What makes organizations unique? Looking inside the box

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Abstract

This study attempts to understand through empirical research how characteristics of resources and capabilities (e.g., value, rareness, imitability, and organization) contribute to sustainable competitive advantages and improved firm performance. Based on a sample of 147 small and medium-sized enterprises (SMEs), this study uses primary data and multivariate statistical techniques to analyze the effects of different resource characteristics on SMEs' competitive advantage and performance. The results suggest that the variables of value, rareness, and imitability are related to competitive advantage. However, they have varied direct and indirect effects and thus affect the development of SME performance differently. This research contributes to filling gaps in the literature created by the scarcity of quantitative studies that have applied the resource-based view theory. The findings discussed include how this approach contributes to a greater understanding of the relationship between competitive advantage and firm performance.

Keywords: VRIO framework; value; rareness; imitability; organization; resources and capabilities; performance; competitive advantage.

1. Introduction

What makes organizations unique? The answer lies in organizational resource characteristics, which the value, rareness, imitability, and organization (VRIO) framework assesses based on these four mechanisms. Successful business strategies thus require knowledge about the relevant company assets and skills (Barney, 1991; Duncan et al., 1998; Ferreira & Fernandes, 2017).

The resource-based view (RBV) originated from Penrose's (1959) research, in which management focus on the best use of available resources both facilitates and limits company growth. However, company assets only later became a central issue in research and important in the literature on management, especially in the field of strategic management (Porter, 1985; Rumelt et al., 1991), starting with Wernerfelt (1984). Barney's (1991) study further marked a clear change in paradigms, linking resources with competitive advantages within business management. The cited author provides a precise, formalized description of this perspective.

Resources include firm assets, capabilities, processes, attributes, knowledge, and know-how used to formulate and implement competitive strategies (Amit & Schoemaker, 1993; Barney, 1991; Peteraf, 1993; Teece et al., 1997). Various researchers have focused, in particular, on the extent to which specific resources considered valuable, rare, and difficult to imitate correlate with companies' competitive advantage and/or better performance (Bird, 2008; Ferreira & Fernandes, 2017; Newbert, 2008). Over time, many studies have sought to understand how resources can or cannot create competitive advantages for firms (Amit & Schoemaker, 1993; Dierick & Cool, 1989; Grant, 1991; Newbert, 2008; Teece et al., 1997).

Despite the diversity of existing research, some questions and limitations have not yet been addressed largely due to a lack of empirical studies on how companies' application of the RBV can influence their performance (Ferreira & Fernandes, 2017). Newbert (2008), for example, reports that assessing how resources or capabilities are associated with competitive advantages' value and rareness contributes to improved firm performance. Guo (2007), however, describes the challenges of applying this approach, observing that the RBV is underexplored in studies that have implemented this method in real-world contexts.

Kraaijenbrink et al. (2010) also found that researchers have more frequently studied geographically weighted regression with qualitative methods but not with quantitative methods because using the latter is challenging (Newbert, 2008). According to the latter cited author, the RBV theory is well accepted, yet little empirical support exists for this approach. Multiple studies would be essential to ensure this theoretical approach can evolve.

The present empirical research sought to understand how characteristics of resources and capabilities (e.g., the four basic pillars of the VRIO model) contribute to small and medium-sized enterprises' (SMEs) sustainable competitive advantages and improved performance. This study thus addressed the following research questions:

- How important is the VRIO combination of resources and capabilities to SME competitive advantage?
- In what way are competitive advantages directly related to SME performance?

The resulting study sheds light on how this model application can affect SME performance. However, companies also differ in the way they face their challenges. Some firms suffer considerably because they fail to develop strategies to eliminate

their weaknesses, while other companies can detect and capitalize on fresh business opportunities.

This research thus makes significant contributions to the field of strategic management. First, the study tests hypotheses about the VRIO application to SME competitive advantage. By examining the way these companies evaluate and treat their resources, a deeper understanding was developed of this multidimensional construct, as well as the relationships between the different sub-dimensions the VRIO approach aggregates. Resources can help companies either to overcome more troubled periods by identifying new business opportunities or to leverage performance and competitive advantage further during periods of profitable growth.

Second, the findings open new lines for future research on the relevance of the VRIO model to enhancing SME competitive advantage and performance. Although business dynamism can often appear to be a limiting condition in terms of the capacity-to-performance ratio (Peteraf et al., 2013), the present results confirm that resources play a key role in firm survival and competitiveness in both stable and dynamic environments (Wang & Ahmed, 2007).

Last, the current findings also have important implications for SME managers. The results indicate that the variables of value, rareness, and imitability contribute to competitive advantage and thus to better business performance, despite their varied direct and indirect effects. The findings further include the direct effect of competitive advantage on company performance development.

The remainder of this paper is organized as follows. Section two presents the literature review and hypotheses, while section three focuses on the methodology. Section four discusses the results, and section five highlights the implications. The

final section provides the conclusions, limitations, and suggested future lines of research.

2. Literature review and hypotheses

2.1. Value of resources and competitive advantage

Porter (1980) argues that companies need to enter new and more attractive markets to develop their value, but Barney (1986) reports that, in extremely competitive markets, creating innovative products is unprofitable. Profits are extremely likely to be insufficient to pay for product development processes. Barney (1986) thus argues that firms should develop their internal resources to generate more competitive value, and Diericx and Cool (1989) assert that these existing assets can produce more value.

The RBV theory explains variations in firm performance within specific industries by identifying the resources (i.e., valuable, rare, difficult to imitate, and irreplaceable assets) that each firm can exploit (Barney, 1991; Spanos & Lioukas, 2001). Peteraf and Barney (2003) assert that the RBV is an efficient approach that can become an essential strategic tool for companies. Other studies, however, claim that resources alone are insufficient to secure competitive advantages (Mahoney & Pandian, 1992; Peteraf, 1993).

Based on prior researchers' conclusions, Oliver (1997) focuses on explaining variations in business performance and concluded that competitive advantage depends on the link between resource decision management and business relationships. Subsequently, Newbert (2008) sought to identify the impact of human resources on companies' competitiveness generated by internal resources. The author reports that firms aiming to develop superiority need to exploit their resources, so these assets are

the basis of competitiveness. Given these findings, this research's first hypothesis was formulated as follows.

Hypothesis 1 (H1): The value of companies' combined capacities and resources is positively related to their competitive advantage.

2.2. Rareness and competitive advantage

The RBV posits that the accumulated effect of resources' characteristics results in good competitiveness with financial returns (Barney, 1986; Dierickx & Cool, 1989; Peteraf, 1993). According to the VRIO model, valuable, rare, difficult to imitate, and irreplaceable assets have a greater potential to create competitive advantages. Amit and Schoemaker (1993) assert that analysts need to understand from each firm's point of view which resources are the most appropriate in order to develop strategies more efficiently. Makadok's (2001) work complements this approach by demonstrating that greater value creation is possible with the aid of business capabilities that can develop more effective company strategies.

In addition, Newbert (2008) suggests that resources' rareness and value are related to competitive advantage, thereby contributing directly to firms' performance. If companies' resources or capabilities can develop in ways that reduce costs and achieve a good market response, this process can become a valuable tool for developing value-added strategies and generating competitive advantages (Barney, 1991). The above findings led to the present study's second research hypothesis.

Hypothesis 2 (H2): The rareness of companies' combinations of resources and capabilities is positively related to their competitive advantage.

2.3. Imitation, resource organization, and competitive advantage

Resources can be valuable and rare, but, to generate competitive advantages, these assets must be difficult to imitate. Company resources can be difficult to copy for one of three reasons (Dierickx & Cool, 1989). The first is firms' ability to develop assets out of their historical conditions, while the second is the ambiguous link between companies and the resources they need to create competitive advantages. The last reason is the social complexity generated by firms' internal assets and tools.

The assumption is that the resources used in company strategies must be (Barney, 1991) strategically valuable to these firms, rare among potential competitors, and difficult for competitors to imitate. These assets also need to be limited in mobility, capable of permanently maintaining competitive advantage, and expensive when imitated. These attributes allow companies to develop advantages, thereby indirectly affecting their organizational performance (Barney, 1997; Peteraf, 1993; Schreyogg & Kliesch-Eberl, 2007). These scholars' findings contributed to the current research's third hypothesis.

Hypothesis 3 (H3): The imitability of companies' combinations of skills and resources is positively related to their competitive advantage.

Regardless of the important role that assets play, resources alone are ineffectual unless firms have the organizational capabilities to exploit these assets. Talaja (2012) examined the impact of competencies' interactions with resources in order to clarify this partnership's potential effect on company performance. The cited study showed that resources with VRIO characteristics develop most efficiently when exploited by firms' capacities, which then play a key role in improving organizational performance.

Thus, making sure companies' resources are valuable, rare, and imitable is a crucial step in exploiting sources of competitive advantage based on well organized operations able to capitalize on assets (Barney & Wright, 1998). This finding led to the present study's fourth research hypothesis.

Hypothesis 4 (H4): The organization of companies' combinations of capacities and resources is positively related to their competitive advantage.

2.4. Competitive advantage, performance, and mediating effects

Researchers make a clear distinction between the meaning of competitive advantage and company performance. For instance, Powell (2001) asserts that these two concepts are quite dissimilar to each other. Competitive advantage consists of implementing strategies that differentiate themselves from competitors' strategies, contribute to reduced costs, facilitate new business opportunities' exploitation, and assist in the neutralization of possible threats (Barney, 1991).

Performance, in turn, is characterized as firms' ability to make a profit by applying strategies (Rumelt et al., 1991). Peteraf and Barney's (2003) study confirmed that companies that gain competitive advantages develop greater financial value compared to competitors. The former firms also generate more beneficial tactics that enhance consumer loyalty and perceived quality (Zou, Fang & Zhao, 2003).

Based on this logic, the current research assumed that companies that develop more competitive advantage will benefit from better performance than their competitors. This conclusion became the fifth research hypothesis.

Hypothesis 5 (H5): Companies' competitive advantage is positively related to their performance.

However, the error of thinking that competitive advantage and performance are equivalent concepts needs to be avoided, so understanding the distinctions made between these two terms is important. Durand (2002) states that, while competitive advantage is a sufficient condition for good performance, this advantage may often not be a necessary condition. The cited author argues that a correlation exists between competitive advantage and performance, but this pattern is not always present as the two concepts are based on distinct theoretical postulates. Competitive advantage is the financial value resulting from exploiting interactions between capabilities and resources, and performance produces financial value through commercialization (Durand, 2002).

Adegbesan (2009) report that firms generate greater value through the use of resources, which is reflected in performance and is a source of competitive advantage. Zott and Amit (2007) observe that the relationship between products and the relevant strategic business models affects performance. The cited researchers assert that companies must develop the type of strategy and resources needed to create competitive advantages.

Firms' performance development relates to their ability to possess capacities and resources characterized as competitive advantages, thereby contributing to a greater ability to evolve as compared to competitors (Chong et al., 2009). Baron and Kenny (1986) define four conditions to be met for a mediating effect to exist. First, value, rareness, organization, and imitability must be related to competitive advantages. Second, these advantages also have to be related to performance. Third, value and rareness need to be related to performance in the absence of competitive advantages. Last, value and rareness's influence on performance must be diminished or removed

by including competitive advantages. These conditions contributed to the present study's sixth research hypothesis.

Hypothesis 6 (H6): Companies' competitive advantage mediates the relationship between the a) value, b) rareness, c) imitability, and d) organization of their skills and resources' combinations and these firms' performance.

Figure 1 presents the overall conceptual model.

Figure 1 here.

3. Methodology

3.1. Data and method

To evaluate the above research model and test its hypotheses, a questionnaire was developed to collect data. This instrument's format was based on Barney (1991) and Newbet's (2008) studies and conceptualizations of the RBV theory and VRIO model's application to SMEs. The data were collected in two stages.

First, a pilot study was conducted with 10 SMEs randomly selected from the Agência para o Investimento e Comércio Externo de Portugal's (Portugal's Trade and Investment Agency) database. Their managers were contacted by telephone. Based on their responses and subsequent interviews with pre-test participants, the questionnaire underwent minor modifications. The pilot study companies' answers were not included in the final sample.

Second, the questionnaires were sent by e-mail to 7,000 SMEs randomly selected from the same database but considered representative in terms of geographical location, company size, and sector of activity. The questionnaire was filled out by

senior or middle managers with responsibilities related to their firms' strategic activities. In total, 147 SMEs responded to the survey.

The data were examined for non-response bias by comparing the earlier and later participants' characteristics. This comparison confirmed that this bias does not distort the results obtained or their interpretation. In terms of company characteristics, the variables included the companies' business activities, region where headquarters are located, company size, and financial performance in 2019. Table 1 shows the sampled firms' profile.

Table 1 here.

The research hypotheses were tested using six hierarchical linear regression models for each category of resources and capabilities and their averages. The data analyses relied on International Business Machines Corporation's SPSS software version 25.

3.2. Measures

The independent variables were the four resource characteristics that the VRIO model treats as independent variables: value, rareness, imitability, and organization. The dependent variables were competitive advantage and performance. The control variable was environment hostility. Table 2 lists the variables and measurement scales used in this study.

Table 2 here.

4. Results

4.1. Construct validity and reliability

Cronbach's alpha was calculated for each scale in order to evaluate their reliability. The values calculated based on the sample are similar to those reported by Newbert (2008), which suggests that the constructs have high internal consistency (see Table 3).

Table 3 here.

Although some variables have Cronbach's alpha values below 0.72 (i.e., the threshold value recommended as acceptable), the variables' internal consistency was considered acceptable because the values are not far below 0.70 and some values are above 0.80. The results thus confirm adequate internal consistency. Descriptive statistics and correlations were calculated for all variables to be included in the models (see Table 4). The great majority of the models' constructs have statistically significant correlations with each other.

Table 4 here.

4.2. Results of analysis and discussion

4.2.1. Determinants of competitive advantage

Table 5 presents the results for the competitive advantage determinants. All F-statistics and changes in F-statistics are statistically significant, confirming that the models have goodness of fit regarding the data, as well as the new variables inserted. The control variable of environment hostility significantly increases the research model's fit.

Table 5 here.

The results show that environment hostility has a statistically significant positive effect on competitive advantage. That is, the stronger environment hostility is, the greater competitive advantage becomes.

Regarding the hypotheses, the resources' value has a statistically significant positive impact on competitive advantage in all models estimated. The results confirm that, the higher resources and capacities' value is, the stronger competitive advantage becomes. Thus, the data supports H1 (i.e., the value of companies' combinations of competencies and resources is positively related to their competitive advantage).

This finding shows that firms do not need to be the best to sell well but only to create superior value (Peteraf & Barney, 2003). The present results thus reveal that companies achieve competitive advantage when they generate value through strategies that facilitate cost reduction, exploit market opportunities, and neutralize possible threats.

In addition, if firms implement the RBV approach efficiently, they are more likely to recover products or services' cost value and production costs and, subsequently, develop competitive advantage more cost effectively (Barney, 1991; Peteraf & Barney, 2003). The current research thus confirmed that the RBV is one of the theories that best complement competitive advantage theories by focusing on the relationships between companies' internal characteristics and competitive advantages (Spanos & Lioukas, 2001).

Organizational and physical aspects' rareness also has a statistically significant positive influence on competitive advantage. In these areas, the stronger resources and competencies' rareness is, the greater competitive advantage becomes. These results

support H2 (i.e., the rareness of companies' combinations of capacities and resources is positively related to their competitive advantage).

The findings further show that the secret of sustainable competitive advantage lies in resources' rareness. If many competing firms have valuable assets, the latter do not develop into positive or sustainable competitive advantages. After all, companies can exploit those resources in the same strategic way. While defining valuable, rare resources can be difficult, unique (i.e., rare) assets are all those that can develop into more significant skills than those of competitors and thus generate sustainable competitive advantage (Barney, 1991; Newbert, 2007; Porter, 1980).

Regarding resources' imitability, this factor has a statistically significant influence on the achievement of competitive advantage based on human assets. These resources ensure that the higher the impossibility of imitating resources and capabilities is, the stronger the associated competitive advantages become. The results support H3 (i.e., the imitability of companies' combinations of competencies and resources is positively related to their competitive advantage).

The support for this hypothesis shows that assets can be valuable and rare, but, in order to gain competitive advantage, resources must be difficult to imitate or duplicate. In other words, assets can only be valuable and rare if competing firms are unable to obtain these resources (Barney, 1986). Thus, competitors cannot copy other companies' inimitable assets to their own advantage (Barney & Clark, 2007; Dierickx & Cool, 1989).

Resources' organization, however, has no statistically significant impact on competitive advantage in any of the models estimated. The results, therefore, do not support H4 (i.e., the organization of companies' combinations of capacities and resources is positively related to their competitive advantage). This finding does not

indicate whether organization has any positive or negative effects, which means that the results for this variable are inconclusive.

The conclusion can be drawn that resources have to be more than just valuable, rare, and inimitable because their organization must be effective enough that it not only capitalizes on these resources but also maintains their ability to achieve competitive advantage (Barney & Wright, 1998; Talaja, 2012). Thus, the models' overall results confirm that resources and competencies' value and rareness have a statistically significant influence on competitive advantage.

4.2.2. Determinants of Performance

Table 6 presents the statistical analysis of performance determinants. All the models with environment hostility confirmed a negative statistical effect on performance. That is, the more hostile the business environment is, the lower firms' performance becomes. Notably, company size does not have any significant impact on performance, so turbulent environments do not reduce SMEs' competitive advantage specifically. The results indicate that SMEs with valuable, rare, and inimitable resource can overcome their environment's adversities (Ferreira & Fernandes, 2017).

Table 6 here.

Depending on resources and capabilities' diversity, this valuable factor can ensure that financial and human resources—and their organization—will have a significant positive effect on performance. Physical assets' imitability also has a significant positive impact on performance since, the more difficult imitating companies' physical resources and capacities is, the stronger these firms' performance becomes.

The models that include competitive advantage (see Table 5 above) show that financial, human, physical, and total competitive advantages have a statistically significant positive influence on performance.

This result provides support for H5 (i.e., companies' competitive advantage is positively related to their performance). The results confirm that firms that gain competitive advantages can develop greater financial value compared to competitors, enjoying increased benefits that strengthen customer loyalty and perceived quality. Thus, companies that develop more competitive advantage achieve better performance than their competitors do (Peteraf & Barney, 2003; Zou et al., 2003).

4.2.3.   Mediating effects of competitive advantages

The results also clarified the mediating effect of resources and capabilities' value on competitive advantage (see Table 7). Assets' value has a statistically significant influence on firms' competitive advantage in all models estimated.

Table 7 here.

Financial and human competitive advantages, in particular, have a significant positive impact on performance. Thus, these kinds of competitive advantages have a mediating effect on the influence of financial and human resources' value on performance. These findings validate H6a (i.e., companies' competitive advantage mediates the relationship between the value of their competencies and resources' combinations and these firms' performance).

The results also strengthen the support for H1. Assets' value not only has a positive effect on competitive advantage but also mediates the positive relationship between resources' value and SME performance (Durand, 2002).

Resources and capacities' rareness, however, has no statistically significant impact on performance. In addition, the results showed no direct or indirect effect, and thus this type of competitive advantage does not mediate rareness's relationship with performance. These findings do not corroborate H6b (i.e., companies' competitive advantage mediates the relationship between the rareness of capabilities and resources' combinations and these firms' performance).

The above results, nonetheless, contribute to H2's empirical robustness. Competitive advantage is influenced by assets' rareness, and this characteristic's relationship with SME performance is mediated by competitive advantage (Ferreira & Fernandes, 2017).

Imitability's different aspects, in turn, have no significant effect on competitive advantage, but physical resources and competencies' imitability has an impact on performance. The results further reveal that assets and capabilities' imitability has no indirect effect on performance even when the connection is mediated by competitive advantage. These findings do not validate H6c (i.e., companies' competitive advantage mediates the relationship between the imitability of capacities and resources' combinations and these firms' performance). Thus, no conclusions could be drawn about competitive advantage's positive or negative mediation of the relationship between assets' imitability and SME performance.

Regarding competitive advantage's mediating effect on resources and capabilities' organization, assets' organization has a statistically significant influence on companies' financial competitive advantages. Financial and human assets and

competencies' organization has a significant positive effect on performance even in the absence of competitive advantage. Financial advantages also have a significant positive effect on performance. These findings confirm that financial advantages have a mediating effect on the connection between financial resources and capacities' organization and performance.

The results thus validate H6d (i.e., companies' competitive advantage mediates the relationship between the organization of capabilities and resources' combinations and these firms' performance). While no conclusions can be drawn about H4 (i.e. organization's effect on competitive advantage), competitive advantage has a mediating effect on the relationship between organization and performance. This indirect impact verifies organization's importance to competitive advantage and SME performance (Chong et al., 2009).

5. Theoretical and managerial implications

The scope and maintenance of SMEs' competitive advantage and performance is an issue requiring the application of new concepts and structures that often differ from more traditional ideas. Theoretical research on the RBV's impact on firms' competitive advantage and performance has ensured robust conceptual structures, but empirical research on this topic has been scarce. The extant literature thus includes calls for new empirical investigations, especially quantitative ones (Barney, 1991; Newbert, 2008).

The present results have implications for both management theory and practice. The first implication is the importance of examining the RBV theory and VRIO model's contributions to SMEs' competitive advantage and performance based on the value, rareness, and inimitability of these firms' resources and capabilities.

Researchers have conducted theoretical studies of the RBV and VRIO approach, as well as essentially qualitative research on both.

The present study provides quantitative evidence of the VRIO model's effectiveness in terms of SMEs' strategies. Value, rareness, and inimitability influence competitive advantage (i.e., H1, H2, and H3), which shows how important resources are for SMEs as assets help these companies to overcome environment hostility. This result provides empirical support for Barney (1991) and Newbert's (2008) findings, reinforcing firms' need to use resources that will have the greatest impact on their business and thus create more sustainable competitive advantages.

In addition, the current research verified that competitive advantage has an indirect effect (i.e., mediating effect) on the link between organization and performance. This finding shows the extent to which competitive advantage can contribute to fostering the formulation and implementation of competitive strategies that affect SMEs' market performance. When companies treat resources as valuable assets, the latter have a direct effect on these firms' profitability.

Regarding the results' implications for management, companies must have systems that support and enhance one or several valuable internal resources. In this context, firms' value comes from knowledge management and sharing tools. Another implication is that the proposed model can provide the theoretical basis and methodological core for SMEs' development of strategic resource management.

Other established approaches have previously been used to help companies formulate business strategies. However, strength, weaknesses, opportunities, and threat analyses often lack a coherent theoretical foundation and end up becoming rather superficial evaluations of internal resources' strategic value. In contrast, a resource-planning methodology built on a vision of competitive strategies and based

on complementary assets can clarify resources and capabilities' comparative advantages and disadvantages. In other words, the proposed model highlights the strengths and weaknesses of firms' choice, use, and development of specific assets regarding the costs generated and of differentiation's advantages as a simultaneously response to SMEs' opportunities and threats. However, the contextual complexities linked to each industry's competitive forces that especially affect SMEs should not be overlooked, regardless of which model or theory is applied.

6. Conclusions, limitations, and future research

This research sought to develop a deeper understanding of RBV-based strategies' relationship with SMEs' development of competitive advantage and improved performance. The study's analyses addressed two research questions:

- How important is the VRIO combination of resources and capabilities to SME competitive advantage?
- In what way are competitive advantages directly related to SME performance?

To answer the first question, the study developed and strengthened the RBV approach as a strategic management theory and thus complemented previous studies such as Newbert's (2008). The tests run on H1, H2, and H3 confirmed that resources' value, rareness, and imitability have a positive effect on SMEs' competitive advantage. In contrast, the organization variable did not have any positive or negative impacts, so H4 was not supported.

The RBV theory is underexplored in terms of empirical research. Thus, this study's findings contribute to a better understanding of how resources and capacities can be developed to exploit competitive advantages. The results confirm that resources and capabilities' combinations contribute to SME performance,

demonstrating that these assets are extremely important to these companies' organization and plans to enhance their performance more effectively.

Regarding the second research question, the results show that competitive advantage has both a direct and indirect effect on SME performance. Thus, H5 was verified, confirming, as various other authors have done previously, that competitive advantage has a direct positive impact on these firms' performance (Barney, 1991; Peteraf and Barney, 2003; Rumelt et al., 1991). After testing H6a) and d), the present study confirmed that competitive advantage has a mediating effect on the relationship between resources' value and organization and company performance.

The findings underline this relationship's particularly important outcome regarding assets' organization. The latter variable has no direct effect (i.e., positive or negative) on competitive advantage, but this variable has a positive mediating effect on the link between organization and performance. The results confirm organization's importance in terms of enhancing resources' value as a tool for achieving competitive advantage, which leads to better SME performance (Chong et al., 2009).

Regarding future research, additional empirical studies could be conducted to understand resources and capabilities' role in different types of companies' competitive advantage, including international corporations and the largest companies worldwide. Although researchers have postulated that the RBV theory and VRIO model's application produces sustainable competitive advantages (Helfat & Martin, 2014; Teece, 2007), further studies of this aspect may benefit from a more nuanced approach. The RBV's greatest challenge is currently how to measure some firm-level capabilities. More research is thus needed to discover whether the resource dynamics and performance ratio can be used to build a more solid model for measuring all resources and capabilities.

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Table 1. Sample characteristics

		Number firms	%
Economic activity	Agriculture and forestry	11	5.3%
	Manufacturing	83	39.7%
	Construction	8	3.8%
	Services	45	51.2%
Firm size (number of employees)	<10	84	60.3%
	10–49	39	23.4%
	50–249	24	16.3%
Region	North	51	34.0%
	Center	36	27.8%
	Greater Lisbon	36	26.8%
	Alentejo	14	6.7%
	Algarve	10	4.8%

Table 2. Variables and hypotheses

Variables	Description	Items	Measure	Hypotheses	Authors
Independent variables					
Value					
• Financial • Physical • Intellectual • Human • Organizational	This variable is made up of six items so that respondents can assess the value of the company's resources and capabilities. The greater the value of the positive response regarding each dimension, the more support the theory has. Namely, resources and valuable capacities' interaction has the potential for developing competitive advantages.	V1: Capabilities enable cost reduction. V2: Resources enable cost reduction. V3: Capabilities enable opportunity exploitation. V4: Resources enable opportunity exploitation. V5: Capabilities enable threat responses. V6: Resources enable threat responses.	Five-point Likert-type scale	H1	
Rareness					
• Financial • Physical • Intellectual • Human • Organizational	The measurement of rareness needs to respect the degree to which a company exploits a unique resource and/or capacity, as well as the degree to which this firm exploits common resources and/or capacities.	R1: Capabilities combine with novel resources. R2: Resources combine with novel capabilities. R3: Novel resources combine with capabilities.	Five-point Likert-type scale	H2	Barney (1991) Newbert (2007)
Imitability					
• Financial • Physical • Intellectual • Human • Organizational	This variable is a system composed of three items, which are rated so that the higher the value of the response, the more the corresponding company resource is considered to be difficult to imitate.	I1: Resources enable cost reduction. I2: Capabilities enable cost reduction. I3. Capabilities combine with resources to enable cost reduction.	Five-point Likert-type scale	H3	
Organization					
• Financial • Physical • Intellectual • Human • Organizational	This variable is a system composed of three items to evaluate the level of organization, and the responses are listed so that the highest rating is defined as the company's most organized relationship.	O1: Capabilities combine with resources to enable cost reduction. O2: Resources and capabilities enable opportunity exploitation. O3: Resources and capabilities enable threat responses.	Five-point Likert-type scale	H4	
Dependent variables					
Competitive advantage					

• Financial • Physical • Intellectual • Human • Organizational	This variable is measured with three items.	CA1: Costs are highly competitive. CA2: Opportunities are capitalized. CA3: Threats are responded to.	Five-point Likert-type scale	H5	Barney (1991)
Performance	This variable is assessed using a market performance scale, which is a subjective scale that includes financial (i.e., sales) and non-financial (i.e., market) aspects.	P1: Marketing P2: Sales growth P3: Profitability P4: Market share	Five-point Likert-type scale	H6a, b, c, d	Perry-Smith and Blum (2000) Richard (2000)
Control variable					
Hostility	This variable is operationalized using three items.	H1: Very safe environment H2: Strong opportunities H3: Controlled environment	Five-point Likert-type scale		Khandwalla (1976)

Table 3. Reliability of constructs

	Construct	Alpha	Number items
Performance		0.805	4
Competitive advantage	Financial	0.745	3
	Physical	0.710	3
	Intellectual	0.711	3
	Human	0.718	3
	Organizational	0.784	3
Value	Financial	0.775	5
	Physical	0.795	5
	Intellectual	0.729	5
	Human	0.814	5
	Organizational	0.711	5
Rareness	Financial	0.823	3
	Physical	0,803	3
	Intellectual	0.768	3
	Human	0.550	3
	Organizational	0.711	5
Imitability	Financial	0.699	3
	Physical	0.724	3
	Intellectual	0.792	3
	Human	0.622	3
	Organizational	0.749	3
Organization	Financial	0.705	3
	Physical	0.715	3
	Intellectual	0.672	3
	Human	0.691	3
	Organizational	0.796	3
Hostility		0.722	3

Table 4. Correlations and descriptive statistics

	Mean	SD	Valid N	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
(1) Performance	9.87	2.06	147												
(2) Value (physical)	19.39	5.28	147	0.047											
(3) Value (financial)	15.24	4.64	147	0.315**	0.607**										
(4) Valor (human)	18.14	4.44	147	0.043	0.728**	0.437**									
(5) Value (intellectual)	17.37	3.68	147	0.098	0.398**	0.317**	0.517**								
(6) Value (organizational)	19.39	4.39	147	−0.092	0.549**	0.284**	0.646**	0.617**							
(7) Competitive advantage (financial)	9.73	2,72	147	0.222**	0.619**	0.554**	0.519**	0.303**	0.345**						
(8) Competitive advantage (physical)	7.87	2.37	147	0.302**	0.432**	0.624**	0.392**	0.296**	0.276**	0.681**					
(9) Competitive advantage (human)	9.03	2.36	147	0.106	0.450**	0.353**	0.507**	0.370**	0.396**	0.593**	0.639**				
(10) Competitive advantage (intellectual)	8,48	2.34	147	0.176*	0.353**	0.426**	0.380**	0.420**	0.363**	0.384**	0.567**	0.404**			
(11) Competitive advantage (organizational)	9.59	2.66	147	-0.028	0.396**	0.253**	0.477**	0.434**	0.467**	0.330**	0.415**	0.417**	0.532**		
(12) Rareness (financial)	10.11	2.90	147	0.079	0,754**	0.516**	0.659**	0.378**	0.500**	0.534**	0.417**	0.422**	0.346**	0.360**	
(13) Rareness (human)	8.03	2.47	147	0.238**	0.576**	0.662**	0.542**	0.423**	0.424**	0.513**	0.491**	0.353**	0.413**	0.464**	0.677**
(14) Rareness (intellectual)	9.15	2.74	147	0.040	0.593**	0.400**	0.711**	0.507**	0.557**	0.392**	0.376**	0.436**	0.409**	0.420**	0.678**
(15) Rareness (organizational)	8.93	2.59	147	0.071	0.428**	0.420**	0.472**	0.451**	0.504**	0.295**	0.363**	0.354**	0.396**	0.395**	0.429**
(16) Rareness (physical)	9.90	2.51	147	−0.078	0.367**	0.279**	0.512**	0.395**	0.528**	0.280**	0.234**	0.278**	0.385**	0.447**	0.345**
(17) Organization (financial)	9.86	2.85	147	0.181*	0.664**	0.558**	0.588**	0.348**	0.471**	0.509**	0.457**	0.376**	0.296**	0.259**	0.655**
(18) Organization (physical)	8.14	2.44	147	0.157	0.458**	0.597**	0.469**	0.352**	0.357**	0.484**	0.509**	0.361**	0.292**	0.257**	0.526**
(19) Organization (intellectual)	9.41	2.37	147	0.009	0.525**	0.435**	0.620**	0.437**	0.480**	0.375**	0.353**	0.428**	0.300**	0.333**	0.576**
(20) Organization (human)	8,88	2.36	147	0.064	0.327**	0.304**	0.377**	0.389**	0.368**	0.259**	0.255**	0.294**	0.305**	0.352**	0.350**
(21) Organization (organizational)	10.00	2.61	147	-0.107	0.455**	0.283**	0.489**	0,335**	0.533**	0.279**	0.248**	0.246**	0.297**	0.368**	0.413**
(22) Imitability (financial)	9.51	2.87	147	0.078	0.666**	0.514**	0.546**	0.338**	0.432**	0.493**	0.352**	0.262**	0.267**	0.229**	0.612**
(23) Imitability (human)	7.93	2.18	147	0.174*	0.560**	0.676**	0.470**	0.345**	0.376**	0.490**	0.582**	0.330**	0,383**	0,249**	0.530**
(24) Imitability (intellectual)	9.21	2.34	147	0.017	0.555**	0.308**	0.635**	0.411**	0.525**	0.465**	0.326**	0.451**	0.271**	0.423**	0.529**
(25) Imitability (organizational)	8.86	2.34	147	0.022	0.437**	0.388**	0.459**	0.328**	0.391**	0.378**	0.319**	0.363**	0.309**	0.356**	0,374**
(26) Imitability (physical)	8.82	2.50	147	0.183*	0.398**	0.450**	0.441**	0.343**	0.464**	0.278**	0.357**	0.211*	0.325**	0.329**	0.380**
(27) Hostility	8.90	1.49	147	−0.189*	0.251**	0.103	0.390**	0.173*	0.242**	0.143	0.155	0.170*	0.106	0.264**	0.221**

	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)	(24)	(25)	(26)	(27)
(1) Performance															
(2) Value (physical)															
(3) Value (financial)															
(4) Value (human)															
(5) Value (intellectual)															
(6) Value (organizational)															
(7) Competitive advantage (financial)															
(8) Competitive advantage (physical)															
(9) Competitive advantage (human)															
(10) Competitive advantage (intellectual)															
(11) Competitive advantage (organizational)															
(12) Rareness (financial)															
(13) Rareness (human)															
(14) Rareness (intellectual)	0.684**														
(15) Rareness (organizational)	0.498**	0.526**													
(16) Rareness (physical)	0.392**	0.476**	0.504**												
(17) Organization (financial)	0.600**	0.557**	0.507**	0.398**											
(18) Organization (physical)	0.673**	0.522**	0.434**	0.420**	0.644**										
(19) Organization (intellectual)	0.511**	0.629**	0.443**	0.454**	0.619**	0.603**									
(20) Organization (human)	0.378**	0.399**	0.414**	0.424**	0.260**	0.355**	0.392**								
(21) Organization (organizational)	0.284**	0.412**	0.472**	0.445**	0.423**	0.265**	0.542**	0.453**							
(22) Imitability (financial)	0.500**	0.551**	0.404**	0.370**	0.585**	0.514**	0.471**	0.354**	0.426**						
(23) Imitability (human)	0.570**	0.460**	0.425**	0.341**	0.605**	0.641**	0.512**	0.313**	0.304**	0.604**					
(24) Imitability (intellectual)	0.370**	0.532**	0.380**	0.488**	0.510**	0.398**	0.609**	0.345**	0.473**	0.559**	0.555**				
(25) Imitability (organizational)	0.386**	0.422**	0.433**	0.400**	0.326**	0.325**	0.369**	0.384**	0.361**	0.444**	0.444**	0.455**			
(26) Imitability (physical)	0.408**	0.409**	0.384**	0.483**	0.445**	0.378**	0.449**	0.369**	0.485**	0.392**	0.580**	0.477**	0.471**		
(27) Hostility	0.243**	0.309**	0.196*	0.224**	0.243**	0.248**	0.318**	0.176*	0.200*	0.203*	0.172*	0.285**	0.094	0.162	

Notes. SD = standard deviation; N = number; $p < 0.05$; ** $p < 0.01$

Table 5. Determinants of competitive advantage (standardized coefficients)

	Financial competitive advantages		Human competitive advantages		Intellectual competitive advantages		Organizational competitive advantages		Physical competitive advantages		Total competitive advantages	
Hostility	0.14	−0.03	0.16	0.04	0.17*	−0.05	0.11	0.00	0.26**	0.13	0.22**	0.00
Value		0.41**		0.38**		0.29*		0.26**		0.25**		0.47**
Rareness		0.09		0.02		0.09		0.20*		0.23*		0.20
Imitability		0.10		0.24*		0.17		0.10		0.04		0.07
Organization		0.23*		0.10		0.10		0.08		0.09		0.01
R^2 adjusted	0.014	0.390	0.042	0.487	0.022	0.274	0.004	0.218	0.063	0.273	0.042	0.487
F statistics	3.05	19.63**	3.57	22.81**	4.31*	12.03**	1.65	9.15*	10.83**	11.97**	7.35	28.67**
Change in F statistic		23.31**		26.98**		13.59**		10.91**		11.48**		32.41

* $p < 0.05$; ** $p < 0.01$

Table 6. Performance determinants (standardized coefficients)

	Financial resources and capabilities		Human resources and capabilities		Intellectual resources and capabilities		Organizational resources and capabilities		Physical resources and capabilities		Total resources and capabilities	
Hostility	−0.24**	−0.23*	−0.24*	−0.25	−0.24*	−0.24*	−0.22*	−0.22*	−0.17*	−0.18*	−0.24**	−0.24*
Value	0.20*	0.12	0.29**	0.20*	0.12	0.09	0.10	0.05	−0.08	−0.10	0.09	−0.03
Rareness	0.01	−0.02	0.15	0.14	0.04	0.03	0.07	0.03	−0.11	−0.12	0.01	−0.04
Imitability	0.02	0.00	−0.05	−0.10	0.00	−0.02	−0.04	−0.06	0.38**	0.38**	0.10	0.08
Organization	0.29*	0.20**	−0.02	−0.05	−0.01	−0.02	0.05	0.04	−0.17	−0.17	0.01	0.01
Competitive advantages		0.27**		0.23*		0.11		0.17		0.26**		0.25**
R^2 adjusted	0.064	0.102	0.130	0.154	0.019	0.021	0.026	0.042	0.105	0.101	0.036	0.060
F statistics	2.98*	3.76*	5.36**	5.44**	1.56	1.51	1.77	2.06	4.43*	3.73**	2.09	2.56*
Change in F statistics		6.99**		5.04*		1.24		3.34		0.35		4.65*

* $p < 0.05$; ** $p < 0.01$

Table 7. Mediating effects of competitive advantages (standardized coefficients)

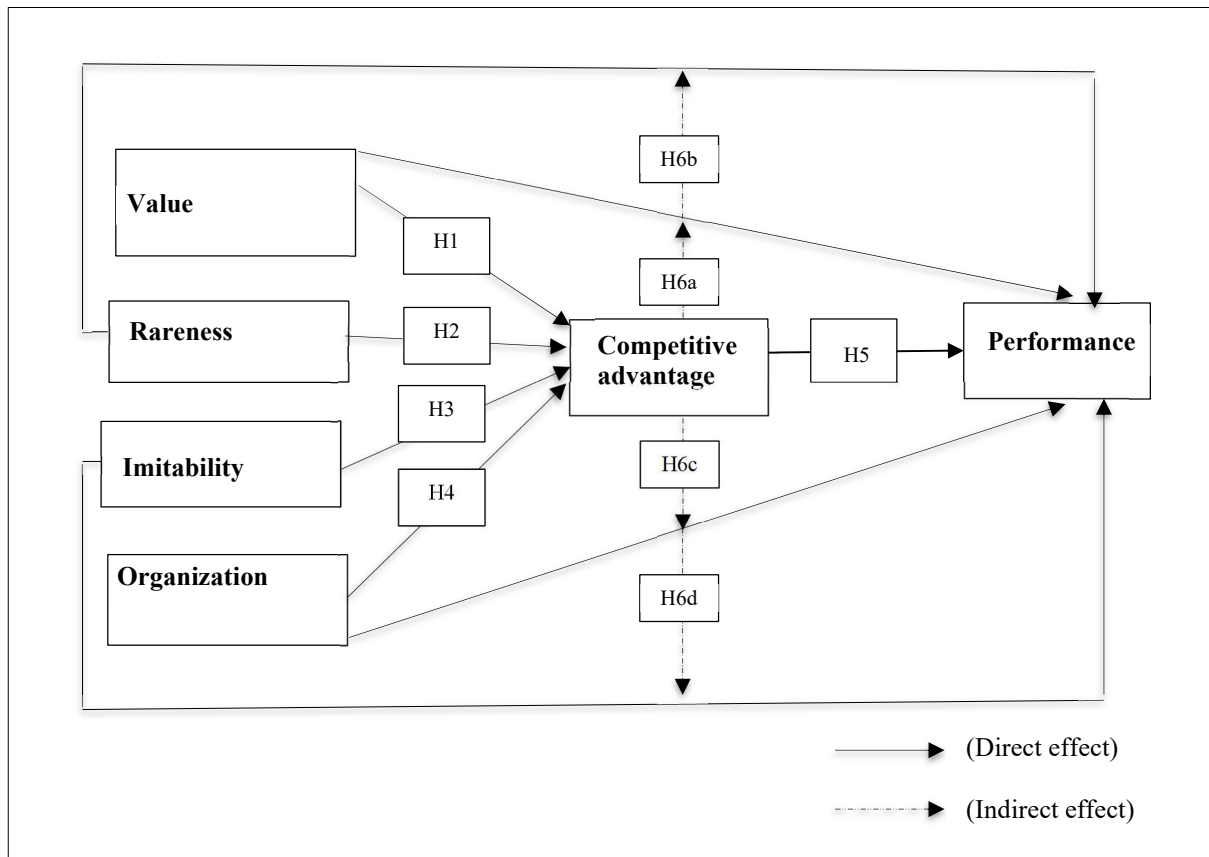|	Financial resources and capabilities		Financial competitive advantages		Human resources and capabilities		Human competitive advantages		Intellectual resources and capabilities		Intellectual competitive advantages		Organizational resources and capabilities		Organizational competitive advantages		Physical resources and capabilities		Physical competitive advantages		Total resources and capabilities		Total competitive advantages	
Hostility	−0.24**	−0.23*	0.14	−0.03	−0.24*	−0.25	0.16	0.04	−0.24*	−0.24*	0.17*	−0.05	−0.22*	−0.22*	0.26**	0.13	−0.17*	−0.18*	0.26**	0.13	−0.24**	−0.24*	0.22**	0.00
Value	0.20*	0.12		0.41**	0.29**	0.20*		0.38**	0.12	0.09		0.29*	0.10	0.05		0.25**	−0.08	−0.10		0.25**	0.09	−0.03		0.47**
Rareness	0.01	−0.02		0.09	0.15	0.14		0.02	0.04	0.03		0.09	0.07	0.03		0.23*	−0.11	−0.12		0.23*	0.01	−0.04		0.20
Imitability	0.2	0.00		0.10	−0.05	−0.10		0.24*	0.00	−0.02		0.17	−0.04	−0.06		0.04	0.38**	0.38**		0.04	0.10	0.08		0.07
Organization	0.29*	0.20**		0.23*	−0.02	−0.05		0.10	−0.01	−0.02		0.10	0.05	0.04		0.09	−0.17	−0.17		0.09	0.01	0.01		0.01
Competitive advantages		0.27**	0.014	0.390		0.23*	0.042	0.487		0.11	0.022	0.274		0.17	0.063	0.273		0.26**	0.063	0.273		0.25**	0.042	0.487
R^2 adjusted	0.064	0.102	3.05	19.63**	0.130	0.154	3.57	22.81**	0.019	0.021	4.31*	12.03**	0.026	0.042	10.83**	11.97**	0.105	0.101	10.83**	11.97**	0.036	0.060	7.35	28.67**
F statistics	2.98*	3.76*		23.31**	5.36**	5.44**		26.98**	1.56	1.51		13.59**	1.77	2.06		11.48**	4.43*	3.73**		11.48**	2.09	2.56*		32.41
Change in F statistic		6.99**				5.04*				1.24				3.34				0.35				4.65*		

*$p < 0.05$; ** $p < 0.01$

Figure 1. Conceptual model