

UNDERSTANDING HOW RESOURCES AND CAPABILITIES AFFECT PERFORMANCE: ACTIVELY APPLYING THE RESOURCE-BASED VIEW IN THE CLASSROOM

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The resource-based view is a strategic framework for understanding why some firms outperform others. Its importance is reflected in its wide inclusion in strategy texts as a tool for assessing a firm's internal strengths and weaknesses. This article outlines an experiential exercise that demonstrates how different bundles of resources and capabilities may explain differences in value created across firms. The primary benefit of this in-class exercise is that students actively apply Barney's VRIO (valuable, rare, inimitable, and organized) framework to understand why their team won or lost. The debrief can also focus on issues such as the impact of inimitability on sustainability, why strategies emerge, and elements of a good strategy. Preliminary data from 18 undergraduate and graduate sections indicates that learning objectives have been consistently met.

Keywords: strategic management education; experiential exercise; resource-based view; VRIO framework

The resource-based view has become a standard tool for evaluating firm strengths and weaknesses as witnessed by its inclusion in many leading strategy texts (e.g., Afuah, 2004; Barney & Hesterly, 2006; Collis & Montgomery, 2004; Dess, Lumpkin, & Taylor, 2005; Ghemawat, 2006; Harrison & St. John, 2004; Hill & Jones, 2004; Hitt, Ireland, & Hoskisson, 2005; Pearce & Robinson, 2004; Thompson, Gamble, & Strickland, 2004; Wheelen & Hunger,

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JOURNAL OF MANAGEMENT EDUCATION, Vol. 30 No. 3, June 2006 421-430
DOI: 10.1177/1052562906286697

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2005). The main tenets of the resource-based view are that firms possess different resources, the differences are enduring, and these differences lead to variations in performance (Barney, 1991; Peteraf, 1993). The resource-based view has been operationalized by Barney's (Barney, 1995; Barney & Hesterly, 2006) VRIO framework, which hypothesizes that firms possessing valuable, rare, inimitable, and organized resources may be able to capture superior industry positions and thus enjoy superior performance.

Schneider and Lieb (2004) argued that despite its increasing relevance, the resource-based view is underrepresented in the classroom because of the dominance of the industrial economics view, lack of simple models or heuristics, and application of a modernist perspective. This article argues that one way to overcome some of these pedagogical barriers is to use experiential exercises that allow students to actively apply concepts. One experiential exercise that I have had great success with in teaching concepts from the resource-based view is PaperScape. Unable to find an exercise that met my learning objectives, I adapted PaperScape from one of Coff and Hatfield's (2000) *Experiential Exercises for Teaching Strategic Management*. Although Coff and Hatfield's Builderific exercise provides student groups with the same resources and asks them to build paper towers to generate a discussion on task planning, PaperScape provides student groups with different bundles of resources and asks them to build paper skyscrapers to generate a discussion on how differences in resources and capabilities affect performance.

PaperScape is a variation of the Tinker Toy exercise (e.g., Coff & Hatfield, 2003; McNeely, 1994). It differs significantly from McNeely's (1994) original exercise in that PaperScape focuses on teaching elements of competitive strategy. And although PaperScape and Coff and Hatfield's (2003) Tinker Toy exercise illustrate concepts from the resource-based view, their expected learning outcomes differ substantially. In Coff and Hatfield's Tinker Toy exercise each group receives the same resources and groups build their structures sequentially to illustrate the interplay between first-mover advantages and performance. The PaperScape exercise, on the other hand, demonstrates the role resources and capabilities play in generating superior performance and provides students a hands-on opportunity to apply Barney's (Barney, 1995; Barney & Hesterly, 2006) VRIO framework.

When to Run PaperScape

The primary target audience includes students in undergraduate or masters' level strategy or business policy courses, although I have also had success using PaperScape with managers. PaperScape is run during the session where we discuss how the resource-based view, and in particular

TABLE 1
Performance Implications of Barney's (1995) VRIO Criteria

<i>Valuable?</i>	<i>Rare?</i>	<i>Inimitable?</i>	<i>Organized?</i>	<i>Competitive Impact</i>	<i>Performance Implications</i>
No	—	—	—	Competitive disadvantage	Under industry average
Yes	No	—	—	Competitive parity	Industry average
Yes	Yes	No	—	ST competitive advantage	Over industry average
Yes	Yes	Yes	Yes	LT competitive advantage	Over industry average

NOTE: VRIO = valuable, rare, inimitable, and organized; ST = short term; LT = long term.

Barney's VRIO framework, can be used to evaluate a firm's internal strengths and weaknesses.

As a way of discussing the VRIO framework select a successful firm and then have students suggest which resources and capabilities contributed to its superior performance. For example, Dell Inc. has resources such as scale, supplier relationships, brand name, and custom manufacturing processes. Then ask students to evaluate whether Dell's proposed resources and capabilities meet the VRIO criteria. One key point you can raise is that if a firm does not possess any resources or capabilities that meet Barney's VRIO criteria, then it lacks potential to earn long-term economic rents. If a firm without VRIO resources manages to earn economic rents, current rivals or new entrants can easily copy this winning strategy by accessing the same resources, thus driving the economic rent to zero (Barney & Hesterly, 2006). It is only by implementing strategies based on leveraging VRIO resources that managers can hope to protect profitable positions from imitation.

The last step is to review the competitive impact and performance implications of each of Barney's (Barney, 1995; Barney & Hesterly, 2006) VRIO criteria (see Table 1). When reviewing this table, I recommend leaving the last two columns blank and asking the students to suggest what the competitive impact and performance implications will be if a firm has a resource which is (a) not valuable, (b) not rare, (c) not inimitable, or (d) not organized.

How to Run PaperScape

After you are satisfied that students understand the basics of the resource-based view, run the PaperScape exercise. It is possible to run PaperScape in as little as 45 minutes; however, I recommend using 60 minutes to allow for in-depth discussion. Assuming you have eight or more groups, give two student groups two rolls of tape and 40 to 50 sheets of paper (preferably

recycled) each. All remaining groups should be given 40 to 50 sheets of paper, 10 to 15 paper clips, and 5 to 8 rubber bands each. Thus the only differences between each group's resource endowments are the elements they have to bind paper together; one or two groups will have tape, whereas the remaining groups will have paper clips and rubber bands. Although you may use any resources, such as twigs, cardboard, or string to build skyscrapers, using just two sets of resources keeps it simple and drives home the point regarding the differential impact of resources on performance.

REVIEW LEARNING OBJECTIVES AND INSTRUCTIONS FOR PAPERSCAPE (2 MINUTES)

The goals of the exercise and instructions are placed on two separate slides. The learning objectives of PaperScape are for students to

- understand the role resources and capabilities play in achieving competitive advantage using Barney's VRIO framework
- discuss elements of a good strategy
- start teambuilding in their groups
- build the highest paper skyscraper with the resources and capabilities their firm has.

Students may be disappointed with the resources they are allocated, so you may remind them that as in real-world firms, they may not always have the resources they desire.

The instructions for the exercise are

You have 10 minutes to plan the way your group will build the tallest paper skyscraper with the resources and capabilities you have. The skyscraper cannot lean on anything, nor are you allowed to hold it up. It is possible to trade resources with other groups during the planning period; however, you are not allowed to trade strips of tape, you must trade the entire roll. You may touch the materials, but please do not start building until the instructor announces that the building period has started.

Your group will have 5 minutes to build your skyscraper.

After 5 minutes, the instructor will call time, measure each skyscraper, and announce the winning group.

You will be provided time to discuss and answer the questions regarding to the exercise in your group—please see the handout questions. The exercise will conclude with a class discussion of the handout questions.

ASSIGN STUDENTS TO GROUPS AND ALLOCATE RESOURCES TO GROUPS (3 MINUTES)

Assign students to groups of 3 to 6 each. In a class of 50, you would have 10 groups of five students and would require 10 sets of resources.¹ If you have already selected case groups, you may use these, otherwise you can

assign students to groups randomly. After explaining the exercise and showing students the sets of resources (which I place in piles at the front of the classroom prior to class), ask them which set of resources they would prefer. Students typically indicate that tape is superior to rubber bands and paper clips for the task of building paper skyscrapers (i.e., a priori students should agree tape is valuable, rare, and inimitable). At this point, randomly allocate the resource sets to the groups. Usually I pick a number between 1 and 100 and have students guess. The group with the closest guess gets to pick first, which later allows a discussion regarding the role of luck in explaining why some firms outperform others (e.g., Barney, 1986).

PLAN AND BUILD SKYSCRAPERS, THEN DECLARE A WINNER (15 MINUTES)

Allow the groups 10 minutes to plan their skyscraper and tell them they are allowed to trade resources. As an option, you can warn them that their paper skyscrapers should be able to withstand a mild "wind" (I typically blow on them). At the end of the 10-minute planning session, announce the start of the building period. Watch a flurry of student building activity and call time after 5 minutes. At this point, I typically have fun blowing on the skyscrapers and then measuring each group's skyscraper. (You can use a measuring tape; however, I usually use myself as the yardstick.) Finally, declare a winner, making sure everyone sees the winning skyscraper and understands which physical resources the group possessed.

SMALL GROUP AND CLASS DISCUSSION (20+ MINUTES)

Hand out the following five questions as a basis for small group and class discussion. If you are running short of time, you can start the class discussion immediately, although I have found there is merit in letting students have 10 minutes to attempt to answer the questions in their groups. If students have not had time to discuss the questions among themselves, I recommend starting the discussion with Question 3.

1. Which resources and/or capabilities contributed to the success of the winning group (evaluate which were valuable, rare, inimitable and organized)? Were any of the resources or capabilities not valuable?

The purpose of this question is to give students practice in using the VRIO framework. You may start the discussion by picking a resource, say paper, and then asking: What are the competitive and performance implications of a resource that is valuable, but not rare? You then can review paper clips, rubber bands, and finally tape.

Part two of the question leads students to see the implications of a resource or capability that is not valuable. If a resource or capability is not valuable, it is

a weakness, as it causes the firm to have lower performance than otherwise. You then can ask: Did any groups have resources or capabilities that were not valuable? Perhaps the inability to work as a team? To drive the point home, you can ask for examples from existing companies, which exhibit lower-than-industry-average performance because of possessing resources or capabilities which are not valuable.

2. Did it help to trade resources? Can you trade capabilities?

Groups are allowed to trade resources during the planning period. Typically, no one trades, and you can probe this by asking: Why? The students usually understand that the reason for this is that you can only trade tape for tape. This is the case in the real world as well. If a firm wants to buy a valuable resource, it must pay an amount equal to the expected future cash flows; there are no "bargains" or short cuts to success (Barney, 1986).

When you ask if they can trade capabilities, students begin to understand that they are usually tied to an individual (i.e., knowledge or relationships) or groups of individuals (collective learning or reputation), and thus capabilities are difficult, if not impossible, to acquire.

3. Why did the winning group win? Better resources and/or capabilities? Better strategy?

In my experience, groups with tape win only one third of the time. This is much lower than one would anticipate, given that tape is a superior resource and thus should provide a competitive advantage.² There are three reasons why groups with tape may not win: capabilities of other groups, group organization (or lack thereof), and differences in strategy.

There are other assets that students generally do not think of a priori, such as the ability to work together, creativity in planning, ability to work quickly (as students only have 5 minutes to complete their skyscraper), previous construction experience, or an engineering background. The discussion leads to an examination of the role of capabilities because it is generally capabilities that decide which team wins PaperScape.

You can point out this result is mirrored in the real world: Capabilities typically lead to superior performance because they are hard to observe and thus imitate. Capabilities are also protected from imitation because they require time to develop, because of time compression diseconomies (Dierickx & Cool, 1989). You can note the reason some groups function better as teams may be because they have previously worked together. To follow up, you can ask: How difficult is it to imitate a team with high cohesiveness? It is challenging because to get to a stage of high cohesiveness, teams typically have to go through the stages of forming, storming, and norming before they reach the stage of performing. You can use this sequence to make the point that capabilities are path dependent—in a sense "where you end up, depends on where you start."

Groups with tape can also lose if they were not well organized. This observation provides an opportunity to further discuss the *O* in Barney's VRIO framework. You can emphasize that if a firm is to succeed, it is not enough to own strategic resources. Firm managers must also be organized to take full advantage of these resources. The second issue involves recognizing resources, but more particularly, the capabilities groups may possess. Asking "Did the firm take

into account all factors prior to formulating its strategy?" leads to a discussion of what is a good strategy.

Groups will exhibit different strategies. You can ask students to explain their strategy. After eliciting several responses, you can ask: What is a good strategy? Groups only have 5 minutes to construct their skyscraper, so they need a strategy that fits the resources and time they have. This is a point that can be emphasized in the discussion: Good strategies take advantage of firm strengths while avoiding any weaknesses, plus they exhibit a strong fit between what managers would like to do and what managers have the ability to do.

Pause here to reflect on the role of time. Time is an often-neglected factor because all groups are given the same amount. However, its impact is significant as many groups underestimate how long their strategy will take to implement, or stated another way, they overdesign their paper skyscrapers. Ask: Is time a constraint or a strategic resource that needs to be organized? This discussion provides an opportunity to discuss how firms can use time to their advantage. There are firms that are continually pressing their industry forward by introducing new products. They do not wait until they have perfect product to bring to market, just a better product in the eyes of the customer. This competitive tactic challenges firms that are not capable of moving as fast.

4. Would the result have been different if all groups were given the same resources? Which group would have won then?

This question allows you to return to the role that intangible resources and capabilities play in achieving competitive advantage. Typically, when I ask this question, the more boisterous groups will argue that they would have won if each group had had the same resources. You can challenge them or others in the classroom by asking: Why would you have won? What resources or capabilities do you have that other groups do not? To push them further, ask: Do these resources or capabilities meet the VRIO test?

After completing this discussion, you can alter the scenario so that all groups have similar capabilities and similar resources. Now ask: Is it possible to sustain a competitive advantage? Under this scenario, any advantage is temporary because each position is easily imitable. If you like, you can bring in D'Aveni's (1994) concept of *hypercompetition*: All firms have similar resources and capabilities (or possess resources and capabilities that are easily imitated or substituted). Under conditions of hypercompetition, the only advantage is the ability to quickly spot profitable market niches, seize them, and then move on before competitors enter the niche and drive the economic rents to zero.

5. Did you change your strategy after the construction period had started? Why?

In almost all classes, at least one group attempts to change its strategy midway through the construction period. Because students are not allowed to "test" their strategies prior to actually building their paper skyscrapers, they may be forced to alter them under way. This question allows you to cover Mintzberg's (1987) concept of deliberate versus emergent strategies. Ask: Why did you change your strategy? You can reinforce this concept by noting that companies also have difficulty forecasting all strategic contingencies and are often forced to change their strategy because of changing circumstances.

OTHER POTENTIAL AREAS FOR CLASS DISCUSSION

The role that intangible resources and capabilities play in what some have referred to as the “newer” economy (e.g., Drucker, 1999; Kaplan & Norton, 2001) can be probed in a number of ways.

One can point to the fact that the relative value of tangible resources vis-à-vis intangible resources and capabilities has changed significantly during the past century. In Henry Ford’s age, it was the firm with the best tangible resources (i.e., its factory) that typically enjoyed the best performance. In the “newer” economy, where access to tangible resources is easier, it is the intangible resources and capabilities that are critical to achieving competitive advantage.

You can note that in the “newer” economy, one cannot generally identify which firms will enjoy a competitive advantage just from looking at a firm’s balance sheet because the key intangible resources and capabilities are either undervalued (i.e., patents) or not included (i.e. value of reputation, relationships with stakeholders, corporate culture, or knowledge base). To make the point clearer, you can mention that in 1978 there was almost a perfect correlation between a firm’s stock market value and its book value, whereas in 1998 book value had dropped to 28% of a firm’s stock market value (Dess et al., 2005). As Dess et al. (2005) noted, current financial reporting standards were developed 50+ years ago and provide little guidance regarding firms’ financial or strategic potential today.

PaperScape can also be used to discuss first-mover advantages and disadvantages (e.g., Coff & Hatfield, 2003). For example, you can ask a series of questions, such as Who would win if the groups built their skyscrapers sequentially, instead of simultaneously? What are the benefits of going first? What are the benefits of going last? How can firms sustain a first-mover advantage? How can later entrants overcome these advantages?

A final way to extend PaperScape is to discuss team-building issues. This is especially salient if the PaperScape teams are also the case groups. One issue that arises is that groups with one or two dominant individuals may rush the decision with respect to choosing a strategy for building their paper tower. These groups are easily recognizable as they finish planning in a few minutes and then sit talking for the remainder of the planning session. Unfortunately, these groups inevitably fare poorly when it comes to building their paper tower. If this situation occurs, you can ask questions such as Is making a quick decision a blessing or a burden? Does everyone get a chance to be heard? If no, how can you improve brainstorming in your group? If you did not observe this phenomenon, you can still ask questions regarding the group process. For example, you can start off by asking: What process did your team use to come up with your strategy? Other starting points for this discussion include questions such as What behaviors helped your team accomplish the task? What behaviors hindered your team?

Results

Informal student feedback indicates they enjoyed participating in the exercise. However, a more important question from a pedagogical view is whether the exercise meets its learning objective of introducing students to the role that resource and capabilities play in achieving competitive advantage.

Since fall 2001, 472 students have rated this exercise using a mid-term survey. The survey question reads, "PaperScape (Building Paper Towers to understand how resources help achieve competitive advantage)." It asks students "To please rate each of the following in-class exercises. Circling a 1 indicates you learned nothing from the exercise. Circling a 10 indicates that you feel you have an excellent understanding of the concepts employed in the exercise."

The overall average rating for PaperScape from 18 masters' and undergraduate sections is 7.91 ($N = 472$). The average rating for 11 undergraduate sections was 7.89 ($n = 308$) and the average for 7 masters' sections was 7.95 ($n = 164$).

PaperScape has also been run with three groups of managers in different settings with success. Although I did not collect data regarding their experiences, anecdotal feedback from participants was very positive.

Conclusion

PaperScape is an easy exercise to run, and the resources needed (tape, paper clips, rubber bands, and paper) are readily accessible to most instructors. It is well suited for demonstrating the concepts from the resource-based view, and it also provides an opportunity to probe issues such as the importance of capabilities for sustaining competitive advantage and the impact of learning on emergent strategy. Other intangible benefits of PaperScape are that it creates energy in the classroom, it caters to students who favor learning by doing, and last but not least, it is fun for the instructor and for students.

Notes

1. The exercise can be run with as few as two groups. However, with fewer than six groups give only one group tape and give the remaining groups paper clips and rubber bands.
2. A winning strategy for groups with tape is to build a structure that resembles a radio tower. Winners roll up the paper into tubes, connect and reinforce the tubes with tape, and then use long strips of tape as guide wires which stabilize the long tube of paper (typically several guide wires are needed).

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