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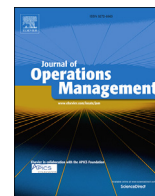
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Operations management and the resource based view: Another view

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ABSTRACT

This paper evaluates the usefulness of the resource-based view (RBV) to the field of operations management. Based on the seminal RBV articles, we argue that using the RBV does not align with the objectives and activities of operations management researchers in several ways. First, the dependent variable in the RBV is sustained competitive advantage. Using sustained competitive advantage as a dependent variable implies that scholars focus on explaining the differences between the relatively few firms with sustained competitive advantage and all the other firms, ignoring performance variations within the great mass of firms. In addition, competitive advantage exists at the level of the business or the firm and does not directly translate into the normal level of operations management research. Measuring sustained competitive advantage also presents difficulties. Second, the explanatory variables in the RBV are resources that must be rare, valuable and hard or impossible to imitate. Measuring valuable resources or factors firms cannot imitate poses serious problems both in demonstrating value independent of the factor's impact on performance (i.e., avoiding tautology) and in measuring unique or nearly unique entities. Third, under the RBV, prescription is problematic; you cannot prescribe things that firms can readily implement because such things can be imitated. We present the practice-based view (PBV) as a simpler and better alternative for operations management where scholars attempt to explain the entire range of firm and unit performance based on transferable practices.

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1. Introduction

In their very impressive discussion of the resource based view, Hitt et al. (2015) present what they see as the key characteristics of the resource based theory and evaluate its implications for operations management scholarship. Specifically, they discuss how research in four key areas of operations management – supply chain management, operations strategy, performance management, and product/service innovation – aligns with resource based theory.

Let us begin by noting that strategy scholars generally call what Hitt et al. (2015) termed the Resource Based Theory as the Resource Based View (RBV). We will use the RBV terminology for two reasons. First, it is the standard terminology. Second, we see the RBV more as an umbrella concept than a theory per se. We explain this below.

Any discussion of the RBV inherently depends on how one defines the RBV. We wish to disagree with Hitt et al. (2015)

characterizations of the RBV and to offer a somewhat different analysis that leads to different conclusions about the RBV's value to the field of operations management. Since we are not in the operations management field, let us clarify what we see as the primary interests of the field. We believe operations management scholars want to explain which firms use which operations management practices and understand the influence of such operations management practices on operational performance. A good understanding of such relations could support prescription.

The RBV has been incredibly popular in strategy and operations management research for several reasons. It has an extremely compelling logic but, as we will argue in this paper, the logic rests on factually incorrect assumptions. It also has been applied by scholars who for the most part do not take the details of the RBV arguments seriously, a point acknowledged by Barney (2001). As we will demonstrate later, the immense majority of strategy papers claiming to use the RBV do not do so in a way that could ever test the RBV.

We will criticize the suitability of the RBV for operations management research on several grounds. First, seminal articles on the RBV identified the dependent variable in the RBV as sustained competitive advantage. Using sustained competitive advantage as a

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dependent variable implies research focuses on explaining the differences between the relatively few firms with sustained competitive advantage and all the other firms, ignoring performance variations within the great mass of firms. In addition, competitive advantage exists at the level of the business or firm and does not directly translate into the normal level of operations management research. Measuring sustained competitive advantage presents such difficulties that the immense majority of RBV studies in strategy do not even try to measure it, using firm performance instead. Second, the explanatory variables in the RBV are resources that must be rare, valuable and hard or impossible to imitate. Measuring valuable resources or factors firms cannot imitate poses serious problems both in demonstrating value independent of the factor's impact on performance (i.e., avoiding tautology) and in measuring unique or nearly unique entities. Third, under the RBV, prescription is problematic; you cannot prescribe things that firms can readily implement because such things can be imitated and so are not RBV resources. We present the practice-based view (PBV) as a simpler and better alternative for operations management where scholars attempt to explain the entire range of firm and unit performance based on transferable practices.

In the next section, we identify the core ideas, constructs, and intellectual foundations of the RBV. We detail why we see the RBV as inappropriate for operations management research, and why we see the RBV as a perspective rather than a theory. The following sections expand on these issues considering problems in the usefulness of the RBV for operations management based on two major components of the RBV namely, the dependent variable of interest and the kinds of variables that explain the dependent variable. We then present the practice-based view (PBV, Bromiley and Rau, 2014) as an alternative to the RBV. We conclude the paper by exploring the implications of the practice based view for operations management research.

2. What is the RBV?

Defining the RBV runs into the difficulty that authors have written about it in somewhat inconsistent ways. Hence, clarity about the RBV is problematic. We, and we think most strategy scholars, view the seminal RBV works as Barney (1986, 1991) and Peteraf (1993). Most RBV studies cite these three articles as the basis of the RBV, giving these studies extremely high numbers of citations. Consequently, we take these three articles as defining the RBV. When we refer to the RBV in this paper, we mean the RBV as presented in these papers.

In brief, **the RBV attempts to explain firm sustainable competitive advantage as stemming from firm resources that are rare, valuable, hard or impossible to imitate or duplicate, and hard to substitute.** This description alone suggests the RBV is not appropriate for most of what operations management scholars want to study. Operations management practices for the most part are not RBV resources. Most practices are not rare or impossible to imitate. Indeed, operations management scholars generally want to identify practices that many firms can implement. Furthermore, operations activities per se do not tie to sustained competitive advantage. Operations management activities have performance implications, but good operations management is neither necessary nor sufficient for sustained competitive advantage. Consequently, this paper will elaborate on these two themes: the problems with both the dependent variable and the explanatory variables in the operations management context.

We see the RBV as a perspective rather than a theory primarily because a theory should lead to testable hypotheses; a theory should be refutable or falsifiable (Bacharach, 1989). However, the RBV does not lead to many testable hypotheses, particularly in the

form proposed by Hitt et al. (2015). Exactly what data and analysis would refute the RBV as described by Hitt et al. (2015)? One might argue the RBV predicts that firms will differ and that those differences will improve performance. However, any sensible theory of organizations predicts firms differ and those differences will influence performance, but obviously firm differences can have negative or positive influences on performance. One might argue the RBV predicts serial correlation in performance, but again any sensible theory of organizations predicts this. Even a conventional economic model where firms make optimal decisions can make these predictions if we assume random shocks at the firm level and adjustment costs.

The theoretical developments of the RBV do make some testable assertions, but these are not assertions RBV scholars usually consider. Specifically, theoretical developments of the RBV imply that firms cannot obtain sustainable competitive advantage by the use of practices that are not RBV resources. Theoretical developments of the RBV also imply that firms will use all publicly available practices that might benefit the firms making these unable to explain sustained competitive advantage. However, RBV scholars do not concern themselves with these implications.

We do agree that the mechanisms identified by the RBV can operate, but, contrary to RBV theorizing, they are not the sole explanation for variation in firm performance within industries and may not even be the primary ones. The logic in RBV papers suggests that only RBV resources matter in explaining sustained competitive advantage, but we will argue that firm abilities that are not necessarily rare, imitable, or inherently valuable can also explain performance variation.

A more serious issue is that the RBV's lack of specificity means that most studies ostensibly under the RBV label actually use other theories to justify their hypotheses. Suppose for example that the resource of interest was a combination of human resources (HR) practices that resulted in greater employee motivation and performance. Remember, these practices must not be definable enough that they can be readily copied or imitated. The RBV says nothing about the relation between the HR practices and employee motivation and between employee motivation and firm performance. Rather, the arguments linking HR to motivation and motivation to performance derive from theories of employee motivation (see, for example, De Saa Perez and Falcón, 2004). RBV scholarship generally follows this pattern – invoking the RBV but actually justifying hypotheses with other, non-RBV, theories. According to Hitt et al. (2015), this trend appears also in operations management research based on the RBV; Hitt et al. (2015) notes that 77% of the articles in this field that used RBV did so in conjunction with other theories such as transactions cost theory, agency theory, etc.

It may help to understand the RBV by examining its implicit and, and to some extent explicit, intellectual foundations. RBV theorizing often takes as a backdrop a world where every firm can and does imitate every useful technique. In such a world, the theorists assume firms will tend toward homogeneity and equal profitability. Indeed, following such a logic, Grant and Jordan (2012, 174–175) says “(i)n the long run, competition eliminates differences in profitability between competing firms ... In the world tobacco industry, the external environment is fairly stable and the leading firms pursue similar strategies ... competitive advantages, as reflected in inter-firm profit differentials, tend to be small.” While this sounds plausible, it is dead wrong. If we look at the seven cigarette manufacturers available in Compustat (sic code 2111), in 2012, return on assets varied from 2.5% to 23.3% and return on equity is much more variable. A quick examination of the distribution of performance by industry will show that almost all industries have substantial continuing variation in performance. Such variation is not just between a set of high performing firms and the mass of

other firms, but rather extends across the entire performance distribution.

Due to this implicit assumption that firms will tend toward homogeneity and equal profitability, RBV scholars view explaining firm heterogeneity or why firms differ as a central issue. Lippman and Rumelt (1982) tried to explain why firms may differ in performance in a market in equilibrium. Their explanation rested on firms drawing production functions from a distribution. Barney (1986) and others attempt to address a similar problem in that they assume a generally available pool of knowledge that all firms use appropriately. The RBV assumes that everyone knows all practices in the public domain, and if everyone could implement a practice, all firms that will benefit from the practice will use it, eliminating its ability to explain variation in performance. Given these assumptions, firms that consistently have higher performance must have rare, valuable, hard to imitate or duplicate, and hard to substitute resources.

Our disagreement with Hitt et al. (2015) on the usefulness of RBV for operations management rests on two major components of the resource-based view. First, what dependent variable does the RBV attempt to explain? Second, what variables will do that explaining?

2.1. What dependent variable do we want to explain?

According to Barney (1991) and Peteraf (1993), the object of the RBV is to explain, “sustained competitive advantage.” Indeed, the title of Barney (1991) is “Firm resources and sustained competitive advantage,” and the abstract of Peteraf (1993) states “The essence of this model [*the RBV*] is that four conditions underlie sustained competitive advantage, all of which must be met” (p.179). Other papers in this area reiterate this theme. For example, a recent review of the RBV states that “It [*the RBV*] aspires to explain the internal sources of a firm’s sustained competitive advantage” (Kraaijenbrink et al., 2010, p.350).

We suspect RBV theorists focus on sustained competitive advantage over firm performance as the dependent variable because the original articles assumed a mass of firms with normal returns (perhaps with some noise) coupled with a small set of firms that have RBV resources and hence, sustained competitive advantage. Peteraf (1993), for example, explicitly discusses what would happen if some firms do not have superior resources that are in limited supply. In such a situation, “... rents will be dissipated and only normal returns will be earned by efficient (now homogenous) producers” (p.181). Peteraf (1993) uses rents in the traditional economic sense as returns above normal returns to capital.

In this context, where a homogenous mass of firms has the same expected returns and a few distinctive firms have RBV resources, explaining sustained competitive advantage by RBV resources owned only by a few firms makes perfect sense. However, an examination of performance distributions within industries generally demonstrates a wide distribution with no “normal firm” lump.

While RBV theorists claim the RBV explains sustained competitive advantage, very few RBV papers even try to measure it. Newbert (2007) review of 55 empirical RBV articles finds that the dependent variable in 93% of “RBV” articles was performance, 16% “competitive advantage,” and 2% “sustained competitive advantage” or “sustained performance.” Similarly, Armstrong & Shimizu (2007) review finds that only 4 out of 145 RBV empirical articles even tried to measure sustained competitive advantage. Another 17 of the 145 used three or more year averages of performance to proxy for sustained competitive advantage. Armstrong and Shimizu (2007) notes, however, that averages can include below-average years missing the sustained criterion. In a meta-analysis 125 RBV

studies, Crook et al. (2008) finds that “22 percent of the utility available from predicting performance differences across organizations is provided by strategic resources” (p. 1150). Again, the emphasis is on explaining performance differences, not on sustained competitive advantage.

Sustained competitive advantage (or even temporary competitive advantage) does not equal firm profitability. A firm with a competitive advantage might choose not to increase profits to prevent entry by other firms or for other reasons. Alternatively, Coff (1999) points out that a firm might have sustained competitive advantage but not profits if powerful employees or managers appropriated the benefits of the advantage.

RBV scholars have not clarified what the sustained in sustained competitive advantage means. Whether sustained is one year or twenty remains unclear. We suspect the original RBV statements used “sustained competitive advantage” with a view to “profits in equilibrium” (the term in Lippman and Rumelt (1982) that many RBV theoretical articles cite as an important part of the RBV development). The lack of a clear definition of sustained adds another level of ambiguity to the RBV. It also makes the RBV even more difficult to refute since any evidence of a non-RBV practice resulting in enduring high performance could be rejected as not using an appropriate duration for sustained.

Note that our objections have been at the level of elementary validity – does the measure of the dependent variable used even approximate the construct. Obviously, you cannot test a theory that claims to explain sustained competitive advantage without attempting to measure sustained competitive advantage. Almost none of the empirical papers claiming a theoretical basis in the RBV even try to measure sustained competitive advantage. For the very few papers that attempt to measure sustained competitive advantage, higher level concerns about validity (e.g., discriminant and nomological validity) and measurement reliability still remain.

Substantively, we question whether strategy and operations management scholars should only focus on explaining the differences between firms with sustained competitive advantage and the mass of other firms. Wiggins and Ruefli (2002) claims that on average, only 2% of firms within an industry have sustained high performance as measured by Tobin’s q, with a range of 0%–8%. Measuring performance by ROA, an average of 5% of firms have persistent superior performance, with a range of 1%–13%. While one can easily debate where one draws the lines and get different numbers, only a relatively small proportion of firms have sustained competitive advantage. Why should scholars focus exclusively on explaining why the performance of the top 5 or 10% of firms differs from the rest while ignoring performance differences among the remaining firms? If operations management scholars aspire to practical relevance, then they probably do not want to ignore performance variation among the immense majority of firms.

Studies using firm performance as the dependent variable do not necessarily speak to competitive advantage. The many RBV empirical studies that use the entire distribution of performance could have strong statistical results because they explained performance variations at the bottom of the distribution, with no ability to explain variation at the top where competitive advantage would lie.

We suspect most strategy and operations management scholars are as interested or even more interested in explaining variance within the lower 80% or 90% of firms in an industry as in explaining performance differences between the top 10% of firms in an industry and the remaining 90% of firms. Indeed, explaining variation in performance or finding techniques that improve performance may be easier in the lower performing firms than in the top performing firms. Pragmatically, half the firms in an industry would be better off being average (Bromiley, 2005).

Sustained competitive advantage also has problems if we want to study it at levels below the whole business, as most OM scholarship does. While we can easily talk about plant productivity and plant productivity relative to other similar plants, plant productivity does not connect directly to sustained competitive advantage. Competitive advantage inherently refers to the amalgam of the features the firm brings to the marketplace compared to other firms. It is by definition an overall effect rather than a partial effect. In some markets, a firm that excelled consistently in product development or marketing could have competitive advantage while being below par in production. In other markets and with other strategies, production cost might largely determine competitive advantage. Thus, the idea of competitive advantage does not translate neatly if one wants to study units below the level of the business. Indeed, most OM scholarship does not even examine profitability because profitability does not derive directly from operational effectiveness.

Hitt et al. (2015) counter some of this reasoning by combining RBV reasoning with other reasoning such as that by Sirmon et al. (2007). The original RBV statements assumed that firms used resources correctly which let theorists tie resources directly to competitive advantage. Sirmon et al. (2007) claims holding rare, inimitable, and non-substitutable resources is a necessary but not sufficient condition for firms to achieve competitive advantage; firms must also manage those resources effectively to achieve competitive advantage. Note, the “necessary but not sufficient” statement means that without RBV resources firms cannot achieve competitive advantage.

Sirmon et al. (2007) does not address a basic issue related to RBV as applied to operations management namely, that the RBV relates to the firm overall rather than its individual components. Operations management scholars inherently study part of the firm. Competitive advantage simply does not reside at the level of operations.

In short, sustained competitive advantage as a dependent variable has many problems. How you measure competitive advantage separately from firm performance remains unclear. Competitive advantage also does not translate naturally to levels below that of overall business performance. Taking sustained competitive advantage seriously means that we accept the objective of our research is to explain the differences between an immense mass of homogenous firms that do not have such an advantage and the few that do. We do not think that is what most OM researchers want to do.

2.2. What explains performance? The problem with inimitable resources

The second major problem with the RBV comes in the question of how we define resources, and particularly, whether resources can be imitated. While Hitt et al. (2015, p. 6) says that the RBV says sustained advantage comes from resources that “must also be difficult to imitate,” Barney (1986, 1991) and Peteraf (1993) in fact say that resources that give a firm sustained competitive advantage must be inimitable i.e., only imperfectly imitable or else entirely impossible to imitate. For example, Peteraf (1993) states that RBV assets “tend to defy imitation” (p.183). Barney (1991) identifies imperfectly imitable resources as stemming from unique historical conditions, causal ambiguity, or social complexity. Barney (1991) says, “to be a source of sustained competitive advantage, both the firms that possess resources that generate a competitive advantage and the firms that do not possess these resources but seek to imitate them must be faced with the same level of causal ambiguity (Lippman and Rumelt, 1982).” Causal ambiguity means that the

firm that possesses the resource must also not understand how it works. The logic underlying this is that if a manager fully understood the resource, other firms could hire the manager and duplicate the resource.

Resources, as used in the RBV, differ from what we normally consider resources. Generally, capital cannot be an RBV resource because firms can duplicate capital. Likewise, most physical plant or properties (with the potential exception of unique properties or equipment) cannot be RBV resources because firms can duplicate these. We discuss whether other firm activities constitute RBV resources below. From here on, when we refer to resources we mean resources as defined by the RBV.

This emphasis on inimitability arises partially because the theorists tended to an economic rationality view that firms will use all available beneficial techniques, so only things not generally known can explain sustained competitive advantage. Indeed, the three seminal articles make this absolutely clear because they argue that techniques and practices in the public domain cannot explain firm performance under the RBV. Barney (1991), for example, in discussing why a firm’s formal planning system cannot be a source of sustained competitive advantage states that “Even if in a particular industry formal planning is rare, the formal planning process has been thoroughly described and documented in a wide variety of public sources (Steiner, 1979). Any firm interested in engaging in such formal planning can certainly learn how to do so, and thus formal planning seems likely to be highly imitable (Barney, 1989). Thus, apart from substitutability considerations, formal strategic planning by itself is not likely to be a source of sustained competitive advantage” (p.113).

This line of argument has some implications that the theorists readily acknowledge. If we take this view (heavily influenced by economic rationality assumptions), then a firm could not start with what is known and logically develop resources that would provide sustained competitive advantage because, if one firm could do it, other firms could imitate it. Consequently, the theorists claim that underneath these advantages must be some random event. Barney (1986) explicitly states that “... firms can obtain above normal returns through luck when they underestimate the true future value of a strategy” (p. 1238). Having the luck to have a manager with exceptional ability to anticipate the value of things can also lead to competitive advantage, although in this case the firm must have ways to prevent other firms from bidding up the individual’s salary.

This use of information ties back to a general problem acknowledged in the economic literature dating to work by Roy Radner and others (Arrow, 1986; Radner, 1967, 1968, 1972). Economic rationality means that everyone has derived all useful information available in publicly available data. For example, one knows all the theorems of mathematics once one has the axioms required to derive the theorems. The same logic underlies the idea of capital market efficiency; in an efficient capital market, one cannot make money using publicly available information. The RBV logic, just as in the efficient capital market analyses, does not just say currently known techniques (in finance, currently known trading procedures) using public information will not pay off; it says no such techniques (in finance, no possible trading procedures) can exist. In finance, finding such techniques underlies most tests of capital market efficiency.

This economic view has very unpleasant implications for management and operations management scholarship. If firms make optimal choices, then we cannot improve those choices. In other words, an economic rationality assumption implies there are no “rules for riches” (Barney, 2001). Indeed, Barney (2001, p.52) claims that “efforts to develop theories that, when applied, will always

generate sustained strategic advantages clearly are foolish.¹ If firms make optimal operations management decisions, we cannot develop techniques that would improve such decisions. While firm choices may correlate with performance, if firms make optimal choices, then preconditions fully explain those choices and firm choices simply mediate the relation between preconditions and performance. Performance differences cannot be explained by differences in decision quality, which makes the choice uninteresting.

The RBV's resources not being subject to imitation rules out trying to understand which firms adopt which practices. If resources cannot be imitated, then there is no point in studying their imitation. Consider for example our understanding of organizational structure. According to Chandler (1962), at the first part of the 20th century, firms could gain advantage by adopting divisional organizations. However, as more managers understood the divisional organizational form, the benefits from its adoption may have declined. Armour and Teece (1978), for example, finds that early adopters of the M form benefited while late adopters did not. Likewise, going back to the formal planning system example cited earlier from Barney (1991), when many firms did not practice strategic planning, scholars found such planning associated with high performance. De Geus (1988), for example, notes the use of scenarios in strategic planning allowed Shell to cope better than its competitors with a drastic drop in oil prices in the spring of 1986. As more firms became aware of strategic planning, however, the association between planning and performance became negligible, and is currently considered by many scholars to depend on specific firm level factors such as operational flexibility (Rudd et al., 2008). Understanding which practices firms use has been a focus of many OM scholars that is largely incompatible with the RBV.

In the operations area, consider the research on benchmarking and firms learning from other firms. Benchmarking is a practice explicitly designed to modify practices by imitation. The concept of benchmarking rests on the assumptions that (i) some firms have superior practices in given areas, (ii) other firms can imitate the practices of firms with superior practices, and (iii) such imitation can improve the adopting firm's performance. Much of operations management work on this topic in the 1990s revolved around the theme of learning from others, with the underlying idea that firms can imitate practices related to quality management. Studies therefore tried to identify the conditions within companies that supported the adoption of these practices, thereby resulting in manufacturing excellence (e.g., Flynn et al., 1994). Benchmarking is thus the antithesis of the RBV; benchmarking emphasizes the benefits from imitable practices.

Alternatives exist to the economic logic underlying RBV that make more sense for management studies. At least since Simon (1949), management scholars have worked with the assumption of bounded rationality. Bounded rationality simply means we assume people try to achieve their goals, but they do so subject to what we know about people's ability to process information. Naturally, actual modeling requires simplifications from the complete understanding of human decision making. Developing tools to improve decisions makes perfect sense in a bounded rationality world, but not in one that assumes firms make optimal decisions. For discussion of the differences between bounded and non-

bounded rationality, see Herbert Simon's Nobel Prize Lecture (1978).

The entire endeavor of operations management scholarship makes sense in a bounded rationality world but does not make sense in an economic rationality one. With bounded rationality, we can find tools that will help improve decisions. With bounded rationality, firms generally will not use all the potentially beneficial techniques for a variety of reasons (Bromiley, 2005). If you assume economic rationality, then firms already make optimal choices, which by definition cannot be improved. Looking for better decision rules makes no sense under the assumption that firms make optimal decisions.

2.3. The problem with valuable resources

The construct of resources has other problems. Let us note another major one; RBV resources must be valuable. Some observers criticized the RBV as tautological in that the determination a firm has an RBV resource depends on firm performance (Priem and Butler, 2001; Bromiley and Fleming, 2002). In response to these criticisms, Barney (1991, 2001) argued that a resource could be identified if it met the conditions of being valuable, rare, inimitable, and unsubstitutable. However, this does not solve the problem. Barney (1991) conditions for the most part rule out the possibility that one could directly market a resource, that is, buy or sell the resource independent of the rest of the organization. For example, Barney (1991) emphasizes that "The requirement that firm resources be immobile ... is also clear" (p.105). Peteraf (1993) notes resources are "nontradeable assets which develop and accumulate within the firm ... Because immobile or imperfectly mobile resources are nontradeable or less valuable to other users, they cannot be bid away readily from their employer. They remain bound to the firm and available for use over the long run. Thus, they can be sources of competitive advantage" (p.184).

How would we know something that is not tradeable (i.e., for which market prices cannot exist) is valuable? For the most part, we know it is valuable because it leads to desirable organizational outcomes like performance, but performance is what we want to explain with the resource. While we have talked about these issues at the conceptual level, pragmatically think how hard it would be to demonstrate the firm actually has an RBV resource, i.e., something about the firm is valuable, rare, inimitable, and unsubstitutable, without reference to firm performance and without being able to find market prices for such resources. Yet, this is a precondition for something being an RBV resource.

The onus on justifying a measure lies with the scholar who uses it. If a scholar wants to claim to have an RBV resource, the scholar would need to demonstrate the thing is valuable, rare, inimitable, and unsubstitutable. We seldom see such demonstrations.

We also question the idea that unmarketable resources have value independent of how firms use them. The impact of almost anything a firm does depends heavily on other factors. Unless you have a market price, the value of a given resource (whether in the form of a behavior, practice, or physical asset) is not predetermined or exogenous. Rather it depends on how managers use that resource and the conditions surrounding that resource in the firm and market (Miller, 2003; Sirmon et al., 2007).

The returns to the firm from using any practice depend on many other factors. For example, consider a firm that is exceedingly good at low cost, long-run assembly line manufacturing. This ability may positively influence performance in industries where low cost, long runs are desirable. However, in an industry that valued short runs, it would be a negative; job shops might be better. The ability to do research and development might have positive returns in certain fields, but negative returns in fields with stable, well-known

¹ The "always generate" condition might save this statement. However, we suspect few if any non-tautological things always generate sustained competitive advantage. There is certainly no evidence that any specific thing always generates sustained competitive advantage. In our opinion, the best management scholars can hope for is to find things that have high probabilities of improving performance.

product and process technologies. In short, the idea that some non-marketable, unique resources are valuable suggests the resource itself has value rather than the resource interacts with other factors to produce performance benefits. Note, that to justify something as a measure of a RBV resource, the researcher must demonstrate such value independent of firm performance.

To summarize our discussion above, the definition of RBV resources faces serious issues of tautology. If we define resources as having a positive impact on performance, then we have ruled by definition that resources cannot negatively influence performance, creating the tautology. If an identical set of resources or practices can have positive or negative impacts on performance depending on other factors, then the idea of valuing resources that do not have a market-determined price is problematic. Indeed, it illustrates the positive bias of the RBV in that it sees idiosyncratic activities as associated with positive performance; idiosyncratic practices could just as likely associate with negative performance. In fact, in some domains it may be quite likely (Winter and Szulanski, 2001). Maritan and Brush (2003), for example, examines the implementation of flow manufacturing in multiple plants at an industrial products firm. The study finds a wide variance (including undesirable variation) in implementation across plants; this variance stemmed from across-plant heterogeneity which in turn resulted from differences in both conventional resource endowments and managerial choices. If an industry has converged on a set of effective practices, those that deviate in idiosyncratic ways often will have lower performance than those who follow the practices. The fundamental statements of the RBV ignore this possibility.

3. Implications of valuable and inimitable resources for research

As we note earlier, Barney (1991) states that unique historical conditions, causal ambiguity, or social complexity generate imperfectly imitable resources. From an empirical standpoint, this is problematic. How exactly do you measure something that must be valuable but not understandable or imitable? In general, RBV scholars use some conventional measure like R&D spending, claiming that it actually proxies for some underlying firm-specific non-imitable firm resource like an ability to innovate (e.g., Sher and Yang, 2005). However, it does not take much belief in Occam's razor to see that R&D spending is a much better measure of R&D resource allocation than it is of some rare, valuable, inimitable, not understood, innovation ability. The same is true for almost all measures of resources in RBV empirical work. It strikes us as problematic to use a measure that at least in theory can assign identical values to two firms while at the same time claiming that measure indicates something that is rare and inimitable. Indeed, we had a colleague who truly believed in the RBV and quit doing research because he could not imagine how you could ever measure resources.

The immense majority of operations management research emphasizes empirical studies. To use the RBV, one must be able to measure resources. While in some cases such measurements may be feasible, we have little evidence of measures that really meet all four conditions identified by Peteraf (1993) or Barney (1991, 2001).

The definition of RBV resources also means that we cannot usefully talk about firms having different levels of a given resource. If multiple firms can have different levels of something, then that something cannot be an RBV resource because it is imitable and not rare.

In short, if researchers want to take the RBV theorists seriously, then they must only consider practices that are extremely difficult or impossible to imitate and must only attempt to explain differences between normal and sustained competitive advantage. Note

that, as in our discussion of sustained competitive advantage, we are discussing validity problems; we have not even questioned the reliability of such measures. If researchers want to use well-defined, imitable practices to explain performance, the RBV does not apply.

Belief in the RBV in strategic management has resulted in RBV advocates claiming various kinds of research are inappropriate. Scholars (and journal reviewers) who really believe in the RBV reject the idea (and empirical evidence) that generally observable and replicable activities explain firm performance. Of course, the empirical evidence is absolutely to the contrary; a massive number studies across strategy, operations management, and in almost every discipline in the business school demonstrate that the use of management techniques taught in business schools does associate positively with performance (see Bromiley and Rau (2014) for examples). We discuss this evidence and its implications for operations management scholarship in the next section.

Some have even gone so far as to suggest that strategic management had no theory that could explain firm differences below the level of industry before the RBV or that prior to the RBV strategy scholars only dealt with industry difference (Levinthal, 1995; Barney, 2001). However, this is historically incorrect. Throughout the entire history of empirical scholarship in strategic management, and long before the generation of the RBV, most strategy (and OM) scholars studied inter-firm differences in behavior and performance often within industries (see, for example, Hoopes et al. (2003) discussion of competitive heterogeneity). One only need look at the tables of contents for *Strategic Management Journal* in the years before the RBV to see strategy scholars have always addressed inter-firm differences (Bromiley, 2005).

Likewise, operations management scholars have dealt with inter-firm or inter-plant differences in operations management practices long before the development of the RBV (see, for example, Skinner (1969)). Theoretically, these scholars rested their work on well-developed theories including the behavioral theory of the firm (Cyert and March, 1963), agency theory (Jensen and Meckling, 1976), and transactions cost economics (Williamson, 1989).

Mosakowski (1998) points out that the RBV is particularly problematic when you consider prescription. The RBV rules out the possibility that publicly known practices could explain variance in performance. However, any practice explained in the open literature is by definition publicly known; if you explain how to do something in a journal, it cannot be an RBV resource. The only advice that the RBV might provide would be about helping firms exploit their resources once they have the original resource, but this is not very helpful since a) the RBV assumes everyone uses such advice appropriately once it appears in the public domain and b) it does not tell firms how to get the resource initially.

Mosakowski (1998) critique is particularly relevant to operations management. The mission statement of the *Journal of Operations Management* says, "The mission of *Journal of Operations Management* is to publish original, high quality, operations management empirical research that will have a significant impact on OM theory and practice. Regular articles accepted for publication in *JOM* must have clear implications for operations managers based on one or more of a variety of rigorous research methodologies." Given the assumption that RBV resources must be nearly or completely inimitable, they generally do not meet this journal's call for practical implications.

So far, we have offered a variety of concerns about the RBV in general and the application of the RBV to operations management. We question whether the RBV really makes interesting and testable predictions. We note that, to be true to the RBV, researchers must (1) attempt to explain the difference between most firms and those with sustained competitive advantage, and (2) use as an

explanatory variable a resource based on a definition that requires evidence it is rare, valuable (although not sold in markets) and difficult or impossible to imitate. If researchers do not want to define their work this way, they have two basic choices.

First, like many studies, researchers can take a somewhat ambiguous interpretation of the RBV in place of what the theorists originally claimed. Astley (1985, 501) notes that, “The maintenance of linguistic ambiguity enhances a theory’s conceptual appeal by widening its potential applicability.” The RBV’s ambiguity, in fact, may account for a great deal of its popularity. While ambiguity has benefits, one’s preference for ambiguous theorizing clearly depends on one’s intellectual training and other proclivities. We would generally favor clear theories that we can compare theoretically and, potentially, reject empirically. An emphasis on ambiguous theories results in a quagmire of apparent theories with no way to choose among them.

Alternatively, researchers can turn to the practice based view (Bromiley and Rau, 2014). We discuss this in the next section.

4. The practice based view

Even a casual glance at large-sample OM studies shows that many OM scholars want to study how broadly available practices that are in no way inimitable or rare influence performance: just-in-time principles, kanban, lot size reduction, employee involvement, statistical process control, supply chain collaboration, et cetera. These practices have proven valuable in numerous empirical studies, but are incompatible with the RBV. The RBV would predict that these practices do not lead to sustained competitive advantage since every firm can implement them. In this section, we present an alternative view that allows for variation in adoption of beneficial practices, and for ties between such adoption and firm performance.

Bromiley and Rau’s (2014) practice based view (PBV) offers OM researchers an approach compatible with using imitable practices to explain the entire range of performance. The PBV says that, due to bounded rationality, firms often do not know of and/or do not use all the techniques that might benefit them. Consequently, we may explain performance partially by “imitable activities or practices, often in the public domain, amenable to transfer across firms” (Bromiley and Rau, 2014, p.1249) where practices are a defined activity or set of activities that a variety of firms might execute (Bromiley and Rau, 2014).

Paralleling our discussion of the RBV, we now discuss two major components of the PBV: the dependent variable the PBV wants to explain and the variables that will do that explaining.

4.1. The practice based view: what dependent variable do we want to explain?

The PBV rejects the idea that all we want to do is explain sustained competitive advantage. In its place, we want to explain performance. While strategy scholars generally look at firm-level performance, the argument applies equally to plant or business unit performance. This does not eliminate all the difficulties in measuring performance, but it does eliminate the inherent illogic of using annual financial or operational performance to measure sustained competitive advantage.

Given an interest in the entire distribution of firm performance, the PBV also raises the possibility that what generates or explains variation in firm performance varies across levels of firm performance. What differentiates a poor from a good high school basketball player has very little to do with what differentiates a poor from a good professional basketball player. In operations terms, what explains variation in performance in very badly run factories probably differs from what explains variation in

performance in well-run factories. For example, in study of textile plants in India, Bloom et al. (2011) found that simple things like cleaning out the garbage on the shop floor, painting lines indicating where equipment should rest, having an inventory of materials, and tracking machine breakdowns significantly raised plant performance. Similar findings exist in operations management (c.f., Bayo-Moriones et al. (2010) on cleanliness and plant operating performance, and Flynn et al. (1994) that includes neatness in a discussion of quality management principles). Obviously, this only works in an environment where all firms do not do these things. Different imitable factors explain variation in performance in populations where everyone already does these basic things.

4.2. What explains performance? The effect of publicly available practices

Practices can be as simple as cleaning out the garbage or as complex as the most advanced optimization procedure and can have positive or negative influences on performance. Most firms may use some practices but there remain practices that only part of the population of firms uses. Consequently, publicly available practices can explain variations in firm performance. The PBV explicitly rejects the idea that firms use all techniques that could benefit them. This aligns directly with our understanding of the primary thrust of OM scholarship: understanding what organizations use what definable practices and how such use influences performance.

Assuming firms do not use all the techniques that would benefit them agrees with massive empirical evidence that shows well-defined techniques, whether they are operations management tools, corporate compensation practices, HR practices, or any of a dozen other things that we teach in the business school, explain part of the variance in firm performance. Let us consider some of this evidence.

Bloom and colleagues find the use of several common management practices (e.g., having key performance indicators for production, setting goals, having clear performance measures, rewarding high performers, and removing poor performers) associate significantly with firm performance; firms that apply these practices do better than firms that do not (Bloom et al., 2007; Bloom et al., 2012; Bloom and Van Reenen, 2006). These studies examine thousands of firms in a variety of industries and across many countries. The experimental study by Bloom et al. (2011) that we referred to earlier demonstrates this point even more convincingly. The study assigned firms in a sample of Indian textile plants randomly to treatment and non-treatment groups, where both groups received some free consulting but the treatment group received advice on (and was encouraged to follow) modern management practices such as clean production floors, regular machine maintenance, recording reasons for machine breakdowns, keeping an accurate inventory, and so on. Firms in the treatment group increased their average productivity by 11% more than firms in the control group.

Studies in other areas such as human resource management, strategic management, and knowledge management find similar results (Collins and Clark, 2003; Combs et al., 2006; Huselid, 1995; Ichniowski et al., 1997; Marques and Simon, 2006; Nohria et al., 2003). For example, in a meta-analytic study of 92 studies examining high performance work practices, Combs et al. (2006) finds that firms that use common high performance work practices such as incentive compensation, performance appraisal, internal promotion policies, and procedures for airing grievances perform better than companies that do not.

In the operations management field, studies find that firms that use well known practices such as those related to total quality

management and supply chain management perform better than firms that do not use these practices (Kaynak, 2003; Nair, 2006; Vonderembse and Tracey, 1999). For example, in a study of 382 U.S. firms from various industries, Kaynak (2003) finds that established total quality management practices such as supplier quality management, product/service design, and process management directly influenced operating performance while management leadership, training, employee relations, and quality data and reporting influenced operating performance through the practices of supplier quality management, product/service design, and process management. Vonderembse and Tracey (1999) finds that firms that implement explicit supplier selection criteria and involve suppliers perform better than firms that do not use these practices. This list could include the majority of OM empirical research.

Of course, the evidence does not show that all firms would benefit from adopting any specific practice. How much a given practice would benefit a given firm is a non-trivial issue and likely varies with firm and industry, although there are probably practices that all firms in an industry would benefit from employing. Lean manufacturing practices, for example, while certainly of value, may not be appropriate for all manufacturing firms. Likewise, the literature on best practices finds that, even within a single industry, firms cannot and should not attempt to implement exactly the same set of practices (Howard et al., 2007; Robertson et al., 1996). While there is a potential for over-interpretation and other potential design issues in the evidence we have just presented, all of the practices associated with high performance in the majority of firms studied are imitable, and neither surprising nor too technically complex for many firms to use.

The PBV also focuses attention on understanding which firms use which practices, a study largely ruled out by the RBV's inimitability assumption. A full explanation of OM phenomena would include at least an explanation of firm use of specific techniques along with the impact of such techniques on performance.

5. Implications of the practice based view for operations management research

Summarizing our arguments above, the PBV differs from the RBV in three primary ways. First, our primary outcome or dependent variable of interest should be performance, not sustained competitive advantage. Specifically, researchers should be interested in explaining differences in performance among all the firms in an industry, and not just in the differences between the top 10% or so and the remaining firms. In the OM context, this equates to explaining variation in performance at whatever level a particular study chooses. Second, the PBV holds that imitable resources or practices may account for differences in performance among firms; additionally, the same factors may not explain performance differences across the entire range of performance variation in an industry. Third, the explanation of firm use of practices is central to the PBV but nonsensical in the RBV.

PBV research involves two primary classes of dependent variables. First, we have dependent variables associated with the adoption or utilization of specific practices. The details of these variables depend on the specific practices considered in any study. Second, we have performance outcomes instead of the competitive advantage of the RBV. Here too, the PBV offers some flexibility. The PBV allows for a wide variety of intermediate and final dependent variables, but also would encourage us to look at the connections between the two. By intermediate, we mean things like defect rates or cost per unit. By final, we mean overall profitability. Naturally, one might legitimately study what determines defect rates but one might also want to show the defect rates associate negatively with unit financial performance.

The PBV highlights several kinds of research questions. Let us begin with those that relate to the first class of dependent variables namely, the adoption or utilization of specific practices.

5.1. Research questions associated with the adoption or utilization of specific practices

Since the PBV assumes that firms do not use every beneficial technique, what determines which firms use which practices? The RBV assumes a simple functionalist explanation that predicts that all firms that could benefit from a practice will use it. Potential benefits from adoption influence adoption under the PBV as well, but the PBV entertains other explanations for which some empirical evidence exists.

For example, while the PBV allows that firms may adopt practices that could increase profits more quickly than practices with less profit benefit, this is not a given in the PBV. Instead, the PBV ties back to various established literature on the diffusion of innovation, social desirability and legitimacy, firm networks, and the behavioral theory of the firm to suggest a variety of factors that will influence adoption beyond actual benefits of the practice. Let us briefly note some of the possible explanations.

One explanation for adoption would derive from organizational practices that systematically change other organizational practices. Some organizations have routines that search for improvements in existing practices or for better practices in certain defined areas even when performance is adequate. Such routines include new product development, internal consulting, TQM, Kaizen, six sigma, benchmarking, etc. Generally, however, such routines only search within specific domains. Thus, new product development routines will probably not find practices that improve HR and vice versa. Alternatively, the behavioral theory of the firm (BTOF, Cyert & March, 1963) addresses when firms are most likely to seek practices that will improve performance. The BTOF predicts firms will seek new practices when their performance falls below targets. A substantial literature in management based on the behavioral theory of the firm finds low performance relative to targets or aspirations drives a variety of change activities from risk-taking to mergers.

The BTOF also notes that the search for better practices depends on organizational factors. Managers will search in areas seen as "near" to the area in which the problem appeared. Search will also depend on managerial beliefs. Managers will search in areas they believe are likely to contain solutions that can raise performance above aspirations (March and Simon, 1958). Thus, search depends on managers' prior knowledge. Many firms may not look for (let alone find) particular kinds of management practices because they simply have never thought about the possibility of improving performance in an area by applying such practices. This explains the non-adoption of innovations like TQM and 6-Sigma in the US before their popularization in the US. Books existed detailing the processes, but US managers simply did not think to look for them. Changes in ownership or management may ameliorate this problem as new managers and owners bring their knowledge of, and experiences with, practices used in their previous firms (Barden, 2012).

Social factors (such as social desirability, legitimacy, and firm or managerial networks) also may influence the search for and adoption of new practices. Firm networks and the use of practices by local firms may influence managers' beliefs about practices. Local firms using the practice increases the likelihood that a firm's managers hear of the practice and can find individuals knowledgeable about the practice (Connelly et al., 2011; Corrocher and Fontana, 2008; Xu et al., 2012). Managers may choose to mimic firms seen as having high legitimacy. Managers may also respond to

social desirability. In a study of 164 mid-size to large manufacturing plants in five countries and across three industries, [Ketokivi and Schroeder \(2004\)](#) finds that plants may adopt innovative manufacturing practices (e.g., JIT, cross-training of employees) not just because of strategic or structural contingency related reasons, but because of institutional isomorphism reasons. That is, plants may sometimes adopt new practices simply because their peers have done so.

Even if a firm finds a commonly used practice, a variety of other factors may influence adoption. Implicitly or explicitly, managers balance the expected costs of adoption against its expected benefits. These costs and benefits may include the costs and benefits to the managers themselves, the costs and benefits to their units, and the costs and benefits from the corporate perspective. Often, the estimates of costs and benefits depend on managerial opinions with only modest empirical support; estimating the benefits from new practices is often difficult. Consequently, managers may decide that the expected costs of adopting a new management practice outweigh the practice's benefits ([Smith et al., 2010](#)). Such decisions will include some errors of both commission (over-estimating the benefits resulting in adoption of practices that do not have appropriate benefits) and omission (under-estimating the benefits resulting in rejection of practices that would have had appropriate benefits). Both the decision to explore a practice and the subsequent decision to implement will depend on management's ex ante estimation of the costs and benefits of the practice. [Ungan \(2005\)](#), for example, finds that companies may identify better manufacturing practices that produced superior results elsewhere but not adopt them if adoption requires an unacceptable amount of change in the adopting organization. Even when approving adoption, managers in the adopting organization may provide inadequate managerial support for implementing some practices.

The characteristics of the practice and the interaction of those characteristics with those of the organization should also influence adoption. Firm age, size, and slack should influence adoption although the evidence on the effects of these factors is mixed. [Nakamura and Ohashi \(2012\)](#), for example, find that large organizations adopt new practices earlier, but also retain the old technology longer. At the same time, smaller, younger organizations may be more flexible, and therefore, more likely to adopt innovations ([Pierce and Delbecq, 1977](#)).

Firms are more likely to adopt practices that have obvious payoffs over those with more diffuse returns – improving truck routing or inventory management has clearer benefits than improving a planning or personnel evaluation system. Firms are more likely to adopt practices that require less change and consequently less disruption of the organization – in other words, practices that are compatible with the existing practices of the firm. The literature on managerial biases, judgment, and decision making should shed more light on these issues.

In short, while the RBV rules out understanding adoption (since RBV resources are inimitable), the PBV leaves the entire domain of explaining which firms use which practices open. Indeed, self-selection issues imply that understanding the impact of a practice on performance requires appropriate controls for which firms choose to use the practice.

5.2. Research questions associated with the performance outcomes of specific practices

The second major thrust of the PBV – explaining the impact of practices on performance – is likewise consistent with a wide variety of explanatory factors. While we might expect a main effect from the use of a given practice, we should also expect the impact of a given practice on performance depends on both moderating and

mediating variables. How much a practice benefits a given company will depend significantly on the other practices operating in the company. A practice might influence performance directly or indirectly. For example, a practice that increased manufacturing flexibility might improve performance by the flexibility increasing sales, lowering costs, or increasing quality.

Some practices will influence performance negatively or not at all. For example, certain practices represent fads; they become widely accepted without their having a demonstrable positive influence on performance. Whereas the RBV defines resources strictly as valuable, i.e. positive, the PBV allows for the possibility that practices may have positive, negative, or neutral impacts on performance both directly and indirectly and may have different impacts in different circumstances. Understanding the circumstances under which a given activity benefits or damages the company is essential to understanding both the practice and prescription (see, for instance, the discussion of fit in [Hult et al., 2005](#)).

In all of this, organizational history and context will matter not only by influencing the practices the firm considers using but also by influencing how the new practices influence firm performance. Consequently, while in some cases we will be interested in the main effect of the practices' influence on performance, more commonly we will want to understand under what conditions a firm's practice has what impacts on performance.

Our ability to explain variation in performance may also differ across performance levels just as our ability to provide advice to improve operations differs. Factors that differentiate performance among badly run firms may be standard practice in well run ones. We may find it easier to explain differences among poorly run operations than among well run ones. Indeed, a parallel exists between our ability to explain variation in performance and our ability to provide advice that would improve operations. Prescription depends on a belief that a practice applied in a given situation positively influences performance. Both what explains performance variation and our ability to offer useful prescription may differ dramatically across performance levels.

Whereas the RBV assumes firms adopt all useful transferable practices, the PBV recognizes that practices differ radically in how easy they are to transfer. That is, the PBV views ease of adoption as a continuum. At one end, we have very easily adopted practices like buying more fuel-efficient trucks. At the other end of the continuum, the PBV converges with the RBV in recognizing that some practices or resources are extremely hard or even impossible to transfer or imitate (e.g., creating a 3 M innovative culture). The easily adopted practices tend to be simple, well-defined, modular practices (e.g., using software to efficiently route trucks). Simple does not mean that the internal operation of the practice is simple but rather that the user has a relatively simple interface. Well-defined means the practice has clear implications for behavior. Modular implies that the practice is to some extent decomposable ([Simon, 1969](#)); it does not require complex interactions with many portions of the organization. Consequently, researchers may want to characterize practices along a variety of dimensions and understand how those dimensions influence both adoption and the influence of adoption on subsequent performance.

[Table 1](#) summarizes our discussion of the differences between the RBV and the PBV.

6. Using the PBV to explain RBV based OM research: two examples

We have made a number of claims about RBV research based on scholarship in the strategic management domain. However, a number of OM papers also use the RBV. We look at two exemplars below and discuss how the PBV might be a more useful perspective

Table 1
Key differences between the RBV and the PBV.

	RBV	PBV
Dependent variable	Sustained competitive advantage	Adoption or utilization of specific practices Intermediate or final performance outcomes at the firm, business unit, plant, or other levels
Explanatory variables Key question	Rare, valuable, hard to imitate, and hard to substitute resources What explains sustained competitive advantage? That is, why do the top firms in an industry outperform the rest?	Practices about which knowledge is publicly available What explains differences in performance (or related outcomes) among firms, business units, or plants, across the entire range of performance?
Underlying assumptions	Markets are at equilibrium. The great mass of firms within an industry has normal economic returns (i.e., similar performance), while a very few show superior (above normal) performance. All information that is publicly available will be used by the firm. Hence, sustained competitive advantage can only derive from resources that are rare, valuable, hard to imitate, and not substitutable.	Firms show a wide variation in performance within an industry. All firms do not use all practices that could benefit them. Consequently, the use of practices can explain performance variation. The benefits of a practice may vary across firms and may depend on a variety of moderators. For example, practices that explain performance differences among low and medium performing firms may not explain performance differences among medium and high performing firms.

than the RBV for understanding the research problems examined in these studies.

Before discussing these studies, let us observe that great many studies adopt similar strategies and present similar problems. Like many studies that refer to the RBV, researchers often reinterpret the RBV to be much more reasonable than the RBV's actual specification. Our objective here is not to criticize these studies, but to illustrate how our concerns noted above played out in actual scholarship.

Sarkis et al. (2010) in the *Journal of Operations Management* claims to use the RBV. This study examines whether environmental training efforts mediate the influence of stakeholder pressures on the adoption of environmental practices. Using a sample of 157 Spanish automotive companies, this study finds that environmental training in eco-design, life cycle assessment, recycling/reusing, and waste elimination mediates the relations between stakeholder pressures and the adoption of three major groups of environmental practices including eco-design, source reduction, and environmental management systems. The study claims these results illustrate the complementarity of the stakeholder and RBV theoretical frameworks, where training helps to build an RBV resource namely, knowledge resources. Let us now illustrate the concerns noted above as reflected in this paper.

Again, let us note that we are not addressing the importance or contribution of the Sarkis et al. (2010) study. Our point is that the RBV does not advance the paper's contribution; the RBV is unnecessary, indeed misleading.

Consistent with our discussion of the dependent variable, Sarkis et al. (2010) explains adoption of environmental practices, not the RBV's competitive advantage. The connection between the adoption of environmental practices and sustained competitive advantage remains undemonstrated. Thus, the study does not attempt to explain the dependent variable the RBV claims to explain.

Also consistent with our discussion of problems in measuring resources, we note that this study talks about RBV resources, but does not attempt to measure them directly. Instead, the study looks at how the adoption of training moderates the influence of stakeholder pressures on environmental practices. The phrasing itself (adoption of X) raises questions whether that X is sufficiently difficult to imitate to meet the RBV's inimitability condition, and X certainly cannot meet it if several firms adopted that something. Training itself is unlikely to be an RBV resource, not being rare and generally not hard to imitate. While an internal training program that had much better results than other forms of training might be an RBV resource, training using standard materials or external

courses cannot be considered an RBV resource. In the Sarkis et al. (2010), two firms in an industry might do almost precisely the same training; for all we know, two firms may have sent employees to exactly the same training program. The topics of training (eco-design, life-cycle assessment, recycling, and disposal of production waste) touch on well-known methodologies.

One might argue that even though firms used similar training, they learned different amounts or used the training differently. However, for the RBV explanation to make sense, what has to matter is the idiosyncratic differences in learning (i.e., how firm learning deviated from what is normally learnt in a program), not the imitable main effect from the training.

Note also, if the intent of Sarkis et al. (2010, 163) is to assess "whether or not training should be integrated in order to help with the adoption of particular environmental practices," the paper clearly assumes that training is imitable; otherwise there would be no point in assessing whether firms should do it.

Consider now how the PBV might fit this study better. The dependent variable is a variant of performance and the analysis considers the entire range of outcomes, fitting well with the PBV. The primary explanatory factors, forms of training, are practices that can be transferred across firms.

Consistent with the PBV but inconsistent with the RBV, Sarkis et al. (2010) explicitly models the determinants of training. As Sarkis et al. (2010) notes, that this still leaves open a variety of complexities; both who undertakes the practice (training) and the effect of that practice on the outcomes can depend on a variety of other factors. While Sarkis et al. (2010) only use stakeholder pressures to explain training, subsequent research under the PBV could greatly expand the potential explanations of training.

To summarize, Sarkis et al. (2010) does not use the RBV's dependent variable and explains outcomes with something that cannot be an RBV resource - training which is generally imitable. We question the utility of the RBV to this analysis.

Hult et al. (2005) apply what is claimed to be an RBV approach to the benefits of specific resources in supply chain management. This paper also reflects the concerns we have with RBV studies.

First, the paper does not try to measure sustained competitive advantage. The firm uses survey measures of supply chain speed, quality, cost, and flexibility as measures of performance.

Second, the explanations associating variables with outcomes derive from other theories, not the RBV. In this case, the study uses configuration theories in strategy about ideal types of knowledge elements (e.g., tacitness, accessibility, quality, and so on) for specific kinds of strategic profiles based on Miles and Snow (1978).

Third, the paper offers no evidence that the items used to measure what are claimed to be RBV resources measure RBV resources. For example, learning capacity, one dimension that might make imitation difficult, is measured the following survey items: “the number of logistics individuals learning new skills is greater than last year,” “the resources spent on learning have resulted in increased logistics productivity,” and “our learning activities have resulted in better logistics performance than last year.” For these to be legitimate measures of RBV resources, the researcher must demonstrate that they are not readily imitated. Both the number of people learning new skills and resources spent on training are clearly imitable.

The second and third question, that resources spent on learning or learning activities have resulted in better logistics, could possibly be an RBV resource but only if what mattered was not the resources spent but rather some idiosyncratic difference in learning. However, it is not clear that the questions really measure such an idiosyncratic difference in learning. Note also the danger here of tautology in the resource measure; resources spent on training only count if they improve logistics performance so the measure depends on performance in a study explaining supply chain performance. This problem also appears in other questions in the study. For example, one of the questions used to measure learning capacity is “Our learning activities have resulted in better logistics performance than last year.” Here, the authors define the measure the resource in terms of its impact on performance and then use it to explain performance; a clear illustration of the tautological issues we discussed earlier. These are not simply design issues in one study; rather they reflect underlying problems in the resource construct. We do not know how a firm could know the training has value other than it resulted in desirable outcomes, but the study wants to use valuable training to explain such outcomes.

Again, the PBV's emphasis on performance rather than sustained competitive advantage and on imitable practices fit this study better than the RBV. Logistic productivity is a one form of performance. Training employees is a transferable practice. Emphasizing the training or learning practices rather than having a value requirement would help the research avoid issues of tautology.

We are not saying that these are not important and interesting studies. Like many sensible scholars, the authors have reinterpreted the RBV to make it more reasonable than the original statements make it. We argue that authors would benefit from using a view that did not require such reinterpretation.

While we have talked about two studies, the immense majority of studies citing the RBV follow this pattern. Only very rarely do studies actually try to explain sustained competitive advantage. Almost always, the actual mechanisms explaining the outcomes derive from a non-RBV source. Only rarely if ever do studies offer measures of resources that appear valid by meeting the criteria for an RBV resource while avoiding tautology. Most studies attempt to explain performance across the entire distribution and most use imitable practices. Instead of shoe-horning these studies into the RBV, they would much more naturally fit the PBV.

7. Conclusion

In this article, we have attempted to explain why the RBV may not be an appropriate perspective for OM scholarship. Let us summarize the issues.

To use the RBV, scholars must use RBV resources – valuable and imitable factors that other firms cannot imitate or imitate with great difficulty – to explain sustained competitive advantage i.e., performance above “normal” economic rents in an industry. The analysis assumes firms use available information and resources

appropriately. These create significant problems. We discussed two in particular.

The first relates to the dependent variable of interest. Apart from the problems associated with measuring sustained competitive advantage, using competitive advantage as a dependent variable implies that scholars should focus on explaining the difference in performance between the top 10% or so of firms and all the other firms in an industry, ignoring performance variations within the great mass of firms in an industry. In addition, competitive advantage exists at the level of the firm and does not directly translate into the normal level of operations management research. Furthermore, efforts to explain adoption of valuable practices make little sense in the RBV that assumes such adoption is extremely difficult or impossible.

The second relates to the explanatory variables. Measuring valuable resources or factors firms cannot imitate poses serious problems both in demonstrating value independent of the factor's impact on performance (i.e., avoiding tautology) and in measuring things that cannot be imitated. Under the RBV, prescription is problematic; you can only prescribe things that the firms cannot use unless they already have specific RBV resources. Studying firm use of replicable practices is the antithesis of the RBV.

We presented the PBV as an alternative to the RBV. In the PBV, scholars can use publicly available practices that firms can imitate to explain performance. Practices vary in their ease of adoption or imitation. The benefits from unique or idiosyncratic abilities appear as the extreme end of a continuum of ease of imitation. Depending on various factors, PBV practices could have positive, negative or no influence on performance.

The PBV eliminates some of the problems associated with the RBV – using sustained competitive advantage as the dependent variable, and using valuable, non-imitable resources as explanatory variables. In addition, the PBV's emphasis on practices and the interactions of these practices with other firm level factors makes it particularly well suited for operations research. In some ways, OM scholars adopting the PBV may be like Moliere's gentleman who found he had been speaking prose his entire life.

However, the disadvantage of the PBV is that, like the RBV, it is an umbrella concept under which one uses other theories to provide the primary mechanisms that explain why particular organizational characteristics have specific influences on competitive advantage or performance. If researchers feel the need for such an umbrella concept, they should seriously consider the PBV.

Our intent in this paper is not to tell OM researchers what to do, but to discuss the research implications of using the RBV. Given the serious research implications of the RBV, what operations management researchers need to decide is whether to continue using the RBV with all of its underlying assumptions or, following the Occam's razor principle, use a simpler perspective like the PBV.

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