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RESOURCE MANAGEMENT IN DYADIC COMPETITIVE RIVALRY: THE EFFECTS OF RESOURCE BUNDLING AND DEPLOYMENT

DAVID G. SIRMON
Texas A&M University

STEVE GOVE
Virginia Tech

MICHAEL A. HITT
Texas A&M University

Although resources are instrumental to a competitive advantage, management must effectively bundle and deploy an organization's resources for an advantage to be realized. Despite their importance, little research has examined these managerial actions. Using a sample of competitive dyads, we tested theory regarding the effects of rivals' comparative resource stocks and managers' bundling and deployment actions on competitive outcomes. Results indicate that both comparative advantages in resource stocks and managerial actions affect performance. However, their efficacy depends on contextual factors and the deployment flexibility of specific resources. Thus, resource management actions are critical to achieving and sustaining competitive advantage.

The resource-based view of the firm suggests that positive competitive outcomes are largely attributable to organizations' idiosyncratic resources (Barney, 1991; Peteraf, 1993; Wernerfelt, 1984). Specifically, the resource-based view indicates that the potential for competitive advantage exists when a firm controls resources that are valuable and rare; that advantage is sustainable when those resources are also costly to imitate and lack substitutes (Barney, 1991). Although empirical support for this general logic is growing (see Barney and Arikan [2001] for a review), this literature has been criticized for being overly focused on the "generic characteristics of rent generating resources" (Priem & Butler, 2001: 33). Owning or having access to a valuable and rare resource is necessary for competitive advantage, yet alone it is insufficient. Such resources must be effectively bundled and deployed to exploit opportunities and/or mitigate threats in specific competitive engagements for a firm to *realize* a competitive advantage (Hansen, Perry, & Reece, 2004; Kor & Mahoney, 2005; Lavie, 2006; Mahoney, 1995; Majumdar, 1998). Bundling and deployment actions have been integrated into a developing theory on "resource management" (Sirmon, Hitt, & Ireland, 2007). However, despite recent theory explicating the components of resource management and their importance, we understand little regarding how much managers' actions influence a resource-based competitive advantage or when these actions matter most.

Reflecting on the absence of resource management considerations in the resource-based-view literature, Barney and Arikan (2001) stated that earlier work (e.g., Barney, 1991) took a "remarkably naïve view" of implementation issues. As a result, they argued that "more work is needed before the full range of strategy implementation issues not included in the 1991 paper are integrated with a resource-based theory of competitive advantage" (Barney & Arikan, 2001: 175). We address this void by focusing on resource management. Building on the extant literature, we examine the independent effects of resources and their management on competitive outcomes. Additionally, our theory and analysis explore when managerial actions matter most, as well as the characteristics of resources (i.e., deployment flexibility) that affect managers' ability to effectively bundle and deploy them.

To capture the fine-grained and fluid nature of resource management, we focus on the rivalries between specific organizations (i.e., direct "engage-

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ments" or "contests"). This approach allows more precision by avoiding the aggregation of numerous competitive engagements with multiple rivals over time, an important attribute for testing theory focused on the effects of resource bundling and deployment. Dyadic engagement is the focus of other research involving competition as well. For instance, Chen, Su, and Tsai stated that "competitive tension, consistent with the competitive dynamics perspective, is a firm-dyad-level construct" (2007: 103). Measuring direct engagements between rivals allows the independent effects of resources and their management to be assessed. Therefore, we examine *relative* or *comparative* levels of rivals' resource management and resources, which are often more important to competitive outcomes than absolute levels (Dutta, Narasimhan, & Rajiv, 2005; Jacobides & Winter, 2005; Wernerfelt & Karnani, 1987).

This research highlights important portions of resource-based logic that require further empirical examination. First, although we demonstrate the important role resources play in determining competitive outcomes, we focus special attention on the contribution of managerial actions in the bundling and deployment of resources. Our results suggest that greater consideration of the role of managers in resource-based logic is vital for a more complete understanding of how a competitive advantage is created and sustained. In fact, our theory and analysis demonstrate that resource management is more important than resources when rivals' stocks of resources are similar. Additionally, we explore factors that limit the effects of resource management. Results suggest that the deployment flexibility of resources affects managers' ability to bundle and deploy them effectively in competitive contests. Lastly, our theory and results underscore the fact that although a firm may have a substantial advantage in its stock of resources, only the subset of resources that are bundled and deployed directly contributes to a firm's competitive outcomes. However, greater depth and scope in the organization's resources increase managers' ability to affect outcomes through bundling and deployment actions. Thus, our focus on resource management contributes to extant theory by explicitly locating management in a resource-based theory of competitive advantage and to practice by explicating the actions and conditions that affect a manager's ability to help a firm realize an advantage.

We tested our theory by focusing on human capital. We obtained data on human capital and managers' ability to bundle and deploy it from a sample of major league baseball organizations over the period 1997–99. This sample was appropriate for testing theoretical tenets of the resource-based view and the resource management hypotheses offered herein for several reasons. First, athletic organizations are useful in testing theory related to competitive organizations and their resources. Samples of basketball organizations have been used to explore managerial succession (Pfeffer & Davis-Blake, 1986), escalation of commitment (Staw & Hoang, 1995), the effects of strategic fit on performance (Wright, Smart, & McMahan, 1995), and theory pertaining to tacit team knowledge (Berman, Down, & Hill, 2002). Similarly, samples of professional baseball organizations have been used to test managerial theories (e.g., Bloom, 1999; Howard & Miller, 1993; Moliterno & Wiersema, 2007).

Second, the nature of rivalrous competitive engagements between these organizations provides data with features essential to testing resource-based theory. For example, the organizations share a common factor market and general environment. Additionally, although the quantity of players per organization is highly similar, the quality of their human capital varies. The ongoing consistency in the measurement and reporting of players' industry-specific human capital, therefore, is vital to our efforts. The consistent measurement across organizations over time allows us to examine how managers bundle and deploy their players after isolating the effects of their raw skill sets (Rouse & Daellenbach, 1999). Lastly, the implications of the study are applicable to other business organizations because athletic organizations face markets that are similar to those of businesses in their competitiveness, and both face economic and operational restrictions on the attraction and retention of talent necessary to achieve advantages vis-à-vis competitors. Furthermore, success in dyadic contests contributes to both types of organizations' overall financial performance (Chen et al., 2007). This success can produce higher market share for other business organizations, but for athletic organizations it leads to increased ticket sales, which, in turn, is a significant predictor of team financial performance (Bruggink & Eaton, 1996; Major League Baseball, 2001). Lastly, the maximization of organizational performance is a primary consideration for both industrial and nonindustrial organizations, including athletic organizations, as evidenced by similar performance distributions (Powell, 2003).

We begin developing theory by exploring human capital as a primary resource for most organizations and the specific skills of human capital in baseball organizations. Next, we discuss the role of resource management actions and when those actions matter most. Drawing on the theoretical arguments presented, we derive four sets of hypotheses. We explain the theory-testing procedures in the methods section.

The article closes with a discussion of the results and their implications for theory and practice.

CONCEPTUAL FRAMEWORK

The assertion that resources affect organizational outcomes has long been espoused (e.g., Ansoff, 1965; Penrose, 1959; Selznick, 1957). However, the development of the resource-based view provided a clearer understanding of when resources are likely to have positive effects on organizational outcomes. Specifically, the theory suggests that when a resource, defined as a tangible and intangible asset that a firm controls, is both valuable (i.e., useful in exploiting opportunities and/or neutralizing threats in the environment) and rare (i.e., uncommon), a competitive advantage is possible (Barney, 1991). Although tangible resources are necessary, in the dynamic and competitive environments that characterize many markets (Bettis & Hitt, 1995), intangible resources such as an organization's human capital are more likely to satisfy these conditions (Miller & Shamsie, 1996).

Human capital is defined as the skills, experience, and knowledge of individuals (Becker, 1964). Organizations rely on the human capital of employees to compete effectively with rivals. However, human capital is not a monolithic construct. Theory distinguishes between categories of human capital that include general, industry-specific, and firm-specific components (Becker, 1964; Castanias & Helfat, 1991). This categorization is based on the transferability and applicability of specific skills, experience, and knowledge to different contexts. General human capital is the most transferable and least unique, and firm-specific human capital is the least transferable and most unique. Industry-specific human capital, however, is both transferable and relevant to the organizations within a given industry.

Because this study emphasizes the outcomes of competitive contests between rivals within a single industry, we focus on industry-specific human capital. Moreover, prior research suggests that industry-specific human capital is important for various firm-level outcomes. For example, industry-specific human capital is linked with the dissolution (Pennings, Lee, & Van Witteloostuijn, 1998) and performance (Hitt, Bierman, Shimizu, & Kochhar, 2001) of service-based organizations, and the survival of entrepreneurial firms (Gimeno, Folta, Cooper, & Woo, 1997).

Industry-specific human capital is comprised of the skills relevant for success in an industry. Across industries, these skills will differ. For example, in the pharmaceutical industry, new product development is often based on employees' knowledge of microbiology, genetics, and chemistry, though in the software industry new product development is based on employees' knowledge of advanced mathematics, computer languages, and systems theory. Within industries, where skill types are shared, variation in employees' "degree of skillfulness" (Castanias & Helfat, 1991: 160) or proficiency per skill helps to determine the outcomes of competitive engagements.

Although proficiency is important, the organization whose employees have *more* proficient industry-specific skills has the advantage (Peteraf & Barney, 2003). Both a firm and a rival can employ personnel with valuable skills, but only one achieves a competitive advantage. The organization with the more valuable industry-specific skills holds the advantage, despite the fact that a rival organization employs individuals with valuable skill sets. Stated simply, "It is the strengths relative to competitors that matter, and not absolute strengths" (Wernerfelt & Karnani, 1987: 192). Like Jacobides and Winter (2005: 401), we use the term "comparative resource advantages" to describe this relationship. Thus, a comparative advantage in any unique industry-specific skill set embedded in an organization's human capital can contribute to the positive outcome of competitive engagements.

Focused on the sample of this study, the salient industry-specific skills sets are batting, fielding, and pitching (James, Dewan, Munro, & Zminda, 1998; Lewis, 2003). Therefore, when baseball teams compete, comparative advantages in the batting, fielding, and pitching skills of the players influence which team is likely to win. A comparative advantage in batting skills allows a team to score more runs, a comparative advantage in pitching and fielding reduces the likelihood of loss by decreasing the rival's ability to score. Therefore, we hypothesize that:

Hypothesis 1a. Comparative resource advantages in batting skills positively affect the outcomes of competitive contests.

Hypothesis 1b. Comparative resource advantages in pitching skills positively affect the outcomes of competitive contests.

Hypothesis 1c. Comparative resource advantages in fielding skills positively affect the outcomes of competitive contests.

Although comparative advantage in an industry-specific skill represents the raw difference between competitors' employees and help determine the upper bounds of an organization's potential success (Makadok, 2003), the resource management process influences the specific outcomes that are realized.

Thus, resource management has a measurable effect on the outcomes of competitive engagements.

Resource Management

Decades ago, Penrose argued that "the experience of management will affect the productive services that all of [the organization's] other resources are capable of rendering" (1959: 5). The influence of managerial experience is manifested through the processes of resource management. Sirmon et al. (2007) describe resource management as the comprehensive process of structuring a firm's resource portfolio, bundling the resources to build capabilities, and leveraging those capabilities to *realize* a competitive advantage. *Structuring* a resource portfolio involves the processes of acquiring, accumulating, and deleting the resources in a firm's stock of resources. *Bundling* refers to the processes used to integrate resources in order to create capabilities. *Leveraging* involves the set of processes used to configure and deploy capabilities specific to a particular market context. Although sequential in presentation, in operation their synchronization can be achieved through continuous feedback and monitoring. Over the long term, managers can affect all three processes, but in the short term, their actions are constrained to the bundling and deploying of resources presently controlled by the organization (Makadok, 2003). That is, during a specific competitive contest, a firm is limited to managing existing resource stocks. In this study, we specifically focus on the resource management processes of resource bundling and deployment.

Focusing on these processes and their effect on the outcomes of competitive contests is critical. Competitive outcomes are not determined by an organization's portfolio of resources per se but rather by the more focused set of resources that it bundles and deploys. Managers must select the subset of organizational resources to bundle together in order to build the capabilities necessary to compete effectively. However, multiple capabilities are needed to compete effectively, and valuable and rare resources are not abundant; it is possible that some capabilities will represent comparative resource advantages, yet others are comparative resource disadvantages. Thus, deploying multiple bundles of resources in a mutually supportive manner is a challenging task, requiring significant attention on the part of the manager.

In part, the difficulty in effectively bundling and deploying resources is due to the contingent effect of context. An organization's task environment (Dess & Beard, 1984), including such factors as dynamism (Miller & Shamsie, 1996), information asymmetries (Brush & Artz, 1999), and munificence (Sirmon et al., 2007), can influence competitive outcomes. Rivalry is an important contingency as competitors' capabilities change over time (Helfat & Peteraf, 2003), resulting in a dynamic landscape (Bettis & Hitt, 1995). This dynamic landscape affects the comparative resource advantages in the skill sets of an organization's human capital endowment. Together, environmental contingencies and a need to deploy a focused subset of the organization's resources in rivalrous competitive engagements emphasize the importance of managerial action to achieve and maintain a competitive advantage.

Although closely related, we distinguish the processes of bundling and deployment from the resources that are being managed. These processes are "actions that firms engage in to accomplish some business purpose or objective" (Ray, Barney, & Muhanna, 2004: 24). Working in tandem, the bundling and deploying processes share the objective of optimizing an organization's opportunities for success in targeted markets, engaging specific competitors. Bundling integrates a subset of organizational resources for that engagement, and deploying sets in motion the act of engagement.

The objective of these processes is similar across organizations; however, their outcomes are not. Managers clearly influence the outcomes by the resources they select to bundle, the manner in which they bundle them, and how they deploy them. Therefore, after the availability of various resources for bundling and deployment has been controlled for, variation in the outcomes of these processes is attributable to the effectiveness of the managers.

Although it seems logical for managers to bundle and deploy only their "best" resources (e.g., employees), they are often precluded from doing so for several reasons. First, an organization's best salespeople, for example, cannot call on two clients simultaneously, its most efficient machinery cannot be tooled for two simultaneous production runs, and financial assets cannot be continuously divided without the loss of effectiveness. Thus, a manager's choices in bundling and deployment have constraints. For human capital skill sets, the constraints can be especially formidable. When managers consider each employee's industry-specific skill sets, they must contend with the fact that these skill sets are embedded within an individual. Managers cannot simply bundle and deploy one skill set, but instead must bundle and deploy these skills via individuals, whose proficiency over multiple skill sets is likely to vary (Castanias & Helfat, 1991). Although each member of a cross-functional

team may have a specialty, members are often expected to contribute to the team on matters and activities that extend beyond their special expertise (Jassawalla & Sashittal, 1999; Randel & Jaussi, 2003). Thus, instead of maximizing a single skill set, managers try to optimize the requisite skill sets for their team's situation in order to optimize the organization's performance.

Managers optimize the requisite skills by using their knowledge of the contingent value of their employee's skill sets as deployed in various contexts. Ghoshal and Bartlett (1994) argued that high-quality managers facilitate an environment that fosters discipline, trust, and support while simultaneously challenging employees to stretch their capabilities. In such an environment, managers can more fully understand each individual, his or her skill set, and the contexts in which he or she is likely to be most productive. This knowledge allows managers to bundle and deploy employees' skill sets in ways that increase the probability of realizing an advantage over a competitor. As such, the bundling and deployment choices made by managers to realize comparative resource advantages are likely to differ, depending on their understanding of several contingencies, including contextual factors that affect rivals' human capital as well as their own. Because such understandings are likely to differ among managers, the effectiveness of resource management likely varies across organizations.

The influences and constraints faced by managers in other types of organizations are shared by field managers of professional baseball organizations. Field managers are responsible for the bundling and deployment decisions regarding their roster of players. They utilize their idiosyncratic experiences and understanding of external contingencies, coupled with their knowledge of their players' skill sets and situational performance (e.g., how they perform in certain ball parks, against specific pitching/batting configurations, time in the season, etc.) to determine how to bundle players. Their intent is to create bundles with the greatest opportunity to realize comparative advantages in batting, fielding, and pitching skills relative to their competitors (Berman et al., 2002).

Baseball managers have three primary ways to enact bundling and deployment. First, they select a starting line-up. The starting line-up represents the subset of players that is actually deployed. When bundled together, these players' skill sets determine the team's realized batting, fielding, and pitching skills. For example, when considering who should bat and when, the manager may consider how players perform when facing the pitching style of a specific rival. Second, through player substitutions managers can, in effect, re-bundle the batting, fielding, and pitching skill sets for specific situations (e.g., change in the opponent's pitcher). Third, they make tactical decisions (e.g., hit-and-run plays, steals, intentional walks, type of pitches to be thrown, bunts, etc.) that best deploy the players' skills in given situations. Moreover, the way a manager engages a player off and on the field creates a relationship that can affect the player's performance (Ghoshal & Bartlett, 1994). Thus, when one manager is more effective in bundling and deploying the team's batting, fielding, and pitching skill sets vis-à-vis opponents, the team is more likely to win as a result of the *realized* advantages. These arguments suggest that more effective resource management positively affects competitive outcomes. Formally, we propose:

Hypothesis 2a. Comparative managerial advantages in the bundling and deployment of batting skills positively affect the outcomes of competitive contests.

Hypothesis 2b. Comparative managerial advantages in the bundling and deployment of pitching skills positively affect the outcomes of competitive contests.

Hypothesis 2c. Comparative managerial advantages in the bundling and deployment of fielding skills positively affect the outcomes of competitive contests.

To this point, the arguments suggest that both resources and their management influence the outcomes of competitive contests. An organization's set of resources represents its potential, and resource management, especially bundling and deployment, influences the realization of this potential (Makadok, 2003). Although both potential and realized potential are important, their degree of influence is not necessarily equal.

Bundling and deploying organizational resources appropriately for specific contingencies can produce a comparative managerial advantage that increases an organization's opportunities to succeed. However, effective management is less important if the organization's comparative resource advantage is large. In this case, most or all bundles of resources will be better than the rival's. For example, superior resource management is unlikely to lead an organization with inferior industry-specific human capital to beat a rival with far superior skill sets because even with optimal bundling and deployment, the human capital–poor organization is unlikely to be competitive with the human capital–rich organization. In this case, the large differential in resources overwhelms the influence of manage-

rial bundling and deployment. However, when rivals' human capital endowments are more similar, the importance of resource management increases.

When rivals' resources approach parity, the outcomes of competitive engagements are determined more by resource management than by resources. In these cases, a manager's bundling and deployment actions have greater bearing on which organization realizes an advantage in a given competitive engagement than does the set of resources. For example, when two baseball teams possess players with similar batting, pitching, or fielding skills, resource management is critical in determining the outcome. Bundling and deploying players idiosyncratically on the basis of the contingencies faced (e.g., venue, pitchers faced, layout of the playing field, in combination with certain other teammates, etc.) can produce an extra run scored (or fewer runs scored by the opponent), which in turn determines the outcome. Thus, we expect that resources matter more than resource management in determining the outcomes of competitive contests when rivals possess large resource differentials. However, as rivals' resource stocks approach parity, resource management is more influential. Therefore, we propose that the relationship between management of resources and outcomes of competitive contests is moderated by the degree of parity in the resources held by the two competitors. Formally, we propose:

Hypothesis 3a. As parity in batting skills is approached, comparative managerial advantage becomes increasingly important in determining the outcome of competitive contests.

Hypothesis 3b. As parity in pitching skills is approached, comparative managerial advantage becomes increasingly important in determining the outcome of competitive contests.

Hypothesis 3c. As parity in fielding skills is approached, comparative managerial advantage becomes increasingly important in determining the outcome of competitive contests.

We argue that resource management is critical in determining the outcomes of competitive engagements, yet we also suggest that not all resources are equally "manageable." Resources can differ in their deployment flexibility. We define deployment flexibility as the "attribute of a resource that facilitates its application to different organizational settings" (Anand & Singh, 1997: 101). Thus, high deployment flexibility means that a resource can be effectively and efficiently redeployed to different applications within the organization, and low deployment flexibility suggests that doing so is difficult, if not impossible. For example, managers will find it more difficult to redeploy a resource such as a large, specialized, and complex manufacturing facility than human capital. However, human capital can also have low levels of deployment flexibility, depending on the skill set and task.

When Procter and Gamble (P&G) acquired Gillette, the integration of P&G's Crest toothpaste with Gillette's Oral-B toothbrush seemed to be an opportunity for synergy. However, creating synergy was hampered by the unwillingness of many Gillette employees to relocate to Cincinnati. The P&G executive in charge of the integration commented, "We didn't get as many people to move to Cincinnati as we would have wished" (Byron, 2007). The human capital necessary to create synergy existed within the organization, but managers had a group of employees with low deployment flexibility—the workforce was not amenable to a change in geographic location—thus limiting managers' ability to redeploy the valued human capital embedded in these employees.

When faced with resources having low deployment flexibility, managers are likely to allocate significant attention to the initial deployment because these decisions establish a path dependence, making future changes difficult (Dierickx & Cool, 1989). After initial deployment decisions, it is difficult to redeploy or even re-bundle resources with low deployment flexibility. Managers can, however, optimize the organization's opportunities for success by redeploying resources with high levels of deployment flexibility. Thus, the effect of management is likely to vary with the deployment flexibility of the focal resource, including human capital.

Players in professional baseball organizations differ in their deployment flexibility, with pitchers providing a good example. Starting and relief pitchers differ greatly in deployment flexibility. Starting pitchers are deployed through a tightly fixed rotation, with physical rest required to replenish their throwing ability. Starters usually rest four to five days between deployments and only under extreme circumstances do managers change this rest period. For example, in game seven of the 2003 World Series, Arizona Diamondbacks manager Bob Brenly chose to deploy Randy Johnson, a celebrated starting pitcher, as his closing pitcher on short rest. Even in game seven, the final and deciding game of the World Series, the manager was only willing to use him in the final innings. His choice still was the subject of much media attention. Thus, starting pitchers have low deployment flexibility. Relief pitchers, alternately, offer a higher level of deployment flexibility. Managers may deploy them readily. A reliever can pitch in many games for several innings, or infrequently, such as pitching to only one batter, or in some combination of these.

Thus, relievers, with their high deployment flexibility, differ greatly in comparison to starters, with their low deployment flexibility. In view of this difference, we argue that the management of relief pitchers has a greater effect on competitive outcomes than the management of starting pitchers.

Hypothesis 4. A comparative managerial advantage in the bundling and deployment of relievers' pitching skills has greater positive effects on competitive outcomes than the same type of advantage vis-à-vis starters because of differences in the deployment flexibility of the two types of players.

METHODS

Sample

The sample for this study consists of major league baseball teams during the period 1997–99. Professional baseball is a highly competitive sport wherein teams utilize the same number of players to perform similar tasks using batting, fielding, and pitching skill sets. Archival data on resources and performance are available for multiple years. These characteristics are highly desirable for empirical tests of theory, as they allow consistent measurement of constructs and comparison across organizations. A review of the literature suggests that batting, pitching, and fielding skills comprise the critical industry-specific skills sets in baseball, although the influence of field managers has been recognized (James et al., 1998; Lewis, 2003). Baseball field managers are not the highest-level managers in their respective organizations but have primary responsibility for bundling and deploying the team's players.

Each baseball team plays in one of two leagues, and teams within each league play all others within that league, for a total of 162 games played by each team during the regular season. We excluded dyadic competitive engagements across the two leagues, during both the regular season and the post season, as the rules governing deployment of resources differ slightly for each. To isolate the effect of comparative resource and managerial advantages, as opposed to the aggregated effects of season-long performance outcomes across multiple rivals, we assembled a matrix of within-league dyadic team pairs. For example, during the 1999 season, the Boston Red Sox competed in dyadic competitions against 13 teams having within-dyad contests ranging from 9 to 13 games. Isolating performance to the level of dyadic engagements is an important extension for resource-based logic (Ray et al., 2004): although the Red Sox's overall win percentage was .580 for the season, its within-dyad win percentage ranged from .308 to .900. Our sample includes 604 dyadic competitive engagements among the 30 major league teams over the three years (seasons) examined.

Measures

Performance. The dependent variable is the relative performance of the teams in the dyadic competitive contests within each season. We randomly assigned teams as team A and team B. We used team A as the referent for all comparisons by calculating team A's win percentage for within-dyad games.

Comparative advantage. We assessed a comparative resource advantage by comparing the skill sets of the teams in the dyad. As with performance, all were compared to team A, so positive values represent a resource advantage for team A, and negative values indicate a disadvantage. To make this comparison, we took four steps to transition from players to dyadic competitors at the team level. The Appendix provides a sequential example of this procedure.

First, we used multiple indicators to fully assess individual players' skills (Boyd, Gove, & Hitt, 2005). For each indicator, we calculated a three-year lagged average. A lagged average was calculated to minimize the effect of anomalies (both high and low) and to eliminate contemporaneous effects on performance during the season under examination. Second, using these figures, we calculated a team-level simple average per indicator. Additionally, we calculated a team-level weighted average per indicator based on actual deployment. Third, we constructed team-level indices for batting, pitching, and fielding skill sets. The indicators for each are identified in the Appendix.

All indices employed a minimum-use criterion that was consistent with the measurement units per skill set. For *batting skills*, the requirement for inclusion was at least ten at-bats during the season. The index for batting skill includes 13 indicators. All of these indicators relate to scoring runs, which is the primary objective of batting. The coefficient alpha for this index is .84. Next, the index for *pitching skills* used a minimum-use criterion of at least ten innings over the 162-game season to be included in the team-level index. This criterion is liberal, as it is approximately one-half of one percent of the approximate 1,458 available regular season innings. The seven indicators in the index of pitching skills relate to the ability and endurance of the pitching squad, and the lack of pitching errors. Coefficient alpha for the overall measure is .84. To assess Hypothesis 4, we also created subindices for starting and relief pitchers. Starting pitchers were

defined as the four pitchers on a team who had the most starts during the season. This operationalization captures over 71 percent of the games started over the three seasons. Relief pitchers were defined as all other pitchers on the team's roster. The alpha for the starting and relief pitchers indices are .81 and .86, respectively. The index for *fielding skills* employed a minimum-use criterion of ten innings played and, with two indicators, yielded a coefficient alpha of .67.

Fourth, we created comparative scores per dyad. Importantly, when developing the comparative resource scores per dyad, we compared them resource-to-resource. That is, team A's pitching resource was compared to team B's pitching resource.

Comparative management. We conceptualized resource management as the differential between the simple and the weighted team average for the indicators. The simple team average per indicator represents baseline skill sets, and the weighted team average represents the realized skill sets. Each player on a team's roster could, hypothetically, be deployed by the manager in 0 up to 100 percent of the situations. Thus, if the players were randomly bundled and deployed over time, the simple and weighted averages of their skills sets would be highly similar. The most critical managerial task is to bundle and deploy resources where their realized output is optimal, thereby increasing the organization's probability of success in competitive contests. With selective deployment per situation, managers are able to realize better-than-average player performance. Therefore, a team's weighted average per indicator captures the effectiveness of the manager: positive differentials between the simple and weighted averages indicate the degree to which resources were successfully bundled and deployed. For example, a team with a simple batting average of .200 and random bundling and deployment would likely have a weighted batting average of approximately .200. However, with effective resource management, the weighted batting average could be greater than the simple average (in this example, above .200), but ineffective resource management would yield a weighted batting average of below .200. This difference is due to the manager's idiosyncratic knowledge of each player's contingent ability. Some players perform better under certain conditions (e.g., during high-pressure games, on artificial turf instead of real grass) or against certain pitchers. Thus, our measure of comparative managerial advantage captures what managers consider in making bundling and deployment decisions.

Therefore, we calculated comparative managerial advantage as the differential between the simple and weighted team average per indicator. We then followed the same procedure used to calculate the skill set indices. The alpha coefficients for batting and fielding resource management measures are .94, and .88, respectively. For pitching, we created an overall index of resource management and separate measures for the management of starters and management of relievers. The coefficient alphas for these measures are .89, .91, and .76, respectively.

Control variables. We controlled for four additional factors that can influence the relationship among resources, management, and performance within dyads. All were coded as dummy variables. First, we controlled for *league membership* because the leagues' rules governing resource deployment differ slightly. The American League was coded 0, and the National League was coded 1. Second, we assigned a score of 1 to *first year managers* who may not have a complete understanding of the resources specific to a team and its opponents. Third, we controlled for and coded as 1 instances in which a team replaced managers during a season. Games within the competitive dyads are usually scheduled at multiple points across the length of a season. If a managerial change occurs midseason, the deployment of resources could be attributable to either manager. Including a measure for *multiple managers* during a season controls for this potential confound. Fourth, we controlled for potential unusual events during a particular season by adding dummy variables for 1998 and 1999 seasons with 1, indicating the year.

RESULTS

We employed a random-effects panel methodology utilizing generalized least squares (GLS) to analyze the data. A Hausman test yielded a statistically nonsignificant result ($\chi^2 = 14.84$, n.s.) suggesting a random-effects model was more appropriate than a fixed-effects model. A random-effects model is appropriate because of the cross-sectional panel data's inherent longitudinal characteristics (Bergh, 1993). The univariate and multivariate normality scores for all variables were examined and found to be within acceptable limits. Furthermore, multicollinearity does not influence the results; the variance inflation factor scores are all well below ten. Table 1 lists descriptive statistics and intercorrelations for the variables. Model 1 in Table 2 presents the results of the tests for Hypotheses 1a, 1b, 1c, 2a, 2b, and 2c, and model 2 presents the results for Hypothesis 4.

Hypotheses 1a, 1b, and 1c propose positive relationships between comparative resource advantages in the batting, pitching, and fielding skill sets of an organization's human capital and perfor-

TABLE 1
Descriptive Statistics and Correlations[a]

Variable	Mean	s.d.	1	2	3	4	5	6	7	8	9	10	11
1. Team A win percentage	0.51	0.18											
2. Multimanager control	0.06	0.24	.06										
3. First-year manager control	0.32	0.47	−.02	−.10									
4. League control	0.55	0.50	.03	.06	−.15								
5. Year 1998	0.35	0.48	−.05	−.004	−.01	.03							
6. Year 1999	0.35	0.48	.05	−.19	.16	.03	−.54						
7. Batting skill	−0.50	0.68	.07	−.01	.10	−.81	−.04	−.05					
8. Batting management	0.04	1.12	.20	.03	−.15	.80	−.02	−.05	−.63				
9. Pitching skill	0.02	0.98	.38	.10	.10	−.24	−.07	.13	.32	.01			
10. Pitching management	0.04	0.76	.20	.10	−.17	−.09	−.13	−.01	.17	.04	.24		
11. Fielding skill	0.03	0.79	−.05	.07	.06	−.19	.03	.06	.16	−.19	.13	−.15	
12. Fielding management	0.05	1.36	.10	−.19	−.06	.13	−.35	.44	−.02	.23	.22	.10	−.08

[a] $n = 604$. Correlations greater than .08 are significant at $p < .05$; correlations greater than .11 are significant at $p < .01$.

mance. As shown in model 1 of Table 2, the effect of a team's comparative batting advantage on performance is statistically significant and positive, providing support for Hypothesis 1a. The results also provide support for Hypothesis 1b. A comparative pitching advantage had a positive and statistically significant relationship with performance. However, the coefficient for Hypothesis 1c, which focused on the comparative fielding advantage, was not statistically significant, thereby providing no support for the hypothesis.

Hypotheses 2a, 2b, and 2c propose a positive relationship between comparative managerial advantages in the bundling and deployment of batting, pitching, and fielding skill sets, respectively, and performance. As shown in model 1 of Table 2, the effect of a comparative managerial advantage in the bundling and deployment of batting skills on performance is positive and statistically significant, thus offering support for Hypothesis 2a. Additionally, the results provide support for Hypothesis 2b. A team's comparative managerial advantage in the bundling and deployment of pitching skills is statistically significant and positive. However, a comparative managerial advantage in the bundling and deployment of fielding skills is not statistically significant, thereby providing no support for Hypothesis 2c.

Hypotheses 3a, 3b, and 3c proposed that with greater resource parity between a focal team and rivals in batting, pitching, and fielding (respectively), a comparative managerial advantage becomes increasingly important to the outcomes of competitive contests. We tested these hypotheses by examining the coefficients for the comparative resource advantage and comparative managerial advantage across three different groups in the sample. These groupings identified the rivals with similar resources and those with larger differentials in their resources. The "similar" group consisted of 10 percent of the sample's observations in which the focal skill set of team A is most similar to team B. The "dissimilar" group had two parts: high and low. The high portion consisted of the 10 percent of the sample's observations in which team A held a very high comparative advantage over team B; the low portion consisted of 10 percent of the sample's observations where team A held a very high comparative *disadvantage* to team B. Results show that, in the group with similar resources, the coefficient for the comparative managerial advantage of batting is larger and statistically different from the coefficient for the comparative resource advantage of batting ($F = 6.76$, $p < .01$), and in the high and the low groups the coefficient for the comparative resource advantage was larger ($F = 4.18$, $p < .05$; $F = 5.48$, $p < .05$; respectively). To test the robustness of these results, we used different metrics to identify the groups. The results were consistent with both more conservative (5%) and liberal (20%) metrics. Together, these results provide strong support for Hypothesis 3a.

We followed the same procedure to test Hypotheses 3b and 3c. For Hypothesis 3b, the results show that in the group with similar resources there is no statistically significant difference between the coefficients for the comparative managerial advantage of pitching and comparative resource advantage of pitching ($F = 1.06$, n.s.), and there were no differences for either the high or the low group. Moreover, robustness checks at the 5 percent and 20 percent levels show no differences. In total, these results provide no support for Hypothesis 3b. Likewise, there is no support for Hypothesis 3c. Specifically, the coefficient for the comparative managerial advantage of fielding is not statistically

TABLE 2
GLS Random Effects Panel Data Analyses for Winning Percentage in Dyads[a]

Independent Variables	Model 1	Model 2: Relievers vs. Starters
Control variables and intercept		
Intercept	0.53***	0.51***
First-year manager	0.01	0.06†
Multimanager	−0.01	−0.001
League membership	−0.01	−0.003
Year 1998	0.00	−0.01
Year 1999	0.03	0.01
Hypothesis 1a		
Batting skill	0.04*	
Hypothesis 1b		
Pitching skill	0.06***	
Hypothesis 1c		
Fielding skill	−0.01	
Hypothesis 2a		
Batting management	0.05***	
Hypothesis 2b		
Pitching management	0.02*	
Hypothesis 2c		
Fielding management	−0.01	
Hypothesis 4		
Starting pitching skills		0.04***
Management of starting pitching skills		0.01
Relief pitching skills		0.03†
Management of relief pitching skills		0.05**
Observations	604	604
R^2	.20	.07
Wald chi-square	150.16***	37.10***

[a] Coefficients are unstandardized; standard errors are in parentheses.

† $p < .10$
* $p < .05$
** $p < .01$
*** $p < .001$

different from the coefficient for the comparative resource advantage of fielding ($F = 2.42$, n.s.), and the same results exist for both the high and the low groups ($F = 1.26$, n.s.; $F = 0.52$, n.s.; respectively). Again, robustness checks at the 5 and 20 percent levels did not provide any support.

Hypothesis 4 proposed that the positive effect of a comparative managerial advantage in the bundling and deployment of relief pitchers would be greater than for starting pitchers, because of differences in their deployment flexibility. We tested this hypothesis by separating the teams' pitchers into two groups, starters and relievers, and modeling the effects of managerial advantages for each of these groups (model 2 of Table 2). Starting pitchers, we argued, have low deployment flexibility compared to relief pitchers. The resources with higher deployment flexibility allow managers to have a greater influence on performance.

The results are consistent with our theoretical arguments. A comparative managerial advantage in the bundling and deployment of starters' pitching skills does not have a statistically significant effect on the outcomes of competitive contests, whereas a comparative managerial advantage in the bundling and deployment of relievers' pitching skills has a statistically significant positive effect on performance. Additionally, this model shows that although a comparative resource advantage in the pitching skills of starters has a significant effect on winning, a comparative resource advantage in the pitching skills of relievers only has a marginal statistically significant positive effect. These results provide strong support for Hypothesis 4.

Because of these results, we performed a post hoc analysis of Hypothesis 3b, now separating relievers—for whom management matters—from starters. The results show the coefficient for the comparative managerial advantage of relief pitching is larger and statistically different from the coefficient for the comparative resource advantage of relief pitching ($F = 3.11$, $p < .10$) in the similar group, but in the high group the opposite is true ($F = 2.91$, $p < .10$). However, in the low group there is no statistically significant difference between these coefficients. These results suggest boundary conditions for the logic presented in support of Hypothesis 3b.

DISCUSSION

Although the resource-based view of the firm has become a dominant theoretical perspective in strategic management, little empirical research has opened the black box to help researchers understand the importance of resource management (Colbert, 2004; Mahoney, 1995; Sirmon et al., 2007). Prior resource-based work has primarily focused on the characteristics of controlled resources while largely overlooking *how* managers use those resources (Barney & Arikan, 2001). The objective of this study was to begin to fill this void by investigating how and when resource management affects the outcomes of dyadic competitive contests. Using a relative approach, we argued that both comparative resource advantage among industry-specific skill sets and the management of resources positively affect the

TABLE 3
Summary of Results and Implications

Hypothesis	Category	Batting Skill	Pitching Skill	Fielding Skill
1a, 1b, 1c	Comparative resource advantage	+ winning	+ winning	n.s.
2a, 2b, 2c	Comparative managerial advantage	+ winning	+ winning	n.s.
3a, 3b, 3c	Effect of resource parity	Supported Management increasingly important	n.s. Post hoc analysis suggests deployment flexibility may be cause	n.s.
4	Effect of deployment flexibility		Supported No managerial influence on starters High managerial influence on relievers	
	Conclusions	Critical resource, manageable Possession and management matter	Critical resource, managerial influence affected by deployment flexibility Possession matters with low deployment flexibility Management matters most with high deployment flexibility	Resource of necessity, management does not affect Not all valuable industry-specific skills are rarely distributed
	Managerial implications	Identifying resources (skills) that contribute the most to the outcomes of competitive contests. Some resources may be necessary to achieve competitive parity but do not contribute to competitive advantage When a resource has low deployment flexibility, acquisition choices are most critical, but when deployment flexibility is high, managers must go beyond acquisition choice and actively bundle and deploy resources in order to optimize results. Managers must understand and integrate the effect of contextual factors on the effectiveness of resources in their bundling and deployment decisions The effect of management increases as parity between competitors increases; highlighting why great managers are so important to an organization's success		

outcomes of competitive engagements. We also argued that the effects of resource management are greater when parity exists between rivals. Lastly, we argued that the effect of resource management is limited by a resource's deployment flexibility. The results support the thrust of these theoretical arguments and provide several theoretical contributions and practical implications. We begin with a review of the most significant results of this research.

Critical Findings

Our results produce an intriguing picture of the role of both resources and their management in the outcomes of competitive baseball contests. As summarized in Table 3, not all resources are equally important in determining competitive outcomes, nor are they equally manageable. The skills of batting and pitching are both important to the outcomes of competitive engagements, as is the management of these skills. Both the possession and the bundling and deployment of the batting skill set affect success in competitive contests, but the management of batting is more important when rivals' batting resources are similar. Alternatively, starting pitchers and relief pitchers affect the outcomes of competitive contests differently. Resource advantages in starting pitchers matter, but management of this resource has little effect on outcomes, though the management of relief pitchers matters greatly. Managers have less discretion in the deployment of starting pitchers than they do in the use of relief pitchers, owing to differences in these resources' deployment flexibility. Lastly, fielding skills do not play a significant role in determining competitive outcomes of baseball contests, nor does their man-

agement affect these outcomes. Therefore, this skill can be viewed as tertiary; although perhaps necessary for competitive parity, it is unlikely to contribute to a competitive advantage. The contributions of these findings extend beyond the context of baseball, with implications for resource-based logic as well as managerial practice.

Implications for Resource-Based-View Theory and Research

The primary contribution of this research comes from examining the role of management within resource-based logic. This contribution is derived from three sets of theoretical arguments and related empirical findings. First, we tested theoretical arguments explaining the independent influence that managers' bundling and deployment actions have on the outcomes of dyadic competitive contests. Prior work on the resource-based view has alluded to the general role of resource management; the present study specifically examines its influence. We find that although resources are an important determinant of competitive outcomes, managers play an important role in the realization of that potential. Managers are able to increase the probability of winning competitive engagements and, more generally, positively influence outcomes by making idiosyncratic bundling and deployment choices that optimize use of a firm's resources for specific market contexts and competitive engagements. However, our results also show that when a resource does not differentiate rivals (i.e., fielding in the present empirical context), its management is unlikely to be significant.

Second, we explored when resource management matters most. Our results suggest that, at least in some instances, managers' actions can overcome resource parity. We found that when rivals' industry-specific skill sets are more similar, the importance of bundling and deployment actions by managers is greater. However, the importance of managerial actions varied across the resources. When there was greater parity in rivals' pitching skills, the management of pitching had little effect on competitive outcomes. Although the lack of support for this hypothesis might be of concern, the results pertaining to the effects of deployment flexibility, discussed next, led to post hoc analyses and a nuanced understanding and qualified support for the importance of managerial actions with specific pitching skills.

Third, we examined how the deployment flexibility of resources affects resource management. Our findings suggest that differences in resources' deployment flexibility affect the relationship between bundling and deployment actions and winning. Specifically, pitchers vary in the deployment flexibility they offer managers. Starting pitchers have low deployment flexibility, which limits managers' ability to bundle and deploy them in a context-specific manner to optimize success. Relief pitchers, on the other hand, are more readily deployable. High deployment flexibility increases the potential for managers' context-specific bundling and deployment actions to positively affect the outcomes of competitive engagements.

In light of the effect of deployment flexibility, we performed post hoc analyses on the effect of resource parity on the relationship between resource management and winning. Results show that under conditions of parity among relief pitchers, managerial actions contributed to greater success. However, no managerial effect resulted when there was parity among rivals' starting pitchers. The results of these post hoc analyses provide insights into our other findings. With increasing parity, the effect of resource management on the outcome of competitive engagements grows, but only when the focal resource can be actively managed (i.e., has high deployment flexibility).

Therefore, we find that the management of resources influences competitive outcomes; however, variance in the quality of resources held by two competitors and in the deployment flexibility of those resources influences the efficacy of resource management actions. These results demonstrate that the management of resources has unique and important effects on the outcomes of competitive engagements beyond the effect of resources alone. As such, this study begins to fill a void in the application of resource-based logic.

Beyond the role of resource management, this study makes at least two more contributions to theory. First, by focusing on comparative advantage and industry-specific human capital, we add richness to our understanding of how employees affect the outcomes of competitive engagements. Specifically, we find that relative advantages in industry-specific skill sets largely have positive effects on organizational outcomes. The conclusions, based on the results of this study, extend the arguments of Peteraf and Barney (2003), which specify that competitive advantage is the result of having *more* valuable resources. Additionally, these results support yet extend recent research on human capital (Hitt et al., 2001; Hitt, Bierman, Uhlenbruck, & Shimizu, 2006).

Investigating three industry-specific skill sets embedded within individuals increases our appre-

ciation for the difficulty of managing human resources. These skill sets are independent, they are embedded in individuals; as such, they are bundled and leveraged via the deployment of individuals. Unless the individual's skill sets are highly correlated (often a rare occurrence), deployment trade-offs are necessary. It may appear illogical for a manager to deploy an employee with average skills, but when skills cannot be decoupled from one another, this choice may be better in some situations than deploying an individual with large variance among skill sets. However, in a different context, managers may understand that high proficiency in one skill set is more important than a deficiency in other skill sets. Differentiating among skill sets is not limited to baseball. For example, in commercial banking, analytical skills are necessary but insufficient for success. More important is the banker's ability to generate the interest of qualified applicants (interpersonal skills, positive reputation). Thus, deploying a commercial lender with strong business generation skill is often more desirable than employing one with strong analytical skill. Thus, it is important for researchers to understand the underlying relationships between components of an individual's human capital along with effects that managers' bundling and deployment decisions have on the outcomes produced by that human capital. In fact, coupling finer-grained measures of human capital with the contingent effects of resource management in empirical inquiries provides the opportunity to further extend our understanding of resource-based logic (cf. Newbert, 2007).

Lastly, our focus on dyadic competitive engagements extends resource-based logic to more proximal outcomes, thereby increasing the predictive validity of resource-based theory (Ray et al., 2004). The majority of the prior research on the resource-based view examines the link between resources and overall organizational performance. However, such an approach does not shed light on how to achieve success in specific competitive engagements, which collectively result in overall organizational performance (Ray et al., 2004). In essence, an aggregation problem exists: overall firm performance is the net result of multiple competitive contests, yet prior resource-based research has not examined specific competitive contests as the unit of analysis.

Within such contests, only one firm will win. Consider the direct competition between Best Buy and Circuit City, two United States–based electronics retailers. Best Buy recently altered how it bundles and deploys two sets of resources, store layouts and its in-store sales force. The sales force is the firm's most significant stock of human capital and is being transitioned from a push sales model to a "customer centric" approach (Walden, 2006) based on the integration of technology with customer lifestyle. Best Buy is now not only a "big-box retailer" with electronics, but is also trying to become a technology solution center. The firm's "Geek Squad" computer service and support initiative is one example of this approach. If Best Buy's reconfigured sales force can match a customer's lifestyle with electronics products and if the customer uses this as a primary criterion for making a purchase, the firm is likely to obtain the sale. Competition between rivals is the foundation of industrial organizations and baseball organizations (Powell, 2003). A major sale in a business context is comparable to a win in the baseball context. For Circuit City, a sale made by Best Buy is a loss. A firm's performance for a year, like a baseball team's winning percentage for a season, is based on its success in numerous competitive contests. We join calls encouraging scholars to consider carefully the outcome studied when employing resource-based logic.

Implications for Practice

The results of this study also provide several implications for the practicing manager. First, managers need to carefully identify requisite and value-adding resources, along with those that may be required but insufficient to produce a competitive advantage. Especially important is developing a keen understanding of the strengths and limitations of employees' skill sets. Such understanding allows managers to bundle and deploy individuals along with other resources effectively, in a manner applicable to specific competitive contexts. For example, managers are likely to manage resources differently when trying to maintain market leadership than when attempting to effect a turnaround (Morrow, Sirmon, Hitt, & Holcomb, 2007).

Second, results indicate that the importance of effective resource management is higher when resources are close to parity between rivals. Many mature markets are characterized by rivals with similar resource stocks. Our results suggest that in such markets, a firm's investment in the training of future managers is one of the most important factors determining success. From this perspective, GE's long-term success in many mature industries may be explained more by its renowned capability in management development than by many of its other investments. Our

results suggest that the return on GE's investment in developing managers increases as competitors match the resource portfolios of their different businesses. However, it is also important to note that managers are unlikely to have positive effects on outcomes if the resources available for them to bundle and deploy lack deployment flexibility or a relationship to outcomes.

The third implication relates to the importance of deployment flexibility. Actions that affect the deployment flexibility of resources in turn affect managers' ability to respond effectively to market changes. For example, the 3M Company has long been recognized for innovation. For years, managers encouraged employees to use flextime arrangements to focus on developing new products and technologies. The deployment flexibility this policy created enhanced managers' ability to harness the innovative capacity of 3M's human capital. However, changes in leadership brought about workforce reductions and procedural changes that emphasized operational efficiency. Under this new leadership, efficiency was viewed as equal to, or even more important than, innovation. Managers bundled and deployed the human capital in ways intended to maximize efficiency, thereby reducing deployment flexibility, which in turn limited their ability to harness the innovative capacity of their employees. Alternatively, Whirlpool adopted an approach that applies human capital to innovation efforts contingent upon stages in the innovation cycle (Snyder, 2006). Specifically, individuals are deployed to various innovation efforts, depending on the contributions of their skill sets. Thus, in Whirlpool, enhanced deployment flexibility allows managers to influence innovation via effective resource management. In total, when a resource has low deployment flexibility, effective managers focus on resource acquisition, either to increase the quality of their organization's resource portfolio or to prevent a critical resource from being acquired by rivals. However, when deployment flexibility is high, effective managers can focus on bundling and deployment. A traditional question for a manager assessing the value of a resource has been, Is the organization aligned to take advantage of a resource? Our results suggest that in addition, managers need to ask a qualifying question: *Can* the resource be bundled and deployed effectively?

Limitations and Future Research

Although there are close connections among an organization's resources, their management, and organizational performance, our measurement approach still has some limitations. For example, the effects of firm resources and their management may not be captured fully by a dyad-level winning percentage in competitive contests. Additionally, each contest within each dyad presents multiple opportunities for managerial actions. Although we have captured the net effect of these actions, it may be insightful to assess the effect of specific managerial actions as well as the specific resources deployed within a given situation. In fact, the importance of resource management may prove to be even greater when research uses finer-grained performance measures within individual competitive engagements. Future research may provide further contributions by addressing these issues.

Future research should broaden the investigation of resource management. For example, resources other than the skill sets of an organization's human capital should be considered, as well as additional resource management actions. Investigating how the integration of resource investment and deployment decisions affects firm performance would be one such extension. Effectively integrating investment and deployment decisions is likely critical for performance, especially for resources having limited deployment flexibility.

Lastly, although our measurement approach was an attempt to isolate the effects of a resource in a manner fully independent of its management, the value of a resource is partly a reflection of its true underlying value and partly a reflection of how it has been previously bundled and deployed (i.e., how it has been managed). We believe it is important for researchers to take steps to isolate these effects in future research, though complete isolation may not be possible.

Conclusion

In conclusion, the current study is one of the first to examine the importance of comparative resource advantages and comparative managerial advantages in dyadic competitive contests. Most comparative resource advantages contribute to success in competitive contests, but comparative advantages in the management of resources are also important. The identified boundary conditions to the influence of resource management have significant implications for theory in strategic management, managerial practice, and future research on the resource-based view.

APPENDIX

Measurement of Comparative Resource and Managerial Advantage

Step 1: Calculate Player's Lagged Three-Year Average per Indicator

For example, for the batting average indicator for player 1:

Season	Use Factor[a]	Indicator	Three-Year Lagged Average[b]
1994	250	0.25	
1995	325	0.35	
1996	450	0.30	
1997	250	0.28	0.30
1998	175	0.25	0.31
1999			0.28

Step 2: Calculate Raw Team and Managerial Scores per Indicator

For example, for the batting average indicator for a team in 1997:

Player	Player's Lagged Batting Average	Actual Deployment during Season	Team Weighted Batting Average	Managerial Score for Indicator
1	.304	250 at bats		
2	.250	275		
3	.175	115		
n	.285	235		
Raw team average	.29[c]			
Weighted team average			.31	
Managerial score				.02[d]

Step 3: Create Resource and Management Indices

The team-level resource and managerial values were then standardized and used to create the following indices.

Skill Set Indices	Managerial Indices
Batting Skill: Resource	Batting Skill: Management
Runs at bat	Runs at bat
Hits at bat (singles)	Hits at bat (singles)
Doubles	Doubles
Triples	Triples
Home runs	Home runs
Runs batted in	Runs batted in
Base on balls (walks)	Base on balls (walks)
Strike-outs (reverse-coded)	Strike-outs (reverse-coded)
Stolen bases	Stolen bases
Caught stealing (reverse-coded)	Caught stealing (reverse-coded)
Batting average	Batting-average
On-base batting average	On-base batting average
Slugging average	Slugging average
α = .84	α = .94
Pitching Skill: Resource	Pitching Skill: Management
Completed games (excluded for relievers)	Completed games (excluded for relievers)
Hits (reverse-coded)	Hits (reverse-coded)
Home runs against (reverse-coded)	Home runs against (reverse-coded)
Walks (reverse-coded)	Walks (reverse-coded)
Strike-outs	Strike-outs
Earned runs (reverse-coded)	Earned runs (reverse-coded)
Win percentage	Win percentage
Overall α .84	Overall α .89
Starters α .81	Starters α .91
Relievers α .86	Relievers α .76
Fielding Skill: Resource	Fielding Skill: Management
Putouts	Putouts
Fielding percentage	Fielding Percentage
α = .67	α = .88

Step 4: Calculate Within-Dyad Relative Team and Managerial Scores

We calculated relative indicator scores within-dyad using the indexes for both teams in the dyad. The team B index value was subtracted from the team A index value. Positive values indicate relative resource advantages for team A, and negative values represent a disadvantage for team A. The relative managerial scores were calculated in the same manner.

[a] Use factor varied per indicator, but for batting average the use factor was "at bats."

[b] The three-year average was calculated as

$$\frac{(I_{T-3} \times U_{T-3}) + (I_{T-2} \times U_{T-2}) + (I_{T-1} \times U_{T-1})}{U_{T-3} + U_{T-2} + U_{T-1}},$$

where T is the season being examined; I is the indicator being calculated; and U is the use factor for the indicator.

[c] The raw team average is the average for all players on the team per indicator.

[d] The managerial score is the difference between the raw average and the weighted average based on actual deployment of the resources during the season in which the dyad occurs.

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David G. Sirmon (dsirmon@mays.tamu.edu) is an assistant professor of management at Texas A&M University. He received his Ph.D. from the W. P. Carey School of Business at Arizona State University and has served on the faculty at Clemson University. Resource management, family business, and strategic entrepreneurship are current research interests.

Steve Gove (steve.gove@vt.edu) is an assistant professor of management at Virginia Polytechnic Institute and State University. He received his Ph.D. in business administration from the W. P. Carey School of Business at Arizona State University. His current research interests include the role and effect of top managers in strategy and corporate governance, intersections of philosophy of science and faculty productivity, and management education.

Michael A. Hitt (mhitt@mays.tamu.edu) is a Distinguished Professor of Management and holds the Joe B. Foster Chair in Business Leadership at Texas A&M University. He received his Ph.D. from the University of Colorado. His research interests focus on managing firm resources for competitive advantage; international strategy, especially the effects of country institutional environments on the strategic behaviors of firms; corporate governance; and strategic entrepreneurship.