

ABSTRACT

Title of Dissertation: HOW FIRM RESOURCES AND BEHAVIOR IMPACT FIRM PERFORMANCE: AN EXAMINATION OF FIRM RESOURCES, COMPETITIVE ACTIONS AND PERFORMANCE

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In this dissertation, I considered how firm resources, actions and performance may be interrelated. I tested the notion that resources both enable and interact with firm actions to impact performance. Drawing from resource-based and actions-based theory and empirical research, testable hypotheses were developed suggesting that a firm's resources may impact performance potentially in three ways – directly, mediated by actions, and in combination with actions. I examined 1) the extent to which firm resources and actions each directly predict variation in firm performance; 2) the extent to which firm resources predict variation in intervening actions and thereby predict variation in performance; and 3) the extent to which the product of resources and actions in combination predict variation in performance. With a combined dataset of 4,337 actions, gathered through the structured-content analysis of over 16,000 published news articles, and 980 model-years of resources and performance data collected from industry and government sources, 44 foreign and domestic automakers were analyzed over a study period from 1993 to 2000. I find empirical support for key components of their relationships. The analysis shows evidence that firm resources impact performance, both through, and with firm actions.

HOW FIRM RESOURCES AND BEHAVIOR IMPACT FIRM PERFORMANCE:
AN EXAMINATION OF FIRM RESOURCES, COMPETITIVE ACTIONS
AND PERFORMANCE

by

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DEDICATION

To my dear mother, who saw me through most of this journey:

Mrs. Julia Mae Major

(1931-2009)

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CHAPTER ONE:

PROBLEM STATEMENT

Lexus, the luxury automaker division of the Toyota Motor Company, achieved the highest consumer ratings in 1995 for Luxury & Comfort – #1 carline in the J.D. Power & Associates Customer Satisfaction Study for the fifth consecutive year. The feature-rich SC model surpassed other luxury offerings from competitor nameplates, such as Mercedes and Cadillac, and consequently, the Lexus automaker enjoyed positive financial gains – best selling luxury import for the year. In 1997 however, Lexus fared lower on consumer ratings lists when evaluated on “fun-to-drive” models (Lassa, 1997). Its entry in this segment, the ES model, went on to struggle in the market, with lagging vehicle sales. Both of these examples describe instances when the firm’s resource positions, namely the reputational resources signaled by consumer ratings, translated into clear performance outcomes for the firm.¹ Yet without consideration for the intervening actions the firm may have taken in each case, it is impossible to see just *how* those resources affected changes in performance. Priem and Butler (2001a) refer to this as the “black box” in the resource-performance relationship.

¹ In this research the word *firm* is used to reflect autonomous automaker brands, such as Lexus, the luxury automaker brand of the Toyota Motor Company, and Volvo, the Swedish unit of the Ford Motor Company. In other words, the unit of analysis in both theory and empirical methods reflects the notion that each automaker brand operates as a separate strategic unit (see Rhee and Haunschild, 1996; Svenson, 1984). Thus, I use firm and automaker interchangeably.

AutoWeek Magazine, a major industry publication for auto-enthusiasts, reported that in 1995, following Lexus' ratings success, the automaker raised the price of its six-cylinder SC 300 from \$41,700 to \$42,600, the eight-cylinder SC 400 from \$43,600 to \$44,500 and the GS 300 from \$42,700 to \$43,600 – representing an across the board increase of \$900 or roughly two percent (AutoWeek, 1995). In contrast, Lexus followed its weaker showing in the ratings in 1997, with substantial pricing reductions on its ES model (Lassa, 1997). According to *AutoWeek*, it cut the sticker price for the ES 300 by nearly \$3,000 or seven percent, in the hopes of luring buyers who preferred fast, fun-to-drive car models (O'Donnell, 1996).

In each case, for the automaker, Lexus, the realization of performance outcomes flowed through the firm's resource-enabled strategies. Understanding how resources both enable and interact with firm actions to impact performance is the goal I set for this dissertation. I draw on two research perspectives in strategic management for this study – the resource-based view of the firm and the competitive dynamics perspective on firm actions. The resource-based view (RBV), an especially dominant perspective of strategy research, is the result of the efforts of a host of management scholars (Amit & Schoemaker, 1993; Barney 1991; Dierickx & Cool, 1989; Henderson & Cockburn, 1994; Penrose, 1959; Peteraf, 1993; Wernerfelt, 1984). At its core, resource-based logic conceives of firms as heterogeneous collections of resources, subject to the constraints of imperfect resource mobility (Barney, 1986; Dierickx & Cool, 1989; Oliver, 1997). It argues that those resources that are valuable, rare, and difficult to imitate or substitute have the potential to allow firms to enjoy periods of competitive advantage (Barney, 1991).

The competitive dynamics perspective in strategic management research focuses on the interaction between firms and how each firm affects others over time (Smith, Grimm, Gannon, & Chen, 1991; Young, Smith & Grimm, 1996). With roots in the Austrian economic tradition, competitive dynamics is concerned with the strategic and tactical moves firms make that both create and erode competitor advantages. In common between the competitive dynamics and the resource-based perspective is their shared focus on competitive advantage – an ability to create more economic value than competitors (Barney & Hesterly, 2006; Grimm, Lee, & Smith, 2006). The terms, “competitive advantage” and “performance” however, are often used interchangeably across studies in both perspectives even as subtle distinctions may exist in their conceptual construction (Newbert, 2008; Peteraf & Barney, 2003; Powell, 2001; Sirmon, Hitt, & Ireland, 2007). A consistent focus on performance is used in this study to conceptually and empirically integrate the two distinct research streams.

Taken together, RBV and competitive dynamics perspectives allow for a clarification of the relationship between a firm’s resources and its actions. In the strategic management literature on RBV, the firm’s resources are characterized as those physical, human, financial, and organizational assets that might be used to implement value-producing strategies. Yet it is still unclear how resources impact a firm’s specific strategic actions and how those resource-enabled actions generate performance for the firm. The researchers, Ireland, Hitt, Camp, and Sexton, (2001:50) referred to strategic actions as those that a firm takes, “to select and implement the firm's strategies.” The competitive dynamics perspective, that captures the strategic actions of firms, has the potential to bring the analysis of firm actions into resource-based logic. I theorize in this

research that the firm's collection of resources enables and is strengthened by its actions taken to implement potentially high-performing strategies. The firm's resources may impact performance potentially in three ways – directly, mediated by strategic actions, and in combination with strategic actions. This study investigates the direct, indirect, and interactive effects of resources and actions on performance.

I begin with two base-line hypotheses that test the foundational assertions of the respective resource-based and competitive dynamics perspectives, suggesting that performance is directly and independently impacted by resources and actions (Barney 1991; Henderson & Cockburn, 1994; Grimm, et al, 2006; Smith, et al, 1991). That is, I hypothesize about the impact of the level of resource stocks, such as the complement of safety features, the power and efficiency of engine models, and consumer and government ratings on the focal firm's subsequent performance. Whereas a number of resource-based studies have shown evidence of a resource-performance direct relationship when focusing on a particular resource or type of resource, I evaluate the effect of a bundle of critical firm resources. For instance, intellectual property (Somaya, Williamson, & Zhang, 2007), human resources (Li & Zhang, 2007), and high-quality production systems (Newbert, 2008) have individually shown evidence of direct effects on performance. I examine a full array of tangible and intangible resource stocks in this study. Likewise, as a baseline, I suggest that there is direct impact of the firm's actions, such as marketing campaigns, new product introductions and pricing changes, on the focal firm's subsequent performance. Previous competitive dynamics studies used discrete measures of firm actions to show evidence of an actions-performance relationship. In consonant, I propose to evaluate the quantity of firm actions – measured

by a count of the number of actions each year. These actions include those taken throughout the value chain – from factor market to product-customer market actions. I investigate the direct and independent effect of the firm’s actions on performance.

I then bring the distinct theoretical perspectives together in two sets of hypotheses that suggest enabling and amplifying relationships between firm resources and actions. Results of some resource-based and action-based studies that find a lack of direct effects on performance are indication that more sophisticated relationships may exist between firm resources and performance and firm actions and performance (e.g. Galbreath & Galvin, 2004; Miller & Chen, 1994). I explore the existence of mediated and moderated relationships. First I suggest the presence of a mediated relationship, in that resources impact performance through actions. Competitive dynamics studies tend to control for resource differences (Derfus, Maggitti, Grimm, & Smith, 2008; Smith, Ferrier, & Ndofor, 2001; Ferrier, Smith, & Grimm, 1999). I instead hypothesize about a link between resource stocks and firm actions that drive the impact on subsequent firm performance. The baseline direct hypotheses serve as the building blocks for this indirect argument. I expect that the direct link between actions and performance is preceded by a relationship between resource stocks and firm actions.

Second, I suggest the presence of a moderated relationship, in that the impact of resources on performance is enhanced by competitive actions. Resource-based arguments assume that, given an endowment of developed resources, the focal firm will “almost automatically” take the proper actions necessary to implement valued-producing strategies (Barney, 2001: 53). Variations in the results of some research studies, however, suggest otherwise. I explicitly explore an interaction between resource stocks

and actions that positively alter the relationship between resources and performance. Based on the baseline direct hypotheses, I argue that actions may create competitive leverage to maximize the value of a firm's resource stocks and amplify performance.

In sum, I draw from RBV and competitive dynamics theory and empirical research, to examine 1) the extent to which firm resources and firm actions each directly predict variation in firm performance; 2) the extent to which firm resources predict variation in intervening firm actions and thereby predict variation in performance and 3) the extent to which a compensatory relationship exists, such that resources combine with actions to predict variation in performance.

The dissertation makes three key contributions. First, the research contributes to management theory in modeling the essential mechanism by which resources influence firm outcomes. It opens the "black box" in the link between resources and performance (Priem & Butler, 2001a; Sirmon, Hitt, & Ireland, 2007). As described with the example of Lexus, without the explanation for the role of strategic actions, the path to advantage is left unclear. This research answers a call from strategy researchers to address how resource stocks within the firm dynamically connect with the external competitive environment. Barney concedes that, "..., Priem and Butler are correct to emphasize the importance of dynamic analysis of sustained strategic advantage, for it is only through this kind of analysis that the full implications of resource-based logic for the sustained strategic advantages of firms can be understood." (Barney, 2001:52). This panel study models the key intermediary mechanism between resources and outcomes.

Second, the dissertation also contributes to theory a framing of the relationship between firm resources and actions. How firms leverage key resource stocks and their strategic actions has yet to be fully explored. This research suggests that resources and actions combine to influence firm outcomes. The examination in this study yields useful support for the relationship.

Third, the work contributes rich measures to empirical research. While examining direct relationships in the first hypothesis may not be especially novel, in and of itself, the richness of the measures in this study offers new and compelling evidence for resource-based and actions-based research. New, comprehensive measures of both tangible and intangible resource stocks, coupled with discrete firm actions are evaluated longitudinally in the same study. The results that flow from the investigation lend more rigorous validation of the foundational assertions made by RBV and competitive dynamics.

My aim for this dissertation was that through these contributions, it sets the empirical groundwork for an ongoing research stream. Evidence of the proposed set of relationships, direct, indirect, and interactive, allows for deeper development of our understanding about the conditions that drive variation in how resources impact performance.

The remainder of the dissertation is devoted to five tasks. First, in chapter two, I establish the foundations for my arguments in the strategic management literature. A review of the resource perspective on performance is followed by a parallel review of the actions perspective. Second, in chapter three, I develop a set of testable hypotheses,

which bridge tenets of resource-based and actions-based perspectives. Separate baseline direct arguments are posited, and the firm's resources and actions are then conceptually linked in mediated and moderated models. The mediated model suggests that the effect of resources on the firm's performance goes through the strategic actions the firm undertakes. The moderated model suggests that the effect of independently influential resources is amplified by the firm's strategic actions. Third, I describe the methodology for empirical investigation in chapter four. Detailed resource data, collected from industry sources and a wide array of direct actions data, gathered through content-analysis of archived media accounts, are brought together in an eight-year longitudinal study. Fourth, in chapter 5, I report the results of the analysis. The results of this research show considerable empirical evidence about how resources and behaviors impact performance. Finally, I use the last chapter, chapter six, to discuss the implications of the findings, contributions and limitations of the work.

CHAPTER TWO:

LITERATURE REVIEW – TWO PERSPECTIVES ON PERFORMANCE

The question of what drives variation in performance is central to strategic management theory (Chakravarthy, 1983; Summer, Bettis, Duhaime, Grant, Hambrick, Snow, & Zeithaml, 1990). Two research perspectives, in particular, have made rich contribution towards our understanding of the causes of performance variation, but from separate vantage points from within the firm and its environment – a perspective on the firm’s stock of resources vis-à-vis competitors and a separate focus on the actions that the firm takes relative to others in the competitive market. With this review of the literature, I attempt to summarize the development of these perspectives, from their origin to recent work, describe their central tenets, and thereby establish the building blocks for new contributions I propose for this research. I contend that a study that draws from both research perspectives is critical for understanding more fully how resources drive performance. From original works in resource-based and actions-based research, a large number of studies have since contributed to the development of both perspectives, but along separate streams.

Even as I aim to be thorough, this chapter is not intended to be a general and exhaustive analysis of the host of studies that precedes this work (for a complete review of studies, please see Barney & Arikan, 2001, and for meta-analysis refer to Newbert, 2007). Rather, I am careful to include a representative sampling of the works, based on the criterion that they contribute to the proposed rationale for theory development – namely those studies that explicitly test resources on performance, actions on performance, and a relationship between resources and actions. A review of the resource perspective on performance is followed by a parallel review of the actions perspective. Also, given that in both perspectives, the concept of competitive advantage is often prominently considered in theory development, I conclude this chapter with a brief discussion of competitive advantage and establish its links to firm performance.

The Resource Perspective on Performance

Early conceptualizations of RBV focused on general conditions for determining how a firm should compete, particularly in terms of diversification strategies (Penrose, 1959; Wernerfelt, 1984). Penrose (1959:24, 31) argued that a firm is a “collection of productive resources.” She drew attention to the importance of these resources to the firm’s competitive position, and argued that firm growth, particularly through diversification, is a function of the deployment of these resources. Wernerfelt (1984), and later Barney (1986), formalized the initial RBV arguments and suggested that firms could realize superior returns by identifying and acquiring critical resources. Research that followed in the last two decades has focused more specifically on the characteristics

of a firm's critical resources as sources of competitive advantage (Barney 1991, 1994; Dierickx & Cool, 1989; Peteraf, 1993). No less than 166 studies have applied resource-based logic to empirical research (see detailed assessments in Barney & Arian, 2001, and more objectively in Newbert, 2007). An exhaustive bibliometric study found that 3,904 academic articles cited the core studies in the resource-based perspective (Acedo, Barroso, & Galan, 2006:630-631). They found that at the epicenter of these studies is an article on the conceptual framing of resources and competitive advantage by Jay Barney in 1991.

Barney (1991) constructed a detailed framework to determine the potential for competitive advantage that rested on two assumptions – that there exists heterogeneity among firms in their distinct resource endowments; and that the market for resources suffers from imperfections that make the movement of resources across firms problematic. The relative immobility of resources across firms allows firms to enjoy periods of competitive advantage through its development of valuable resources that are unique to the firm. This gives rise to four determining characteristics of resources in the RBV perspective. The basic determination of the potential for firm assets to generate performance lies in the degree to which the assets are 1) valuable and 2) rare. Then, the extent to which improved performance is potentially lasting is determined by 3) the ease of imitation or 4) the availability of substitution by competitors. Each is described as follows.

Valuable resources were defined by Barney (1991) as a function of the environmental conditions the firm faces. Those resources that allow the firm to address opportunities and threats in the environment are thus considered valuable. A study by

Miller and Shamsie (1996) that examined the early days of the Hollywood film industry provides example of the impact of resources, with respect to the firms' environment. They found that property-based resources are more valuable in stable environments, and knowledge-based resources in uncertain environments. A separate study, conducted in the value characteristic of resources and its impact on performance evaluated firm investments in human capital (Galunic & Anderson, 2000). Their findings showed evidence that generalized human capital investment, as a valuable resource, affected performance through its impact on employee commitment. In both cases, the valuable resources within the firm led to improvements in efficiency and effectiveness.

Also, in terms of valuable resources, one of the more intractable critiques of Barney's resource framework however, is that of the tautology imbedded in the operational definition of value, with respect to competitive advantage (Priem & Butler, 2001b). Newbert (2008), in a test of RBV in the nanotechnology industry, used a primary-data gathering approach in an attempt to skirt the measurement conflict. Multi-item survey scales allowed him to explore uncorrelated measures of value and competitive advantage. His findings were consistent with RBV in that valuable firm resources were positively related to the performance of the firm. For this study, I rely on the insights offered by Barney (1991, 2001) that valuable resources are those that may be used to improve efficiency and effectiveness. This research will investigate whether the presence of critical resources may be necessary, though perhaps not sufficient for the realization of improved firm performance.

Rare resources are those assets or attributes that are unique to the focal firm. As the number of firms that have a particular resource increases, the potential advantage

from the resource decreases. Resource-based logic argues that a firm with resources that are both valuable and rare may enjoy at least some temporary advantage. Whether in the case of firm-specific human capital (Galunic & Anderson, 2000) or high-quality, rare production systems (Newbert, 2008), firms with resources that meet these two criteria of value and rarity have potential for higher performance. They have the potential to be strategic innovators, with opportunities for first-mover advantages. The potential for advantage from valuable and rare resources, however, is not necessarily lasting. In a dynamic, hypercompetitive environment (D'Aveni, 1994), where competitive positions are shifting, additional conditions are required for enduring performance.

The question of sustainability of competitive advantage from rare and valuable assets is determined based on the difficulty of competitors to imitate or substitute the firm's assets. Conditions that make some valuable and rare resources difficult to replicate include their dependence on unique historical conditions, causal ambiguity that describe the difficulty of competitors in understanding the internal causes of advantage, and the socially complex development of the resource. Ultimately, the durability of variation in resource stocks across firms, which allow for sustained competitive advantage, depends on factor market imperfections. They include barriers to acquisition, imitation, and substitution of key resources or inputs (Barney, 1986, 1991, 1997; Penrose, 1959; Schoemaker and Amit, 1994). Therefore, the persistence of advantage from resources relies fundamentally on the features of the resources themselves (Oliver, 1997).

In sum, these resource characteristics include whether resources are scarce, unique, inimitable, durable, idiosyncratic, nontradeable, intangible and nonsubstitutable (Amit and Schoemaker, 1993; Barney 1991; Mahoney and Pandian, 1992; Peteraf, 1993).

While these characteristics hold, the potential for lasting performance for the firm may persist. From the body of research in the resource-based perspective, there is evidence to conclude that certain characteristics of resources have impact on the firm. Indeed, valuable and rare resources (Miller & Shamsie, 1996; Newbert, 2008) are associated with improved performance; and that those resources that are difficult to imitate or substitute (Oliver, 1997) suggest durable performance. Even from the host of studies, however, it is still left unclear how resources impact performance. Additional insight can be derived from work along a separate stream of strategy research – a competitive dynamics approach to firm performance.

The Action Perspective on Performance

Competitive dynamics is an approach rooted in the Austrian economics focus on purposeful organizational behavior that provides a dynamic perspective on the firm's ability to gain competitive advantage to impact performance (Kirzner, 1976, Schumpeter, 1950). Numerous empirical studies in this area show evidence that the strategies a firm may undertake have direct implications for its performance (Derfus, Grimm, Smith, & Maggitti, 2008; Ferrier, et al., 1999; Lee, Smith, Grimm, & Schomburg, 2000; Smith, Grimm, Gannon, & Chen, 1991; Young, Smith & Grimm, 1996). The competitive dynamics perspective conceptually places the implementation of the firm's strategies within the context of the concurrent actions of its competitors. Strategic implementation is conceived of as discrete competitive actions – defined as specific and detectable competitive moves or behaviors, such as new product introductions, advertising

campaigns, or price cuts, initiated by a firm to improve or defend its relative competitive position (Grimm, et al, 2006; Smith, Ferrier, & Ndofor, 2001; Smith, Grimm, Chen, & Gannon, 1989). Notable competitive actions in the automobile industry include the 1995 introduction by US automaker, Lincoln, of global positioning satellite technology, the RESCU (Remote Emergency Satellite Cellular Unit) as an option for its line of Continental models. The market observed the minor product introduction as a clear move by Lincoln to improve the positioning of its model among segment rivals.

In Schumpeterian competition, where creative destruction explains the process that leads to competitive activity in an industry, firms take actions against opportunities or threats in the environment as a means of achieving competitive advantage. Firms create new combinations, or strategic actions, that realize profit outcomes (Grimm, et al, 2006). The opportunities that firms act upon disrupt equilibrium (the status-quo), and as such, destroy the profit performance of prior actions and the actions of competitors. This process is replicated by all the profit-seeking firms, and often manifests in a series of innovative products and firm capabilities (Ferrier, et al, 1999).

As a firm takes actions on market opportunities (i.e., opening a new plant, adding product lines, etc), the impact on its performance is often positive (Young, et al, 1996). The empirical evidence shows that the positive impact comes as a result of the sheer quantity of strategic actions taken by the firm (Ferrier, et al, 1999; Young, 1993). Those firms that take more actions than competitors improve their competitive position and generate improved performance. The inverse has also been supported. In a study of competitive inertia, Miller and Chen (1994) showed that fewer actions taken in

competitive markets yielded negative performance consequences. A firm tends to benefit from taking action.

While taking action tends to yield early benefit for a firm, the action does not happen in a vacuum. It most often incites some competitive response. Price, marketing, and product actions have proven especially incisive (Dorfus, et al, 2008). The research has shown that due to the response of rivals, the focal firm's initial action often enjoys only fleeting advantage (Dorfus, 2001). Therefore, competitors face an unending action dilemma – take action (and risk damaging response) or take no initial action (and forgo profit opportunity). This ongoing dynamic is captured in the competitive dynamics research that tracks a firm's strategic actions to achieve improved performance. As with research from a resource perspective, there is evidence to conclude that actions tend to have impact on performance. Yet it remains unclear, empirically, the role of resource antecedents in constraining and/ or enabling firm actions to lead to performance.

Competitive Advantage as Performance

Michael Porter (1985:11) and many other scholars have applied the terms “performance” and “competitive advantage” interchangeably in research, even though there exist subtle distinctions in their conceptual construction (Newbert, 2008; Peteraf & Barney, 2003; Powell, 2001; Sirmon, Hitt, & Ireland, 2007). Resource-based studies have tended to conceptualize competitive advantage as the firm's ability to reduce its costs, capture market opportunities, or neutralize external threats (Barney, 1991; Barney

& Hesterly, 2006). Advantage is manifested in the firm's performance in the market. Performance, in a market-based sense, is captured in the differential economic rents a firm accrues or market share it gains as a result of the implementation of its strategies (Porter, 1985; 1990; Rumelt, Schendel, & Teece, 1994). Peteraf and Barney (2003) explain competitive advantage as the creation of more economic value – specifically greater benefit to cost ratio – compared to competitors.

Competitive advantage, then, produces greater utility for customers, vis-à-vis the competition, and therefore positive profit margin (Sirmon, et al, 2007). Even so, Powell (2001) points out, in an extensive philosophical argument, that competitive advantage might not completely predict performance. Yet, he argues that researchers may be justified in measuring performance as a reflection of competitive advantage, on the basis of pragmatism. Performance is then a measure of profit generated or share gained from the implementation of firm strategies (Grimm, Lee, & Smith, 2006).

The resource-based view and competitive dynamics streams of research share a common focus on performance and as such, conceptually connecting them can be useful for understanding how resources impact performance. Research studies in RBV have found relationships between various types of resources and performance that suggest that the particular characteristics of resources may be, at minimum, necessary for improved performance. Along a separate stream, competitive dynamics studies have also found causal relationships between strategic actions and performance. Conceptually bridging the two perspectives may show both necessary and sufficient links between resources and actions to cause performance effects on the firm. Given the foundations of these theoretical approaches and the results of their empirical studies, I posit that resources

impact performance by enabling firm actions and that firm actions strengthen the impact of resources on performance. In chapter three, I develop these arguments and suggest how they may be investigated.

CHAPTER THREE:

THEORY DEVELOPMENT – DIRECT, INDIRECT, AND

INTERACTIVE EFFECTS

In the automobile industry, a firm's JD Power & Associate ranking in the Initial Quality Study (IQS) may have direct revenue implications. That is, the series of rankings from JD Power and other major independent assessments, including Consumer Report's Reliability rankings, provide important signals to would-be buyers about product quality and thereby lead to greater sales (Purohit & Srivastava, 2001). Similarly, an aggressive warranty campaign by a new import may lead to direct margin gains in competitive auto segments, as buyers rely on the offer to bridge their uncertainty about the quality of the new firm's models. Actions and resources such as these are common in competitive environments. To be comprehensive and exhaustive in this research, I propose alternative hypotheses or baselines that assume unrelated and independent direct effects from resources, such as institutional rankings, and from actions, such as pricing behavior, on firm performance. Drawing from prior research, I expect that controlling for the corresponding effects of resources and actions, the direct effects on performance remain significant.

Using the baseline hypotheses as building blocks, I then turn to hypotheses that suggest more sophisticated relationships with performance, where firm actions mediate

and moderate the link between resource stocks and performance. Largely assuming that resources and actions are independent, there exist at least three explanations of their relationship with performance: that each has direct, independent impact on performance; that resources indirectly impact performance through actions; and that resources and actions interact to impact performance. In this chapter, I develop a model for each explanation, with a goal of empirically testing them in the dissertation research.

DIRECT EFFECTS ON PERFORMANCE

Direct effect of Firm Resource Stocks

On the strength of prior research, I hypothesize first, that the firm resource directly impacts performance. Resources, conceived of as “stocks of available factors owned or controlled by the firm”, relate directly to performance in a number ways (Amit & Schoemaker, 1993:35). Reputation as a critical resource, for instance, serves as a quality signal and thereby leads to improved revenues (Hall, 1993; Robert & Dowling, 2002). Also, as path dependence makes reputation as a resource difficult for others to match, firms may enjoy extended periods of improved revenues (Dierickx & Cool, 1989). Recall Lexus’ streak of five consecutive #1 IQS rankings. Prior RBV studies have isolated individual firm resources, like reputation, and have shown links to performance (e.g. Li & Zhang, 2007; Robert & Dowling, 2002; Somaya, Williamson, & Zhang (2007).

The mix of physical, human, financial, and organizational resources, positions the firm to implement a variety of performance-generating strategic options (Barney, 1997). As a means of categorization, Hall (1992; 1993) and others conceptualize a firm's resources into tangible and intangible resource stocks (Barney & Hesterly, 2006; Hall, 1993). I posit that the firm's level of resource stocks, tangible and intangible, have direct implications for performance. First, tangible resources include the financial and physical assets of the firm (Galbreath & Galvin, 2004). Financial resources include the firm's credit rating, its available cash, or its fixed asset value. Physical assets include attributes of manufacturing facilities and distribution channels such as size, location, capacity. For firms in the automobile industry, a manufacturing intensive industry, the effectiveness of their physical assets are integral to their performance.

Intangible resources, as defined by Johnson and Kaplan (1987:202) broadly include, "the stock of innovative products, the knowledge of flexible and high-quality production processes, employee talent, and morals, customer loyalty and product awareness, reliable suppliers, efficient distribution networks and the like..." From this extensive list of potential intangible resources, Hall (1992, 1993) identified in a national survey of company executive, a top ranking of those that were considered "key intangible resources". They included reputation, human resource abilities, culture, and organizational networks. They may exist in employee knowledge and skills, collaborative abilities, and loyalty and have direct impact on the performance of the firm. For example, in a study of managerial resource stocks (political networks and functional experience), Li and Zhang (2007) found intangible resource effects on performance. A study by Roberts and Dowling (2002), also demonstrated a significantly positive

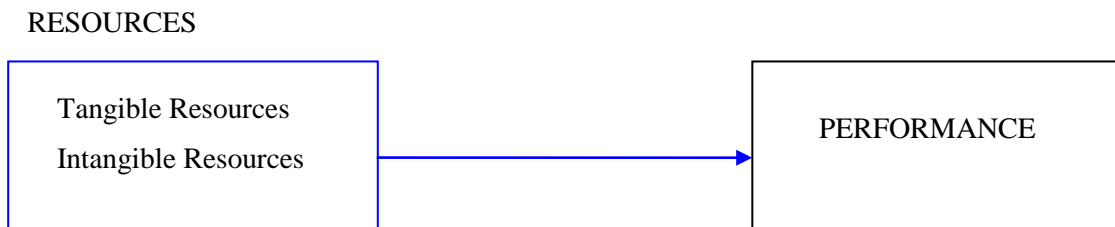
relationship between a firm's reputation and the firm's ability to show profits that outperformed others. Their investigation compared firm's that were among *Fortune Magazine's* America's Most Admired Corporations to other Fortune 1000 firms.

Reputation, in Roberts & Dowling (2002), was assigned by general consumer stakeholders. Reputation, however, may be a resource ascribed to firms by any group of their stakeholders, including consumers, trade partners, institutional analysts, as well as others (Hall, 1993). As demonstrated with the *AutoWeek Magazine* reports on Lexus, intangible resources such as reputation may have substantial impact on the firm's performance outcomes. Intangible resources refer also to a firm's intellectual property, and its R&D expertise and technological capabilities (Barney, 1991; Mahoney & Pandian, 1992; Schoemaker and Amit, 1994). Intellectual property resources such as patents portfolio and trade secrets has been shown to have direct implications for firm outcomes. In one such study conducted by Somaya, Williamson, and Zhang (2007), patents and R&D resources were found to have significant effect on firm performance.

When isolated within individual studies, tangible and intangible resources both have shown some direct impact on performance. In accord with the findings of predecessors, I expect that as a baseline, the attributes that comprise a firm's level of resource stocks, including tangible and intangible resources, have direct effect on the performance of the firm in the competitive market. Moreover, specific qualities of intangible resources may make them a more effective tool for seizing market opportunities and reducing threats (Hall, 1993; Michalisin, 1997). They tend to be socially complex or highly path dependent, and thereby harder to imitate or substitute. Given such characteristics, Hitt et al (2001) suggest that, "intangible resources are more

likely to lead to a competitive advantage than are tangible resources.” Therefore, just as Hitt et al (2001) concluded that they influence performance, I also expect that the level of intangible resource stocks will even more positively impact performance than tangible resources.

**DIRECT MODEL I:
Direct effect of Resources**



Hypothesis 1a: The level of resource stocks is positively related to performance

Hypothesis 1b: The level of Intangible Resource stocks is more positively related to performance than the level of Tangible Resource stocks

Direct effect of Firm Actions

I hypothesize also that competitive actions undertaken in the implementation of firm strategy have direct impact on performance. Particularly, based on prior studies, the full quantity – amount over a given period – of competitive moves have direct performance implications for the firm (Chen & MacMillan, 1992; Ferrier, et al., 1999; Smith, Grimm & Gannon, 1992). First, there is direct effect from the amount of actions. Firms make a series of competitive moves along the entire value chain, from the actions it takes in the development of supply lines, manufacturing capacity, and organizational boundaries, to the more visible competitive actions it takes in product and consumer markets. Actions in the production process comprise investments by the firm in new manufacturing capacity, expansion to distribution channels, and changes to the workforce. Actions that adjust the boundaries of the firm include inter-organizational agreements such as joint-ventures, equity alliances, divestments, mergers, and acquisitions; licensing and legal tactics. Actions in product-consumer markets include pricing strategies, product introductions, and marketing and advertising campaigns. There tends to be a positive direct relationship between the number of actions and the effect on performance. The empirical studies using a competitive dynamics approach have found effects on performance from aggregated actions that span the value chain (e.g. Derfus, Grimm, Smith, & Maggitti, 2008; Ferrier, et al., 1999; Lee, Smith, Grimm, & Schomburg, 2000).

Along with the quantity of actions, there is evidence that the timing of actions drives performance variance. In one study, Chen and MacMillan (1992) found that quick responders gain market share at the expense of slow responders. In another, MacMillan,

McCaffery, and Van Wijk (1985) showed that response times, varying as a function of the firm-specific significance of new product introductions by competitors, exhibited performance implications. The authors concluded that slow response allowed for longer “monopoly position” for a firm’s newly introduced product (MacMillan, et al, 1985:83). They however did not test this performance effect explicitly. Smith, Grimm, Chen, and Gannon (1989) empirically tested response time in a field study and found effect. In their examination of technology firms, they found evidence that as response times decreased, performance increased. The authors followed this study with a large-scale empirical test of competitive actions, and found support for a direct action speed-performance relationship (Smith, et al, 1991). They found, in their study of the airline industry, that the quality of competitive actions firms took in response to rival moves had direct effects on profitability. Early response led to increased profitability.

It is important also to make a distinction between the concept of firm action, used in action-based research, and the concept of firm capabilities, used often in resource-based research. I contend that they are conceptually different, in that capabilities refer to what a firm has the ability to do, and firm action refers to what a firm actually does. In a number of studies that apply a resource-based logic, empirical tests have explored performance effects from firm capabilities – or the ability to deploy firm resources (e.g. Kor & Leblebici, 2005; Tanriverdi & Venkatraman, 2005). I argue that the capability for resource deployment becomes a firm action in the actual deploying of resources. The action-based research, in effect, accounts for capabilities in the capture of firm competitive actions that are actually taken. Therefore, I argue that capabilities set in motion, (i.e., firm actions) affect firm performance.

I expect that the quantity of firm actions taken by the firm, as determined the number of actions within a given timeframe, should demonstrate direct impact on the firm's performance.

**DIRECT MODEL II:
Direct Effect of Actions**



Hypothesis 1c: The quantity of actions is positively related to performance

INDIRECT AND INTERACTIVE EFFECTS ON PERFORMANCE

Beyond the baseline assertion of independent, direct effects of resources and actions, a number of researchers have advocated for the examination of enabling and complimentary relationships (Priem & Butler, 2001a, Barney, 2001, Sirmon et al, 2007). Although the separate theoretical bases for the influences of resources and actions on performance have been well framed in the literature (Barney, 1991, Grimm et al, 2006;

Henderson & Cockburn, 1994; Smith et al, 1991), the foundation for how resources and actions are related has not yet been fully clarified. Gaining clarity about this relationship is particularly important, given that results of some resource-based and action-based studies find no support for direct effects on performance. This would indicate that more sophisticated relationships may exist between firm resources and performance and firm actions and performance (e.g. Galbreath & Galvin, 2004; Miller & Chen, 1994).

Resource-based and competitive dynamics perspectives together provide basis to argue that firms' actions are both enabled and enhanced by firm resources. In contrast to perspectives that assume optimal implementation or one where resource differences are deemphasized, a combined perspective peers into the resource-performance black box. How resources impact performance, and how firms leverage resources and actions to achieve performance are left to be explored. Thus, I introduce a focus on performance that is driven by a conceptualized connection between a firm's strategic actions and its resource stocks in mediated and moderated relationships.

Resource Stocks Enable Firm Actions (Mediation model)

The core point of contention in the literature on RBV seems to be that between the realization of performance and resources there exist behavioral processes undertaken by the firm that have been unexplained. Priem and Butler (2001a:32) referred to the "black box" of intervening strategic actions that is otherwise left to assumption. In response to this critique, Barney (2001) seemed to agree that as a matter of "theoretical convenience" he adopted a simple view that given unique and valuable resources, with

potential for advantage, managers would pursue due implementation (2001:53). Both researchers, however, call for greater investigation into this assumption. This is in harmony with Wernerfelt's (1995) comments in reflection on his seminal RBV article. He posits that "strategies which are not resource-based are unlikely to succeed in [the competitive] environment," (1995: 173). I argue that there exists an important complementarity between a resource-based approach and the competitive dynamics perspective that explains the relationship between firm resources and strategic actions.

In resource-based logic, valuable resources are those that allow the firm to implement strategies to address opportunities and threats in the environment (Barney & Hesterly, 2006). Strategy implementation then is the execution of firm actions that improve efficiency and effectiveness. A number of studies in both research perspectives suggest that firm resources, tangible and intangible, are directly related to variances in the quantity of actions. Consider a few such examples of this relationship.

In a large sample study of top management teams, Hambrick, Cho, and Chen (1996) examined an association between team heterogeneity and firm competitive actions. Team heterogeneity, a potentially valuable firm resource, had direct impact on the propensity to take action and the timing of those actions. Similarly, MacMillan, McCaffery, and Van Wijk (1985) demonstrated that the characteristics of particular organizational resources, such as the complexity of the organization structure and the rigidity of reporting authorities, impacted qualities of the firm's response to competitor moves. The airline study mentioned earlier, conducted by Smith et al. (1991) extended the contribution of the preceding study by finding a causal link between the characteristics of firm resources and firm action. The top management teams' educational

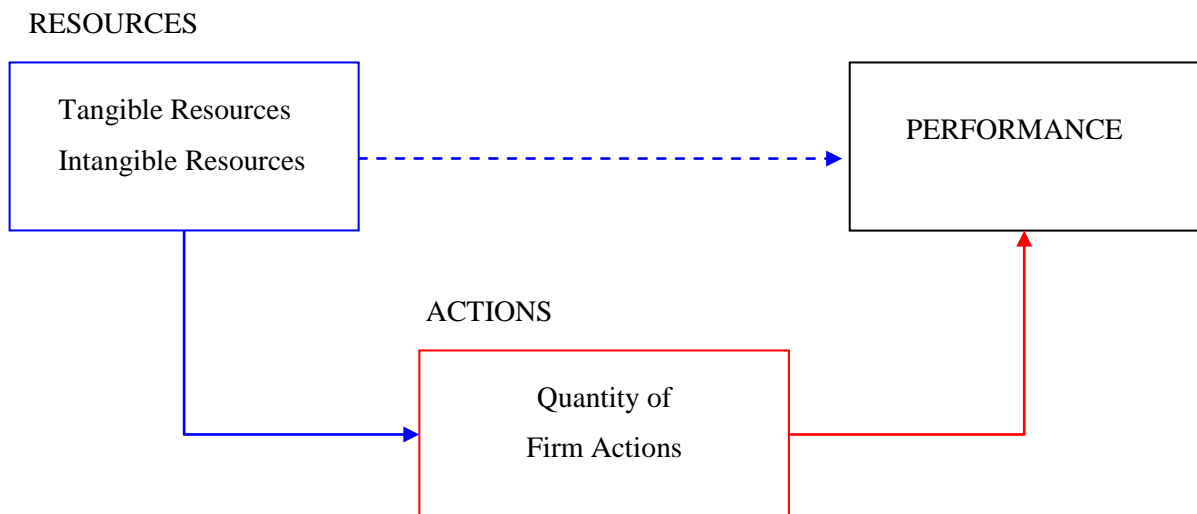
and industry experience, as indicators of the value of human capital resources, drove the firm's propensity to take competitive actions. The firms' propensity to take action, as measured in response time, order and imitation, ultimately showed significant effect on performance. In effect, human resource characteristics influenced firm performance through its direct impact on the quantity of actions.

Powell (1992:128, 130) found that organizational resources such as its size, age, and workforce may be sources for "organizational alignment-creation" - including the extent of organizational integration and differentiation - to generate competitive advantages. In this case, performance effects are generated by firm tangible and intangible resources, through the organizational actions they facilitate. Also, in a more recent study, Young, Smith, Grimm, and Simon (2000) found that size and age drove variation in the quantity of actions. Their study of firms in multimarket competitive situations demonstrated that dissimilarities in resource endowments caused significant variance in firms' propensity to engage in collusive behavior. Specifically, differences in size, age and technological intensity caused firms to take more actions and to act more quickly. This would suggest that perhaps even more fine-grained measures of resource stocks, such as the number of high-technology product features, may also exhibit evidence of effect on firm actions.

I posit that resources predict variation in intervening firm actions and thereby predict variation in performance. Moreover evidence suggests that levels of intangible resource stocks allow for a broader repertoire of firm actions than tangible resource stocks (Audia & Greve, 2006; Chen & Hambrick, 1995). Therefore I argue that intangible resource stocks will more positively impact firm actions.

In a study of risk-taking among shipbuilding firms, Audia and Greve (2006) found that firm size, as a measure of resource stocks, influenced firm strategic behavior. The firm's size positively impacted its strategic actions, namely its production expansion decisions. Similarly, Chen & Hambrick (1995) found variation in the competitive behavior of airlines as a function of their size. Small and large airlines impacted their performance through the repertoire and timing of their competitive moves. Though these tests employed size as a broad proxy for organizational resources, I hypothesize a mediated effect on performance from a firm's level of resource stocks, through the magnitude of its actions.

**MEDIATED MODEL:
Indirect Effect of Resources through Actions**



Hypothesis 2a: The level of resource stocks is positively related to the quantity of actions

Hypothesis 2b: The level of Intangible Resource stocks is more positively related to the quantity of actions than the level of Tangible Resource stocks

Hypothesis 2c: The quantity of actions mediates the relationship between the level of resource stocks and performance

Resource Stocks and Firm Actions (Moderated model)

I hypothesize that firm actions strengthen the relationship between resource stocks and performance. While I maintain that there is theoretical grounding in the earlier hypothesis to suggest that resources impact performance through actions, resources may also interact with firm actions to impact the firm's market position. Others have also suggested that resources interact with other variables to impact performance (Gatewood, Shaver, Powers, & Gartner, 2002; Sirmon, Hitt, & Ireland, 2006; Teece, Pisano, & Shuen, 1997). The concepts of leverage, bundling and dynamic capabilities, and expectancy theory have been posited and to varying degrees empirically examined in the literature. Importantly, however, there is yet no major precedent in the literature for explicit investigation into the moderating role of firm competitive actions in the resource-performance relationship. I summarize the related arguments and offer a more precise prediction for testing in this study.

Sirmon, Hitt, and Ireland (2006) suggested that management processes combine with resources to generate leverage for the firm. They conceived of leverage as "the set

of processes (i.e., mobilizing, coordinating, and deploying) used to exploit capabilities to take advantage of specific market's opportunities.” Insofar as management processes seem to reflect the general qualities of firm actions –distinct and discernable moves to maintain or enhance competitive position – the Sirmon et al (2006) concept of leverage serves as good example. However, I suggest a broadening of the concept of management processes to include those firm actions that are less related to the mobilization or deployment of specific resources. Prior actions-based studies consider the full complement of firm actions – of which resource mobilization and deployment are subsets. Moreover, by way of theoretical extension, I argue that leverage allows a firm to balance resource deficits with firm actions. A key assumption of resource-based logic is that the market for resources is imperfectly mobile (Barney, 1991). Given that assumption, a firm that may be locked into a weak resource position might then compensate with a greater magnitude of actions. I suggest that the Physics concept of leverage – based on the mechanics of levers – might be used to model a compensatory relationship between resources and actions.

In the principle of leverage, based on Newton's laws of motion and modern statics, the amount of *work* done is given by *force* multiplied by *distance* (Giancoli, 2000). For instance, to use a lever to lift a certain unit of weight with a force of half a unit, the distance between the fulcrum and the spot where force is applied must be twice the distance between the fulcrum and the weight. The lever allows a trade of force for distance and vice versa. As such, the basic equation of *force* times *distance* (from the fulcrum point) might be mapped onto the interactive relationship between actions and resources. A firm's resource position may compensate (allow) for fewer competitive

actions, much as distance compensates (allows) for less application of force. Likewise a flurry of actions by the firm may compensate for under-developed resource stocks. In each case, the compensatory relationship may ultimately reduce performance variance. In a strategic management study of product recalls in the automobile industry, Rhee and Haunschild (2006) found that reputation, as a high-valued resource, buffered the negative impact of recalls.

A second area of research that has suggested resource interactions is the more closely related strategic management concept of dynamic capabilities (Nelson & Winter, 1982; Teece, Pisano, & Shuen, 1997). This theoretical perspective, closely related to the resource-based view (Acedo, Barroso, & Galan, 2006), is to some degree similar to the concept of leverage. Teece and colleagues (1997: 510) proposed dynamic capabilities, “to explain how combinations of competences and resources can be developed, deployed, and protected.” Like the concept of leverage, the dynamic capabilities perspective is concerned with combining resources and deployment with respect to shifting market opportunities and threats. However, competitive leverage introduced by Sirmon et al (2006) and offered here differs from dynamic capabilities in at least one important respect – scope of firm actions.

The focus of dynamic capabilities (building on the definition of capabilities described earlier in the paper) is on resource bundling, or “the firm’s ability to integrate, build, and reconfigure internal and external competences” (Teece et al, 1997:516). Sirmon et al refer to bundling as “the processes (i.e., stabilizing, enriching, and pioneering) used to integrate resources” (2006:273). Competitive actions include those actions that integrate the firm’s resources. Certainly resource bundling is integral to

actions taken across the value chain – for instance, those that improve supplier contract terms and shorten delivery time; or those that target-market growing customer segments and offer rebates to first-time car buyers. However, beyond resource integration, firms take an array of actions that may or may not be tied to the particular deployment of a given resource or the integration of several resources. Firms take competitive moves in product markets for instance through aggressive advertising campaigns. They take actions also that are independent of resources, including those that impact firm operations or the firm’s boundaries. In such cases, these actions by the firm have the potential to strengthen the relationship between the firm’s resource stocks and performance.

An example in the literature of actions that are distinct from resource bundling, include the impact of an important set of organizational actions. Teece (1997) argued that a firm’s ability to appropriate economic value is at least in part based on the effectiveness of available legal protections. Legal tactics, though outside the scope of bundling, have direct and independent effect on firm advantage. Combining it with the firm’s resources may generate improvements to performance above and beyond the impact of its resources alone. The legal tactics a firm employs such as issuing a “*cease & desist*” demand from copyright infringement, combined with its intellectual property resources may amplify the firm’s leverage in the market.

A third area of research that illustrates the resources-actions interactions lies just outside the strategic management field (Arvey, 1972; Gatewood, et al, 2002; Hau & Salili, 1996; O Reilly & Chatman, 1994). The industrial/ organizational psychology and organizational behavior concept of expectancy (Miner, 2005; Vroom, 1964) offers some insight into the modeling of this resource-action, firm-level construct. Individual effort,

as motivated through expectancy, instrumentality and valence interacts with ability to amplify performance effects (Porter & Lawler, 1968; 1981). In a study of MBA students, O Reilly and Chatman (1994) found that ability and motivation interacted with significant impact on individual performance. Those students who were smartest and worked hardest were most successful across a range of performance indicators. The effort, ability, performance model was supported. It is important to also note that there are boundary setting effects of ability, such that at some point, the effort required to enhance deep deficits in ability may offset performance gains. However within those boundaries, the concepts in the model might be mapped to a firm-level prediction: firm actions (like individual efforts) moderate the relationship between firm resources (like individual abilities) and performance. When firms collide in a dynamic market space, their efforts, not just their abilities, are held to task. As supported at the individual level with expectancy theory, I suspect that a firm's actions strengthen the effect of its stock of resources on performance.

These preceding arguments for the consideration of more sophisticated resource-performance relationships begin to peer into the black box, and broaden our understanding of how resources may interact with firm actions. The concept of leverage expressed by Sirmon et al (2007) perhaps most readily illustrates the moderating impact of firm actions. Several empirical studies, with varying degrees of success, begin to demonstrate evidence of this relationship. For instance, Wiklund and Shepherd (2003) argued that in addition to having all of the high qualities of resources – valuable, rare, inimitable, and non-substitutable – the firm also must have the organization in place to take advantage of these resources and achieve superior performance. Their tests of the

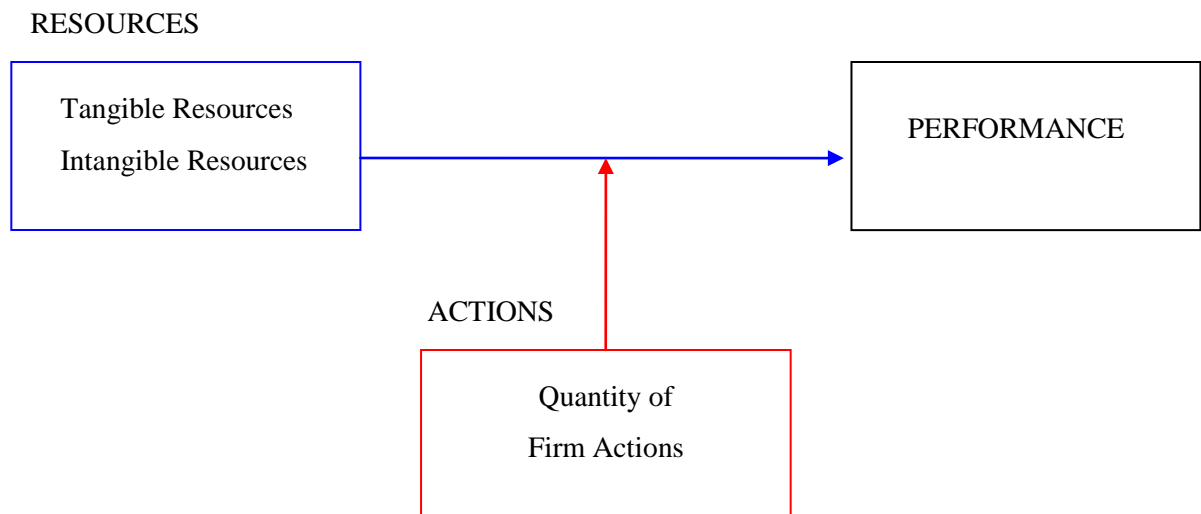
interaction between a firm's knowledge as resource and its entrepreneurial orientation on performance found support. However, a more revealing test would have been the combination of the intangible knowledge resource stocks with the quantity of firm actions marshaled to improve performance and timing of those actions compared to competitors.

I propose an alternative to studies such as Wiklund and Shepherd's (2003) that tested a single resource, in this case knowledge, in interaction with another, orientation. Resources that are moderated by the magnitude of strategic actions have more substantial impact on firm performance. Indeed, King and Zeithaml (2001: 75) suggested that "firm performance is a function of how well managers build their organizations around resources that are valuable, rare, inimitable, and lack substitutes." In other words, the magnitude of actions interacting with resource stocks affect performance. Yet, rather than empirically investigate a resource-action interaction, King and Zeithaml instead tested the effect of yet another resource characteristic on performance. I argue that firms leverage resources *and* actions. Firms must combine actions, as represented in the quantity of actions, with resources, as captured in the level of resource stocks, including knowledge resources, to create competitive leverage in the market.

More to the point, resources rely on the enhancements that come from the quantity of actions. Independently, resources controlled by the firm may yield negligible or suboptimal effect on performance. For instance, an auto firm with a cross-trained workforce may experience performance benefits – such as a level of productivity that is higher than industry average. Yet, when augmented with the firm's magnitude of competitive actions – such as the initiation of employee profit-sharing, the launch of rebate campaigns, and the start of new financing offers – the combined impact on

performance would be more pronounced. I expect, therefore, that the level of resource stocks a firm controls within its boundaries combines with its broad array of competitive actions to impact the firm's performance.

**MODERATED MODEL:
Interactive Effect of Resources and Actions**



Hypothesis 3: The quantity of actions positively moderates the relationship between the level of resource stocks and performance

CHAPTER FOUR:

METHODOLOGY

SAMPLE

The focus of this dissertation study is on the investigation of firm resources and actions as predictors of variation in focal firm subsequent performance. I empirically examine the hypothesized relationships developed in the preceding chapter, with an extensive data sample comprised of eight years of resources, and actions in the automobile manufacturing industry from 1993 to 2000. One important criterion in selecting this sample was that the automakers would be drawn from within the same market so that their specific actions could be directly connected to one another and that their resources might be compared among them. To that end, I focused solely on the actions of automakers competing in the U.S. market. Specifically, only those automobile manufacturers with sales in the US market were included.

Industry Focus

The automobile industry provides good context to examine relationships between resources, actions, and performance for several reasons in common with two previous studies of the industry (Thomas & Weigelt, 2000; Yu & Cannella, 2007). First, this industry consists of an identifiable and manageable set of companies (Thomas & Weigelt,

2000). The industry boundaries are clear, and particularly within this oligopolistic setting, there exists substantial strategic interdependence among the firms. Therefore this setting resolves conflicts in the literature regarding the difficulty in determining theoretically appropriate boundaries of an industry (Priem & Butler, 2001a; Barney, 2001). The automobile industry, with arguably distinct boundaries, allows for tests of competitive advantage as it relates to interaction among competitors. The resource stocks of any one automaker may be considered in relation to the resource stocks of any pairwise competitor. Likewise the actions undertaken by one automaker are likely to impact others. Second, information about the automobile industry is widely available. Also competitive activity in the industry is well covered in television and print media, trade magazines and general purpose newsprint. Third, the manufacture of automobiles is the dominant line of business for the automakers in the industry, reducing the potential for error associated with industries of highly diversified firms.

Level of Analysis

The focus of this research is on auto manufacturers actively selling vehicles within the United States geographic market. I chose automaker as the unit of analysis (e.g., Pontiac, Dodge), rather than the corporate owner (e.g., General Motors Corporation, DaimlerChrysler Corporation) or individual car model (e.g., Sunbird, Ram) based on two reasons. First, research in marketing suggests that these semi-autonomous automakers tend to have more significant impact on predictor variables than either model brand or corporate brand (Rhee & Haunschild, 2006; Bettis & Taran, 2002; Taran, 2001; and

Sullivan, 1998). This study follows the empirical approach in Rhee & Haunschild's (2006) test of a reputational effect among automakers. Second, I was guided by the results of variance analysis. I conducted Multivariate analysis of variance (MANOVA) tests on the independent variables described below, and found that significantly more variance exists between automakers. The sample, therefore, comprises all automakers that sold vehicles in the United States geographic market at any time during the study period. The forty-four automakers include the following:

List of Automakers

1 Acura	16 Honda	31 Nissan
2 Alfa Romeo	17 Hummer	32 Oldsmobile
3 Audi	18 Hyundai	33 Opel
4 BMW	19 Infiniti	34 Plymouth
5 Buick	20 Isuzu	35 Pontiac
6 Cadillac	21 Jaguar	36 Porsche
7 Chevrolet	22 Jeep	37 Saab
8 Chrysler	23 Kia	38 Saturn
9 Daewoo	24 Land Rover	39 Subaru
10 Daihatsu	25 Lexus	40 Suzuki
11 Dodge	26 Lincoln	41 Toyota
12 Ferrari	27 Mazda	42 Vauxhall
13 Fiat	28 Mercedes	43 Volkswagen
14 Ford	29 Mercury	44 Volvo
15 GMC	30 Mitsubishi	

The remainder of this chapter is devoted to the following three tasks – a description of the data and data collection process; an outlining of the variables identified as good tests of the hypotheses; and an account of the methods for statistical analysis of each of the hypotheses.

DATA COLLECTION

Within the context of competitive interaction in the automobile industry over an eight year period, two datasets were developed for use in the study. I combined the two datasets to provide a robust mechanism to shed new light on important linkages between a firm's resources, its competitive actions and its resulting performance. What follows is a description of each dataset – a set of data on resource stocks and a corresponding set of data on actions.

Resources Data

This research takes an empirical approach to resource stock that is relatively novel to the predominant perspective of many resource-based studies, in two respects. A number of the studies either isolate one firm resource and consider its impact on the firm, or take broad-stroke measures of resources, or a combination of broad measures. For instance, researchers in this tradition have found statistical support for isolated resources, including intellectual property (Somaya, Williamson, & Zhang, 2007), human resources (Li & Zhang, 2007), and firm reputation (Rhee & Haunschild, 2006). Also many studies utilize omnibus variables such as size, age, and workforce to proxy the effect of a firm's varied group of resources (Powell, 1992; Villalonga, 2004).

The variable choices of previous studies may be a product of the wide-ranging definitions used for the concept of resources. In the resource-based approach, the concept of firm resource has been broadly defined to include any “*input factors controlled and used by firms to develop and implement their strategies*” (Oliver, 1997:700). In one such case, Audia & Greve (2006) relied upon firm size as a measure of tangible resources to assess risk-taking in shipbuilding firms. I examine a full array of tangible and intangible resource stocks in this study.² This resource dataset gives rare clarity into the intricacies and variability of resource stocks across an entire industry of firms. It was compiled from industry publications, including *Automotive News Market Data Book*, *Ward’s Automotive Yearbook*, and *Consumer Reports Magazine*. As a function of their publication cycles, the data on each car model were gathered from the sources for every other calendar year – including 1993, 1995, 1997, and 1999 – for a total of 980 model-years. The data gathered include product attributes such as vehicle dimensions, fuel-efficiency and engine power; business-level attributes such as the mix of models and vehicle segments; and institutional attributes such as ratings from consumer, insurance industry, and government agencies. A more detailed summary of the contents of the dataset is included in Appendix One.

Actions Data

A primary database of actions was gathered through structured-content analysis of media reports (Jauch, Osborn, & Martin, 1980; Pollock, Rindova, & Maggitti, 2008).

² Dr. Richard D’Aveni, of Dartmouth College, provided me with full access to a robust compilation of resource data for all firms in the US automotive industry. I am very grateful for his willingness to share his work, as it has made this investigation of the hypotheses possible.

Data was meticulously drawn from articles in two complementary industry publications of Crain Communications, Inc. *Automotive News*, a comprehensive publication of industry-relevant news and information, served as the primary source of actions data for the study; and *AutoWeek Magazine*, a popular automobile enthusiast publication served as a secondary source. Where *Automotive News* focuses on actions important to industry insiders, competitors, suppliers, and analysts; *AutoWeek* focuses on actions important to buyers and automobile aficionados. Excerpts of their positioning have been included in Appendix Two. The data drawn from the sources were carefully sorted and matched for dates and action types to ensure that accounts of actions were recorded only once. The decision rules and procedure are included also in Appendix Two. To correspond with the bi-annual data on automobile resource stocks, actions were capture for all even years in the study period (1994, 1996, 1998, and 2000).

The structured-content analysis of 15,893 articles from the complementary sources yielded an exhaustive dataset of competitive actions in the United States automobile industry. Actions are defined here, in harmony with the body of literature on competitive behavior, as “*specific and detectable moves, such as price cuts or new product introductions, initiated by a firm to defend or improve its relative competitive position,*” (Smith, Grimm & Gannon, 1992:1). These actions include strategic and tactical choices of the automakers – encompassing pricing behavior, product strategy and advertising, plant investment, inter-organizational agreements, and legal tactics. The search, coding, and collection process to build the dataset of actions followed the procedures of other recent studies on competitive behavior (Derfus, et al, 2008). In Appendix Two is an outlining of the detailed procedures for data gathering, as defined in

the initial stages of this study. To efficiently search the vast media reports on record, keywords were used as reference for pertinent articles. However, consistent with the studies that preceded this one, decisions on which media events to include in the dataset are governed by carefully constructed definitions and decision rules included in Appendix Two. With the procedure for content-analysis and the decision rules, a total of 4,337 actions were collected of moves taken globally. Ultimately, 1,905 actions taken by automakers within the United States geographic market were used for analysis in this study.

Previous competitive dynamics studies used discrete measures of actions to show evidence of an actions-performance relationship (Derfus, Grimm, Smith, & Maggitti, 2008; Ferrier, et al., 1999; Lee, Smith, Grimm, & Schomburg, 2000). In consonant, I aggregate the detail in the collected dataset per automaker to calculate the quantity of actions – measured by the count of actions each year. These actions include those taken throughout the value chain – from factor market to product-customer market actions. I investigate the direct and interactive effects of the firm’s actions on performance in this study.

VARIABLES

The combined datasets described above comprise the measures to be used for empirical testing of the hypotheses. I time-ordered each variable to be consistent with prior resource-based and action-based studies (i.e., Somaya, et al, 2007; Derfus, et al,

2008) and to ensure causal validity in the empirical results (Finkel, 1995; Menard, 1991)³. The set of variables, described below, are ordered such that resources precede actions and that actions precede performance using two-, one-, and zero-lagged years, respectively. What follows, is a description of each of the set of variables – performance, resources, actions, and controls.

Performance

Performance by automaker is the consistent dependent variable for the testing of each of the three sets of hypotheses. It is operationalized as the bi-annual change in total sales dollars (i.e., the change in total sales dollars for Lexus in 1995 is the difference between sales dollars of the automaker in 1995 and sales dollars in 1993). This sales growth measure of performance is calculated based on sales data aggregated per vehicle sold, using average list price x units sold (excluding rebates and discounts). Average list price is calculated as one-half the sum of both the base price and the fully loaded price of each vehicle. The performance measure for this study, therefore, is the *Growth in Sales Dollars* per automaker, based on the sum of the individual vehicle growth totals. The variable, Growth in Sales Dollars, has been standardized, and the z-scores are used in the regression analyses. In each test of the hypotheses, standardized Growth in Sales Dollars is evaluated in time zero.

³ Given the three criteria for determining causality (1. Empirical association (correlation), 2. Appropriate time order, and 3. Nonspuriousness), each variable is lagged to meet the second criterion (Finkel, 1995; Menard, 1991).

Resources

To test the hypothesized causal relationships, six resource variables are used. They include tangible and intangible measures drawn from the comprehensive resource dataset described above, (summary of content included in Appendix One). First, for tangible resource stocks, variables include measures of the optimal physical assets available for each automaker – maximum *Vehicle Length* (measured in inches), maximum fuel-efficiency (measured in Miles-Per-Gallon, *MPG*) and maximum *Engine Power* (measured in horsepower). Second, for intangible resource stocks, variables that capture the highest measure of reputation of each automaker’s vehicles for safety and quality include the following: Consumer Report’s *Reliability* rating, based on frequency of repair data where scores include -1 (below average), 0 (average), and 1 (above average); *Crash Protection* rating, based on the National Highway Safety Administration’s crash test results, where scores range from 1 (much below average) to 5 (much above average); and *Injury Claims* rating, based on the frequency and magnitude of claims filed according to the Insurance industry’s Highway Loss Data Institute. The six measures of tangible and intangible resource stocks provide a multi-dimensional perspective on the performance effects of resources. In departure from many of the extant studies in the resource-based perspective that evaluate a single resource in isolation, this research investigates the effects of tangible and intangible bundles of resources in the same study. Two-year lags of each of the resource variables are used consistently across analyses.

For a few automakers, during some years of the study period, resource data were not available. For instance, beyond 1993, Consumer Reports did not include Hyundai in

its reliability ratings. In those instances, I populated the missing values according to the follow procedures: 1) A missing value was assigned the same value as that in the immediately previous period. 2) In the case where there was no immediately previous period, either because that value was also missing or because the missing value was the first year's entry, the value in the immediately following period was assigned. 3) In the case where no immediate values were present, either previous or following, the missing value was left unassigned. The procedure yielded additional observations for analysis; however the impact of replacing missing values on the regression results was negligible.⁴

Actions

The primary measure of firm behavior used in the study is the *Total Actions* variable. It is a common independent variable among many of the comprehensive competitive dynamics studies (Derfus, Grimm, Smith, & Maggitti, 2008; Ferrier, et al., 1999; Lee, Smith, Grimm, & Schomburg, 2000). A one year lag of Total Actions is in use consistently in the analysis of all three sets of hypotheses, operating as independent, mediator, and dependent variable, respectively.⁵ I use the detailed actions dataset collected according to the coding procedure outlined in Appendix Two to construct the variable. Specifically, I calculate the quantity of actions by summing all the actions taken

⁴ As a check, I performed regression analyses on the data without replacement for the missing values, and find that the results remain unchanged.

⁵ For reporting the results of the analyses, I use the Total Actions variable; however I conducted separate regressions using quantities from each type of action and find robust results across them.

throughout the value chain by each automaker, each period. For instance, if Chevrolet in 1995 took 10 actions to improve production capacity, entered into 2 alliance agreements, and initiated 100 pricing actions; its total amount of actions would be 112 for that year.

Controls

As I confine this study to one industry in a common market – namely, the automobile industry in the United States – potentially confounding effects associated with differences across industries and markets are avoided. Other potential effects however, have also been considered. To control for systematic differences at the environmental and automaker levels, I include the following variables. First, I sought to account for conditions in the environment that vary over time, and that may impact performance. I include an industry-wide aggregate production measure, *Industry Production*, which has the dual benefit of accounting for environmental shifts and of tracking closely with years. Its natural logarithm is used as environmental control. Then to control for systematic differences between automakers, I include two additional controls. For a size control, a commonly used measure, I calculated the number of units produced by the automaker, *Automaker Production*, by summing the produced units for all models by each automaker. Also, I included a control to account for potential differences in behavior associated with a automaker’s degree of focus on cars versus trucks (*Car Share*).

Summary of Variables and Model Specification

A consistent measure of performance, six measures of tangible and intangible resource stocks, one aggregate measure of the quantity of actions, and three control measures are used for the evaluation of the hypotheses developed for this dissertation research.

List of Variables	
Performance	Sales Growth Dollars (t)
Actions (one year lag)	Total Actions (t-1)
Resources (two year lag)	Vehicle Length (t-2)
	MPG (t-2)
	Engine Power (t-2)
	Reliability Rating (t-2)
	Crash Protection Rating (t-2)
	Injury Claims Rating (t-2)
Controls	Industry Production(t)
	Automaker Production(t)
	Car Share (t)

ANALYTICAL METHODS

Summary of Hypotheses

To clarify the role of resources and actions in impacting performance, I used the data gathered to investigate the set of theoretical arguments posited earlier. I examine the

extent to which resources and actions each directly predict variation in performance; the extent to which resources predict variation in intervening actions and thereby predict variation in performance; and the extent to which a compensatory relationship exists, such that resources combine with actions to predict variation in performance. On the strength of theory and empirical precedent, those arguments gave rise to the testable hypotheses, summarized as follows:

H1a: The level of resource stocks is positively related to performance

H1b: The level of intangible resource stocks is more positively related to performance than the level of tangible resource stocks

H1c: The quantity of actions is positively related to performance

H2a: The level of resource stocks is positively related to the quantity of actions

H2b: The level of intangible resource stocks is more positively related to the quantity of actions than the level of tangible resource stocks

H2c: The quantity of actions mediates the relationship between the level of resource stocks and performance

H3: The quantity of actions positively moderates the relationship between the level of resource stocks and performance

Estimation procedures

For the testing of the hypotheses posited in this study, specific estimation procedures are indicated. For direct and interactive effects of resource stocks and actions, Generalized Least Squares regression is indicated. GLS regression accounts for problems of independence associated with longitudinal data. For the direct test of resources on actions, negative binomial regression is indicated. Negative binomial or Poisson regressions are specified for tests of discrete dependent variables (Greene, 2007). However, negative binomial regression is indicated when discrete dependent variables are overly dispersed, (Typically, the data of discrete counts of actions tend to be widely varied [Derfus, et al, 2008]). The Total Actions variable in this study fit the criteria, with mean of 11.4 and variance of 275.6. Negative binomial regression is therefore indicated. However, to confirm, I also performed both Wald chi-squared and ln-alpha tests and determined that the fit of the estimates to the data is consistently good (Greene, 2007).

In summary, Generalized Least Squares and Negative Binomial regressions are indicated for testing the set of hypotheses. The specifications of the regression models are:

$$(1) \textit{Growth}(t) = c + b_1\textit{Resource}(t-2) + b_2\textit{Control}(t) + e$$

$$(2) \textit{Growth}(t) = c + b_1\textit{Actions}(t-1) + b_2\textit{Control}(t) + e$$

$$(3) \textit{Actions}(t-1) = c + b_1\textit{Resource}(t-2) + b_2\textit{Control}(t-1) + u$$

$$(4) \textit{Growth}(t) = c + b_1\textit{Resource}(t-2) + b_2\textit{Actions}(t-1) + b_3\textit{Control}(t) + e$$

$$(5) \textit{Growth}(t) = c + b_1\textit{Resource}(t-2) + b_2\textit{Actions}(t-1) + b_3\textit{Resource}(t-2)\textit{Actions}(t-1) + b_4\textit{Control}(t) + e$$

where firm performance [$Growth(t)$] and total actions [$Actions(t-1)$] are for each automaker in year t and $t-1$ respectively; $Resource(t-2)$ is a vector of resource stock variables for each automaker in year $t-2$; $Control(t)$ is a vector of control variables; and $Resource(t-2)Actions(t-1)$ is a vector of interactions of resource stock variables in year $t-2$ by total actions for each automaker in year $t-1$; Betas are parameter estimates; and e and u are error terms; e is normal distribution and u is standard gamma distribution

The descriptive statistics and correlations are shown in Tables 1 and 2. I observed no unexpectedly high correlations among independent variables.

TABLE 1 Descriptive Statistics

Variable	Obs	Mean	Std.	Min	Max
DV- Growth in Sales Dollars (t)	114	0.0	1.0	-1.1	5.9
Industry Production (t)	152	16.3	0.1	16.1	16.3
Automaker Production (t)	152	7.4	6.2	0.0	15.0
Car Share (t)	152	0.7	0.3	0	1
Vehicle Length (t-2)	112	198.3	19.0	159	255.4
MPG (t-2)	113	28.4	7.3	11	58.5
Engine Power (t-2)	113	223.3	68.4	70	450
Reliability (t-2)	100	0.1	0.5	-1	1
Crash Protection (t-2)	99	4.3	0.8	1	5
Injury Claims (t-2)	100	3.9	1.0	1	5
Total Actions (t-1)	117	11.4	16.6	0	112
Total Marketing/ Advertising/Promo (t-1)	117	2.8	5.3	0	35
Total Product Actions (t-1)	117	3.4	5.2	0	40
Total Pricing Actions (t-1)	117	1.5	2.1	0	12
Total Capacity/Dist Actions (t-1)	117	2.5	4.0	0	23
Total Organizing/ Signaling Actions (t-1)	117	1.2	2.2	0	14

TABLE 2 Correlations

(*Significant at <5%)

		1	2	3	4	5
1	DV- Growth in Sales Dollars (t)	1				
2	Industry Production (t)	0.0497	1			
3	Automaker Production (t)	0.3283*	0.0008	1		
4	Car Share (t)	-0.2620*	-0.0748	-0.2880*	1	
5	Vehicle Length (t-2)	0.4911*	-0.0234	0.5050*	-0.0751	1
6	MPG (t-2)	0.3594*	0.0240	0.3615*	-0.0052	0.0268
7	Engine Power (t-2)	0.3488*	0.0619	0.2324*	0.1046	0.5741*
8	Reliability (t-2)	0.1232	0.0924	0.1860	0.0836	0.0504
9	Crash Protection (t-2)	0.2408*	0.0107	0.3642*	0.1426	0.2252*
10	Injury Claims (t-2)	0.1408	-0.0945	0.2732*	-0.0077	0.5711*
11	Total Actions (t-1)	0.6676*	-0.1141	0.3826*	-0.1213	0.3352*
12	Total Marketing/ Ad/Promo (t-1)	0.6609*	-0.0891	0.3191*	-0.0997	0.3363*
13	Total Product Actions (t-1)	0.5726*	-0.0802	0.4512*	-0.1872*	0.3689*
14	Total Pricing Actions (t-1)	0.5296*	-0.1304	0.3405*	-0.1388	0.2913*
15	Total Capacity/Dist Actions (t-1)	0.5861*	-0.0718	0.3396*	-0.0703	0.2399*
16	Total Org/ Signaling Actions (t-1)	0.5961*	-0.1159	0.2775*	-0.0447	0.2493*

		6	7	8	9	10
6	MPG (t-2)	1				
7	Engine Power (t-2)	-0.1376	1			
8	Reliability (t-2)	0.2450*	0.2733*	1		
9	Crash Protection (t-2)	0.3568*	0.1069	-0.0604	1	
10	Injury Claims (t-2)	-0.3536*	0.4519*	0.2109*	0.0230	1
11	Total Actions (t-1)	0.4298*	0.0253	0.0697	0.2266*	0.0402
12	Total Marketing/ Ad/Promo (t-1)	0.3605*	0.0250	0.0784	0.1484	0.0402
13	Total Product Actions (t-1)	0.4032*	0.1927*	0.1136	0.2372*	0.1295
14	Total Pricing Actions (t-1)	0.3929*	0.0083	0.1112	0.2001*	-0.0015
15	Total Capacity/Dist Actions (t-1)	0.3966*	-0.0232	0.0221	0.2545*	0.0507
16	Total Org/ Signaling Actions (t-1)	0.3488*	-0.0275	-0.0724	0.1938	-0.0043

		11	12	13	14	15
11	Total Actions (t-1)	1				
12	Total Marketing/ Ad/Promo (t-1)	0.9379*	1			
13	Total Product Actions (t-1)	0.7590*	0.6625*	1		
14	Total Pricing Actions (t-1)	0.9121*	0.7975*	0.6783*	1	
15	Total Capacity/Dist Actions (t-1)	0.8675*	0.7509*	0.5755*	0.6999*	1
16	Total Org/ Signaling Actions (t-1)	0.8567*	0.8125*	0.5537*	0.7042*	0.7357*

CHAPTER FIVE:

RESULTS

This chapter reports the results of the regression analyses conducted based on the methodology presented in chapter four. The analyses conducted test the hypotheses developed in chapter three. Results spread across five tables included at the end of this chapter. They are as follows: Table 3 reports the results for regressing performance on resource variables along with control variables for firm and industry. Table 4 reports the results for regressing performance on the Total Actions variable and control variables for firm and industry. Table 5 reports the results for regressing Total Actions on the resource variables and control variables for firm and industry. Table 6 reports the results for regressing performance on resource variables, the Total Actions variable, and control variables for firm and industry. Finally, Table 7 reports the results for regressing performance on resource variables, the Total Actions variable, interaction variables for each of the resource variables and Total Actions, and control variables for firm and industry.

Regression analyses were conducted in three ways, consistently for each test of the hypotheses. The dependent variable was regressed on each independent variable

individually; separately on bundles of tangible and intangible resource variables; and on all variables at once, along with identical control variables throughout. For the purpose of revealing complete information, I include the results of all the models. However in the determination of support for the hypotheses, I focus on the pair of models with bundles of tangible and intangible variables, for two reasons. First, in accordance with the theoretical arguments I posited in chapter 3, valuable resources must be evaluated while accounting for the impact of other valuable resources. Therefore the individual models, though statistically relevant, present a more stylized test of the hypotheses. Second, using the full model that includes all the variables at once exposes the model to threats to statistical validity. Specifically multicollinearity violates basic assumptions of the statistical model, and in the case of the resource variables, significant correlation exists between the tangible and intangible measures. Therefore the primary tests of the hypotheses are determined based upon the results of the pair of models with bundles of tangible and intangible variables, respectively. Details of each of the results follow.

DIRECT EFFECTS

Resources and Performance

Hypothesis 1a states that as the level of resource stocks within the automaker increases, its performance will increase. This hypothesis is supported by five of the resource variables. In Model 7 and Model 8 of Table 3, five of the six resource variables have positive and significant coefficients, including: Vehicle Length ($B = .016, p < .01$),

MPG ($B = .038$, $p < .01$), Engine Power ($B = .003$, $p < .05$), Reliability ($B = .263$, $p < .10$), and Crash Protection ($B = .183$, $p < .05$). The coefficient for Injury Claims is not significant.

Tangible and Intangible Resource and Performance

Hypothesis 1b states that as the level of intangible resource stocks within the automaker increases, its performance will increase more so than the increase in performance as the level of tangible resource stocks increase. This hypothesis is not supported. In Model 7 and Model 8 of Table 3, the R-squared value for the tangible bundle of resource variables is significantly higher than for the intangible bundle. This indicates that increases in tangible variables more closely predict increases in performance than increases in intangible variables.

Total Actions and Performance

Hypothesis 1c states that as the quantity of actions taken by the automaker increases, its performance will increase. To test this hypothesis, performance was regressed on Total Actions. In addition to regressing on Total Actions, performance was also regressed sequentially on categories of actions that, in aggregate, comprise the overall Total Actions variable. The models, with disaggregated versions of the Total Actions variable, test whether the impact of actions on performance is confined to particular categories of actions or is significant across the full array of actions. Based on

the results of the tests, hypothesis 1c is supported by five action variables. In Table 4, five of the six action variables have positive and significant coefficients, including: Total Actions ($B = .025, p < .01$), Total Market/ Advertising/ Promotion Actions ($B = .094, p < .01$), Total Product Actions ($B = .104, p < .01$), Total Capacity/Distribution Actions ($B = .072, p < .01$), and Total Organizing/Signaling Actions ($B = .139, p < .01$). The coefficient for total Pricing Actions was not significant.

Based on these results from Table 4, Total Actions is used throughout the remainder of the regressions as the actions variable. Total Actions has dual benefit. It contains the full array of actions taken by the automaker each year in the study period. Also, it is a good predictor of performance, in that the test in Model 10 yields a strong R-Squared value ($R^2 = .40$).

INDIRECT EFFECTS

Resources and Total Actions

Hypothesis 2a states that as the level of resource stocks within the automaker increases, the quantity of actions taken by the automaker increases. This hypothesis is supported by two of the resource variables. In Model 22 and Model 23 of Table 5, though three of six resource variables have significant coefficients, including two positively, Vehicle Length ($B = .014, p < .05$) and MPG ($B = .019, p < .05$), one however is negative, Reliability ($B = -.345, p < .01$), and therefore not supportive of the hypothesis. The coefficients for Engine Power, Crash Protection and Injury Claims are not significant.

Tangible and Intangible Resource and Total Actions

Hypothesis 2b states that as the level of intangible resource stocks within the automaker increases, the quantity of actions taken by the automaker increases more so than the increase in quantity of actions as the level of tangible resource stocks increase. As the only significant intangible resource variable is negatively related to Total Actions (Reliability with $B = -.345$ and $p < .01$), this hypothesis is not supported. Coefficients for the other resource variables are not significant.

Resources, Total Actions and Performance

Hypothesis 2c states that as the level of resource stocks within the automaker increases, the quantity of actions taken by the automaker increases and thereby, performance increases. Baron and Kennedy (1986) provide guidance for determining the presence of mediation among the variables, with four separate regressions steps. Mediation can be said to occur in this case when (a) Resource variables significantly affect performance in the absence of actions, as shown in the models of Table 3, (b) The actions variable has a significant unique effect on performance, as shown in the models of Table 4, (c) Resource variables significantly affect actions, as shown in the models of Table 5, and (d) The effect of resource variables on performance shrinks upon the addition of actions to the model, Table 6 contains this step. Based on these results, the mediation hypothesis is supported by two of the resource variables. In Model 31 and

Model 32, two of six resource variables meet all four criteria for partial mediation by Total Actions, including Vehicle Length and MPG.

In addition to the Baron & Kennedy steps, I applied Sobel-Goodman mediation tests to each of the resource variables. Sobel-Goodman more formally is a statistically based method by which mediation may be assessed. The results determine the extent to which the Total Actions variable as a mediator carries the influence of each of the resource variables to performance (Goodman, 1960; Sobel, 1982). The results show that Total Actions mediates 18.6% of the total effect of the resource variable, Vehicle Length; and Total Actions mediates 66.7% of the total effect of the resource variable, MPG.

INTERACTIVE EFFECTS

Resources, Total Actions and Performance

Hypothesis 3 states that the level of resource stocks and the quantity of actions have an interactive effect on performance such that the combined effect of increases in the level of resource stocks and in the quantity of actions by the automaker, its performance will increase. This hypothesis is supported by two of the resource-actions interaction variables. In Model 40 and Model 41 of Table 6, two of the six interaction variables have positive and significant coefficients, including: Vehicle Length X Total Actions ($B = .000$, $p < .1$) and Engine Power X Total Actions ($B = .000$, $p < .01$). The

coefficient for MPG, Reliability, Crash Protection, and Injury Claims interaction variables are not significant.

Summary of Regression Results

Direct Effects	Hypothesis 1a	Supported by 5 resource variables
	Hypothesis 1b	No Support
	Hypothesis 1c	Supported by 5 action variables
Indirect Effects	Hypothesis 2a	Supported by 2 resource variables
	Hypothesis 2b	No support
	Hypothesis 2c	Supported by 2 resource variables
Interactive Effects	Hypothesis 3	Supported by 2 resource variables

TABLE 3 Regression Results: Performance on Resources

DV- Growth in Sales Dollars (t)									
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Industry Production (t)	2.31 [1.564]	2.207 [1.532]	1.789 [1.549]	2.276 [1.752]	2.263 [1.768]	2.547 [1.717]+	1.229 [1.672]	1.433 [1.913]	0.566 [2.010]
Automaker Production (t)	0.007 [0.019]	-0.018 [0.019]	0.016 [0.018]	0.018 [0.021]	-0.021 [0.020]	0.017 [0.021]	-0.011 [0.018]	0.007 [0.022]	-0.016 [0.022]
Car Share (t)	-0.709 [0.369]*	-0.718 [0.400]*	-0.831 [0.386]*	-0.756 [0.439]*	-0.759 [0.437]*	-0.868 [0.479]*	-0.881 [0.321]**	-1.025 [0.504]*	-1.062 [0.426]*
Vehicle Length (t-2)	0.019 [0.006]**						0.016 [0.006]**		0.017 [0.008]*
MPG (t-2)		0.02 [0.014]+					0.038 [0.012]**		0.028 [0.016]*
Engine Power (t-2)			0.004 [0.002]*				0.003 [0.002]*		0.003 [0.002]+
Reliability (t-2)				0.224 [0.186]+				0.263 [0.199]+	0.187 [0.200]
Crash Protection (t-2)					0.155 [0.090]*			0.183 [0.096]*	0.163 [0.101]+
Injury Claims (t-2)						0.035 [0.122]		0.03 [0.127]	-0.026 [0.133]
Constant	-40.974 [25.540]+	-36.141 [24.992]+	-29.534 [25.250]+	-36.677 [28.630]+	-37.147 [28.856]+	-41.092 [28.133]+	-24.379 [27.280]	-23.568 [31.264]	-13.832 [32.849]
Observations	109	110	110	99	97	98	109	92	92
R ²	.27	.18	.24	.12	.14	.12	.44	.17	.44
Standard errors in brackets. + significant at 10%; * significant at 5%; ** significant at 1%, based one-tailed significance tests									

TABLE 4 Regression Results: Performance on Actions

DV- Growth in Sales Dollars (t)						
	(10)	(11)	(12)	(13)	(14)	(15)
Industry Production (t)	2.978	2.609	2.478	2.382	2.573	2.933
	[1.581]*	[1.550]*	[1.737]	[1.628]	[1.581]	[1.612]*
Automaker Production (t)	0.013	0.012	0.019	0.029	0.022	0.023
	[0.017]	[0.016]	[0.017]	[0.018]	[0.017]	[0.016]
Car Share (t)	-0.574	-0.643	-0.575	-0.666	-0.615	-0.616
	[0.348]*	[0.328]*	[0.337]*	[0.384]*	[0.350]*	[0.343]*
Total Actions (t-1)	0.025					
	[0.007]**					
Total Marketing/Advertising/Promo (t-1)		0.094				
		[0.020]**				
Total Product Actions (t-1)			0.104			
			[0.039]**			
Total Pricing Actions (t-1)				-0.002		
				[0.017]		
Total Capacity/Dist Actions (t-1)					0.072	
					[0.021]**	
Total Organizing/Signaling Actions (t-1)						0.139
						[0.039]**
Constant	-48.488	-42.395	-40.275	-38.539	-41.83	-47.688
	[25.802]*	[25.285]*	[28.341]+	[26.582]+	[25.810]+	[26.302]*
Observations	110	110	110	110	110	110
R ²	.40	.41	.30	.12	.32	.33

Standard errors in brackets. + significant at 10%; * significant at 5%; ** significant at 1%, based one-tailed significance tests

TABLE 5 Regression Results: Actions on Resources

DV- Total Actions (t-1)									
	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)	(24)
Industry Production (t)	-2.578	-2.726	-2.257	-1.807	-2.761	-2.698	-2.7	-2.571	-2.753
	[1.158]*	[1.228]*	[1.201]*	[1.144]+	[1.234]*	[1.268]*	[1.163]*	[1.189]*	[1.158]*
Automaker Production (t)	0.035	0.045	0.052	0.052	0.034	0.037	0.034	0.042	0.035
	[0.020]*	[0.019]*	[0.021]*	[0.020]**	[0.020]*	[0.021]*	[0.019]*	[0.020]*	[0.019]*
Car Share (t)	-0.716	-0.428	-0.501	-0.592	-0.694	-0.725	-0.427	-1.022	-0.944
	[0.546]+	[0.466]	[0.535]	[0.563]+	[0.536]+	[0.540]+	[0.483]	[0.590]*	[0.510]*
Vehicle Length (t-2)	0.013						0.014		0.015
	[0.007]*						[0.007]*		[0.007]*
MPG (t-2)		0.021					0.019		0.009
		[0.011]*					[0.011]*		[0.011]
Engine Power (t-2)			-0.001				-0.002		-0.002
			[0.001]				[0.001]		[0.001]
Reliability (t-2)				-0.356				-0.345	-0.33
				[0.109]**				[0.109]**	[0.108]**
Crash Protection (t-2)					0.059			0.05	0.041
					[0.063]			[0.062]	[0.061]
Injury Claims (t-2)						-0.056		0.028	-0.012
						[0.106]		[0.103]	[0.102]
Constant	43.689	47.125	40.573	34.28	48.674	47.828	45.127	47.206	60.502
	[18.961]*	[20.038]*	[19.693]*	[18.946]*	[20.209]*	[20.834]*	[18.932]*	[19.696]*	[635.812]
Observations	110	110	110	99	97	98	109	92	92
Log Likelihood	-326.647	-326.504	-328.033	-295.174	-294.466	-300.109	-321.628	-276.495	-273.460
Wald chi2 (#)	(4) 16.84**	(4) 17.75**	(4) 13.55**	(4) 23.88**	(4) 11.07*	(4) 11.27*	(6) 23.89**	(6) 27.17**	(9) 37.52**

Standard errors in brackets. + significant at 10%; * significant at 5%; ** significant at 1%, based one-tailed significance tests

TABLE 6 Regression Results: Performance on Resources and Actions

DV- Growth in Sales Dollars (t)									
	(25)	(26)	(27)	(28)	(29)	(30)	(31)	(32)	(33)
Industry Production (t)	2.865	2.783	2.247	2.783	2.908	3.25	1.858	2.184	1.344
	[1.598]*	[1.592]*	[1.621]	[1.766]+	[1.813]+	[1.793]*	[1.649]	[2.000]	[2.075]
Automaker Production (t)	-0.006	0.009	-0.004	0.004	0.01	0.007	-0.023	-0.005	-0.03
	[0.017]	[0.017]	[0.015]	[0.020]	[0.019]	[0.020]	[0.015]+	[0.021]	[0.018]*
Car Share (t)	-0.623	-0.604	-0.744	-0.665	-0.647	-0.716	-0.832	-0.846	-0.944
	[0.315]*	[0.350]*	[0.282]**	[0.388]*	[0.390]*	[0.413]*	[0.258]**	[0.427]*	[0.314]**
Vehicle Length (t-2)	0.016						0.01		0.01
	[0.006]**						[0.006]*		[0.007]+
MPG (t-2)		0.013					0.027		0.024
		[0.013]					[0.011]*		[0.014]+
Engine Power (t-2)			0.005				0.004		0.005
			[0.001]**				[0.001]**		[0.002]**
Reliability (t-2)				0.298				0.317	0.098
				[0.179]*				[0.193]+	[0.182]
Crash Protection (t-2)					0.135			0.171	0.135
					[0.091]+			[0.099]*	[0.099]
Injury Claims (t-2)						0.072		0.066	0.008
						[0.112]		[0.117]	[0.117]
Total Actions (t-1)	0.024	0.023	0.032	0.025	0.024	0.025	0.028	0.025	0.028
	[0.006]**	[0.007]**	[0.006]**	[0.007]**	[0.007]**	[0.007]**	[0.006]**	[0.007]**	[0.006]**
Constant	-49.702	-45.61	-37.501	-45.216	-47.846	-53.026	-33.572	-36.241	-25.689
	[26.059]*	[25.951]*	[26.404]+	[28.845]+	[29.563]+	[29.341]*	[26.863]+	[32.645]+	[33.817]
Observations	109	110	110	99	97	98	109	92	92
R ²	.50	.41	.55	.39	.41	.41	.61	.43	.62

Standard errors in brackets. + significant at 10%; * significant at 5%; ** significant at 1%, based one-tailed significance tests

TABLE 7 Results: Performance on Resources, Actions and Resources and ResXActions

DV- Growth in Sales Dollars (t)	(34)	(35)	(36)	(37)	(38)	(39)	(40)	(41)	(42)
Industry Production (t)	2.672 [1.563]*	2.692 [1.602]*	2.711 [1.555]*	2.985 [1.768]*	3.205 [1.833]*	3.214 [1.808]*	2.088 [1.589]+	2.778 [2.050]	1.838 [2.118]
Automaker Production (t)	0.002 [0.018]+	0.011 [0.018]	-0.005 [0.015]	0.004 [0.020]	0.012 [0.019]	0.006 [0.020]	-0.013 [0.016]	-0.002 [0.021]	-0.021 [0.018]
Car Share (t)	-0.578 [0.334]*	-0.565 [0.354]+	-0.669 [0.286]*	-0.598 [0.400]+	-0.598 [0.386]+	-0.689 [0.411]*	-0.687 [0.284]*	-0.779 [0.441]*	-0.821 [0.329]*
Vehicle Length (t-2)	0.011 [0.007]+						0.004 [0.007]		0.004 [0.009]
MPG (t-2)		0.006 [0.017]					0.019 [0.017]		0.013 [0.024]
Engine Power (t-2)			0.002 [0.002]				0.002 [0.002]		0.003 [0.002]
Reliability (t-2)				0.056 [0.304]				-0.014 [0.351]	-0.27 [0.326]
Crash Protection (t-2)					0.002 [0.140]			0.012 [0.158]	0.043 [0.165]
Injury Claims (t-2)						-0.016 [0.171]		0.042 [0.184]	0.082 [0.182]
Total Actions (t-1)	-0.077 [0.071]+	-0.011 [0.047]	-0.045 [0.028]+	0.024 [0.007]**	-0.046 [0.056]	-0.01 [0.052]	-0.138 [0.066]*	-0.046 [0.080]	-0.132 [0.087]+
Vehicle Length(t-2) X Total Actions(t-1)	0.000 [0.000]+						0.000 [0.000]+		0.001 [0.000]+
MPG(t-2) X TotalActions(t-1)		0.001 [0.001]					0.000 [0.001]		0.001 [0.002]
Engine Power(t-2) X TotalActions (t-1)			0.000 [0.000]**				0.000 [0.000]*		0 [0.000]
Reliability(t-2) X TotalActions(t-1)				0.018 [0.018]				0.021 [0.020]	0.027 [0.019]+
Crash Pro(t-2) X TotalActions(t-1)					0.014 [0.012]			0.015 [0.013]	0.007 [0.014]
Injury Claims(t-2) X TotalActions(t-1)						0.009 [0.013]		-0.001 [0.014]	-0.015 [0.015]
Constant	-45.402 [25.552]*	-43.919 [26.143]*	-44.407 [25.313]*	-48.549 [28.891]*	-52.116 [29.847]*	-52.118 [29.601]*	-35.5 [25.928]+	-45.136 [33.419]+	-31.871 [34.530]
Observations	109	110	110	99	97	98	109	92	92
R^2	.50	.44	.54	.39	.43	.43	.62	.45	.66

Standard errors in brackets. + significant at 10%; * significant at 5%; ** significant at 1%, based one-tailed significance tests

CHAPTER SIX:

DISCUSSION AND CONCLUSIONS

“... [T]he interesting part of science is to explain how something comes about.”

– David Kenny (2008:354)

In this dissertation, I considered how firm resources, actions and performance may be interrelated. In harmony with Dr. Kenny’s sentiment, I tested the notion that resources both enable and interact with firm actions to impact performance. Drawing from resource-based and actions-based theory and empirical research, testable hypotheses were developed suggesting that a firm’s resources may impact performance potentially in three ways – directly, mediated by actions, and in combination with actions. With a combined dataset of 4,337 actions taken by 44 foreign and domestic automakers and 980 model-years of resource and performance data, I find empirical support for key components of their relationships. The analysis shows evidence that firm resources impact performance, both through and with the actions the firm takes. This chapter is devoted to discussing the implications of the study, namely the relationship between resources and actions, the contributions and limitations of the dissertation, and finally the future direction for this stream of research.

Three sets of hypotheses were tested in this study. In turn, I examined first, the extent to which firm resources and actions each directly predict variation in firm performance; second, the extent to which firm resources predict variation in intervening actions and thereby predict variation in performance; and third, the extent to which the product of resources and actions in combination predict variation in performance. On the strength of extant theory, the first sets the baseline for the second and third. However, understanding how resources and actions connect is the main thrust of this work. I discuss here, the findings from each of the tests with emphasis on the implication for the resource-action relationship.

Direct Effects

Consistent with the findings of predecessors, my baseline tests show strong support for the direct impact of resources on performance and actions on performance. Dominant bodies of work forecast these direct results. However finding significant results across most of the variables was important for this study, particularly because of the assumptions necessary to test the hypotheses that followed. From Barney's (1991) foundational arguments that firms achieve positive performance given valuable resource stocks, I included in the hypothesis testing those resource stocks that impacted performance. The strong support for the baseline test of resources on performance, therefore, was pivotal.

Likewise, support for the impact of actions on performance was critical, but for additional reasons. Numerous action-based studies successfully tie actions to performance, (Grimm, et al, 2006); and have shown that greater quantity of actions leads to increased performance (Ferrier et al, 1999), while fewer actions have negative performance effects (Miller & Chen, 1994). I find strong evidence of this relationship not just in the aggregate, but also among an array of action types.

Tangible and Intangible Resources

In contrast to the hypothesis, the tests do not support the notion that intangible resources have greater influence on performance than tangible resources. This finding is at first disappointing, given resource-based theory about the nature of intangible assets – that they are often socially complex, causally ambiguous, and path-dependent (Barney 1991, Hall, 1993). However, it may be that these resources, such as quality and safety reputation, are more elusive than tangible resources, yet their impact on performance is not necessarily greater. In short, that they are harder to come by should not necessarily suggest that they will cause better outcomes. Williamson and Zhang (2007) found that patent and R&D, as important intellectual property resources, had significant effect on performance; and Roberts and Dowling (2002) showed a significant relationship between firm reputation and profit. However neither study demonstrated whether these intangible resources outperformed their tangible counterparts. An earlier study by Miller and Shamsie (1996) included both resource types. They found differences in performance between the resource types, but specific to the environment - tangible, or property-based

resources, more valuable in stable environments; and intangible, or knowledge-based resources, during periods of uncertainty. To the extent that the US automobile industry during the study period may be considered relatively stable, my findings would support Miller and Shamsie.

Resources on Actions

For my first hypothesis connecting resources and actions, I find inconsistent support among the variables. First, for two of the resource variables, Vehicle Length and MPG, the impact is significant and positive: as the automaker improves its capability for producing larger or more fuel-efficient vehicles, it engages in additional actions. Considering that resource-based logic posits that valuable resources are those that contribute to organizational effectiveness and efficiency at addressing opportunities and threats in the environment (Barney & Hesterly, 2006), my finding supports theory. Moreover, it adds clarity to the logic, as the test in this study identifies the impact of resource stocks, controlling for the impact of other resources.

Unexpectedly, I also find evidence of the obverse relationship. For one variable, Reliability, the impact on total actions is significant, though negative: as the automaker improves its reliability rating, it subsequently engages in fewer actions. The rationale offered above makes this an unexpected outcome. However, using evidence from action-based research to deconstruct the dependent variable may be one way of reconciling the finding. Smith, Grimm and Gannon (1992) reported the impact of components of total actions, finding that some actions, such as those related to product introductions, showed

stronger relationships than others. Also Derfus (2001) found that pricing actions had a significantly negative impact on firm performance, while other types were positive. My finding of a negative impact of reliability on total actions may be a result of its negative impact on a component of total actions, while positive on others. It is conceivable that the finding may be interpreted as: Improvements to the reliability rating, that scores vehicles based on the number of repairs, cause the automaker to subsequently engage in less retooling of its manufacturing process or its parts sourcing. In this case the negative impact on factor actions may be dominating positive relationships elsewhere. For the sake of parsimony, total actions were used throughout this study. However a more focused study in the future may well parse out the differences in impact by action type.

Push-pull strategies may also explain the finding that reliability negatively impacts the total actions taken by a focal automaker (Bennett & Cooper, 1982; Herstatt & Letti 2004). The reliability rating variable is an indicator of product quality among the vehicles produced. Bennett & Cooper (1982) seemed to suggest that those automakers with lower quality vehicles tend to engage in more actions to push their products onto the market – through such actions as heavy marketing, advertising campaigns and rebating. They argued that particularly American automakers appear to subscribe to a credo of, “where our product is lacking, we will make up the difference by aggressive selling and heavy promotions,” (Bennet & Cooper, 1982). In contrast, those automakers with higher quality vehicles would need to engage in fewer such marketing behaviors. This explanation would be consistent with the negative reliability-action finding. Given either alternative interpretation, an even more targeted study in the future may well determine

whether the negative result indicates additional factor actions for retooling, additional consumer actions for push marketing, or a combination of both.

Resources and Actions on Performance – Indirect Effects

In the final step in the Baron & Kenny (1986) mediation test, I find some support for the contention that resources are mediated by actions. In the case of two resource variables, Vehicle Length and MPG, the relationship with performance weakened with the inclusion of actions. The finding might be interpreted as follows: As the automaker improves its capability for producing larger or more fuel-efficient vehicles, its performance increases partly because the improved capability causes it to take additional actions. This finding is especially critical for resource-based and action-based research, for at least three reasons. First, it is vital to resource-based logic because it directly addresses a key criticism of the Resource-Based View. Priem and Butler's (2001) contention, that behavioral processes undertaken by the firm have been left unexplained, is clarified by this outcome. In the case of MPG, the mediation effect is twice that of the direct effect. The finding of a mediated relationship provides evidence of *how* resources impact performance – through the additional actions it enables.

Second, the resource variables that were not significant are especially informative to action-based research. Action-based studies often control for resource differences with broad, proxy variables, such as size, age, and slack (Audia & Greve, 2006; Chen & Hambrick, 1995; Young et al, 2000). However, this study shows evidence that more

refined measure may improve or alter the results. My findings demonstrate both how actions mediate some resources but also how they do not mediate others.

Third, examining the impact of bundles of resource stocks on performance, while accounting for actions, also reveals interesting findings about the relative influence of resources and actions. The difference, in R^2 in the outcome of the tests in Models 31 and 32 of Table 6 and the R^2 in the outcome of the tests in Models 7 and 8 in Table 3, would suggest that Total Actions better represents variance in Performance. The difference is even more pronounced when compared to the bundle of intangible resource stocks. This finding may imply that even as both resources and actions have impact on performance, the quantity of actions the firm takes better explains its subsequent performance.

Resources X Actions on Performance – Interactive Effects

My finding in the test of interaction effect shows some support for a moderated relationship of resources and actions on performance. The product of Vehicle Length and Total Actions, and likewise, the product of Engine Power and Total Actions have significant and positive impact on performance. The relationship might be interpreted as: Improvements in the automaker's capability for producing larger vehicles, or engines with greater horsepower, coupled with increases in the number of actions it takes would lead to improvements in sales growth. This finding has important implications for resource-based and actions-based research for at least two reasons. First, unlike the mediation effect of the last hypothesis, that places actions within resource-based logic, evidence of a moderated effect seems to fall outside extant resource-based theory. The

core framework in RBV is that valuable, rare, inimitable, and non-substitutable resources lead to increased performance, and competitive advantage. However the finding in this dissertation suggests that resources must work together with actions if the firm is to achieve optimal performance.

Second, finding evidence of a moderated relationship suggests that firms may employ either the principle of leverage or the concept of expectancy, as introduced earlier in the dissertation (Chapter 3). Giancoli's (2000) discussion of the physics concepts of *work*, *distance* and *force* might be mapped onto firm performance, resources and actions. As demonstrated in the case of Engine Power X Total Actions, the product of resources and actions impact performance, as the product of distance and force produce work. Likewise, just as supported at the individual level with expectancy theory, I suspect that the interaction between effort (firm actions) and bounded ability (resource stocks) impact performance. My findings seem to show some evidence of this relationship.

Summary of Findings

With the combined dataset of actions, resources and performance data, I find empirical support for key components of the relationships. There is now evidence that firm resources impact performance, both through and with the actions the firm takes. Two key hypotheses, however, were not supported by the analysis. I posited that intangible resources have greater impact on performance (Hypothesis 1b) and greater impact on actions (Hypothesis 2b) than tangible resources. There is at least one reason why they were not supported - operationalization. The variables used to operationalize

the concept of tangible and intangible variables may have been misidentified. Vehicle Length, MPG, and Engine Power are readily measurable and under the direct control of the firm, and therefore might be considered property-based, or tangible variables (Miller and Shamsie, 1996). However, under further consideration, these variables may better proxy knowledge within the firm – Length indicates the breath of manufacturing platform capabilities; MPG, or fuel-efficiency, indicates engineering technology; and Engine Power indicates both manufacturing capability and engineering technology. Operationalized as intangible resources, the findings would then better support the theory.

Also in summarizing all of the findings, it is important to mention that among the tests conducted in this research, several of the variables were not significant. For instance, Injury Claims was consistently not significant across the study. This was especially surprising given that the Injury Claims rating, conducted externally by the Insurance Institute, would seem to be an unambiguous proxy for the automaker's reputation for vehicle safety. An explanation may be that the rating does not adequately parse out the share of injuries directly attributable by consumers to the safety of the vehicle, from the share more attributable to driver error. The underlying attribution, unfortunately, is not knowable with these data.

Other non-significant results, such as the impact of Engine Power on Total Actions and the interactive effect of Crash Protection Rating X Total Actions on Sales Growth may have supported the hypothesis with additional control variables. I included three control variables consistently throughout the tests – for the general environment, size of the automaker, and the share of cars-to-trucks produced by the automaker. Two

others sets of controls may have been useful. First, additional controls for parenting effects could include whether the automaker was foreign or domestic, R&D and advertising intensity, or proliferation of dealers. These parenting controls may account for perceptions of quality and safety that differ across automakers. And second, controls for broad economic trends may include consumer confidence ratings or unemployment figures. Economic controls would capture trends in the effectiveness of firm actions – such as marketing and advertising campaigns. It is not clear ultimately what effect the addition of parenting and economic controls would have on the results, though, it is reasonable to expect that they would strengthen the implications of the study.

In total, the results of the analyses provide evidence to draw three main conclusions – that, in particular cases, resources work through actions to impact performance; that in other cases resources work in tandem with actions; and that tangible and intangible resources have distinctly different impact on performance. I found support for the following hypotheses.

Direct Effects	Hypothesis 1a	Supported by 5 resource variables
	Hypothesis 1b	No Support
	Hypothesis 1c	Supported by 5 action variables
Indirect Effects	Hypothesis 2a	Supported by 2 resource variables
	Hypothesis 2b	No support
	Hypothesis 2c	Supported by 2 resource variables
Interactive Effects	Hypothesis 3	Supported by 2 resource variables

THEORETICAL CONTRIBUTIONS

The research contributes to management theory in modeling the essential mechanism by which resources influence firm outcomes. It has opened the “black box” in the link between resources and performance (Priem & Butler, 2001a; Sirmon, Hitt, & Ireland, 2007). As described with the example of Lexus at the introduction to the dissertation, without the explanation for the role of strategic actions, the path to advantage is left unclear. This research answers a call from strategy researchers to address how resource stocks within the firm dynamically connect with the external competitive environment. Barney concedes that, “..., Priem and Butler are correct to

emphasize the importance of dynamic analysis of sustained strategic advantage, for it is only through this kind of analysis that the full implications of resource-based logic for the sustained strategic advantages of firms can be understood.” (Barney, 2001:52). This panel study modeled the key intermediary mechanism between resources and outcomes, and finds that actions indeed mediate.

The dissertation also contributes to theory a framing of the relationship between firm resources and actions. How firms leverage key resource stocks and their strategic actions had not yet been fully explored. My findings suggest that resources and actions combine to influence firm outcomes. There is evidence now that a firm may leverage a high-valued resource, such as engine power, with a flurry of actions to outperform a competitor with equivalent engine power. The automaker, Dodge, part of the DaimlerChrysler Corporation, offers one example of leverage during the study period. With an industry-leading 400 maximum horsepower engine in years 1993 through 1995, Dodge enjoyed sales growth in consecutive periods, at steady total actions. It increased maximum horsepower to 450, and even in the face of fewer actions, the automaker realized 54% greater sales growth in the subsequent period.

Example of Chrysler Dodge: Resources, Actions, Performance						
		t=	1995	1997	1999	2001
Engine Power(t-2)	{Horespower}		400	400	450	450
Total Action(t-1)	{count}		3	3	2	14
Sales Growth(t)	{\$million}		\$ 5,232	\$ 4,977	\$ 9,215	--

This one case might be considered anecdotal; however, as part of the empirical analysis, it demonstrates how resources, actions, and performance are interrelated. This dissertation research contributes to the framing of the relationship.

The execution of this study has yielded useful contributions also to empirical work in the management field through the study of a set of rich resources, actions, and performance. While examining direct relationships in the first hypothesis may not be especially novel, in and of itself, the richness of the measures in the research offers new and compelling evidence. New, comprehensive measures of both tangible and intangible resource stocks, coupled with discrete actions are evaluated longitudinally in the same study. The results that flow from the investigation lend more rigorous validation of the foundational assertions made by RBV and competitive dynamics.

Beyond just validation however, an important strength of the work is also in causality. With a relatively brief window into the automobile industry of just eight years, this research produced findings that support causal inferences about how resources, actions and performance are interrelated. Recall that resource stocks are measured in the study at time $t-2$, actions at time $t-1$, and performance at time t . We now have evidence that resources precede actions, and actions lead to performance. This is important as robustness tests of these variables in different times (i.e., resources at $t-0$, and $t-4$) did not yield the same rich results.

Even as I expect that this study makes important contributions, I also recognize some limitations of the research, particularly as it relates to the data sample. While the empirical study has produced a robust set of findings, the methodological choices carry

some inherent limitations. Limitations in the data were as follows: Size of the sample, single industry focus and geographic market constraints. First, the size of the sample – the data gathering for this study was comprehensive and exhaustive; however the study period was constrained by the bi-annual frequency of some of the main sources of data. I suspect that additional observations would have allowed for stronger and more stable regression results. However, I sacrificed some observations, with good effect, to place greater emphasis on the time ordering of the variables. Also, additional data over a longer study period would help explain differences between the impact of intangible and tangible resources. The nature of intangible resources that make them costly to duplicate could perhaps be better described as a condition that would make them greater predictors of long-term superior performance, or sustained competitive advantage. Given a longer time horizon in the dataset, it may be possible to examine whether, over more years, intangible resources overtake tangible resources in impacting firm performance.

Second, the industry focus – this study was confined to one industry, namely the automobile industry, which allowed for ideal examination of automakers within a setting of substantial strategic interdependence (Thomas & Weigelt, 2000; Priem & Butler, 2001a). On the other hand, the single industry focus limits the generalizeability of the findings to the automobile industry and other similar manufacturing-driven industries. And third, Geographic market constraint – the United States served as the geographic market setting for this research, and was a necessary component to ensuring interdependence among firms. However, as competitive moves become increasingly cross-border, studies confined to a single market have diminishing impact. A recent study by Yu and Cannella (2007) successfully applied action-based research to a global

setting. Deeper insight and impact may be gained in the future by work that expands the geographic boundary to include a broader array of national and international markets.

FUTURE RESEARCH

Limitations notwithstanding, the dissertation highlights the path to even more sophisticated research in the future, particularly as it relates to the role of the mediated and moderated relationships. My aim at the very start of this study was that through the contributions of the dissertation, new empirical groundwork would be set for an ongoing research stream.

I was encouraged by my interpretation of the extant theory, the prior empirical work and my own professional experiences from having had my career start in the automobile industry, that there would be some base level of support for the set of relationships posited. More so than my initial inclination however, the outcome of the research goes further than providing convincing evidence of a link between actions and resources. It importantly allows for deeper development of our understanding about the ways in which these variables are connected and the conditions that make the relationship optimal for performance. Research on recursive relationships between actions and resources should flow from this work, given the structure of the data. Examining how

firm actions refresh, improve, constrain, or reinforce resource and capabilities of the firm would shed further light on the resource-actions relationship.

In conclusion, this dissertation makes a number of important contributions to management theory, including opening the resource-performance “black box” and speaking to the role of actions as a vital intermediary mechanism; demonstrating the combinatory power of actions and resources working in tandem; and building a rich set of measures that might be useful to more deeply explore these relationships in the future. As the culmination of my PhD program, this research has been an exciting journey of discovery for me since I started coding roughly three years ago. Through the process, I have come to know that what I learned about the body of knowledge in management research and what I gained from my own years of professional experience are both useful tools to me in my research. I will use them interchangeably. And more practically, I have also confirmed to myself through the sometimes monotonous data gathering and the sometimes exciting STATA results, that I truly enjoy research. I am thrilled about new research challenges ahead!

APPENDICES:

APPENDIX 1: SUMMARY OF THE CONTENTS OF THE RESOURCES
DATASET

APPENDIX 2: PROCEDURES FOR COLLECTING AND CODING FIRM
ACTIONS

APPENDIX 1:

SUMMARY OF THE CONTENTS OF THE RESOURCES DATASET⁶

Years included: 1993, 95, 97, and 99

All vehicles listed in Automotive News Market Data Books

Primary sources of data: Automotive News Market Data Book, followed by Ward's
Automotive Yearbook and Consumer Reports

n= approx 980 model-years

For each car model:

Type (small, medium, large, luxury, SUV, minivan, sports/sporty, coupes pickup truck,
electric)

Listed base and fully loaded price

Price change ---absolute and percentage

Units sold and produced domestic US

Unit sales growth and growth in production

Unit Market share and market share within car type

Unit Market share change

Dollar sales and market share have be estimated using average list price x units sold (but
average discounts, rebates, and actual price info are not available) where average
list price = (base price + fully loaded price)/2

Automaker Brand name

Car attributes:

Length, width, chassis size (=length x width)

Highest and lowest engine house power available

⁶ This dataset was generously made available to me by Dr. D'Aveni, of Dartmouth College, for use in this study

Size of trunk

Number of passengers

MPG-city and highway (from the EPA)

Tank Capacity (in gallons)

Company Brand (includes all US, European, Japanese, Korean producers selling in US)

Origin--Domestic vs. foreign

Ratings (1= much below average, 5=much above average) from Consumer Reports:

Consumer Reports endorsement (overall car rating)

Crash Protection –driver and passenger side (based on the National Highway
Safety Administration tests)

Injury Claim Ratings –based on the frequency and magnitude of claims filed
according to the Insurance industry's Highway Loss Data Institute

Injury Claim Rating within Type (1999 Only)

Consumer Reports Reliability Rating (-1=below average, 0 = average, 1=above average)
–based on frequency of repair data

Features (1=not available, 2= optional, 3=standard)

Airbags—driver's & passenger side (all yrs- became standard in later years)

Side airbags (99 only)

Antilock brakes

Traction Control

Four and All Wheel Drive (1999 only)

Stability Control (1999 Only)

Performance (Power to size ratio) = average engine power/chassis size where average
engine power = (highest engine power + lowest engine power)/2

Other Notes:

1. Preliminary factor analysis show two factors exist, using standardized data:

- a. platform = chassis size + lowest engine power + highest engine power + injury claim rating –MPG city –MPG highway -----This is a measure of the powerful, large, crashworthy vehicle
- b. safety = driver airbag + passenger airbag + side airbag + driver crash protection + passenger crash protection

2. Data have been aggregated up to company level with weighted averages (by units sold) for many variables. Merged companies (DaimlerChrysler) have been combined in 1999. Growth information for DaimlerChrysler in 1999 was calculated using the combined company in 1997. Partially owned Japanese companies (Mazda, Isuzu, etc.) have been kept separate from US alliance partners.

APPENDIX 2:

PROCEDURES FOR COLLECTING & CODING ACTIONS

What follows are the coding plans and procedures, designed as a period-driven approach, in that the tasks associated with the search, coding, and collection of data is divided into periods. I take this approach to concentrate the content-analysis on similar types of article subject matter. The intent is to join data gathered on the resource stocks of the automakers operating in the US market with data on the actions they take over a multi-year study.

Period One: An examination of the link between competitive actions and resource stocks. It would include the already compiled data on the stocks of resources in automakers of the US automotive industry. To pair with the resource dataset, consumer/product action data was collected by content-analyzing archival reports in print media. Data gathered will be used to test the theoretical framework currently under development:

Resource stocks → Consumer/product actions → Firm performance

Period Two: I explore the link between resource stocks and factor market and corporate/ organizational actions. During this period the goal would be to gather data to test resource links to actions by the firm that affect factor markets (i.e., production quality improvements) and organizational actions (i.e., restructuring). Data gathered will be used to test the theoretical framework currently under development:

Resource stocks → Factor/Organizational actions → Firm performance

Coding Plan for Firm Actions

The initial schedule for gathering competitive actions data includes pre-search, search and coding, divided into Periods One and Two. It has benefited from the guidance of preceding competitive dynamics studies (Derfus, 2001 Young, 1993; Jauch, Osborn, & Martin, 1980)

Pre-search steps

1. Boundaries

a. source of data

- Lexis-Nexus Academic. Given that much of the extant studies of content analysis have used Lexis-Nexus, this study is consistent with prior work.

b. Periodical category

- Automotive News. Covers news and information on consumer/market actions (detail on product, pricing, marketing) and factor market actions (detail on capacity, distribution, etc)
- AutoWeek. Covers consumer/market actions (detail on product features, pricing, marketing)

c. Time period

- Matching the search time periods to those covered in the resource dataset of market resources: 1993, 95, 97, 99
- Collect data to enable tests of actions as Independent Variable; as well as resources as IV. Covering years inclusive of 1993-2000,
- Resources as the IV – capturing actions enabled/constrained by resource stocks in year following the resources year

d. Geographic scope - Include actions taken in the United States by all companies selling in the US (consistent with the Resources dataset)

- #### 2. Keywords: for period one, the focus will be on consumer/product market actions – they include those actions that tend to be product and customer facing: marketing, advertising, promotion, product introductions, pricing activity, and product announcements. For period Two, the focus will be on factor market and

organizational action. A list of the keywords corresponding to the actions is used to facilitate the search process.

Period One – Consumer/product market actions

Action Types	Keywords
<i>Consumer/ Product Market Actions</i>	
<i>Marketing</i>	<i>promote, campaign, sponsor, endorse service, warrantee, guarantee, package, carry, financing</i>
<i>/Advertising</i>	<i>television ad, radio ad, (ad content words), (promotion content words)</i>
<i>Product</i>	<i>introduces, launches, unveils, rolls out, debuts, offers, announces</i>
<i>Pricing</i>	<i>price, rate, discount, rebate, coupon</i>
<i>Product Announcements</i>	<i>will, may, or plans (with some product keyword)</i>

Action Definitions and Decision Rules (Derfus, 2001)

Marketing / Advertising – actions of or pertaining to: advertising, promotion, customer service, sales, and product mix in a dealership. Does not include, or pertain to, the product mix or a manufacturer, or service provider. Neither does it include actions defined below as product or pricing actions.

Product – actions of or pertaining to: new or enhanced products or services related to the primary business of the unit under evaluation. Specifically with regard to retail, product actions are those pertaining to new types of dealerships or new dealer branding (not new product brands within the existing dealer framework).

Pricing – actions of or pertaining to: the price paid for the firm’s products or services, including coupons, rebates, discounts and special promotions. Does apply to the price related to promotions and pricing changes that occur within a retail store with regard to the product it sells.

Product announcement – actions of or pertaining to: products or services in development or to be released in the future. Only included if precedes actual product introduction by at least 30 days.

Period Two – Factor Market and Organizational actions

Action Types	Keywords
<i>Factor Market Actions</i>	
<i>Capacity/</i>	<i>opens, adds, raises, boosts, ups or increases (with) capacity, reduces or decreases</i>
<i>Distribution</i>	<i>(with) capacity, output, production, location, store, outlet, warehouse, market, city, area, region</i>
<i>Workforce</i>	<i>hires, lays off, employee buyout, (action word with) employee benefits or pensions</i>
<i>Organizational/Corporate Actions</i>	
<i>Organizing</i>	<i>restructure (organizational, financial), divest, diversify, merge, slip, acquire, buy, purchase, public offering, buyback (stock)</i>
<i>Licensing</i>	<i>licenses</i>
<i>Legal</i>	<i>sues, infringement, litigation, settles, court</i>
<i>Agreement</i>	<i>joint venture, alliance, agreement (with vertical customer or dealer or distribution or supplier or R&D or development)</i>
<i>Overt Signaling</i>	<i>vows, promises, aims, says, seeks, declares, hopes, considers, intends Expects, will, may or plans (without some product keyword)</i>

Action Definitions and Decision Rules (Derfus, 2001)

Capacity/distribution – actions of or pertaining to: increases or additions to a firm’s manufacturing or distribution capacity. This includes additions to both wholesale distribution facilities and dealer locations. It also includes, but does not require, geographic expansions.

Licensing – actions of or pertaining to: granting or purchasing product/ service licenses.

Legal – actions of or pertaining to: legal proceedings. These include proceedings involving buyers (customers), suppliers, rivals, and the government. These do not include proceedings regarding employees.

Agreement – actions of or pertaining to: organizational or marketing agreements to improve the firm’s competitive position - include long-term customer contracts

Overt signaling – actions of or pertaining to: firm intentions. These do not include intentions regarding products or services of the firm.

Search and coding

3. Search criteria, using Automotive News and AutoWeek
 - a. Input search components
 - Each company
 - Each year (chronology order)
 - b. Each keyword
 - Initial scan of search result headline for irrelevant items (to discard)
 - Generate results in “headline” and 1st paragraph form
 - Save the search results as headlines and 1st paragraphs, and as full-text articles
 - Repeat for each of the above search components
4. Steps to content coding
 - a. Scan the headline/1st paragraph for the relevant keywords
 - b. Based on scan, call-up corresponding full-text and read article for actual actions
 - c. Enter the citation and coded actions into a database according to the decision rules
 - d. Only the first report of an action are to be entered into the database as action
5. collect data for potential US control variables (from CompuStat and other sources) – including the size of the distribution/dealer network and other corporate wide assets

Excerpts of Source Positioning:

- I. “It is *AutoWeek's* mission to deliver editorial excellence with unbiased, relevant, insightful and timely news and information to its automotive consumer-enthusiast audience. We seek to be the indispensable source of need-to-know and want-to-know information in order to empower its readers to become experts.

AutoWeek covers trends, features, sports, passion, and emotion-- the automotive lifestyle.”

- II. “Established in 1925, *Automotive News* is published by Crain Communications. Regarded as the "Bible" of the automotive industry, the newspaper provides important, timely news to manufacturers, dealers, suppliers and all those who track trends and developments in the automotive industry. An international publication, Automotive News is delivered to more than 70 countries.”

Procedure for Duplicate Actions

1. Assign database entries by source, AutoWeek and Automotive News
2. Match for Corporation, Automaker, and Model, then actions, then dates
3. In cases where an action is captured in both sources, assign the count to only the Automotive News entry
4. Maintain both original articles in the article archive

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