Mitchell & Netter, 1994). In most of the seminal research reviewed, applications where event studies took place typically included a focus on the price of common equity shares. From the initial studies in the 1930s through the 1960s, the level of sophistication gradually increased, which resulted in removing general stock market price movements and considering the separation of confounding events (Ashley, 1962; Barker, 1958; Myers & Bakay, 1948). After 1960, researchers introduced methodological advances to event studies. Ball and Brown (1968) and Fama, Fisher, Jensen, and Roll (1969) integrated information content, effects of stock splits after removing simultaneous dividend increases, and further development in statistical assumptions to create the framework for event studies will used in the 21st century.

Brown and Warner (1980) considered various methodologies in measuring abnormal security price performance and summarizing the performance of organizations into Type I errors, in which the test method rejects the null hypothesis of no abnormal performance when true, and Type II errors, where tests fail to reject the null hypothesis of no abnormal performance when false. Although Brown and Warner's objective was to determine the most appropriate event study research methodologies, they used data sampled at monthly intervals in 1980 and dealt with issues using daily data in 1985.

Conducting Event Studies

Although there is limited information on the structure of an event study, there is a distinct flow of analysis. Event studies initially require researchers to define the event they are looking to measure against with a specified period, as well as the security prices of the firms they wish to examine. The definition of the event window is important for research that involves looking at information content on the release of new products. Where the measurement of securities prices

takes place monthly, the event will be the announcement (Month 0) and the event window may include data from Month -89 through Month 60 (Brown & Warner, 1980). It is common to define the event window to be larger, and for the sake of this study, it was expected because the automobile industry in question has an ICB of 4-6 years, as described by Fine (1998). The research needed examining over a broader range of periods surrounding the announcements. Because organizational leaders may leak information prior to an announcement, a broader event window allows researchers to investigate performances of security prior to event returns (MacKinlay, 1997).

After researchers have identified an event to examine, it is important to identify the selection criteria of the companies to study. Such criteria may include restrictions imposed by data availability, scope of research, and markets serviced; a summary of general organizational information (e.g., industry representation, market capitalization, revenue, and other financial information); and any potential biases introduced as a result of the sample selection (MacKinlay, 1997).

Conducting an event study requires measuring the event's effect on the price of securities. Researchers look for any abnormal returns as a result of an event; however, before introducing the availability of abnormal return models, it is important to assess models for measuring normal performance. When measuring normal performance, MacKinlay (1997) described two approaches: one focused on economics and another focused on statistics. In statistical analysis, the return on assets is not dependent on economic arguments (e.g., macroeconomic implications, such as recessions). In economic models, the focus on investor behavior is more important; as a result, statistical assumptions are not the only basis for measuring normal performance. In statistical analysis, researchers can therefore measure

performance without including economic variables, whereas in economic models, researchers would still need to add some level of statistical assumptions. Statistical assumptions include the notion that asset returns are based on two or more variables independently and identically distributed throughout time, and as a result are sufficient to use as a distributional assumption for the constant mean return and market model. The constant mean return model is

$$R_{it=\mu_i+\zeta_{it}} \tag{3}$$

$$E(\zeta_{it}) = 0 \qquad \text{var}(\zeta_{it}) = \sigma^2_{\zeta_i},$$

where R_{it} is the period-t return on a security i, and ζ_{it} is the time period t disturbance term for security i with an expectation of zero and variance $\sigma^2_{\zeta_i}$ (MacKinlay, 1997). The market model is

$$R_{it} = \alpha_i + \beta_i R_{mt} + \varepsilon_{it} \tag{4}$$

$$E(\varepsilon_{it} = 0) \qquad var(\varepsilon_{it}) = \sigma^2_{\varepsilon_i},$$

where R_{it} andR_{mt} are the period-t returns on a given security i and the market portfolio, while ε_{it} is the zero mean disturbance term. The parameters of the market model used are thus α_i, β_i, and $\sigma^2_{\varepsilon_i}$.

Multifactor models include other variables in the analysis of abnormal returns. The market model discussed above is an example of a one-factor model, and a general type of statistical model is the *factor model*, where the key motivation for using such models is the reeducation in variance of abnormal returns by explaining variations in the normal returns. In multifactor models, considerations would include firms with similar size and industry classifications. The gains from using multifactor models in event studies are limited, as the marginal effects of using additional variables are small and little reduction above abnormal returns is given; however, variance reduction was significant in cases where the researched firms

had certain common characteristics, such as companies that shared one industry or were concentrated within a certain market capitalization range. In such examples, using multifactor models could warrant consideration (MacKinlay, 1997).

Economic models are also under consideration during event studies. Common economic models such as the capital asset pricing model (CAPM) and the arbitrage pricing theory (APT) include additional restrictions to statistical models. The CAPM includes the covariance of the security against that of the market portfolio. Researchers primarily used the CAPM in the 1970s. Deviations from the original model indicated the possibility that studies using such economic models may be sensitive to restrictions specific to the CAPM. Researchers use the APT to look at the expected return for a typical asset as linked to the combination of multiple risk factors; however, they found that the APT behaves just like the market factor model, and additional variables give little explanation to the variances seen in using the APT model (MacKinlay, 1997).

Measuring and Analyzing Abnormal Returns

The focus of this section is on measuring and analyzing abnormal returns in the market model. To measure the abnormal returns, the following notations regarding calculating abnormal returns need consideration. Returns will be indexed as event time usingτ. As such, define $\tau = 0$ to be the event date and $\tau = T_1 + 1$ to $\tau = T_2$ to represent the event window. To determine the estimation window, we will use $\tau = T_0 + 1$ to$\tau = T_1$; thus, we will use $L_1 = T_1 - T_0$ to observe the estimation window and $L_2 = T_2 - T_1$ to observe the event window.

The two models introduced in the beginning of this section can now be discussed in further detail. The constant mean return model is

$$R_{it=\mu_i+\zeta_{it}} \quad (3)$$

$E(\zeta_{it}) = 0$ $\text{var}(\zeta_{it}) = \sigma^2_{\zeta_i}$,

where R_{it} is the period-t return on a security i, and ζ_{it} is the time period t disturbance term for security i with an expectation of zero and variance $\sigma^2_{\zeta_i}$ (MacKinlay, 1997). The constant mean return model is one of the simplest models but yields results similar to those of more sophisticated models (Brown & Warner, 1980). Researchers using monthly data can apply the model to real returns, nominal returns, and excess returns, with excess returns considering the excess of the nominal risk-free return a U.S. Treasury Bill would yield with 1 month to maturity (MacKinlay, 1997). A more effective model for measuring security performance would be the market model. The market model is

$$R_{it} = \alpha_i + \beta_i R_{mt} + \varepsilon_{it} \quad (4)$$

$E(\varepsilon_{it} = 0)$ $var(\varepsilon_{it}) = \sigma^2_{\varepsilon_i}$,

where R_{it} and R_{mt} are the period-t returns on a given security i and the market portfolio, while ε_{it} is the zero mean disturbance term. The parameters of the market model are thus α_i, β_i, and $\sigma^2_{\varepsilon_i}$ being used. In research, the market portfolio typically considers one of the major indexes, with S&P 500, the Center for Research in Security Prices (CRSP) Value Weighted Index, and the CRSP Equal Weighted Index being typical choices (MacKinlay, 1997). Using the market model has its advantages over the constant mean return model, primarily in situations where the R^2 of the model regression is greater, as this yields a higher variance reduction in the abnormal return and a larger overall gain.

Nonparametric Tests

Using any of the statistical models requires the calculation and evaluation of the statistical significance of an event period with abnormal returns. This review usually involves

taking the ratio of the event-day mean abnormal return relative to its estimated standard deviation (Brown & Warner, 1985). The primary reason for this cross-sectional *t* test is to determine whether the mean-estimated abnormal return is significantly different from zero for the days measured. As parametric tests contain assumptions about the distribution of the abnormal returns, they need examining in the use of parametric test statistics in event studies (MacKinlay, 1997).

Researchers use nonparametric tests, also known as distribution-free tests, when they know outcomes are not approximately normally distributed; however, Corrado (1989) asserted that when observing large samples, using the central-limit theorem shows that the *t*-test statistic is more dependent upon the mean and variance of a given security distribution, rather than the shape of the distribution. Results from *t* tests are most optimal under normal distribution conditions, and in situations where abnormal returns are not necessarily normally distributed, the *t*-test statistic can lose its accuracy, as there is an increased chance of rejecting the null hypothesis when it is true, described earlier as a Type I error (MacKinlay, 1997).

Conclusion

This chapter has involved reviewing research introduced previously, the origins of strategy formulation, the key seminal works regarding general market strategy, and the continuation of strategy in the sense of product strategy and enhancements by introducing the BOS in isolation. The works by Kim and Mauborgne (2015) in particular were presented through the six paths framework to identify with organizations whose leaders have chosen to pursue one or more of the paths that lead to uncontested market space. Bridging the gap between clockspeed industry and strategy, Chapter 2 provided an introduction into life-cycle management and the origins and notions surrounding the seminal works mimicking that of ICB benchmarking

introduced in the late 1990s by Fine. Clockspeed benchmarking measurements were introduced to show the key variables driving slower or faster benchmarks, which can be applicable in any industry. Fine (1998) had already presented the automobile industry as a medium-clockspeed industry, and this chapter highlighted the product introductions of automobile manufacturers based in the U.S. Chapter 2 and the entailing literature thus included organizations pursuing blue oceans, while also including the implications clockspeed benchmarking has on the industries measured.

The last part of Chapter 2 included a discussion on the value and growth of firms, as well as implications for measuring performance using abnormal stock returns through event studies. The events covered in this research were the introduction of a product that suits the six paths framework for BOS in the medium-clockspeed automobile industry while measuring organizational performance for the events described. The arguments that blue oceans do not exist as presented by Barwise and Meehan (2012), the clockspeed benchmarking as introduced by Fine (1998), and the six paths framework toward a blue ocean as introduced by Kim and Mauborgne (2015) were considered and reviewed. ICB and BOS are presented in consideration of observing the price behavior of a security for an organization having introduced products meeting the blue ocean criteria in a medium clockspeed industry**.** The benefits of this study are twofold: general business practitioners in fast-clockspeed industries can see whether the incremental value gained using securities to measure abnormal returns can justify moving forward on incremental or radical product introductions. Researchers focused on general strategy, supply chain, or product management can consider cross-discipline research by looking at faster or slower industries or other strategies and using functional strategies to drive general

strategy. Chapter 3 includes a discussion on the sample size, industries, and specific methodology used to investigate the research question identified in Chapter 1.

CHAPTER 3. RESEARCH METHOD

Introduction

This chapter addresses the dimensions surrounding the methodological approach and research design, population, sample size, and instrumentation used. The primary objective of this chapter is to help answer the research question presented in Chapter 1 and focus on addressing whether companies in medium-clockspeed environments benefit positively from the pursuit of BOSs. In an effort to measure positive effect, the analysis uses stock price behavior; thus, the population and sample size of U.S.-based publicly traded companies in the automobile industry were analyzed over a 4-year period and discussed. The use of a model to determine whether a company has entered a blue ocean, as well as the measurement of abnormal stock returns, is discussed and justified. Lastly, the chapter includes the propositions created to support the research question.

Design and Methodology

The study was a quantitative descriptive proposition-based event study with a focus on determining the effect ICB has on the value a BOS product spends in a blue ocean and whether it garners abnormal returns during the period measured. The focus of the study was on the automobile industry within the context of time as well as the product's overall innovation. The research therefore involved measuring stock price appreciation using the market model presented in Chapter 2 as a result of a new product introduced in a medium-clockspeed industry. The automobile industry, which is a medium-clockspeed industry with a 4- to 6-year cycle, was

studied to see the effects on stock price and benchmarking relative to peers after introducing a product that met the BOS framework.

The time between a new product entering an uncontested market space and the duration the product is uncontested is pivotal in understanding whether to pursue a BOS. The research question and propositions thus linked the independent variable (time) with the dependent variables (industry and innovation) with regard to the six paths framework presented in Chapter 2. The study involved using a longitudinal event study approach, secondary data, and the market model to determine whether a relationship existed between a medium-clockspeed industry and the time a product innovation remained uncontested in a blue ocean while observing the blue ocean effect on the value of the firm. The study included two phases. The first consisted of identifying the population and sample and collecting data. The second consisted of using the instrumentation and research model to measure the data and ensure consistency, reliability, and validity.

Population and Sampling

The first phase involved identifying companies with headquarters in the United States and publicly traded on any of the major U.S. stock exchanges (New York Stock Exchange [NYSE], S&P 500, or the Nasdaq). The *IBIS World* market research report was suitable for determining companies competing in the U.S. automobile market and cross-referencing each company against U.S. stock exchanges and their reported headquarters on company websites to determine the population for the study. Therein, any acquired companies or companies acquired during the time frame analyzed were excluded, as takeovers can trigger a stock price to appreciate above market-to-book ratios, driven in part by variables related to technological

synergy opportunities or the mismanagement of the target company (Edmans, Goldstein, & Jiang, 2012).

Setting for Research

The research study took place in the United States and involved observing quantitative secondary financial data compiled from publicly traded automobile manufacturers with headquarters in the United States. After identifying the U.S.-based publicly traded automobile manufacturers, it was necessary to establish a time frame for conducting the trend analysis. The analysis included the stock performance of the identified population using a 4-year period spanning from December 31, 2011, through December 31, 2015. As the longitudinal study involved using a trend analysis based on events relative to the introduction of products that met the BOS criteria, the performance of stock price was measured at the close of business at the end of each day during this time period, excluding days where the market was closed.

Data Collection

Chapter 2 included a discussion of economic factors regarding the effects on returns in stock prices, which led to identifying the APT and CAPM models as used extensively to place restrictions on statistical models, which resulted in more constrained normal returns. The information regarding new product introductions and announcements was extracted from each company's annual filings with the U.S. Securities and Exchange Commission (Form 10-K or equivalent), as well as the *Wall Street Journal*.

Chapter 2 also included the BOS framework in an all-inclusive format focused on all the frameworks that identify companies' products with that of a BOS. Part of the Phase 1 study entailed identifying which publicly traded automobile manufacturers introduced products that fall into the BOS framework and which therefore are blue ocean products. Identifying companies

that had products matching the criteria of the BOS framework was important in order to use the automobile industry and relate the study to measure abnormal returns during the period observed. In addition to identifying products that met the BOS criteria to conduct Phase 2 of the study, it was important to understand what to peg the estimation window to in an effort to establish the preannouncement of a new product, corresponding events, and stocks returns.

Instrumentation

The primary focus of Phase 2 was assessing whether any correlation existed between an organization's BOS product relative to the company's stock performance over the specified period of time and as it pertained to the introduction of products by each automobile manufacturer researched and its corresponding events by integrating the last element of the BOS framework, which is time. As shown in Table 1, researchers have conducted empirical studies with event-based stock price analysis in the past; however, the primary objective of this research was to show whether an event such as a product introduction that meets the criteria of a BOS in a medium-clockspeed environment has a positive stock price behavior and abnormal returns following the introduction.

Chapter 2 included a discussion on the differences for measuring abnormal returns specific to event studies. Brown and Warner (1980) concluded,

> Beyond a simple, one-factor market model, there is no evidence that more complicated methodologies convey any benefit. In fact, we have presented evidence that more complicated methodologies can actually make the researcher worse off, both compared to the market model and to even simpler methods, like Mean Adjusted Returns, which make no explicit risk adjustment. (p. 249)

Brown and Warner (1985) used daily stock return data to reinforce their earlier conclusions regarding the use of more complex methods for measuring abnormal returns. Using standard parametric tests under a variety of conditions, including variance increases and the presence of

nonsynchronous trading when using the market model, is well specified (Brown & Warner, 1985). The market model outperforms the mean adjusted returns procedure, and exchange listings affect the power of the various tests, with NYSE-listed securities having a higher effect than securities listed on the American Stock Exchange (AMEX). The market model is better suited to reducing variances in abnormal returns, as it removes a portion of the returns associated with the security that stems from variations in the market return (Brown & Warner, 1985).

Researchers use the market model to estimate the normal return (prior to event announcement) from which they can build abnormal performance (using the normal return established and measuring the return after announcement) into the data to observe values generated above the normal rate of return (Brown & Warner, 1980). The next section includes a description of the propositions for this study derived from the research question listed in Chapter 1.

Research Propositions

Proposition 1

Proposition 1 was as follows: The behavior of a stock price following the introduction of a product that meets the BOS criteria in a medium-clockspeed industry is affected positively. The notion that products that enter blue oceans create new levels of value without competition was tested against investor confidence and resulting equity price appreciation to reflect future earnings resulting from unmatched product value (Kim & Mauborgne, 2005, p. 4). If the proposition was validated by determining that abnormal returns were apparent, then the proposition would indicate that the market perceived products meeting the BOS framework to be value creating. If the proposition was rejected, then additional work was necessary to determine

what, if any, other rationales provided during the introduction of the new product would be unfavorable as perceived by investors.

Proposition 2

Proposition 2 was as follows: There is no effect on stock price relative to the general market index for an equity that has introduced a product that meets the BOS criteria in a medium-clockspeed industry. The primary purpose was to test market appreciation on the exchanges on which each equity was traded. Thus, if the NYSE appreciated 20% while the Nasdaq exchange only appreciated 10% over a 5-year period, equities trading on either of the exchanges could have correlational appreciation as a result of better equity marketability. If the proposition was accepted, the market index appreciation would have a negligible effect on equity price appreciation. If the proposition was rejected, then price behavior for the equities researched might have contained marketability factors that showed higher returns for one equity over another. Although market index variations exist, differences in price behavior can also be associated with numerous other variables.

Proposition 3

Proposition 3 was as follows: The behavior of a stock price following the introduction of a product that meets the BOS criteria in a medium-clockspeed industry, when positive, is limited to a time frame of less than 24 months. The primary purpose of testing this proposition using descriptive statistics and the longer term horizon of an event study was to see whether a medium-clockspeed environment in which the typical product life cycle was at least 5 years (Fine, 1998, p. 239), and 4-6 years for automobiles, has a duration in which it is achieving abnormal rates of return. Validation of the proposition would yield affirmation of the studies conducted by Barwise

and Meehan (2012) that blue ocean markets are uncontested for brief periods. Rejection of the proposition would signal that uncontested market spaces can be uncontested for longer periods of time and continue to drive value for an organization in a medium-clockspeed environment past that the study conducted by Barwise and Meehan (2012), while providing additional support to studies conducted by Kim and Mauborgne (1999, 2005, 2015).

Data Analysis

Phase 1 of the study determined which of the organizations sampled had introduced or announced a new product meeting the criteria requirements using the six-path framework to indicate whether it fits within the BOS framework. Because different companies introduced different car models (new products or reiterations) at various intervals during the time frame selected, the event window was specified to align with the research. As there is no specific structure to follow when conducting event studies, there is a distinct flow of analysis.

Because nonzero abnormal stock security returns are inconsistent with market efficiency following an announcement, long-horizon studies can provide key evidence on market efficiency. Observing a medium-clockspeed industry such as the automobile manufacturers in the United States can provide key evidence in a setting where market efficiency is more prone to play out (Fama, 1991). Event studies require researchers to define the event they are looking to measure against with a specified period of time as well as the security prices of the firms under examination (MacKinlay, 1997). Definition of the event window is important for researchers looking at information content on the release of new products. Where securities prices are measured monthly, the event will be the announcement (Day 0) and the event window may include data from Day -60 to Day 60 (Brown & Warner, 1980). It is common to define the event window to be larger, and for the sake of this study, it was customary, considering that the

automobile industry under study had an ICB of 4-6 years. The research needed to be examined over a broader range of periods surrounding the announcement. As organizational leaders may leak information prior to an announcement, a broader event window also allows researchers to investigate the performance of security pre-event returns (MacKinlay, 1997). This dissertation thus defined the announcement of the product introduction as Day 0 and the event window was -12 days, +12 days; therefore, the price behavior of the security was examined over 24 days. The estimation window for this study was -60 days to -15 days; thus, the estimation window ended 15 days prior to the announcement of a new product introduction event or feature. This 75-day period was used to estimate the α and β parameters using ordinary least square regression.

The selection criteria of organizations researched were discussed earlier in this chapter, along with the introduction of the BOS framework used for consideration. MacKinlay (1997) explained the next step in conducting an event study is to determine which market index to use as a market return. Popular choices are the S&P 500 index, CRSP Equal Weighted Index, and CRSP Value Weighted Index. A broad-based index is most common, and because publicly traded automobile manufacturers in the United States trade on multiple exchanges, the Dow Jones Wilshire 5000 Total Market Index was used for determining the market return (R_{mt}) (MacKinlay, 1997). The Wilshire 5000 Index, developed in 1974, is widely accepted as the definitive benchmark for the U.S. stock market. As the Wilshire 5000 index is the broadest and most comprehensive of all indexes, it provides the best measure of the U.S. equity market (Wilshire, 2016). As of September 2016, the S&P 500 represented an estimated 70% of all publicly traded stocks, and the Dow Jones Industrial represented 25% of the market but was generally regarded as a leading indicator of market health. Other indexes, such as the Russell

2000, track only the smallest companies, and the Nasdaq market index, known as the Nasdaq Composite, tracks an estimated 3,000 companies traded on the Nasdaq exchange (Pant, 2016).

The next step in conducting an event study is to identify the normal performance of a security by calculating the parameter estimates (MacKinlay, 1997). Using ordinary least squares, actual returns of each stock measured are integrated into the final samples and then regressed against the market return, which is based on the Wilshire 5000 Total Market Index observed over the estimation window. The results, which provide α and β estimates for each security, are then used to compute the normal return using the formula

$$NR_{it} = \alpha_i + \beta_i R_{mt}, \quad (5)$$

where NR_{it} is the normal or expected return of security *i* for time period *t*, and the other factors are as previously defined and noted in Equation (4). After the normal or expected return of a security was determined over the time period proposed, residual error was then calculated.

Following the computation of residual error terms for each day of the event window for each security, the average residual error term (ARE_t) was calculated across all the securities included in the sample for each of the 5 days in the event window. The calculation was presented by the following formula:

$$\frac{\sum_{i=1}^{N_t} e_{it}}{N_t} \quad (6)$$

where $-2 \leq t \leq +2$ and N_t is the number of stocks for which return observations were available on Day *t*.

These ARE_t terms were grouped and reported in a variety of ways to adjust for the overall sample. For example, the terms could be reported by stock exchange listing or by stock exchange listing and post-event price range. As part of this analysis, *t* statistics were computed for each of the ARE_t terms in the event window to evaluate whether such error terms are significantly different from zero. The ARE_t term was computed for the sample as described in Equation (6).

The cumulative average residual error term (CAR_t) was also calculated for each day of the event window, starting with Day -12. The computation of CAR_t was represented by

$$CAR_t = \sum_{t=-2}^{d} ARE_t, \quad (7)$$

where *d* was the day of the event window on which the cumulative average error term was measured.

This cumulative average residual error term (CAR_t) was the focus of interest for much of the analysis conducted in this study. To test most of the propositions, the CAR_t term was categorized as belonging to different groups. For example, to test whether there was a difference in the stock price behavior of companies that provided a public rationale for announcing a new product introduction versus those that did not, the average CAR_t was calculated for each group.

After calculating the abnormal returns, MacKinlay (1997) contended that the next step in an event study is to design the framework for testing such abnormal returns. MacKinlay noted that properly defining null hypotheses and determining how to aggregate individual firms' abnormal returns are important considerations in this process.

Medium-Clockspeed Analysis

As one of the primary purposes of the study was to investigate the longer term price reaction to the announcement of a new product introduction or corresponding events, a brief look at a longer term stock price performance was also conducted using logarithmic returns. For

organizations researched in the final sample, stock price data were collected for all 4 years. The percentage change in the stock price day to day was measured by first defining a return r_i at time $_i$, where p_i was the price at time i and $j = (i - 1)$:

$$r_i = \frac{p_i - p_j}{p_j}. \quad (8)$$

The primary benefit of using percentage returns rather than raw prices is for normalization, which allows an additional perspective on the event study outcomes because the analysis involved comparing analytic relationships among two or more variables, as the securities could or typically have unequal values of prices based on outstanding shares, dividends, or other performance drivers in the market. Following the analysis in percentage changes of each period, the top and bottom performers were identified by the percentage change in stock price occurrences. One purpose of this additional research was to determine the total number of occurrences a company's security increased or decreased in the period measured from the start of 2012 through the end of 2015. Positions in a company are not only made at the time of the occurrence; longer term investors may be coming into information not publicly available or acquainting a strategy with a market opportunity still shaped by the disruptor's technology. The event study thus highlighted that if a stock price increased after the announcement of a new product introduction meeting the BOS criteria, an investor would want to continue to hold that stock for a period of time disclosed as the typical ICB for a certain industry. The results of this study might help investors be able to distinguish between companies whose prospects are bright while understanding the duration using the clockspeed framework versus dismal performers after announcing a new product introduction meeting the BOS criteria.

Validity and Reliability

The objective of the research was to measure two components: time and value. Would products that met the BOS framework generate higher value for their companies, and was the time duration these products spent in blue oceans short (less than the ICB benchmark) or long (longer than the ICB benchmark)? The measurement of abnormal stock returns using the market model provides a well-established tool that has proven to provide strong validity when conducting event-based studies (Brown & Warner, 1985). The study was also applied to a wide group of research subjects. As long as the ICB is well defined ahead of the study, and aligns with its appropriate clockspeed benchmark of slow, medium, or fast, the event study using abnormal stock return measures can provide the value the BOS products provide, as it pertains to time and value (MacKinlay, 1997).

Ethical Considerations

Although the research did not include data from actual participants, it was still important to note considerations when using secondary data. In cases where data identify individuals, data must be deidentified before being released to a researcher, the consent of research subjects must be reasonably presumed, and the outcomes of the analysis must not allow the reidentification of participants. Because the focus of the data used in this research was on publicly available financial time-series data, misinterpretation of the data was the primary consideration to ensure the organizations studied were represented fairly. As a result, the propositions evaluated might not have represented all the challenges associated with assessing whether BOS-related product introductions provide long-term value. Though event studies using publicly traded companies provide a benchmark, other elements not covered in this analysis may need attention.

CHAPTER 4. RESULTS

Introduction

The research study involved two phases. The first involved identifying publicly held automobile manufacturers based in the United States that exhibited elements of the BOS through the six paths framework described in the previous chapters. Within the identification of a blue ocean product, there are events and occurrences that contribute to the well-being of the products' said market, which further benefit from the product they are using through a series of product modifications and for which the incumbent blue ocean product holder further enhances and develops on the existing product line. The effects of these initial and incremental product development efforts appear in Chapter 4 and provide the framework for the event study and statistical analysis in Phase 2.

The second phase of the study involved looking at the events' and attributes' value to the organization using the event study methodology and applying the market model application to evaluate an organization's performance resulting from the event triggers discussed. This chapter thus covers the two components of the study and provides a quantitative reflection to analyze the effect of the value generated from a BOS on the value of its organization, as well as the propositions presented in Chapter 3.

The research design was a quantitative, descriptive, proposition-based event study with a focus on determining the effect ICB has on the value a BOS product introduced spends in a blue ocean and whether it garners abnormal returns during the period measured. The study used the

event study methodology relating to the market model application to determine whether the securities returns were abnormal over the periods measured. The normality of the data was tested using the Shapiro-Wilk test of normality, and all *p* values were well above .05 for the four events studied. The statistical test used was a one-sample-mean *t* test.

The purpose and reason for Chapter 4 is to provide statistical evidence for the behavior an organization's security experienced that resulted from the introduction and accompanying events exhibiting the BOS framework. Chapter 4 also reintroduces the research question and accompanying propositions, which related to the data analysis and outcomes and are summarized at the end of Chapter 4.

Data Collection Results

The first part of the data analysis involved analyzing the publicly held automobile manufacturers' product introductions and identifying products that were differentiated enough to be categorized as a blue ocean product. The second part of the study then involved looking at critical event triggers within the blue ocean product introduction and considering how these contributed to the market value of the firm, as well as the duration.

Phase 1: Six Paths Framework

Through identifying automobiles that were different from existing hybrid or combustion-based models, the Ford and GM models had little to offer in terms of innovation that would have qualified their products under the BOS framework. The Chevrolet Volt, which was a light contender in its initial introduction, is still part of the bigger hybrid model market that has existed for many years, mostly dominated by Toyota and other manufacturers. The limited electric-only vehicles offered by GM and Ford had significant limitations, such as range and fast charging. The key focus of the six paths framework was industries, strategic groups, buyers,

scope of products, function, emotional orientation, and time. Although BOS products did not necessarily address all six at once or at any one time, they needed to receive consideration to establish event triggers for Phase 2 of the study. Tesla's Model S did not focus on rivals; it was the first all-electric vehicle with a focus on providing a completely different experience to drivers. Although GM and Ford leaders looked to make incremental changes to existing combustion-based models, which appealed to aesthetic or performance factors, the Model S met the fundamentals of design and aesthetic appeal, but did so by offering a new type of experience with unprecedented range and performance. Looking across alternative industries, the Model S integrates power from alternative energies rather than fossil-based fuels.

The Model S identifies with strategic groups that are already in existence; higher end performance sedans not identified in Chapter 2 stem from international manufacturers such as BMW or Mercedes. The Lincoln MKS was a category that aligned with the strategic group in which the Model S would compete. Buyer groups here could possibly be changed through the service model, as the Model S receives software updates without the buyer needing to come into the dealership for services. No oil changes, fuel filters, spark plugs, or emission checks make the service process simpler on the Model S. The services performed included wheel alignment, fob batteries, and windshield wiper blades ("Tesla Support," 2017).

The fourth path involved looking at the scope of products and services; Tesla offered an extensive network of super-charging stations in Europe, North America, and Asia and the Pacific. Tesla's integrated LCD screen automatically identifies and recommends stops along the route to ensure your vehicle is recharged appropriately and does so by offering 848 Superchargers around the world ("Supercharging Station," 2017). One of the largest drivers for why someone would opt out of an electric-only vehicle is range anxiety (Mooney, 2016). Tesla is

thus reshaping the value proposition of its products. Tesla has been investing in developing a well-covered network of chargers that would give its owners peace of mind. None of Tesla's electric-vehicle competitors have any type of network, and owners not only have a significantly smaller range, but they also have to rely on home equipment to charge their vehicles if the city or area they are commuting to does not have charging mechanisms.

The focus of the fifth path is the functional or emotional orientation of the product. The Model S is an example of a product for which its developers rethought the functional and emotional orientation of the industry. The Model S addresses the functional aspects that people want. For example, most vehicles in the same class as the Model S offer seating for five, the Model S offers seating for five adults and an additional two children, for a total of seven. For the range of buyers in its category, the Model S offers full self-driving mode, known as autopilot; an unparalleled safety rating due to the fact that there is no heavy combustion engine; and impact-absorbing steel rails. The Model S comes in five variants that offer a range of 265-337 miles ("Models," 2017). With regard to the emotional aspect, the environmental and sustainable development of products and their impact on the environment sits at the forefront of priorities for most developed and some underdeveloped nations. The United Nations ranks 17 goals as being transformational to achieving sustainability; therein, pollution affects climate actions, renewable energy, good health and well-being, and life on land and in the water ("UN Goals," 2017). The Model S addresses those needs for customers at an emotional level, as the effects of not driving a combustion-based vehicle and helping the environment transcends the experiences of fast and fun and instead focuses on a deeper connection in ensuring the Earth is a good place for generations to come. Although the sustainability aspect of owning a Model S helps with one group of buyers, the second group, which enjoys the performance, would opt for the 2015 P90D

Model S in which owners reached 60 mph in 2.8 seconds (Seabaugh, 2015). None of the GM or Ford vehicles that are electric are able to provide the aesthetic appeal or performance, functionality, range, and overall ecosystem of the products that Tesla offers.

Time, which is crucial to shaping external trends over time in the BOS framework, was also used to conduct Phase 2 of this study. Since the Model S was introduced in 2012, several events have occurred and have shaped the sociocultural norms and perception of electric vehicles. On June 22, 2012, the first Tesla Model S cars were delivered, primarily to buyers in Palo Alto, California, and Chicago, Illinois ("PolitiCal," 2012). On September 24, 2012, Tesla unveiled its Supercharger network, which was to cover the entire United States in 2 years, as well as Asia and Europe. Any Model S owners can fill up for free using Tesla's Supercharger network (Lawler, 2012). The five-star safety rating received from the NHTSA on August 19, 2013, in every subcategory, without exception, led the Model S to set a new record for the lowest likelihood of injury to occupants ("Tesla Model S," 2013). On July 17, 2015, Tesla unveiled its ludicrous mode, which is an upgrade that propels its Model S P85D from 0 to 60 mph in 2.8 seconds (Valdes-Dapena, 2015).

The events covered in Phase 2 were thus represented in the following format: Event 1 was the event in which the first Model S was delivered, with an event date of June 22, 2012. The estimation window went from -60 days from the event (April 23, 2012) up to -15 days from the event (June 5, 2012). The abnormal return window was measured as -12 days from event (June 11, 2012) and went through 12 days after the event (July 3, 2012). Event 2 was the event when the Supercharger network was introduced on September 24, 2012. The estimation window for Event 2 went from -60 days from the event (July 26, 2012) up to -15 days from the event (September 7, 2012). The abnormal return event window was measured as -12 days from the

event (September 12, 2012) through 12 days after the event (October 5, 2012). Event 3 was the event when the Model S received the highest safety rating from the NHTSA on August 19, 2013. The estimation window was measured as -60 days from the event (June 20, 2013) and up to -15 days from the event (August 2, 2013). The abnormal return event window was measured as -12 days from the event (August 7, 2013) through 12 days after the event (August 30, 2013). Event 4 was the event when Tesla introduced ludicrous mode on the Model S on July 17, 2015. The estimation window was measured as -60 days from the event (May 18, 2015) up to -15 days from the event (June 30, 2015). The abnormal return event window was measured as -12 days from the event (July 6, 2015) through 12 days after the event (July 29, 2015).

The estimation window and abnormal return measurements take into account holidays on which the markets are closed. As such, only days in which the market was open were considered as days in the study. In addition to abnormal return measurements conducted in typical event studies, the research involved using both an event-study *t* test as well as a traditional single sample *t* test to test whether the average abnormal returns were greater than zero.

Phase 2: Event Study

Phase 2 of the study involved considering the statistical implications surrounding the introduction of the Model S (Event 1), the introduction of the Supercharger network (Event 2), the announcement of the Model S receiving the highest safety rating of any production vehicle (Event 3, and the announcement regarding the ludicrous mode on the Model S (Event 4). The study consisted of four event samples taken at the time of the announcement and the cumulative abnormal returns over the period of time the study event was measured. As researchers cannot simply use observed market returns for any given security as a measure of the market's reaction to the events discussed, they must isolate the returns attributable to the event while stripping out

the systematic price movement from the overall return reaction by determining normal returns well before an event and indexing these against that of a market index. When measuring abnormal returns in the event window, the returns were then observed while only considering returns above the normal or expected return discovered in the estimation window. As a result, the returns provided included only the unsystematic return components known as abnormal returns. As Tesla had no dividend payments, Phase 2 did not involve considering the continuously compounded returns before measuring the abnormal returns.

Event 1 saw a cumulative abnormal return of 13.37773 and a mean of 0.7869254 during the event window observation. Using both the *t* test commonly used in event studies and the standard single sample *t* test, the abnormal return was greater than zero. The *t*-test statistic, however, was only barely greater than 1.96 at 2.019665, and the *p* value for the single sample *t* test was just below the statistically significant cutoff of .05 at .0302. With a mean of 0.7869254 barely above zero, evidence indicated that the delivery of the Model S on June 22, 2012, affected the abnormal returns. However, the effect of the return was so small that it likely did not have any substantial effect on the corresponding market value of Tesla.

Event 2 revealed a cumulative abnormal return of -19.38116 and a negative mean of -1.076731 during the event window observation. The *t*-test statistic for Event 2 was much greater than 1.96 at 4.261241 and provided much greater levels of statistical significance with a *p* value less than .001, coming in at .0003. Event 2 thus provided evidence that the introduction of the Supercharger network had a negative effect on Tesla's market value.

Event 3 had a cumulative abnormal return of 532.8453 and a mean of 29.60252 during the event window observation. The *t*-test statistic for Event 3 was much greater than 1.96 at 9.031376 and with a *p* value less than .001. The highest safety rating announcement for the

Model S provided strong evidence that the market value of Tesla was significantly affected during this event.

Event 4 saw a cumulative abnormal return of 182.1507 and a mean of 10.11949 during the event window observation. The *t*-test statistic for Event 4 was much greater than 1.96 at 4.891848, with a *p* value of .0001. The introduction of the ludicrous mode on the Model S provides strong evidence of the significant effect on the market value of Tesla during this event.

Descriptive Analysis

The development of visual statistics for event study methodologies can be approached in a few different ways. One consideration is to use arithmetic-based returns day over day and categorize these as occurrences relative to the time period observed. The challenge with this approach is that compounded arithmetic returns are not symmetric, as a security that may appreciate 15% in 1 day and depreciate 15% the next day will show a total change of -2.25%. To address this and align the descriptive analysis with that of the event study methodology, all the data presented used logarithmic rates of return. The logarithmic analysis in Figures 2-4 did not take into account the riskless rate of return; it simply presented the logarithmic returns for General Motors, Tesla, and Ford from the period beginning in 2012 and going through the end of 2015, as conducted in the event study methodology. The event study methodology used the Wilshire 5000 market index as a measurement of abnormal returns. The security prices for Ford, General Motors, and Tesla were all adjusted for any splits or dividend payments issued during the period of this study.

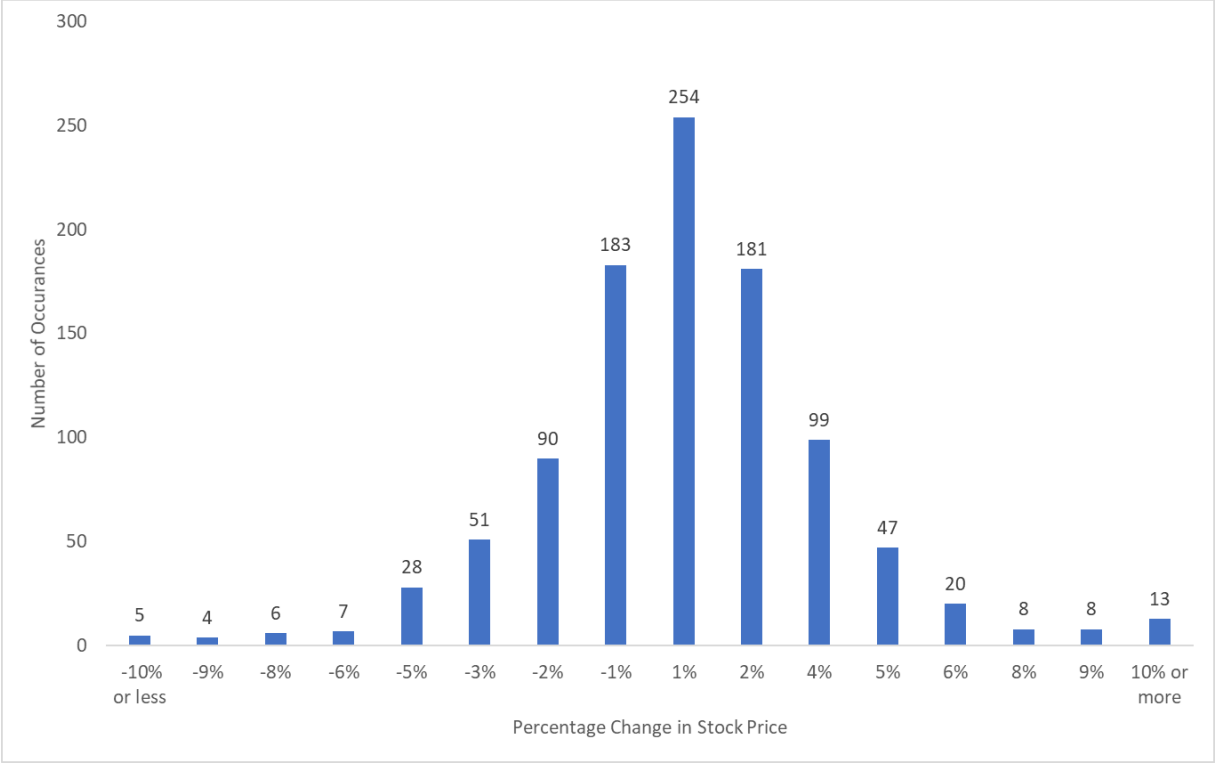

Figure 2. Tesla logarithmic return distribution.

The mean of the logarithmic returns for Tesla was 0.21%, with 1,005 recordings considered. The total return over this period was 215% rounded up, with a standard deviation of 3.32%.

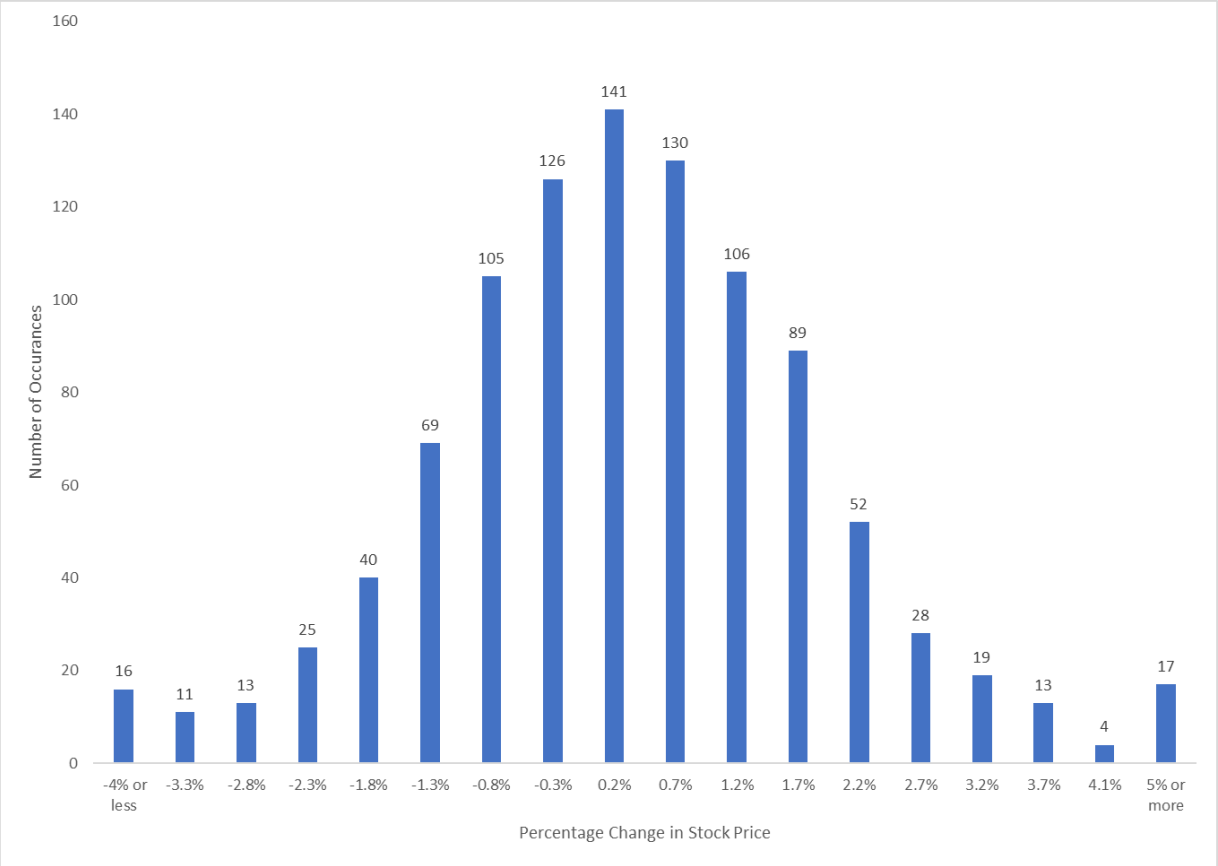

Figure 3. General Motors logarithmic return distribution.

The mean of the logarithmic returns for General Motors was 0.06%, with 1,005 recordings considered over this period. The total return over this period was 56% rounded up, with a standard deviation of 1.68%.

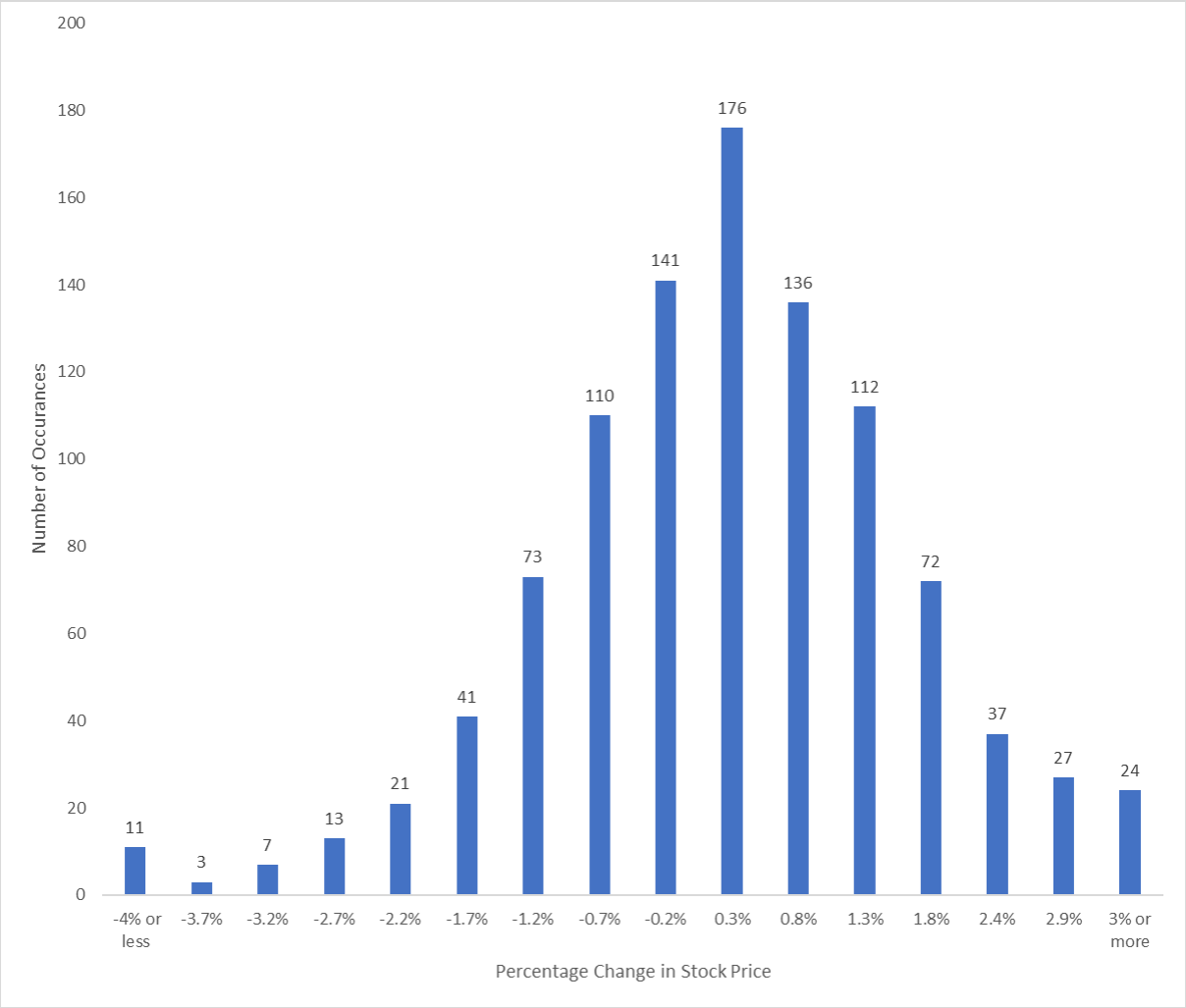

Figure 4. Ford logarithmic return distribution.

The mean of the logarithmic return for Ford was 0.04%, with 1,005 recordings considered for this period. The total return for this period was 35%, with a standard deviation of 1.46%.

Aside from the smaller bin sizes used for Ford and General Motors, the same analysis looking at the Wilshire 5000 index yielded a total return over this period of 54% rounded up, with a mean of .05% and a standard deviation of 0.81%. In Ford's case, the market outpaced its

growth from 2011 to 2015, while General Motors came in on par with the market. Tesla outperformed the market when looking at the logarithmic returns for the period considered. The small bin sizes also indicated that daily changes, either positive or negative, were significantly less volatile, though small, with Ford, General Motors, and the overall Wilshire 5000 index. Tesla's biggest day drops or gains were also significantly larger, with a minimum of -21.48% and a maximum of 21.83%. The descriptive analysis further complemented the findings in the event study methodology used, showing that returns for the entire period outpaced both rivals in the United States, as well as the general market index.

Analysis of Propositions

The study included one research question and three associated propositions. The focus of the research question was the effects a company's market capitalization experiences as a result of the introduction of a product meeting the BOS framework, as measured using the event study methodology to determine securities' cumulative abnormal returns during such event triggers. The research question was as follows: Is there a significant increase in the value of a company after the introduction of a product that meets the BOS framework?

The propositions derived from the research question were as follows:

Proposition 1: The behavior of a stock price following the introduction of a product that meets the BOS criteria in a medium-clockspeed industry is affected positively.

Proposition 2: There is no effect on stock price relative to the general market index for an equity that has introduced a product that meets the BOS criteria in a medium-clockspeed industry.

Proposition 3: The behavior of a stock price following the introduction of a product that meets the BOS criteria in a medium-clockspeed industry, when positive, is limited to a time frame of less than 24 months.

Propositions 1 and 2 were answered using the event study methodologies under Events 1, 3, and 4. Event 1, which was the first official date on which the Model S was rolled out, had a cumulative abnormal return of 13.37773 and a mean of 0.7869254 during the event window observation. The *t*-test statistic was only barely greater than 1.96 at 2.019665, and the *p* value for the single sample *t* test was just below the statistically significant cutoff of .05 at .0302. With a mean of 0.7869254, barely above zero, there was suggestive evidence that the abnormal returns were affected by the delivery of the Model S on June 22, 2012. However, the effect of the return was so small that it likely did not have any substantial effect on the corresponding market value of Tesla. Other considerations for why Event 1 only had a small positive effect on the security may be in part due to the official announcement of the Model S being the event trigger for which the security had adjusted for months before and the rollout of the Model S being expected news that the security's price in the market had also adjusted for earlier. Event 3, which occurred on August 19, 2013, saw a cumulative abnormal return of 532.8453 and a mean of 29.60252 during the event window observation. The *t*-test statistic for Event 3 was much greater than 1.96 at

9.031376 and with a *p* value less than .001. The highest safety rating Model S announcement provided strong evidence that the market value of Tesla was significantly affected during this event. This event occurred a year after the introduction of the Model S, was rewarded by investors as a true product differentiator under the BOS framework, and, considering the sixth framework under BOS, it seemed to shape the perceptions and values of customers and investors over time.

Event 4 included a cumulative abnormal return of 182.1507 and a mean of 10.11949 during the event window observation. The *t*-test statistic for Event 4 was much greater than 1.96 at 4.891848 and with a *p* value of .0001. The introduction of the ludicrous mode on the Model S occurred on July 17, 2015, more than 24 months after the introduction of the Model S, and showed that Proposition 3 was not necessarily true, as it showed abnormal returns well into the product's life cycle. Event 4 also highlighted that significant improvements to the product allowed the Model S to reach new customers, for which Tesla's market capitalization significantly grew. Event 2 contradicted Propositions 1 and 2, showing a negative effect on the market capitalization of Tesla, when the cumulative abnormal return was -19.38116 and the mean was -1.076731 during the event window observation. The *t*-test statistic for Event 1 was much greater than 1.96 at 4.261241 and provided greater levels of statistical significance with a *p* value less than .001 at .0003. Event 2 thus provided evidence that the introduction of the Supercharger network had a negative effect on Tesla's market value. Although Tesla's events were selected to show perceptions customers may have had, at the time investors saw significant cash outflows and capital outlays to develop such a network in Asia, Europe, and North America. As the event study methodology using the market model was benchmarking the Wilshire 5000

index, Proposition 2 was also not true: the introduction of the Model S in all three events had a positive effect and in one event had a negative effect relative to the market index.

Assumptions and Limitations

The data used all publicly traded automobile manufacturers, with 1,005 observations for each automobile manufacturer, plus the Wilshire 5000 index. The limitations of the sample size selected provided a confidence interval of ±3% 19 out of 20 times. The limitation of the study from a sample perspective was a limited focus on the product introduced being able to meet the requirements of the BOS framework and aligning it with the observation over the selected period rather than the number of trades observed. The normality of the data was tested using the Shapiro-Wilk test of normality, which indicated that all four event *p* values were well above .05 for the four events studied. The statistical test used was a one-sample mean *t* test. The data, though publicly available, was at all times contained on my personal computer and protected with a security passcode. There were no concerns of biases in the study.

Limitations to the study centered on only one automobile manufacturer having introduced a product meeting the BOS criteria over the period sampled. Looking at a broader time horizon highlighted other implications, such as bankruptcies, acquisitions and mergers, and broader macroeconomic variables that may have skewed the price of securities in the data. The study provided a 4-year period of observations in securities, but was limited to only U.S.-based automobile manufacturers.

Proposition Summary and Outcomes

Table 1 highlights the proposition summaries and outcomes based on the study conducted.

Table 1. Summary of Propositions Tested and Outcomes

Proposition	Outcome
P1: The price behavior of a stock price following the introduction of a product that meets the BOS criteria in a medium clockspeed industry is affected positively.	True
P2: There is no effect on stock price relative to the general market index for an equity, which has introduced a product that meets the BOS criteria in a medium clockspeed industry.	False
P3: The price behavior of a stock after the introduction of a product that meets the BOS criteria in a medium clockspeed industry when positive is limited to less than 24 months.	False

Summary

In summary, the introduction of a product meeting the BOS framework operating in a medium-clockspeed industry had returns above the normal rate of return and continued to do so well past the 24 months that faster-clockspeed industries may experience, as presented by Barwise and Meehan (2012). The events studied did not all show positive returns, as Event 2, which was the introduction of the Supercharger network, had a negative effect on Tesla in 2012. Events such as the safety rating results and the introduction of the ludicrous mode were the largest drivers of value for Tesla during the period observed.

CHAPTER 5. CONCLUSIONS

Introduction

This study concludes with an evaluation of the research question, the fulfillment of the research purpose, a contribution to the business problem, and recommendations for future research. The interdisciplinary research question of strategy, supply chain, and finance guided this research, and the focus of the three propositions was identifying the value the BOS product created relative to the general market index using a duration exceeding 24 months. The purpose of the study was to examine whether ICB contributed to the duration under which a product meeting the BOS framework's introduction would lead to above-normal returns delivered to an organization compared to previously observed times, as suggested by Barwise and Meehan (2012). The study involved conducting an analysis of securities' closing prices against those of a market index using the event study's methodology in a market model application. The researcher collected the publicly available financial information of publicly traded companies in the automobile industry with headquarters in the United States. The results of the study shed additional light on the use of ICB when using BOS product development initiatives and their possible relative duration in a uncontested market space. Chapter 5 ends with a conclusion of the study.

Evaluation of Research Questions

The research question in this study was as follows: Is there a significant increase in the value of a company after the introduction of a product that meets the BOS framework? Testing

the research question against the three propositions posed revealed that, in most cases, the value of a company increased significantly, with above-normal returns during the events observed. The abnormal returns for the events measured were significant in certain cases. For this study, all of the event returns were measured against a market's overall index, and the event study methodology using the market model application helped shape the evaluation of the research questions against the propositions posed.

Fulfillment of Research Purpose

The purpose of the study was to build on the BOS framework by establishing whether distinctions regarding the time a market is uncontested exist when observed through the ICB lens. The intention behind this study was to contribute to the BOS pursued by organizational leaders globally. The focus of the study was on identifying whether there is a time variable to the duration that products are uncontested. The study shed light on organizations in medium-clockspeed industries, with the automobile industry used as the example and showed that those who introduced a BOS product experienced abnormal returns well beyond the 24-month horizon Barwise and Meehan (2012) had attributed as being a valid duration for the BOS framework in their study on the cell phone market. In addition to this additional perspective on using ICB in strategy formulation, the study indicated that companies pursuing the BOS can benefit from prolonged returns when the clockspeed industry is slower, whereas those in faster clockspeed industries would benefit more from incremental innovations and conservative investments.

Contribution to Business Problem

The primary business problem was Barwise and Meehan's (2012) claim that that companies pursuing BOSs in fast-clockspeed industries do not hold blue ocean market space uncontested for a prolonged period of time. Understanding whether there is a correlation between

ICB and the time a BOS product is uncontested is beneficial in determining whether to pursue radical or incremental innovation.

The research in Chapter 4 shed some light on Tesla and the Model S, which was identified as a product with features attributable to the six paths framework used in BOS product development. The automobile industry, which according to Fine (1998) can expect to see product innovations every 4-6 years, was used to determine if medium-clockspeed industries would have limited abnormal returns below the 24-month threshold observed in the cell phone market. The study found Tesla was contributing abnormal returns well into Year 3 after the introduction of the Model S in 2012. Event 4 occurred in 2015 and saw significant returns for Tesla after the introduction of the Model S with ludicrous mode. Companies pursuing BOSs in medium-clockspeed industries could thus see similar returns as they add enhancements to a product platform under the BOS framework. The stock price of Tesla saw positive movement for Events 1, 3, and 4, and Event 3, which involved the safety score results from the NHSTA, provided Tesla with the highest returns. The relative market index integrated into the event study methodology using the market model application also highlighted that the variables attributable to the returns Tesla was experiencing stemmed from the events regarding Tesla and the Model S and not necessarily broader economic implications or general market consensus. Event 2 was the only event studied that saw a negative effect on the price movement of the security. Event 2 also highlighted implications to operational capabilities and investments that organizations make and their reception in the broader marketplace.

Although a focus on the automobile industry in the United States was limited in scope, the financial data examined revealed some correlation existed between a product that enters a blue ocean and its ability to deliver abnormal returns to its investors over a prolonged period

longer than 24 months. Additional opportunities to round out the BOS framework and ICB remain with other segments, in slower and faster industries, and across other regions.

Recommendations for Further Research

Recommendations for further research include looking at companies in the ICB (slow, medium, or fast) while considering companies across different industry segments. An example would be looking at a company in aircraft manufacturing and a company in ship building with similar market capitalization, knowing that both are in slower industries. Using similar market capitalization may provide a more accurate reflection of companies with similar process and organizational sophistication, thus equating to similar economic moats in their relative industries. Although ICB variations and market capitalization are two variables future researchers can consider in determining additional research to conduct, the tools used could also be altered.

Other researchers could use other quantitative measures to assess the value of a company as a result of product introductions and their relative implications on the value of an organization. For researchers with access to private financial information, a study could involve examining product-attributable margins and revenue dollars in large or small businesses. The implications of companies' operating income or other comprehensive income may be a much more effective approach to determine whether a product that entered a blue ocean is contributing in an abnormal way relative to its peers.

The health care industry has come under significant scrutiny regarding spiraling costs, and though Fine (1998) did not classify health care services or attributable industries therein, aside from pharmaceutical, researchers could choose to consider medical device manufacturers and overlay products meeting the BOS framework with other turmoil in the health care industry to measure whether the BOS products can overcome broader industry implications. Such a study

could include the same research methodology presented in Chapter 3, which was the event study methodologies market model approach, as data would be easily accessible and the research would be repeatable because most global medical device companies are publicly traded and must receive approval before introducing a new product into the market. A product such as an artificial pancreas, which was introduced by Medtronic in 2016 and was a first of its kind, could serve as a possible case study to measure the duration of, and the economic implications on, the uncontested market space. A study with the event study methodology and large market capitalization firms may have smaller abnormal returns, thus moving larger businesses to more incremental innovation-oriented strategies, and leaders of small- to mid-cap businesses could strategize and use more radical innovations in slower clockspeed industries.

Other recommendations for further studies could include looking at businesses trading publicly in underdeveloped nations or looking across multiple regions at businesses competing in similar industries in developed nations. The scope of this study was U.S.-based automobile manufacturers. Researchers could expand this research to all publicly traded automobile manufacturers.

Conclusions

The research conducted was an attempt to shed additional light on the implications surrounding strategic planning and investments in opportunities focused on providing above-normal returns. Leaders in most companies seek to attain uncontested market spaces, either deliberately or through various frameworks and genuine strategic planning. Leaders in other companies at times may achieve uncontested market space through pure chance. The speed adoption of technology and computers is significantly disrupting those who are failing to innovate. Leaders in long-established industries and organizations have to evolve their business

models to meet the needs of existing customers and the offerings of start-ups around them. For example, Uber has provided more context on the value companies are able to provide to customers through technology. As company leaders consciously start to commit dollars to innovation and focused investment, the questions of whether to invest in incremental innovation or disruptive technologies become critical. In established firms, leaders must manage cash outflows well, and investments with faster returns will appease boards and shareholders in the near term, which is a performance variable used to measure most CEOs. However, to disrupt and evolve businesses, leaders of certain companies are investing in processes that lead to product innovation with the focus of achieving uncontested market space.

Kim and Mauborgne (2015) argued for the BOS framework and its integration into product development by providing evidence of firms who have successfully navigated and introduced products using this approach. Such companies benefit from BOS, which provides them with leading market share and differentiated higher margin product attributes (Kim & Mauborgne, 2015). Although seminal research exists to support the arguments Kim and Mauborgne made, Barwise and Meehan (2012) provided evidence that BOS is not a long-term solution and showed that uncontested market space is short lived. As a result, CEOs need to determine how much to invest in BOS, and if the scope of the investment exceeds the attributable uncontested life of the product, the returns will be so small or nonexistent that pursuing the innovation would only hurt organizations' performance in the long run.

The research conducted in this study included a focus on addressing a business problem most CEOs will continue to face in the wake of more technology adoption in the years to come. ICB and the implications of products' evolution could serve as a measurement in assessing the level of investment a firm should make to fund innovations and ensure acceptable returns are

considered relative to competitive replication of their products' introductions. The study highlighted that out of four events in a BOS product, three contributed to abnormal returns, two of which were significant. Furthermore, there are lessons to learn from Event 2, which contributed negatively to Tesla's overall value (Supercharger network). One takeaway was that most investors and shareholders considered the investments in Supercharger networks to contribute to negative or no returns for Tesla in the long run. The BOS framework expands beyond products to ecosystems. In such ecosystems, customers enjoy products and are tied to ancillary services and features not available if they were to move to another competitor's product. The Supercharger network enhances the ecosystem of what Tesla offers, and with the introduction of future products, this ecosystem will start to become a paid service for products reaching more economical customer segments.

The study concluded with evidence that linked a medium-clockspeed industry to abnormal returns well beyond the 24-month window Barwise and Meehan (2012) suggested in their study observing the BOS framework. Furthermore, it led to a new perspective regarding how researchers and organizations should use the BOS framework by taking into consideration implications and variables ICB has on the performance of a business and relative innovation and investments. As some company leaders pursue strategies to move away from R&D and grow their product pipeline through mergers and acquisitions, others could take a more mixed approach. Understanding their business from a BOS and ICB perspective provides CEOs with more meaningful strategic planning tools intended to focus on areas with the highest rate of return while minimizing the risks and costs associated with products easily imitated by competitors or new entrants.

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STATEMENT OF ORIGINAL WORK AND SIGNATURE

I have read, understood, and abided by Capella University's Academic Honesty Policy (3.01.01) and Research Misconduct Policy (3.03.06), including Policy Statements, Rationale, and Definitions.

I attest that this dissertation or capstone project is my own work. Where I have used the ideas or words of others, I have paraphrased, summarized, or used direct quotes following the guidelines set forth in the APA *Publication Manual*.

Learner name and date: Aldin Velic, August 16, 2017

APPENDIX A. TABLES

Table A1. Previous Studies of Abnormal Returns

Researcher(s)	Year	Exchanges	Daily vs. monthly data	Model	Abnormal return event window	Event date
Gillespie, W. B.	1974	NYSE/ AMEX	Monthly	Market model	-12 to +12	Effective date
Gillespie, W. B. & Seitz, N.	1977	NYSE/ AMEX	Monthly	Market model	-12 to +12	Effective date
Radcliffe, R. C. & Gillespie, W. B.	1979	NYSE/ AMEX	Monthly	Market model	-12 to +12	Effective date
Woolridge, J. R. & Chambers, D. R.	1983	NYSE/ AMEX	Daily	Mean adjusted return model	-30 to +30	Proposal approved & effective date
Pickford, L. J.	1985	NYSE/ AMEX/ NASDAQ	Monthly	Market model & ex-post CAPM	-12 to -24	Effective date
Peterson, D. R. & Peterson, P. P.	1992	NYSE/ AMEX/ NASDAQ	Daily	Mean adjusted	-1 to 0	Announcement date
Han, K. C.	1995	NYSE/ AMEX/ NASDAQ	Daily	Market model	-5 to +5	Announcement date & ex date
Masse, L., Hanrahan, J. R., & Kuschner, J.	1997	Toronto Stock Exchange	Daily	Market model & nonparametic sign & rank tests	-30 to +30	Announcement date
Jain, P. K. et al.	2004	NYSE/ AMEX/ NASDAQ	Daily	Market model	-2 to +2	Split ex data