Does VRIO help managers evaluate a firm's resources?

Paul J. Knott

*College of Business and Law, University of Canterbury,
Christchurch, New Zealand*

Abstract

Purpose – The resource-based view and value-rarity-imitability-organisation (VRIO) method have diffused widely into courses aimed at managerial practice, but research has yet to verify whether they help managers analyse a firm's resources. Following recent interest in the use of strategy tools, the purpose of this paper is to focus on what happens when VRIO informs strategy action.

Design/methodology/approach – The paper uses experimental method to evaluate directly users' analysis guided by VRIO relative to analysis that is not. Systematic coding of the responses evaluates how users select resources to evaluate, in which areas they make recommendations, and what account they take of competitors, dynamic evolution, and resource disadvantages, risks and limitations.

Findings – VRIO encouraged users to evaluate resources relative to competitors and competitive dynamics, but resource selection difficulties and failure to evaluate resource disadvantages limited its value. In addition, it drew users to the existing operations and business model.

Research limitations/implications – The study highlights a tendency for users to evaluate antecedents and outcomes of resources, and partly supports the view that VRIO elicits inward-looking descriptions. Field-based research is needed to show how using VRIO plays out in full strategy making context.

Practical implications – Highlighted limitations in VRIO analysis could be alleviated by better specifying resource selection and by addressing the positive-only tenor of VRIO materials.

Originality/value – Only a small number of published studies evaluate VRIO as a method of practical strategic analysis, and this paper is the first to look directly at users' responses.

Keywords Firm resources, Resource-based view, Experimental method, Strategic analysis, Strategy tools, VRIO

Paper type Research paper

Introduction

Understanding the relationship between the resources they control and the performance of the firm is one of the critical strategic analysis tasks for managers. In recent years, arguably the dominant theoretical framework underpinning this relationship has been the resource-based view (RBV) of the firm (Wernerfelt, 1984; Barney, 1991). Recognition of resource heterogeneity and immobility between firms distinguishes this view from the simple notion that firms have strengths and weaknesses. From the resource-based literature, the value-rarity-imitability-organisation (VRIO) technique (Barney, 2002) has become widely advocated for assessing the extent to which a firm's resources meet the criteria for sustained competitive advantage (see e.g. Johnson *et al.*, 2011). The strategy field has debated whether the RBV is a useful perspective for strategic management research (Priem and Butler, 2001; Barney, 2001; Lockett *et al.*, 2009; Kraaijenbrink *et al.*, 2010). It has seldom debated whether the RBV is useful in analysis of a firm's resources, yet the inclusion of VRIO or similar representations in most strategy texts and courses (Arend and Lévesque, 2010) implies that it ought to be.

Although it has diffused widely in the literature, it is not clear that VRIO has had as much impact on managerial practice. Surveys of managers tend to refer instead to core competencies or competence analysis (Rigby and Bilodeau, 2007;

Hodgkinson *et al.*, 2006), and an interview-based study (Knott, 2008) suggests that few of these cases involve formal analysis. Teaching experience suggests that there are practical difficulties in translating RBV theory into application guidelines and in linking analysis and action.

In response to these apparent shortcomings, this paper investigates the VRIO technique's merits and limitations when non-specialist practitioners use it to analyse a firm's resources. The paper presents a study using experimental method to compare analysis that uses VRIO with analysis that does not. It concludes by discussing implications both for theory and for using VRIO in management practice.

Tools and methods in strategy action

In order to evaluate the practical role of VRIO, it is necessary to articulate what the strategy-as-practice and strategy cognition literatures tell us about the use of strategy tools in full organisational context. It is well established that managers generally do not use strategy methods as strict templates, or even usually perform formal analysis as a textbook might suggest (Hodgkinson *et al.*, 2006). Strategy making deals with situations that are too unique and complex for this, and require partly creative solutions (Ohmae, 1982). Typically, practitioners use only parts of tools, and adapt them to suit their local needs (Jarzabkowski and Wilson, 2006; Knott, 2008). This can result in managers using tools differently from their originators' intent (Lozeau *et al.*, 2002), and the tools having only limited influence on individual instances of strategy making (Whittington, 2006). Tools and action can never represent a facsimile of one another (Seidl, 2007). Managers' way of engaging with strategy tools can be dominated by the individual, by existing routines in the firm, or by reflective interpretation of the firm and its environment (Jarratt and Stiles, 2010).

Given this picture of strategy tools often having a secondary role in strategy activity, the question then is how strongly tools such as VRIO influence praxis. One view is that tools can both influence the outcome of a decision and help form mental models, frames, and cognitive categories (Stubbart, 1989; Mintzberg *et al.*, 1998). The resulting mental models can emphasise some elements of the strategic environment at the expense of others (Worren *et al.*, 2002). Armstrong and Brodie (1994) illustrated the potential for tools to introduce unwanted bias by showing in an experimental setting how presenting managers with the Boston Consulting Group (BCG) growth-share model made them more likely to opt for an unprofitable investment choice. Framing the problem in terms of the BCG matrix drew their attention away from a stark set of profit forecasts. Following this, if a manager uses VRIO to frame or structure analysis, there is potentially a risk that this will channel or constrain thinking in a way that alters the resulting insights and decisions. It could, for example, divert attention from other more fruitful managerial logic (Kraaijenbrink *et al.*, 2010). Practice theory (Bourdieu, 1990) limits how strong we can expect these effects to be. According to this view, social capital, field, and habitus are the pervasive influences.

Biases introduced by a method such as VRIO might be open to dilution through practitioners' known tendency to draw on multiple tools (Jarzabkowski and Wilson, 2006; Jarratt and Stiles, 2010; Wright *et al.*, 2013). The cognitive anchoring effect will likely reduce this dilution: starting points in a cognitive process have an on-going influence that alters the outcome. Initial information even biases final responses when actors are fully aware of the lack of relevance of this information (Wilson *et al.*, 1996). The anchoring effect has significant potential to compromise strategy work, as Gavetti *et al.* (2005) highlighted in relation to strategy analogies, and VRIO along with other methods has the potential to act in this way.

In summary, the literature tells us that using VRIO in strategy activity could have pervasive effects on the content and outcomes of the activity, despite the likelihood that the activity will use it in partial or adapted form.

The RBV, VRIO, and managerial practice

The RBV describes conditions under which distinctive resources possessed by a firm are a source of sustained competitive advantage (Barney, 1991). The appeal of creating or discovering a sustained source of advantage over other firms has helped this concept to enter most strategy courses and textbooks as well as giving rise to a significant body of research. There is also a quantum of critique of the RBV, which argues both that it has limitations as a theory and that it has limited value in generating managerial prescriptions (Priem and Butler, 2001; Lockett *et al.*, 2009; Kraaijenbrink *et al.*, 2010). For the present paper, the key issue is the value of the RBV in guiding practical strategic analysis. Literature on this is much more limited than for the research critiques (Arend and Lévesque, 2010). For practical application in analysis, the VRIO technique (Barney, 2002) has become the textbook approach to assessing the extent to which a firm's resources meet the criteria for sustained competitive advantage. In essence, it involves assessing attributes of the firm for strategic value, rarity, difficulty of imitation, or substitution, and degree of exploitation by the firm. VRIO has been advocated as a framework for understanding which resources are valuable to a firm and what makes them so, how vulnerable they are to imitation, and how the firm can exploit and manage them sustainably (Barney and Hesterly, 2006).

Arend and Lévesque (2010) considered this challenge in depth and found that even in principle it is problematic for managers to identify the relevant resources that satisfy VRIO criteria. Similarly, they found it problematic in principle for managers to ascertain how much to invest in specific resource characteristics to maintain performance in these criteria. This aligns with previous literature pointing out that many of the least imitable resources, such as competence embedded in the firm, are hard to identify effectively, and once identified are inherently hard to manipulate (Brumagim, 1994; Teece *et al.*, 1997; Priem and Butler, 2001). Equally, the embedded resource configurations highlighted by VRIO tend to lose value quickly in high-velocity environments and hold firms back from strategic change (Jarzabkowski and Wilson, 2006).

Despite these limitations, using VRIO ought to help managers perform better analysis than otherwise. Within this broad question, this research seeks to address a number of component issues arising from the literature. The first issue in using VRIO is how to select attributes of the firm to evaluate as resources. This is crucial to the subsequent analysis, but can be problematic because of the large scope of firm attributes that are potentially valuable (Priem and Butler, 2001; Kraaijenbrink *et al.*, 2010). Commonly cited versions of VRIO (Barney, 2002; Barney and Hesterly, 2006) lack definitive guidance on what represents a resource, perhaps reflecting the all-encompassing definition within the RBV. Barney and Hesterly (2006) included tangible and intangible assets; reputation; teamwork; capabilities; marketing skills; financial; physical; individual; and organisational resources. Kraaijenbrink *et al.* (2010) found this all-inclusiveness limiting because it lumps together resources that fundamentally differ from one another, such as basic inputs and processes that transform those inputs. This risks devaluing analysis in the same way as confusing symptoms with their causes.

To select resources for VRIO analysis, Barney and Hesterly (2006) advocated using a value chain to think in a disaggregated way about how a firm's activities relate to its resources. This leaves users to make what can be a creative leap from an identified

activity in the value chain to the corresponding resource configuration or characteristics. The temptation can be to evaluate the activities themselves as if they were resources, or worse still to evaluate the firm's strategy or the merits of its products or services. Selecting resources using a value chain breakdown will also lead to evaluation of resources individually, without necessarily considering how they contribute to the firm as a functioning system (Foss, 1997). This will limit the possibility of surfacing and evaluating systemic attributes, contrary to the idea that resources become valuable when firms combine them to derive productive outputs (Penrose, 1959). This approach also does not consider the context-sensitivity of knowledge-based resources. Although the literature suggests some alternative approaches to selecting resources to evaluate (Knott, 2009), these lack detail and are not widely known. Hence, this study evaluates:

   H1. Non-specialist users of VRIO will assess a conceptually marginal range of attributes as resources.

The next question for a VRIO user is how to assess the merits of the selected attributes. According to Barney's (1991) definition, analysis drawing on VRIO ought to evaluate relative to competitors, since it involves determining whether the firm can use a resource to exploit opportunities or neutralise threats in the firm's environment. Consideration of existing and potential competitors is also inherent in evaluating the degree of rarity of a resource and the degree and speed of competitive imitation or substitution. On the other hand, any analysis focused on a firm's internal resources has the potential to divert attention from competitive issues, especially if carried out by analysts who are internal to the firm. The temptation exists to use notional, internal assessments of value rather than, for example, value the firm captures in market exchange (Bowman and Ambrosini, 2000). In respect of these issues, the study evaluates:

   H2. Users of VRIO are more likely than non-users to assess attributes of the firm relative to those of competitors.

Another important issue the literature raises in relation to RBV is the potential for firm resources to have negative as well as positive implications (Collis, 1991; West and DeCastro, 2001). Skills that give a firm a performance advantage in certain areas can inhibit projects centred on other disciplines (Leonard-Barton, 1992). The embedded nature of knowledge-based resources can inhibit performance in a dynamic environment (McEvily and Chakravarthy, 2002; Jarzabkowski and Wilson, 2006). Given these considerations, effective RBV-based analysis ought to incorporate a means of assessing negative as well as positive implications of a firm's resources. Despite this, much of the RBV literature implicitly assumes resources have only positive implications (Bowman and Ambrosini, 2007). Barney and Hesterly (2006) introduce VRIO as an approach that identifies weaknesses as well as strengths, and equate a "non-valuable" resource to a weakness. However, they do not explicitly recognise the possibility of valuable resources simultaneously having negative implications in some aspect or context. To consider user responses within conventional VRIO analysis, this study considers:

   H3. Users of VRIO are more likely than non-users to cite risks, limitations, or sources of competitive disadvantage associated with firm attributes.

Resource-based theory acknowledges as a basic principle that a firm may lose a "sustained" advantage over time if supply or demand conditions change (Barney, 1991; Porter, 1985). On this basis, managers evaluating resources of a firm ought to take

account of how these conditions are evolving. In contrast, critics (Collis, 1994; Teece *et al.*, 1997; Priem and Butler, 2001) have highlighted the potential for analysis using the RBV to surface backwards-looking descriptions of the antecedents of current performance. Such a focus is likely to be unhelpful if the purpose of the exercise is to address future performance, despite the value of path-dependent resource configurations. Although the imitability/substitutability criteria in VRIO focus specifically on the dynamics of imitation of existing resources, they do not take account of dynamics in environmental variables, which Barney (1991) excludes from the logic of the RBV. It is therefore pertinent to evaluate:

H4. Users of VRIO are more likely than non-users to assess the dynamic evolution of markets and competition.

Associated with the level of attention to dynamic issues is the extent to which analysis results in distinct and helpful recommendations. Some authors have accused VRIO and the RBV of doing little to help managers nurture future performance (Black and Boal, 1994), and instead focusing attention on backwards-looking explanation of existing performance as noted above. Prescriptions for action based on VRIO suggested by Barney (2002) and Barney and Hesterly (2006) are limited to the choice of organising to exploit a resource vs not organising to exploit it. Furthermore, evaluating resources that are selected from a value-chain representation of the existing business (as Barney, 2002 outlines) will tend to make the analysis explanatory rather than prescriptive. This leads to:

H5a. Users of VRIO are less likely than non-users to make strategy recommendations that are distinct from the existing business model.

H5b. Users of VRIO will make recommendations in different strategic aspects of the firm than non-users.

Research design and methods
This section sets out the principles behind the experimental design adopted for this research. The use of experimental method complements other approaches in the literature to researching the practical effects of using VRIO. Newbert (2008) carried out a survey to clarify the empirical relationships claimed by resource-based theory, within limitations imposed by single-respondent, perceptual measurement. Arend and Lévesque (2010) constructed a computer simulation to demonstrate in principle issues in applying the RBV as a tool for managers. Kunc and Morecroft (2010) carried out a simulation-based experiment to illustrate how decision-making processes affect a firm's resource configuration. To date, no published research directly accesses practitioners' responses to using the RBV or VRIO to inform analysis. From the strategy-as-practice perspective, which emphasises the interplay of practitioners, practices, and praxis (Johnson *et al.*, 2007), this is a significant omission.

In this research, an experimental exercise in a controlled setting examined a simulated slice of praxis at the individual level both with and without the influence of VRIO. This approach emphasises effects of the technique that social, political, and other influences might otherwise mask (Kunc and Morecroft, 2010). It also circumvents the filter of retrospective accounts inherent in interviews and surveys (Schwenk, 1995), since it directly accesses individuals' expression of their analysis as they undertake it. An important aspect of the research design is that it draws on participants' full explanations of their rationale, not just their final answers. In this respect, the study

differs from that presented by Armstrong and Brodie (1994), which is otherwise similar in its application of a management tool in a case-based exercise. Analysis of component influences is the key to developing better close-to-practice theory, both despite and because of engaging practitioners away from day-to-day coping (Wright *et al.*, 2013). This approach also generated a high response rate and a high level of engagement from participants. Moreover, it circumvented the problem noted earlier that few firms report using VRIO, which limits the possibilities for practice-based observation and interviewing.

Methodological issues arising in experimental work in management research include external validity, due to the artificial setting, and internal validity, since the results depend on the design of the research instrument (Griffin and Kacmar, 1991). External validity in this study comes from generalising based on theoretical explanations, not from expectation that the empirical effects will apply equally in true organisational settings (Greenberg, 1987). Although the scope of the data are limited to how individuals interpret and use VRIO in simplified circumstances, similar influences will exist in organisational settings, along with others. Although the participants are not experienced strategy analysts, their responses still reveal difficulties that experienced analysts must overcome. Additional work in field settings could test specific effects found in the current study (Sekaran, 2003).

A key internal validity issue is that the research setting must capture the constructs of interest (Marks, 2000). Prior to the main study, selected individuals completed the exercise and gave feedback on the case text, VRIO summary, and questions. This gave confidence that these would generate sufficient case comprehension and potential to apply VRIO. As noted below, the study participants also gave self-assessed ratings of comprehension. Another problem in experimental exercises can be the demand effect in which participants give the experimenters what they think they are looking for (Armstrong and Brodie, 1994). Because participants were starting their MBA, they might have been more than usually open to following specific guidance at the expense of their own intuition. If so, they might have been more likely to apply VRIO – but this should not have affected how they did so.

Data collection

This section sets out how the above principles were applied by detailing the setting, the materials provided to participants, and the data collection process. The participants in the research were two cohorts of incoming post-experience MBA students, in 2009 and 2010. The programme had relatively small numbers, with cohort sizes of 27 and 36, respectively. The participants had ten to 15 years of business experience. Job titles included company chairperson, CEO, product manager, design manager, and key account manager. The average age on entry to the programme was 37 years. The participants were therefore reasonably representative of the target for this research, namely, practitioners who are not specialists in this area of theory. Post-experience MBA entrants in general are far more representative of managers than undergraduates (Keats, 1991).

The first cohort of participants were about to start the second term of their MBA, and had not undertaken courses in strategy or marketing during their first term. The second cohort participated during their orientation week on programme entry. Neither cohort had prior exposure to the researcher. For both cohorts, care was taken to specify that the exercise was for research purposes and was separate from course teaching and assessment. Each participant individually completed the exercise without consulting others or checking data sources.

The exercise provided participants with a slightly abridged version of the Dell Computer opening case from the Hill and Jones (2007) strategic management textbook, which set out what was compelling about the firm's business model and performance prior to 2005 using similar material to the worked example of VRIO analysis in Barney (2002). Following the text of the case, the exercise consisted only of the following questions:

(1) "Write some notes or a brief narrative to explain the logic leading to your interpretation of what are Dell's most important and valuable resources".

(2) "Write some notes or a brief narrative to explain the logic leading to your recommendation of what Dell should do to exploit and manage the resources you have identified as the most important and valuable".

The rubric specified that participants should draw on the case data only. Within each cohort, participants were divided into two groups according to self-assigned seated position in the class. This approach pseudo-randomly allocated two groups, which were physically separate to minimise cross-group interaction. One of the two groups received, in addition to the case, a 1-page outline of how to perform VRIO analysis (reproduced in the Appendix). This was abridged from the method outlined in Chapter 3 of Barney and Hesterly (2006), which was selected to represent a widely accepted standard "textbook" approach. The 1-page outline quoted the textbook's definitions of value, rarity, imitability and organisation, and summarised its stated implications for resources that meet one or more of these criteria including the four "sources of costly imitation": unique firm history, causal ambiguity, socially complex resources, and patents. The outline did not provide definitions of resources and capabilities, or any guidance about selecting resources to evaluate. The questions given to this group were identical to those listed above except for the additional sentence appended to each:

Draw on the VRIO technique if you think it will be helpful.

The rubric concluded with comprehension questions in which participants whose materials included the VRIO material were asked to rate their own comprehension of the framework, and the others were asked to rate their own comprehension of the case. Participants spent up to the maximum allowed time of 45 minutes completing the exercise, after which all submitted scripts. Of these, six were excluded from analysis due to low self-assessed comprehension or incompleteness. This resulted in 49 valid responses available for analysis, consisting of 25 with the VRIO materials and 24 without – an effective response rate of 89 per cent of participants in the sessions and 78 per cent of the MBA programme cohort. Comparison of the specialist disciplines indicated by the VRIO and non-VRIO participants showed no clear differences between the two groups. Across both groups, technical, operational, and marketing/sales roles were the most common.

Results and analysis
This section details the methods used to analyse the data and sets out findings in relation to each hypothesis. The author analysed the text of the 49 valid responses with the qualitative text analysis tool NVivo. This is a piece of computer assisted data analysis software that assists with the process of coding qualitative data by providing an efficient framework for organising and configuring the data. NVivo allows chunks of text to be assigned ("coded") against specified meanings ("nodes"), and for these assigned chunks of text to be sorted and counted. The software assists with, but does

not substitute for, the human interpretive process of coding (Saldaña, 2013). Because it enables researchers to handle significant amounts of data, training in its use has become standard in many postgraduate courses (Bringer *et al.*, 2004).

An initial list of nodes was derived from the literature, and nodes were added as required to fully characterise the responses. After initial coding for all responses, the author checked the coding systematically by re-evaluating each of the 49 sources sequentially for each of the 27 nodes, checking for false positives and false negatives and ensuring consistent interpretation. Coding against a given node was made when this aspect of the analysis was present in the text, without making value judgments as to the quality of the response. For additional assurance, academic colleagues familiar with the subject area carried out a *post-hoc* check on the coding for all supported hypotheses. This resulted in either full agreement (*H1*, *H5a*, and *H5b* diversification), or agreement except for a few weak cases with minor potential impact on percentage figures (*H2* and *H4*).

In the completed analysis, the total number of coded references is 550. Findings are summarised in Table I and detailed below.

Comprehension questions
These questions address several internal validity issues. One confounding effect would be if some participants already knew about using VRIO. The VRIO version of the instrument asked this question, and 18 per cent of the valid 2009 responses and 14 per cent of the valid 2010 responses gave a "yes" answer. In addition, only 8 per cent of participants with the non-VRIO version referred to any elements of VRIO in their responses. These low percentage figures provide a basis to expect little impact on the results from prior knowledge of VRIO.

Equally important is whether participants who received the VRIO guide were able to understand it sufficiently. Self-ratings for level of understanding averaged 3.3 out of five (for valid responses), which is a reasonable level in the context of a 1-page outline.

Hypothesis	Criteria/Coding	No VRIO (%)	With VRIO (%)	Outcome
H1	Value chain configuration	71	84	Supported
	Non-disaggregated product/service attributes	50	60	
	Collective knowledge, expertise, capabilities	67	32	
	Non-disaggregated efficiency drivers	29	32	
	Positioning attributes (market, supplier)	17	24	
	Physical resources or facilities or data	46	20	
H2	Evaluated relative to competitors	21	76	Supported
H3	Strengths	96	100	Not supported
	Risks/limitations/disadvantages	46	40	
H4	Competitive dynamics	21	56	Partially supported
	Demand dynamics	21	8	
H5a	Distinct recommendations	83	64	Supported
	Not distinct from existing model	13	24	
	Recommendations absent	4	12	
H5b	Vertical linkages	67	72	Partially supported
	Marketing	54	48	
	Efficiency/effectiveness	50	48	
	Diversification/penetration	29	8	
	Innovation/flexibility	12.5	12	

Table I.
Summary of results

These ratings also formed a basis for comparing the 2009 and 2010 results; a *t*-test yielded an 84 per cent probability that the two sets come from the same underlying population. On this basis, all subsequent analysis combined the 2009 and 2010 data.

Only two of the non-VRIO responses (8 per cent) contained any identifiable references to components of VRIO, and neither of these followed its full structure. This means that effects of VRIO were almost entirely limited to the with-VRIO participants. From the 25 with-VRIO responses, 19 contained at least some identifiable elements of VRIO, and of these eight followed its full analytical structure. The low proportion (32 per cent) that followed the full structure is consistent with the notion of partial use and adaptation of strategy tools described in the literature:

> *H1.* Non-specialist users of VRIO will assess a conceptually marginal range of attributes as resources.

This was investigated by coding the resources participants referred to in their responses. The abridged outline of how to perform VRIO analysis did not provide guidance about defining or selecting resources. Categories derived from the heuristic of Barney and Hesterly (2006) were supplemented during analysis to ensure full characterisation of the data. Each response was coded using as many nodes as applied. The main categories were:

Non-disaggregated product or service attributes; non-disaggregated efficiency drivers – evaluates product or service attributes or efficiency drivers as if they are resources, and does not trace back to antecedent resources or capabilities within the firm (e.g. "the flexibility to customize products and the ability to offer good response times to order is a valuable resource as well").

Positioning attributes (market, supplier) – evaluates a positioning attribute as a resource. This may be in relation to final customers, market channels or suppliers, and often refers to reputational assets (e.g. "Strong customer loyalty comes next. It is extremely valuable, rare in current conditions, well exploited and hard to imitate").

Physical resources or facilities or data – evaluates tangible resources (and not associated capabilities or knowledge) (e.g. "Dell's competitive advantage lay in the information systems it developed").

Adopted value chain configuration – evaluates business model choices and not the resources that enable or result from these choices (e.g. "Dell's most valuable resource is the direct selling model it uses").

Collective knowledge, expertise, capabilities – evaluates collective (rather than individual) competence or capability in a way that is distinct from its outcomes, the facilities it builds on, and the business model it relates to (e.g. "They have built that capability based on information flows and excellent processes and the system of inventory control, production and speed to market is the most valuable resource the company has").

Since the most commonly evaluated attributes were the firm's adopted value chain configuration and non-disaggregated product or service attributes, many participants were evaluating the outcomes of resources and not the resources themselves. With-VRIO responses were the most prone to this. They also less often evaluated tangible or knowledge-based resources, which is concerning because selecting the wrong initial resources severely limits the subsequent analysis:

> *H2.* Users of VRIO are more likely than non-users to assess attributes of the firm relative to those of competitors.

Coding for this item took into account all comments or evaluation of Dell relative to competitors, whether or not the response mentioned any specific competitors.

An example of this was, "Customer's perception of choice gives the customer the confidence they are getting value for money. This differs from most of its competitors". Use of the term "competitive advantage" on its own was not considered sufficient to constitute evaluation relative to competitors, as many participants used the term to describe perceived positive qualities in a non-relative way using only internal (Dell) frames of reference.

The results in Table I show that most with-VRIO responses demonstrated evaluation relative to competitors, whereas most non-VRIO responses did not. This strongly suggests that the value, rarity and imitability components of VRIO did encourage evaluation relative to competitors:

> *H3.* Users of VRIO are more likely than non-users to cite risks, limitations, or sources of competitive disadvantage associated with firm attributes.

This hypothesis was investigated by coding any explicit recognition of risks, limitations, or potential sources of disadvantage associated with firm attributes or strategy, in either the analysis or the recommendations. Examples of such recognition include, "the price for getting it wrong is high given they have no channel support that would ordinarily protect them"; "200 suppliers is too many – it is better to concentrate on fewer to be more effective and under control". For comparison, references to strengths of the firm were also coded.

Both VRIO and non-VRIO responses described strengths far more often than risks, limitations of sources of disadvantage: twice as often in the case of non-VRIO responses and 2.5 times as often for VRIO responses. While to a degree this reflects the request to "identify the firm's most important and valuable resources", with no active encouragement to consider the negative side of resources, this emphasis is consistent with the positive-only tenor of much guidance in the literature. These figures suggest that non-specialist analysts require additional guidance if they are to generate evaluative resource analysis that takes full account of the effects of a distinctive resource configuration:

> *H4.* Users of VRIO are more likely than non-users to assess the dynamic evolution of markets and competition.

Coding for this question looked separately for consideration of future competitive dynamics and consideration of future demand dynamics. Coding recognised any statements that were forward-looking or invoked changing strategies or circumstances, excluding short-term operational dynamics. Examples were, "if Dell continues to refine and improve its model then it will continue to enjoy a sustained competitive advantage"; "in order for competitors to develop a model similar to Dell's they would face costs"; "ensure management attention is spent on not only keeping them current but also looking forward at what market or technological change is next".

The results suggest that VRIO does encourage users to pay attention to dynamic issues, contrary to concerns cited in the literature review. A logical explanation for this could be that the "imitability" criterion in VRIO (and to some extent rarity) explicitly encourages this dynamic thinking. However, the result for demand dynamics is the opposite. This is one indication that participants influenced by VRIO paid less attention to market issues, another being the findings from *H5b*. Participants who did not consider strategic dynamics described instead the existing model, and recommended improving or expanding it as if the environment would remain constant:

> *H5a.* Users of VRIO are less likely than non-users to make strategy recommendations that are distinct from the existing business model.

H5b. Users of VRIO will make recommendations in different strategic aspects of the firm than non-users.

Coding for these items evaluated whether a participant made a suggestion that was not in the original case description. This suggestion could represent improvement to existing operations, or could advocate some form of expansion. The with-VRIO responses were less likely to include distinct recommendations, and more likely to make no recommendation or one that existed in the case description. This is consistent with concerns expressed in the literature that resource-based analysis could be prone to drawing attention introspectively towards the existing business model.

Where participants made recommendations, these were categorised using the emergent categories in Table I. Coding was applied to multiple categories if present in a response. An illustrative quotation coded under "diversification" was, "Can these same systems and processes be utilised to produce other products at lower costs to competitors? Presumably the intellectual design and the managerial capacity could be shared with new company divisions".

The focus of the recommendations was different in only limited respects between VRIO and non-VRIO responses. The with-VRIO participants were more likely to address forward or backward integration issues, and less likely to address marketing issues or to recommend expansion via market penetration or diversification. This tendency is consistent with the observation above and in *H4* that VRIO focused participants on the operation of the existing business model.

Scholarly implications

The contribution of this paper lies in evaluating the in-use validity of VRIO as a form of strategic analysis and identifying its component influences on users' strategic thinking. This has received much less attention in the literature than the theoretical implications of the RBV. The results shed light on several existing critiques of VRIO. One of these is selecting attributes for evaluation. This study shows empirically that users tend to select and evaluate the outcomes of resources (such as fast response time) or the antecedents of resources (such as using a direct selling model). It also shows VRIO driving users away from evaluating collective capabilities, a concern that also exists conceptually with the RBV (Foss, 1997).

Another established criticism of the RBV is a claimed tendency to elicit static and inward-looking descriptions that are insufficiently geared to future-focused decisions (Lockett *et al.*, 2009). In one respect, namely, that the with-VRIO users were more likely to evaluate relative to competitors, the results support the merits of the framework's rubrics for assessing value. In others, notably a tendency to adopt a positive-only tenor and a failure to take account of varying the strategic environment (Kraaijenbrink *et al.*, 2010), the results mostly support the critiques, but with some refinements. In respect of the positive-only tenor, they showed the problem as common across users and non-users of VRIO, and only slightly worsened by VRIO. In respect of failure to take into account the strategic environment, with-VRIO responses were poorer to the extent that they were less likely to make recommendations distinct from the existing model described in the case. They also paid less attention to the dynamics of changing market demand, although more to dynamics of competition. These findings support the critique of the RBV by proponents of the dynamic capabilities view (Eisenhardt and Martin, 2000) suggesting that the RBV is misleading in rapidly changing environments and over-emphasises the potential for leverage of existing resources.

Given the design of this study and the participant demographics, the results are most closely applicable to practitioners who are not specialists in this type of analysis, have limited time to devote to the analysis effort, and do not choose to access specialist advice. This set of circumstances appears commonplace in practical situations, not just in artificially created exercises (Hodgkinson *et al.*, 2006). Specialist users with a longer timeframe and good use of peer review will often overcome limitations highlighted by the study. Individual cognitive preferences will have a bearing on responses to VRIO or any other strategy framework, as will motivation and pressure from the organisational context (Langley, 1989; Jarzabkowski, 2004). Research using field-based methods is needed to refine understanding of how using VRIO plays out in the full context of strategy making. This would also make it possible to research important issues that could not be included in this study due to its reliance on a time-limited and circumscribed individual exercise. These include evaluation of unobservable sources of competitive advantage (Godfrey and Hill, 1995); evaluation of systemic attributes or complex resource combinations; value generated by a resource vs cost of the resource (Barney, 2002; Bowman and Ambrosini, 2000); and the possibility of creating or combining VRIO with other frameworks in a form of *Bricolage* (Jarzabkowski and Wilson, 2006).

Implications for educators
Given the research setting in an MBA classroom, aspects of the results are especially pertinent to strategic management education at MBA and executive levels. Shortcomings in VRIO-based analysis highlighted in this paper could be mitigated by fuller explanation than pedagogical materials currently make available. Since the term "resource" does not appear self-explanatory to non-specialists in this area of theory, a major area of opportunity is to detail more precisely the criteria for selecting attributes to assess using VRIO. As discussed earlier, the literature gives only limited guidance on how to undertake the abstraction from resource outcomes or antecedents to the resources themselves. The findings highlight the need to disaggregate output characteristics such as product attributes or efficiency, and identify their internal drivers. They also highlight the need to emphasise collective qualities such as a valuable culture (Barney, 1986) as well as constituent parts of the value chain, and the need to address the positive-only tenor of most existing presentations of the RBV.

More generally, this study highlights the need to avoid presenting the RBV as an overarching framework for strategy. Issues are better presented from multiple perspectives (Wright *et al.*, 2013) so that students can reflect on the narrow lens presented by any individual tool, and respond accordingly. Just as importantly, VRIO can be presented as part of an inductive de-framing of a firm's strategic assumptions, not just as a deductive tool (Dunbar *et al.*, 1996).

Implications for practitioners
This study has several implications for managers and consultants who use VRIO and the RBV in strategic analysis. It supports the idea that VRIO provides helpful guidance by highlighting competitor issues and competitive dynamics. To this extent, more managers should use VRIO than existing surveys indicate. Conversely, the study also suggests that shortcomings in the application of VRIO by non-specialists limit its value. Crucially, users require guidance as to what kinds of attribute they should evaluate as resources, as noted above. In the absence of guidance, they often evaluate outcomes or strategies as if they are resources, leading to circular reasoning. They also often fail to be evaluative about resources by considering their limitations, downsides, or risks.

Despite the fact that most participants in the study applied VRIO only in part, using it focused their thinking on some strategic aspects at the expense of others. The model's focus on existing resources does seem to divert attention away from new initiatives and opportunities and away from market dynamics. To a degree, these effects could be reduced by awareness of them and by balancing the RBV-based analysis with other forms of strategic reasoning. The anchoring effect – getting stuck in a pattern of thinking – could confound this, however, which suggests that resource-based analysis is not the best starting point if the most important criteria for the organisation are innovation, marketing, or scope expansion.

Conclusions

This paper continues the established line of inquiry into strategy tools in use. Its contribution is to articulate the effects, efficacy, and limitations of the VRIO method when used to analyse a firm's resources. It complements the limited existing research in this area by directly analysing users' responses to an analysis exercise and hence developing "how-to" understanding. It compares responses that draw on VRIO to inform analysis with those that do not. Systematic analysis using NVivo coding shows that VRIO works as designed in some respects, such as evaluation relative to evolving competition, but in other respects does not realise its potential. It could be improved by specifying more carefully what kind of resources users should evaluate and taking more account of limitations and potential negatives associated with firm attributes. Because it focuses attention on pre-existing operations, it would not be a good starting point for firms seeking to move beyond an existing business model or strategy paradigm. Scholars, educators, and practitioners can improve the in-use validity of VRIO by responding to these limitations.

References

Arend, R.J. and Lévesque, M. (2010), "Is the resource-based view a practical organizational theory?", *Organization Science*, Vol. 21, pp. 913-930.

Armstrong, J.S. and Brodie, R.J. (1994), "Effects of portfolio planning methods on decision making: experimental results", *International Journal of Research in Marketing*, Vol. 11, pp. 73-84.

Barney, J. (1986), "Organizational culture: can it be a source of sustained competitive advantage?", *Academy of Management Review*, Vol. 11, pp. 656-665.

Barney, J. (1991), "Firm resources and sustained competitive advantage", *Journal of Management*, Vol. 17, pp. 99-120.

Barney, J. (2001), "Is the resource-based 'view' a useful perspective for strategic management research? yes", *Academy of Management Review*, Vol. 26, pp. 41-56.

Barney, J. (2002), *Gaining and Sustaining Competitive Advantage*, 2nd ed., Prentice Hall, Upper Saddle River, NJ.

Barney, J.B. and Hesterly, W.S. (2006), *Strategic Management and Competitive Advantage: Concepts and Cases*, Pearson Education, Cranbury, NJ.

Black, J.A. and Boal, K.B. (1994), "Strategic resources: traits, configurations and paths to sustainable competitive advantage", *Strategic Management Journal*, Vol. 15 No. S2, pp. 131-148.

Bourdieu, P. (1990), *The Logic of Practice*, Stanford University Press, Redwood City, CA.

Bowman, C. and Ambrosini, V. (2000), "Value creation versus value capture: towards a coherent definition of value in strategy", *British Journal of Management*, Vol. 11, pp. 1-15.

Bowman, C. and Ambrosini, V. (2007), "Identifying valuable resources", *European Management Journal*, Vol. 25, pp. 320-329.

Bringer, J.D., Johnston, L.H. and Brackenridge, C.H. (2004), "Maximizing transparency in a doctoral thesis: the complexities of writing about the use of QSR*NVIVO within a grounded theory study", *Qualitative Research*, Vol. 4, pp. 247-265.

Brumagim, A. (1994), "A hierarchy of corporate resources", *Advances in Strategic Management*, Vol. 10 No. A, pp. 81-112.

Collis, D.J. (1991), "A resource-based analysis of global competition: the case of the bearing industry", *Strategic Management Journal*, Vol. 12 No. S1, pp. 49-68.

Collis, D.J. (1994), "How valuable are organizational capabilities?", *Strategic Management Journal*, Vol. 15 No. S2, pp. 143-152.

Dunbar, R.L.M., Garud, R. and Raghuram, S. (1996), "A frame for deframing strategic analysis", *Journal of Management Inquiry*, Vol. 5, pp. 23-34.

Eisenhardt, K.M. and Martin, J.A. (2000), "Dynamic capabilities: what are they?", *Strategic Management Journal*, Vol. 21, pp. 1105-1121.

Foss, N.J. (1997), "Resources and strategy: problems, open issues, and ways ahead", in Foss, N.J. (Ed.), *Resources, Firms and Strategies: A Reader in the Resource-Based Perspective*, Oxford University Press, Oxford, pp. 35-365.

Gavetti, G., Levinthal, D.A. and Rivkin, J.W. (2005), "Strategy making in novel and complex worlds: the power of analogy", *Strategic Management Journal*, Vol. 26, pp. 691-712.

Godfrey, P.C. and Hill, C.W.L. (1995), "The problem of unobservables in strategic management research", *Strategic Management Journal*, Vol. 16, pp. 519-533.

Greenberg, J. (1987), "The college sophomore as guinea pig: setting the record straight", *Academy of Management Review*, Vol. 12, pp. 157-159.

Griffin, R. and Kacmar, K.M. (1991), "Laboratory research in management: misconceptions and missed opportunities", *Journal of Organizational Behavior*, Vol. 12, pp. 301-311.

Hill, C.W.L. and Jones, G.R. (2007), *Strategic Management: an Integrated Approach*, 7th ed., Houghton Mifflin, Boston, MA and New York, NY.

Hodgkinson, G.P., Whittington, R., Johnson, G. and Schwarz, M. (2006), "The role of strategy workshops in strategy development processes: formality, communication, co-ordination and inclusion", *Long Range Planning*, Vol. 39, pp. 479-496.

Jarratt, D. and Stiles, D. (2010), "How are methodologies and tools framing managers' strategizing practice in competitive strategy development?", *British Journal of Management*, Vol. 21, pp. 28-43.

Jarzabkowski, P. (2004), "Strategy as practice: recursiveness, adaptation, and practices-in-use", *Organization Studies*, Vol. 25, pp. 529-560.

Jarzabkowski, P. and Wilson, D.D. (2006), "Actionable strategy knowledge: a practice perspective", *European Management Journal*, Vol. 24, pp. 348-367.

Johnson, G., Langley, A., Melin, L. and Whittington, R. (2007), *Strategy as Practice: Research Directions and Resources*, Cambridge University Press, Cambridge.

Johnson, G., Whittington, R. and Scholes, K. (2011), *Exploring Strategy, Ninth Edition*, FT Prentice Hall, Harlow.

Keats, B.W. (1991), "An empirical investigation of strategic investment decision models", *Strategic Management Journal*, Vol. 12, pp. 243-250.

Knott, P. (2008), "Strategy tools: who really uses them?", *Journal of Business Strategy*, Vol. 29 No. 5, pp. 26-31.

Knott, P. (2009), "Integrating resource-based theory in a practice-relevant form", *Journal of Strategy and Management* Vol. 2, pp. 163-174.

Kraaijenbrink, J., Spender, J.-C. and Groen, A.J. (2010), "The resource-based view: a review and assessment of its critiques", *Journal of Management*, Vol. 36, pp. 349-372.

Kunc, M.H. and Morecroft, J.D.W. (2010), "Managerial decision making and firm performance under a resource-based paradigm", *Strategic Management Journal*, Vol. 31, pp. 1164-1182.

Langley, A. (1989), "In search of rationality: the purposes behind the use of formal analysis in organizations", *Administrative Science Quarterly*, Vol. 34, pp. 598-631.

Leonard-Barton, D. (1992), "Core capabilities and core rigidities: a paradox in managing new product development", *Strategic Management Journal*, Vol. 13, pp. 111-125.

Lockett, A., Thompson, S. and Morgenstern, U. (2009), "The development of the resource-based view: a critical appraisal", *International Journal of Management Reviews*, Vol. 11, pp. 9-28.

Lozeau, D., Langley, A. and Denis, J.-L. (2002), "The corruption of managerial techniques by organizations", *Human Relations*, Vol. 55, pp. 537-564.

McEvily, S. and Chakravarthy, B. (2002), "The persistence of knowledge-based advantage: an empirical test for product performance and technological knowledge", *Strategic Management Journal*, Vol. 23, pp. 285-305.

Marks, M.A. (2000), "A critical analysis of computer simulations for conducting team research", *Small Group Research*, Vol. 31, pp. 653-675.

Mintzberg, H., Ahlstrand, B. and Lampel, J. (1998), *Strategy Safari: the Complete Guide through the Wilds of Strategic Management*, Pearson Education, Harlow.

Newbert, S.L. (2008), "Value, rareness, competitive advantage, and performance: a conceptual-level empirical investigation of the resource-based view of the firm", *Strategic Management Journal*, Vol. 29, pp. 745-768.

Ohmae, K. (1982), *The Mind of the Strategist: The Art of Japanese Business*, McGraw-Hill, New York, NY.

Penrose, E.T. (1959), *The Theory of the Growth of the Firm*, Wiley, New York, NY.

Porter, M.E. (1985), *Competitive Advantage: Creating and Sustaining Superior Performance*, The Free Press, New York, NY.

Priem, R.L. and Butler, J.E. (2001), "Is the resource-based 'view' a useful perspective for strategic management research?", *Academy of Management Review*, Vol. 26, pp. 22-40.

Rigby, D. and Bilodeau, B. (2007), "Bain's global 2007 management tools and trends survey", *Strategy and Leadership*, Vol. 35 No. 5, pp. 9-16.

Saldaña, J. (2013), *The Coding Manual for Qualitative Researchers*, 2nd ed., Sage, Thousand Oaks, CA.

Schwenk, C.R. (1995), "Strategic decision making", *Journal of Management*, Vol. 21, pp. 471-493.

Seidl, D. (2007), "General strategy concepts and the ecology of strategy discourses: a systemic-discursive perspective", *Organization Studies*, Vol. 28, pp. 197-218.

Sekaran, U. (2003), *Research Methods for Business: A Skill Building Approach*, 4th ed., Wiley, New York, NY.

Stubbart, C.I. (1989), "Managerial cognition: a missing link in strategic management research", *Journal of Management Studies*, Vol. 26, pp. 325-347.

Teece, D.J., Pisano, G. and Shuen, A. (1997), "Dynamic capabilities and strategic management", *Strategic Management Journal*, Vol. 18, pp. 509-533.

Wernerfelt, B. (1984), "A resource-based view of the firm", *Strategic Management Journal*, Vol. 5, pp. 171-180.

West, G.P. and DeCastro, J. (2001), "The Achilles heel of firm strategy: resource weaknesses and distinctive inadequacies", *Journal of Management Studies*, Vol. 38, pp. 417-442.

Whittington, R. (2006), "Completing the practice turn in strategy research", *Organization Studies*, Vol. 27, pp. 613-634.

Wilson, T.D., Houston, C.E., Etling, K.M. and Brekke, B. (1996), "A new look at anchoring effects: basic anchoring and its antecedents", *Journal of Experimental Psychology: General*, Vol. 125, pp. 387-402.

Worren, N., Moore, K. and Elliott, R. (2002), "When theories become tools: toward a framework for pragmatic validity", *Human Relations* Vol. 55, pp. 1227-1250.

Wright, R.P., Paroutis, S.E. and Blettner, D. (2013), "How useful are the strategic tools we teach in business schools?", *Journal of Management Studies*, Vol. 50, pp. 92-125.

Appendix. Outline given to with-VRIO participants

The established textbook technique for evaluating a firm's internal capabilities is the VRIO technique. The acronym VRIO stands for the four questions you must ask about a resource or capability to determine its competitive potential.

Value: does a resource enable a firm to exploit an environmental opportunity and/or neutralise an environmental threat?

Rarity: is a resource currently controlled by only a small number of competing firms?

Imitability: do firms without a resource face a cost disadvantage in obtaining or developing it?

Organisation: are a firm's other policies and procedures organised to support the exploitation of its valuable, rare, and costly to imitate resources?

These four questions can be brought together to understand the return potential associated with exploiting any of a firm's resources or capabilities.

Is a resource or capability controlled by the firm:

	Valuable?	Rare?	Costly to imitate?	Exploited by organization?	Competitive implications
1	No	–	–	No	Competitive disadvantage
2	Yes	No	–	(limited)	Competitive parity
3	Yes	Yes	No	(partially)	Temporary competitive advantage
4	Yes	Yes	Yes	Yes	Sustained competitive advantage

(1) The resource or capability is not valuable: Organising to exploit this resource will increase a firm's costs or decrease its revenues. Firms will either have to fix the resource or avoid using it when choosing and implementing strategies.

(2) The resource or capability is valuable but not rare: Exploitation of this resource in conceiving and implementing strategies will generate competitive parity. Exploiting these types of resources will generally not create competitive advantages, but failure to exploit them can put a firm at a competitive disadvantage.

(3) The resource or capability is valuable and rare but not costly to imitate: Exploiting this resource will generate a temporary competitive advantage for a firm. A firm that exploits this kind of resource is gaining a first-mover advantage. However, once competing firms observe this competitive advantage, they will be able to acquire or develop the resources needed to implement this strategy through direct duplication or substitution at no cost disadvantage.

(4) The resource or capability is valuable, rare, and costly to imitate: Exploiting the resource or capability will generate a sustained competitive advantage as competing firms face a significant cost disadvantage in imitating it. This may reflect the unique history of the successful firm, causal ambiguity about which resources to imitate, the socially complex nature of these resources and capabilities, or any patent advantages a firm might possess. Imitating firms will not generate competitive advantage or even competitive parity.

Barney, J., Hesterly and William, S., *Strategic Management and Competitive Advantage: concepts and cases*, 1st, ©2006. Printed and Electronically reproduced by permission of Pearson Education, Inc., New York, NY.

About the author

Dr Paul J. Knott is a Senior Lecturer in Strategic Management at the University of Canterbury, New Zealand. His research focuses on how managers use techniques and ideas in the practice of strategic thinking and action. He is currently involved with research projects on innovation tools, strategic intuition, strategic planning, and informal sector strategizing. He completed his PhD at the Manchester Business School in 1997 and held positions at the University of Bath and at the Al Akhawayn University, Morocco, before moving to New Zealand in 1999. He has experience in the Aerospace Industry both as an Engineer and as a Researcher. Dr Paul J. Knott can be contacted at: paul.knott@canterbury.ac.nz