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# A judgment-analysis perspective on entrepreneurs' resource evaluations<sup>☆</sup>

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## ABSTRACT

Our study extends resource-based theory (RBT) by developing an understanding of how entrepreneurs judge the importance of the resource attributes of value, rareness, inimitability, and nonsubstitutability for the success of their ventures, and whether they make trade-offs between these attributes or follow RBT, which maintains that all attributes must be attained simultaneously. Resource judgments made by a sample of 181 entrepreneurs reveal that, while value and inimitability have a positive impact on resource importance, nonsubstitutability is only marginally positive, and rareness has a negative impact. Moreover, and contrary to RBT, entrepreneurs make trade-offs between resource attributes. Given prior empirical support for the critical influence of all four attributes on venture success, our findings uncover a systematic influence of judgment heuristics, cognitive biases, and institutional constraints in entrepreneurial resource judgments, and thereby provide a starting point for researchers and entrepreneurs alike to improve both theoretical models and outcomes of resource judgments.

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## 1. Introduction

Resources are at the heart of competitive advantage and determine the marketplace success of entrepreneurial ventures (Chrisman, Bauerschmidt, & Hofer, 1998; Wiklund & Shepherd, 2003). If a venture owns “strategic” resources (Amit & Schoemaker, 1993)—i.e., resources that are valuable, rare, inimitable, and nonsubstitutable—these resources allow it to produce more economically or better satisfy customers' needs, thereby creating the potential for a sustainable competitive advantage (Barney, 1991; Peteraf, 1993).

Strong empirical support exists for the influence of the resource attributes of value, rareness, inimitability, and nonsubstitutability on

business success (Armstrong & Shimizu, 2007; Crook, Ketchen, Combs, & Todd, 2008). Prior research further reminds us that existing stocks of resources must be accumulated by making judgments about strategic expenditures or resource flows (Finney, Campbell, & Powell, 2005; Wu, 2007). So far, however, no study has empirically examined whether entrepreneurs utilize any or all of the four attributes in their judgments of their ventures' key resources. This is particularly disconcerting for resource judgments made by entrepreneurs, defined as “individuals or groups of individuals [...] who create new organizations” (Sharma & Chrisman, 1999: 17), as three out of the five critical steps in the entrepreneurial process concern resources and their organization (Stevenson & Gumpert, 1985). Moreover, entrepreneurial actions are characterized by high levels of uncertainty (McMullen & Shepherd, 2006), and building a resource base, with the entrepreneur as the primary resource him/herself, is crucial for any value-adding activity of new ventures (Brush, Greene, & Hart, 2001).

Addressing this question, we hypothesize that the more a given resource is judged as important for venture success, the more these judgments will be driven by the four resource attributes characterizing strategic resources, i.e., value, rareness, inimitability, and nonsubstitutability. In particular, we employ judgment analysis (Karelaia & Hogarth, 2008) to analyze the weights entrepreneurs apply to each of the resource attributes when forming their resource judgments, and whether or not high values of one attribute can compensate for low values of another attribute.

Our study contributes to both RBT and the entrepreneurship literature by developing an empirically grounded, descriptive understanding

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of entrepreneurial resource judgments. We argue that a descriptive RBT, which concentrates on explaining resource-related behavior and choice, is crucial to understanding the real-world accumulation and management of key resources and to filling gaps in traditional RBT. Our study bridges prescriptive and descriptive views by discussing tenets of cognitive psychology regarding judgment heuristics and cognitive biases (Tversky & Kahneman, 1973) as possible explanations for why entrepreneurs may deviate from prescriptive resource-evaluation frameworks.

Shedding light on entrepreneurs' underlying cognitive processes constitutes a first step towards improving these judgments that lay the foundation for any sustainable competitive advantage, and may thereby help reduce the notoriously high levels of entrepreneurial failure (Dimov & De Clercq, 2006). Alternatively, incongruencies between prescriptive RBT and entrepreneurs' resource judgments may suggest the need to develop a contingency argument for RBT that takes into account the unique context of entrepreneurial ventures.

## 2. Resource judgments

Judgment analysis is ideally suited for our analysis as it examines how decision makers “integrate multiple, probabilistic, potentially conflicting cues to arrive at an understanding of the situation, a judgment” (Goldstein & Hogarth, 1997: 4, emphases in original)—in our case, how practicing entrepreneurs employ resource attributes as cues for their judgment of the importance of a resource for the success of their ventures.

When designing our resource-importance judgment model, we were confronted with substantial theoretical ambiguity in conceptualizing RBT's basic outcome variable (Crook et al., 2008; Foss & Knudsen, 2003; Newbert, 2007; Peteraf & Barney, 2003). On the one hand, there are significant questions as to whether the concept of competitive advantage is philosophically or measurably separate (or separable) from firm performance or success (Powell, 2001). On the other hand, with their notoriously high failure rates (Dimov & De Clercq, 2006), entrepreneurial ventures tend to focus on the survival and success of their own businesses, and less on achieving and maintaining a (sustainable) advantage relative to their competitors as more established organizations would (Gilbert, McDougall, & Audretsch, 2006).

To invest in certain key resources, however, entrepreneurs have to believe that these resources constitute crucial building blocks for the success of their businesses. In line with prior studies (Chrisman et al., 1998; Hall, 1993; King & Zeithaml, 2001; Wiklund & Shepherd, 2003), we will focus on entrepreneurs' beliefs that a particular resource is important for the success of their ventures. Not only does this represent a concrete outcome that is more accessible to entrepreneurs than abstract economic concepts, such as above-average returns and sustainable competitive advantage, it also reflects RBT's claim that resources lie at the heart of business success (Peteraf, 1993; Wernerfelt, 1984).

In contrast to the ambiguity surrounding its main outcome variable, the RBT literature largely agrees on the main elements of a prescriptive resource-evaluation framework. While these frameworks have not been formulated specifically for the context of entrepreneurial ventures, it has been argued that “the tenets of the resource-based view are applicable to both entrepreneurial ventures and established firms” (Hitt, Ireland, Camp, & Sexton, 2002: 4). To develop our resource-importance judgment model, we therefore draw from established RBT frameworks which argue that resources need to be valuable, rare, inimitable, and nonsubstitutable in order to confer a competitive advantage (Barney, 1991; Dierickx & Cool, 1989; Peteraf, 1993).

### 2.1. Value

First, a resource must be valuable, or enable a venture “to conceive of or implement strategies that improve its efficiency and effectiveness”

(Barney, 1991: 106). Whereas the concept of value has proven to be the most controversial and elusive attribute in resource-evaluation frameworks (Bowman & Ambrosini, 2000), there is an implicit understanding that a resource's value is determined by both economic and institutional considerations. On the one hand, actual economic value depends on market outcomes (Barney, 1991), such as growth, profitability, and survival. Many discussions of resource value therefore focus on resources as the building blocks of value-creating strategies, either based on differentiation or cost leadership (Bowman & Ambrosini, 2000; Camelo-Ordaz, Martín-Alcázar, & Valle-Cabrera, 2003; Conner, 1991; Peteraf, 1993).

On the other hand, such an economic value concept implies that entrepreneurs have an almost complete comprehension of the exact impact of any resource on their businesses. “More reasonably,” Bowman and Ambrosini (2000: 3) argue, an entrepreneur “has to have some belief that the procured resource will contribute to the profitability of the firm, and this belief will be rooted in a wider set of beliefs about how the firm competes, which may be further bounded by an industry recipe.” This argument resonates with an institutional perspective on RBT, which maintains that “resource selection and sustainable competitive advantage are profoundly influenced [...] by the institutional context of resource decisions,” which refers to “rules, norms, and beliefs surrounding economic activity that define or enforce socially acceptable economic behavior” (Oliver, 1997: 698). In light of this perspective, historic and long-standing resources may be considered highly valuable not because of their actual economic value, but because their longevity itself is considered as evidence of their value, and because they have been embedded deeply into an organization's culture and traditions, making them seemingly indispensable (Oliver, 1997). We therefore propose:

**Hypothesis 1.** The more an entrepreneur considers a given resource to be valuable, the more likely it will be judged as important for venture success.

### 2.2. Rareness

Second, while it remains unclear how rare exactly a resource must be in order to have the potential for generating a competitive advantage (Barney, 1991; Priem & Butler, 2001), it is obvious that a resource which is possessed by many other competitors gives the focal venture no unique resource advantage as the competitors can develop similar products, processes, and strategies, leading to all benefits of the resources being competed away (Barney, 1991). We thus propose:

**Hypothesis 2.** The more an entrepreneur considers a given resource to be rare, the more likely it will be judged as important for venture success.

### 2.3. Inimitability

Third, ventures that do not possess a resource must not be able to easily obtain it by imitating their competitors (Barney, 1991). The RBT literature has examined various aspects of inimitability, such as unique historical conditions (Ahuja & Katila, 2004), time-compression diseconomies (Dierickx & Cool, 1989), causal ambiguity (King & Zeithaml, 2001), tacitness, complexity, and specificity (McEvily & Chakravarthy, 2002; Reed & DeFillippi, 1990), while acknowledging that such aspects are not mutually exclusive. Whatever the reason for inimitability, without it, the rareness of a resource will be only temporary, as will be the associated competitive advantage. Therefore:

**Hypothesis 3.** The more an entrepreneur considers a given resource to be inimitable, the more likely it will be judged as important for venture success.

#### 2.4. Nonsubstitutability

When examining the rareness and inimitability of a particular resource, one also needs to consider substitute resources (Barney, 1991; Dierickx & Cool, 1989; Peteraf, 1993). Two resources are substitutes for each other “when they each can be exploited separately to implement the same strategies” (Barney, 1991: 111), or to provide similar product benefits. The fundamental danger of a successful substitution is that it might render the original resource obsolete (Dierickx & Cool, 1989). We therefore propose:

**Hypothesis 4.** The more an entrepreneur considers a given resource to be nonsubstitutable, the more likely it will be judged as important for venture success.

#### 2.5. Type of judgment model

Independent of the question of which attributes are involved in resource evaluations, resource judgments can be made using three different models (Einhorn, 1970). First, most judgment analysis studies have used an additive model, whereby one attribute can compensate for another attribute. This approach is consistent with bounded rationality arguments (March & Simon, 1958) and the cognitive biases literature (Karelaia & Hogarth, 2008; Tversky & Kahneman, 1973) which allow for entrepreneurs to select alternatives by “satisficing”—that is, accepting the first alternative that meets the minimal criteria for acceptability, rather than optimizing all criteria (March & Simon, 1958).

Second, entrepreneurs could also apply a disjunctive model, whereby resources are judged based on the most positive attribute (Einhorn, 1970). This judgment model might be relevant in the context of RBT since extraordinary value, rareness, and so on could trigger a version of availability bias (Tversky & Kahneman, 1973): due to the salience of an extraordinarily important attribute, that attribute might be more easily recalled and available in entrepreneurs' memory, therefore positively biasing the overall judgment.

While no study has empirically examined the form of resource judgments (Armstrong & Shimizu, 2007), prescriptive RBT has stressed the fact that resources have to fulfill all four attributes in order to be a potential source of a sustainable competitive advantage (Barney, 1991, 2001; Peteraf, 1993). Established RBT would therefore suggest a third, i.e., a conjunctive judgment model, where resource judgments depend on a minimum value of all attributes (Einhorn, 1970). Following this logic, we propose:

**Hypothesis 5.** In their resource-importance judgments, entrepreneurs are more likely to employ a conjunctive model than either an (a) disjunctive or (b) additive model.

### 3. Methods

Our sample consists of entrepreneurs formerly enrolled in the FastTrac Planning program, a two- to four-month program supported by the Kauffman Foundation that focuses on teaching (nascent) entrepreneurs the business and leadership skills necessary to start or grow a business and provides them with networking opportunities.

Focusing on these entrepreneurs has a number of advantages: First, it allows us to observe decision makers who actually operate a business and are therefore able to judge resource decisions. Second, by sampling entrepreneurs, we also maintain a more direct link between individual judgments and organizational actions, which is crucial as decision makers in any organization must have considerable authority and discretion in order for their idiosyncrasies (and biases) to be reflected in organizational outcomes (Hambrick & Finkelstein, 1987). Third, sampling entrepreneurs diminished the problem that resource judgments are contingent on decision makers' positions

within their respective organizations (Ireland, Hitt, Bettis, & de Porras, 1987). And fourth, since entrepreneurial ventures are usually single- or dominant-business focused (Chrisman et al., 1998), such a setting controlled for otherwise confounding influences of corporate or multi-business strategy (Armstrong & Shimizu, 2007). No resource-related subjects were taught as part of the program, so it is unlikely that respondents' assessments would be subject to a subsequent social desirability bias.

We conducted a number of pilot interviews with entrepreneurs active in the Midwest region of the United States to gain insights into their conceptualizations of resources and to test and refine the wording of the survey. We then sent out 1633 surveys, 31 of which did not reach the addressee because of address problems. Of 1602 potential respondents, 41 declined to respond, and 242 at least partially filled out the survey. The response rate of 15.5% is comparable to other studies on RBT (McEvily & Chakravarthy, 2002; Ray, Barney, & Muhanna, 2004). More than half of our respondents were between 35 and 49 years old, and more than a third between 50 and 65; 46.7% were female; and 34.9% held a business degree.

Our respondents had hands-on experience at founding and managing business ventures. Not including their present businesses, 56% of our respondents had founded at least one other venture. The vast majority of our respondents' ventures were operating for at least one year, and more than half for more than 5 years. For these reasons, we deemed our respondents capable of providing high-quality and reliable assessments of their ventures' resources. We further compared those characteristics for which information on the full sample was available, and found no significant differences between respondents and nonrespondents.

#### 3.1. Selection of judgment cases

We asked respondents: “Of your venture's resources, please list the three resources that are most important to the success of your venture” and “Please list one other resource that is less important to the success of your venture.” Due to constraints on questionnaire length, we then asked them to provide judgments for only the second most important resource and the less important resource. With this approach, we are able to capture judgments of resources that are considered key to venture success—i.e., “strategic” resources (Amit & Schoemaker, 1993)—as well as more ubiquitous, “pedestrian” resources (Montgomery, 1995), which allows for sufficient variance in the dependent variable to test our hypotheses.

The resource types that were most commonly selected by our respondents were human (33%), reputational (25%), physical (14%), financial (12%), technological (8%), organizational (5%), and innovative resources (3%). This is in line with prior research on resource types commonly encountered in new and small companies (Brush et al., 2001; Lichtenstein & Brush, 2001). A one-way ANOVA revealed that this distribution of resource types was not statistically different between each respondent's two judgment cases.

#### 3.2. Measures

Consistent with prior research, we decided to rely on single-item measures to operationalize our variables (Haynie, Shepherd, & McMullen, 2009). For our dependent variable, we requested that respondents “for each resource, rate the importance to the success of your venture,” which was captured on a seven-point Likert-type scale (1 = not important, 7 = extremely important). Our independent variables were measured following the relevant theoretical RBT literature (Amit & Schoemaker, 1993; Barney, 1991; Dierickx & Cool, 1989; Peteraf, 1993) and the few studies that have previously operationalized resources (Hall, 1993; Hatch & Dyer, 2004; King & Zeithaml, 2001; McEvily & Chakravarthy, 2002). Value (“The resource is valuable to my venture”), rareness (“Other firms in the industry

possess the same resource”), inimitability (“Other firms would have difficulty imitating this resource”), and nonsubstitutability (“There are other resources that could be used as a substitute to achieve similar benefits”) were captured on five-point Likert-type scales (1 = strongly disagree, 5 = strongly agree).

We also included venture size (number of full-time employees), venture age; respondents' managerial experience (in years), whether or not a respondent held a business or business-related degree, respondents' age, and respondents' gender (0 = male; 1 = female) as control variables. Moreover, we included a dummy variable for intangible resources (0 = tangible resource; 1 = intangible resource), coded independently by two of the authors based on published resource categorizations (Barney, 1991; Hall, 1992) with an inter-rater reliability of  $\kappa=0.94$ .

### 3.3. Analyses

To obtain respondents' judgment policies (i.e., the weighting applied to each attribute when forming resource judgments), we analyzed the data with hierarchical linear modeling (HLM, Bryk & Raudenbush, 1992). HLM has more recently been advocated for judgment analysis (Haynie et al., 2009) because it can formally represent each level of analysis—in our case, resource judgments (“Level 1”) nested within respondents (“Level 2”)—with its own sub-model, delineating the variance explained by characteristics at each level. For each resource judgment, predicted intercept and slope values were estimated at the resource level (employing an OLS regression) and at the respondent level (employing a GLS regression), followed by an optimally weighted combination of these estimates using a Bayes estimation strategy (Hofmann, 1997).

We also elicited respondents' organizing principle for integrating attribute information (conjunctive, disjunctive, or additive). The additive model can be defined as

$$Y_S = a_0 + \sum_{i=1}^k a_i X_i + e,$$

where  $Y_S$  represents a judgment (the regressand),  $X_i$  represents attribute  $i$  (the regressors),  $a_0$  is the regression constant,  $a_i$  is the regression coefficient for each attribute  $i$ ,  $k$  is the number of attributes, and  $e$  is the residual. The disjunctive model approximates a judgment model where the decision is based upon the attribute having the highest value (Einhorn, 1970). It can be defined as

$$Y_S = \prod_{i=1}^k \left[ \frac{1}{(c_i - X_i)} \right]^{a_i} + e,$$

where  $c_i$  is an arbitrary constant larger than the largest value that the  $i$ th attribute can take on (usually set to the maximum value for each attribute plus one). This model can be linearized through the use of logarithmic transformation to

$$\log(Y_S) = - \sum_{i=1}^k a_i \log(c_i - X_i) + e.$$

In the conjunctive model, all attribute values must pass a certain cutoff point before a decision is made (Einhorn, 1970). It can be defined as

$$Y_S = \prod_{i=1}^k X_i^{a_i} + e.$$

This model can be linearized to

$$\log(Y_S) = \sum_{i=1}^k a_i \log(X_i) + e.$$

In line with prior research (Sethi & King, 1999), we relied on the explained variance ( $R^2$ ) to examine which judgment model best represents entrepreneurs' resource judgments, and calculated it as follows:  $R^2 = (\sigma^2_{\text{oneway ANOVA}} - \sigma^2_{\text{random regression}}) / \sigma^2_{\text{oneway ANOVA}}$  (Hofmann, 1997).

To address common method bias, we employed several procedural and statistical remedies, such as separating scale items for dependent and independent variables, including reverse-coded items, and applying Harman's (1967) one-factor test. Moreover, research has found that judgment analysis reduces social desirability biases compared to other self-report techniques (Schwab, Rynes, & Aldag, 1987). In a study by Hitt and Middlemist (1979), post-hoc interviews revealed that judgment models accurately represent actual decision-making behavior, providing support for the external validity of the procedure.

Results from a one-way ANOVA showed that those resources respondents judged as most important to their ventures' success were judged higher on resource importance (mean of 6.6 versus 4.8 for the less important resources, which was significant at the  $p < .001$  level), value (4.9 vs. 4.3,  $p < .001$ ), inimitability (3.0 vs. 2.2,  $p < .001$ ), rareness (2.3 vs. 2.1,  $p < .05$ ), and nonsubstitutability (3.6 vs. 3.2,  $p < .05$ ). This is in line with our expectations and also suggests sufficient variance, particularly in our dependent variable, to test our hypotheses.

## 4. Results

Descriptive statistics and correlations for all variables are provided in Table 1. Table 2 presents the results of our regression analyses and shows that the additive and the conjunctive models explain the highest amount of variance, with  $R^2 = 36\%$ . In these two models, value and inimitability are positive and fully significant, whereas nonsubstitutability is positive and marginally significant. Combined, these results provide full support for Hypotheses 1 and 3, and marginal support for Hypothesis 4. In contrast to our Hypothesis 2, rareness was fully significant but negative.

Hypothesis 5 proposes that entrepreneurs are more likely to employ a conjunctive model in their resource importance judgments than either a disjunctive or additive model. With only 33%, the disjunctive model explains the least amount of variance, thereby supporting Hypothesis 5a. With 36%, however, the conjunctive model explains the same amount of variance as the additive model, which leads us to reject Hypothesis 5b.

## 5. Discussion

Our analysis of entrepreneurs' resource judgments reveals that our respondents have utilized only three of the four attributes that prescriptive RBT has discussed as relevant, i.e., value, rareness, and inimitability, while attributing only marginal relevance to nonsubstitutability. Moreover, our respondents' judgments imply a negative association between rareness and resource importance. There are two possible interpretations of these results. First, our findings are in line with the literature on behavioral decision making (March & Simon, 1958), which suggests that while entrepreneurs have the best intentions to act rationally, cognitive constraints limit their ability to incorporate all available information into their judgment models (Brehmer & Brehmer, 1988) and introduce systematic biases into their judgments (Tversky & Kahneman, 1973), which we will discuss in more detail below. Given broad empirical support for the critical influence of all four resource attributes on business success and performance (Armstrong & Shimizu, 2007; Crook et al., 2008), our study thus represents a starting point for improving entrepreneurial resource judgments.

Second, our findings may be evidence of the unique context of entrepreneurial ventures, which provide different institutional constraints on resource judgments than those in more established organizations.

**Table 1**  
Descriptive statistics.

	Mean	s.d.	1	2	3	4	5	6	7	8	9	10	11
1. Venture size (log)	1.37	1.13											
2. Venture age	3.42	0.78	0.25**										
3. Managerial experience	14.45	10.07	0.16**	0.27**									
4. Business degree	0.34	0.48	0.16**	-0.12*	0.15**								
5. Age	3.26	0.65	0.00	0.22**	0.46**	-0.10							
6. Gender	0.47	0.50	-0.21**	-0.06	-0.14*	-0.12*	-0.02						
7. Intangible resource	0.61	0.49	-0.10	0.05	-0.07	-0.10	0.02	0.13*					
8. Value	4.55	0.79	-0.02	0.11*	0.08	-0.09	0.11*	0.07	0.04				
9. Rareness	2.18	1.15	0.15**	0.01	0.07	0.13*	-0.06	0.04	-0.11*	-0.01			
10. Inimitability	2.54	1.31	0.08	0.04	0.01	0.04	-0.04	0.05	0.05	0.15**	0.48**		
11. Nonsubstitutability	3.36	1.28	0.05	0.12*	0.12*	0.01	0.02	-0.01	-0.02	0.36**	0.08	0.05	
12. Resource importance	5.62	1.48	-0.02	0.04	0.05	-0.01	0.11	0.13*	0.11*	0.60**	-0.02	0.20**	0.28**

\*  $p < 0.05$ .  
\*\*  $p < 0.01$ .

In contrast to prior research which has argued that the main tenets of RBT are applicable to entrepreneurial ventures (Hitt et al., 2002), our results may provide a starting point for outlining boundary conditions for RBT. In the following, we will discuss these two interpretations of our findings as well as their implications for theory and practice.

5.1. Value

Perhaps not surprisingly, our respondents primarily emphasize resource value, which achieved by far the highest weight in their judgments. As previously discussed, rational-economic definitions of value are complemented by the institutional context of resource decisions. As a result, valued resources become central to a venture's identity (Lounsbury & Glynn, 2001; Oliver, 1997), and current resource investments are supported by vested interests (Amit & Schoemaker, 1993) and likely associated with positive affect (Baron, 1998). This, in turn, may have made the value attribute highly emotional, salient, and, therefore, easily available to our respondents during their resource judgments (Tversky & Kahneman, 1973), and thereby caused value to be (over)emphasized in resource judgments.

5.2. Inimitability

The second most important attribute in our respondents' judgments is inimitability. This result may be explained by the fact that inimitability is not only closely tied to a number of competitive

advantages, such as first-mover, scale, cost, or differentiation, which are likely well understood by entrepreneurs, but it also ensures, all else equal, that a competitive advantage is not easily eroded (Reed & DeFillippi, 1990). Moreover, prior research maintains that managers do a reasonably good job when it comes to noticing direct imitation (Lant & Baum, 1995; Peteraf & Bergen, 2003). Inimitability, therefore, may have also been salient in our respondents' resource judgments, and thus had a strong and positive influence in resource importance judgments.

5.3. Rareness

The last fully significant resource attribute in our respondents' judgments is rareness, although its effect is contrary to our hypothesis and to prescriptive RBT. Whereas several recent studies have criticized the rareness attribute (Armstrong & Shimizu, 2007; Priem & Butler, 2001)—which would justify a non-significant result for rareness in resource judgments—our respondents associate rareness negatively with resource importance.

This deviation from prescriptive RBT can be explained by taking into account the institutional backdrop against which entrepreneurial resource judgments are made. In particular, entrepreneurs fighting for legitimacy in the marketplace (Hanlon & Saunders, 2007; Lounsbury & Glynn, 2001) may have strong incentives to follow industry recipes, which encourages the imitation of successful businesses (DiMaggio & Powell, 1983). Possessing a resource that is rare, in contrast, constitutes

**Table 2**  
HLM regressions of resource importance on resource attributes.

Variables	Additive		Disjunctive		Conjunctive		
	Coeff.	s.e.	Coeff.	s.e.	Coeff.	s.e.	
Constant	5.63***	(0.06)	1.68***	(0.01)	1.68***	(0.01)	
Level-2 controls	Venture size (log)	0.02	(0.06)	-0.08***	(0.02)	0.00	(0.01)
	Venture age	-0.09	(0.08)	-0.01	(0.03)	-0.04	(0.04)
	Managerial experience	0.00	(0.01)	0.02	(0.03)	-0.01	(0.02)
	Business degree	0.17	(0.13)	0.10*	(0.04)	0.06	(0.04)
	Age	0.14	(0.11)	0.10	(0.07)	0.06	(0.04)
	Gender	0.26*	(0.13)	0.05	(0.04)	0.14	(0.09)
Level-1 control	Intangible resource	0.21	(0.14)	0.10†	(0.05)	0.06	(0.05)
	Value	1.00***	(0.10)	0.40***	(0.06)	0.83***	(0.12)
	Rareness	-0.12*	(0.06)	-0.06	(0.04)	-0.06*	(0.03)
	Inimitability	0.17**	(0.05)	0.08*	(0.03)	0.09**	(0.03)
	Nonsubstitutability	0.10†	(0.05)	0.06*	(0.03)	0.06†	(0.03)
R <sup>2</sup>	0.36		0.33		0.36		

Level-1  $n = 325$ ; Level-2  $n = 181$ .

†  $p < 0.10$ .  
\*  $p < 0.05$ .  
\*\*  $p < 0.01$ .  
\*\*\*  $p < 0.001$ .

a break with established practice, and entrepreneurs may perceive this as counterproductive for venture success. Our finding is also in line with Barney's (1991) acknowledgement that valuable, but common resources—while not providing the potential for a competitive advantage—can nevertheless help a firm attain competitive parity and thereby ensure its survival, something entrepreneurial ventures are particularly focused on (Gilbert et al., 2006).

#### 5.4. Nonsubstitutability

The least important attribute in our respondents' judgments is nonsubstitutability, which is only marginally significant in both models. When it comes to recognizing potential substitutes, previous research has found decision makers to be notoriously myopic, noticing only competition that is relatively close in terms of product type, geography, and other salient characteristics (Lant & Baum, 1995; Porac & Thomas, 1990). By focusing primarily on the threat of imitation from rivals with resources similar to their own (Peteraf & Bergen, 2003), entrepreneurs are likely to be blindsided by rivalry coming from unexpected sources (Schoemaker & Amit, 1994; Zajac & Bazerman, 1991), such as potential resource substitution. Moreover, the existence of substitutes is not a problem in and of itself because substitutes have to be either common, highly imitable, or both, to threaten the sustainability of a competitive advantage (Barney, 1991). For these reasons, our respondents likely had difficulty recalling and assessing nonsubstitutability, which might explain why they have largely disregarded this attribute in their resource-importance judgments.

#### 5.5. Judgment models

Contrary to RBT's stipulation that resource importance depends on a minimum value of all resource attributes (Barney, 1991, 2001; Peteraf, 1993), our findings suggest that entrepreneurial resource judgments can be represented equally well by an additive model, which allows for trade-offs between resource attributes. As both judgment models explain the same amount of variance, however, our results concerning the type of model entrepreneurs employ in their resource judgments should be confirmed by future studies before definitive conclusions can be reached.

#### 5.6. Implications for research and practice

The discrepancies we have uncovered between prescriptive RBT and entrepreneurs' judgment policies offer us a window into entrepreneurs' cognitive limitations, which constrain the rational identification and allocation of resources (Amit & Schoemaker, 1993; Reed & DeFillippi, 1990). A major implication of our findings for entrepreneurial practice would be the development of techniques to assist entrepreneurs in overcoming the cognitive biases uncovered in this study. Programs like FastTrac or even entrepreneurship classes at universities need to stress the importance of simultaneously considering all four resource attributes.

Given the unique context, however, which entrepreneurial ventures and resource judgments represent (Brush et al., 2001; Ireland, Webb, & Coombs, 2005), our results could alternatively suggest the need for boundary conditions when applying RBT to entrepreneurial firms. In particular, new ventures tend to suffer from liabilities of newness (Stinchcombe, 1965) and smallness (Freeman, Carroll, & Hannan, 1983), and decisions are made to achieve viability of the business, and not to maintain it as in more established ventures (Gilbert et al., 2006). Concerning resource attributes, then, institutional constraints in entrepreneurs' respective industries may focus their attention on the acquisition and maintenance of key success factors (Oliver, 1997) or strategic industry factors (Amit & Schoemaker, 1993), which allow them to achieve legitimacy and social approval (Hanlon & Saunders,

2007; Lounsbury & Glynn, 2001). Resources representing key success factors, however, might be expected to display homogeneity across successful ventures rather than heterogeneity (Eisenhardt & Martin, 2000; Gibbert, 2006), as required by traditional RBT to allow for a sustainable competitive advantage. In line with our finding, more recent studies in the entrepreneurship literature have acknowledged that resources do not have to be rare per se, but that it is the heterogeneity of entrepreneurs' beliefs about those resources that allow for a (sustainable) competitive advantage (Alvarez & Busenitz, 2001). Nevertheless, the requirement of resource heterogeneity among competitors could represent an important boundary condition for RBT when it is applied to entrepreneurial ventures.

#### 5.7. Limitations and future research

In line with prior research capturing entrepreneurial resource assessments (Brush, Greene, Hart, & Edelman, 1997; Greene, Brush, & Brown, 1997; Haynie et al., 2009), we have further relied on entrepreneurs' introspection in judging their ventures' resources at a single point in time, which makes our study subject to common method and social desirability concerns. Future research might address these limitations and capture entrepreneurial resource judgment with a more direct, more objective, and possibly longitudinal approach (Lichtenstein & Brush, 2001).

Moreover, our study focused on entrepreneurs who usually own and run small- to medium-size ventures. The question arises, therefore, to what extent our findings are generalizable to managers in larger organizations. While previous studies have found evidence that entrepreneurs are more susceptible to biases and heuristics than managers in large organizations (Busenitz & Barney, 1997), we nevertheless suspect that boundedly rational managers in larger businesses will be subject to their own, if not similar, judgment biases and employ comparable heuristics when confronted with the complex and cognitively challenging task of resource judgments. Ultimately, however, this is an empirical question only future research can answer. In addition, future studies could take a more fine-grained approach and distinguish between judgments regarding resource acquisition and creation, as well as between individual and bundled resources to complement and extend our findings.

Nevertheless, we hope that the present study's empirical insights into entrepreneurs' resource judgments offer a starting point for researchers and entrepreneurs alike to improve both theoretical models and outcomes of resource judgments.

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