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Full Length Research Paper

Entrepreneurial orientation and competitive advantage: The mediation of resource value and rareness

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This study examines how entrepreneurial orientation (EO), resource attributes, and the competitive advantage of firms are related. Resource attributes refer to the value and rareness of resource–capability combinations, and are proposed to mediate the relationship between EO and the competitive advantage of firms. Based on data collected from 201 public firms in Taiwan, the statistical results show that firms with strong EO are likely to exploit valuable and rare resource-capability combinations. The value and rareness of resource-capability combinations further positively mediate the association between EO and the competitive advantage of firms, supporting the resource-based perspective of entrepreneurship.

Key words: Entrepreneurial orientation, resource, value, rareness, competitive advantage.

INTRODUCTION

In the academic literature, there has been a widely held view that a firm's competitive advantage and abnormal returns stem from its entrepreneurship, a factor of production. Implicit in this notion is a prediction that entrepreneurship is positively associated with firm performance. However, does entrepreneurship directly influence the competitive advantage of firms?

Scholars have argued that some factors might mediate or moderate the relationship between entrepreneurial orientation EO and firm performance, such as the external environment (Covin and Slevin, 1991; Lumpkin and Dess, 1996; Zahra, 1993), internal organization (Covin and Slevin, 1991; Ireland et al., 2003; Lumpkin and Dess, 1996; Teng, 2007; Wang, 2008; Zahra, 1993), and the strategy-making process (Covin and Slevin, 1989; Dess et al., 1997; Lumpkin and Dess, 1996; Thoumrungroje and Tansuhaj, 2005).

Therefore, a study that empirically examines the possible factors that influence the EO-performance relationship is of academic significance. According to Schumpeter (1934), entrepreneurship facilitates unique resource-capability combinations in dynamic and high-risk environments in a manner that distinguishes one firm from another by reducing cost or differentiating their products and services.[1] This argument is largely consistent with the central notion of the resource-based view, which asserts that a firm's competitive advantage lies in the unique combination of resources and capabilities (Penrose, 1959).

In recent years, some studies propose that firms with entrepreneurship are able to influence the changes and configurations of existing resources, capabilities and skills (Alvarez and Busenitz, 2001; Covin and Slevin, 1991; Ireland et al., 2003; Lumpkin and Dess, 1996; Zahra et al., 2006; Zahra, 1993). Existing studies have tried to sort out the complexities regarding the possible associations between EO and resource/capability attributes. Some scholars content that EO represents a type of resource/ capability; thus, EO and resource/capability are viewed as the same construct (Conner, 1991; Foss et al., 2008;

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[1]The term entrepreneurship is first introduced into the literature by Schumpeter (1934). Lumpkin and Dess (1996) make a distinction between the concepts of entrepreneurship and EO. They suggest that entrepreneurship presents new entry or business venturing and it corresponds with strategic content; that is, "What business shall we enter?" On the other hand, EO refers to the processes, practices, and decision-making activities that improve new entry. In other words, entrepreneurship implies what factors consist of, while EO is to indicate how these factors are undertaken. EO thus can be viewed as the manipulative process of entrepreneurship.

Stevenson and Gumpert, 1985; Lee et al., 2001). Some scholars argue that entrepreneurship is an intrinsic feature of the resource-based framework, and the commitment and control of resources can be viewed as characteristics of a firm's entrepreneurial focus (Foss et al., 2008; Stevenson and Gumpert, 1985). For instance, human resources can be considered a feature of collective organization creativity, a feature prominent in the definition of entrepreneurship (Foss et al., 2008). The empirical study of Lee et al. (2001) uses EO to indicate the internal capabilities of firms and finds that EO is positively associated with the performance of technology start-up companies in Korea. Therefore, it is argued that resource/capability partly overlaps with EO (Brown et al., 2001).

In contrast, some scholars argue that the relationship between entrepreneurship and resource/capability might not be so straightforward (Alvarez and Busenitz, 2001; Barney and Arikan, 2001; Ireland et al., 2003; Lumpkin and Dess, 1996). Specifically, resource/capability and EO might represent completely different constructs and their associations deserve close examination (Lumpkin and Dess, 1996, 2001; Miller, 1983).

Covin and Slevin (1991) propose that EO influences organizational capabilities. Lumpkin and Dess (1996) argue that EO has an impact on organizational resources and capabilities, and the latter further influences firm performance. In other words, the relationship between EO and firm performance is mediated by the attributes of resources and capabilities (Brown et al., 2001; Busenitz and Barney, 1997; Casson, 1982; Shane and Venkataraman, 2000).

Overall, resource-capability combinations might act as a bridge that links EO with the competitive advantage of firms (Ireland et al., 2003; Zahra et al., 2006; Zhou and Li, 2007). Recently, this line of reasoning has been supported by some empirical studies. For instance, Kaya (2006) and Wu et al. (2008) find that the relationship between EO and competitive advantage is mediated by specific resources (such as human, physical, and organization resources) and by a variety of capital (such as intellectual and human capital).

This study aims to empirically examine the associations between EO, resource attributes, and the competitive advantage of firms. The following research question is raised: does EO directly influence the competitive advantage of firms? Or, is the relationship between EO and competitive advantage mediated by the resource attributes of firms? Following prior studies (Covin and Slevin, 1988, 1989, 1991; Miller, 1983; Lumpkin and Dess, 1996; Lumpkin et al., 2009), this study uses three dimensions to measure EO, including innovation, proactiveness, and risk-taking. Regarding the attributes of resource and capability, this study focuses on the value and rareness of resource-capability combinations (Newbert, 2008). Based on both the questionnaire and secondary data collected from 201 Taiwanese public firms, this study uses the structure equation modeling (SEM) technique and ordinary-least-squares (OLS) hierarchical regressions to empirically test our hypotheses.

Our statistical results show that firms with strong EO are likely to exploit valuable and rare resource-capability combinations, and the value and rareness of resource-capability combinations further positively mediate the relationship between EO and competitive advantage, providing strong support to the resource-based perspective of entrepreneurship.

The findings of this study are expected to enhance the existing knowledge on the relationship between EO and competitive advantage. The attributes of resources and capabilities can act as internal mechanisms that allow a firm with innovation, proactiveness, and risk-taking to transform its EO into competitive advantage.

THEORETICAL BACKGROUND

EO and the attributes of resource-capability combinations

The resource-based view is widely adopted in the strategic management literature and increasingly so in entrepreneurship studies (Barney and Arikan, 2001; Ireland et al., 2003). Following Newbert (2008), this study focuses on two aspects of resources and capabilities, value and rareness, to review the possible relationship between EO and resource-capability combinations. Barney (1991) argues that value and rareness are different constructs. If a firm can effectively exploit its resources and capabilities to reduce costs and to respond to environmental requirements, the resources and capabilities are valuable; while if a firm possesses some resources and capabilities that are owned by only few companies in the industry, the resources and capabilities are rare (Barney, 1991).

In recent years, this argument has been supported by empirical studies. The study of Irwin, Hoffman, and Lamont (1998) on Florida hospitals finds that value and rareness are different constructs and they both influence the relationship between technological innovation and organizational performance. Newbert's (2008) study on the micro- and nanotechnology firms finds that value and rareness are not the same constructs.

In general, there are two research approaches regarding the resource-based view of entrepreneurship. The first approach focuses on the determinants of EO as it derives from the internal resources and capabilities of an organization (Covin and Slevin, 1991; Foss et al., 2008). Empirical studies following this line report that a variety of resources—human, network, managerial, and knowledge resources—are associated with EO (Yiu and Lau, 2008; Yu, 2010). The second approach emphasizes how internal factors, specifically, firm resources and capabilities, mediate the association between EO and the

competitive advantage of firms (Lumpkin and Dess, 1996;Teng, 2007). However, so far, the empirical evidence is still sparse. This study thus aims to conduct empirical analyses on the overall associations between EO, resource attributes, and the competitive advantage of firms.

EO and the value of resource-capability combinations

Although some scholars define EO based on the individual characteristics of entrepreneurs (Shook et al., 2003), most studies follow the classical economics notion and consider EO a firm-level factor. Lumpkin and Dess (1996) define EO as the processes, practices, and decision-making activities that lead to new entry; it also involves the intentions and actions of a firm willing to grasp new market opportunities in a dynamic and generative process.

Covin and Slevin (1989) view EO as the indication of a firm's strategic posture. Miller (1983) also regards entrepreneurship as firm-level activities and identifies three main dimensions of EO, including innovation, proactiveness, and risk-taking. Measures for the three dimensions are further developed by Covin and Slevin (1988; 1989; 1991) and are used in our study.

Schumpeter (1934) addressed that entrepreneurs can carry out a new combination of production factors, including production means and technical abilities, subsequently facilitating firm growth. Stopford and Baden-Fuller (1994) argued that a firm's entrepreneurial activities obtain resources for novel combinations. In other words, entrepreneurial opportunities arise because different entrepreneurs have contrasting insights into the relative value of resources and tend to combine these resources with capabilities in different ways. Shane and Venkataraman (2000) argue that entrepreneurial opportunities emerge mainly because an agent has different perspectives on the relative value of resources and capabilities to seize new opportunities. If a firm with EO indeed has a unique cognition and mindset for resources from other competitors do, it can create a new combination of resources and capabilities to respond to the competitive environment (Lumpkin and Dess, 1996; Penrose, 1959); in other words, to be entrepreneurial (Alvarez and Barney, 2002; Alvarez and Busenitz, 2001; Barney, 1991).

The three dimensions of EO (that is, innovation, proactiveness, and risk-taking) are all closely linked to the utilization of a firm's resources and capabilities. First, innovation refers to a firm's tendency to create resources and capabilities (Drucker, 1985), to support new ideas, novelty and experimentation (Lumpkin and Dess, 1996), and to introduce new products and services to capitalize on market opportunities (Hage, 1980; Miller, 1983). The wealth of firms will thus be created when existing markets are disrupted by the discovery of new product/service opportunities that stimulate firms not only to optimize valuable resources and capabilities, but also to innovate ways of combining resources and capabilities (Lumpkin and Dess, 1996; Zahra et al., 1999).

Secondly, proactiveness refers to the manner of enterprises in attempting to track the changes in customer tastes and technology (Lumpkin and Dess, 2001) and to seize the new opportunities (Lumpkin and Dess, 1996; Miller and Friesen, 1982), implying a forward-looking perspective that may or may not be related to current operations (Lumpkin and Dess, 1996; 2001). Venkatraman (1989) suggests that introducing new products and brands ahead of competitors is an effective means of combining resources and capabilities. Proactive firms are thus expected to get beyond current capabilities, and combine these capabilities with valuable resources to respond to environmental changes (Stopford and Baden-Fuller, 1994).

Finally, there are potential risks in all types of resource-exploiting decisions made by an organization (Morris et al., 2008). Firms with EO are likely to be involved in risk-taking behaviors, and are willing to commit a large amount of resources in order to aggressively seize new opportunities (Baird and Thomas, 1985; Lumpkin and Dess, 1966; Miller and Friesen, 1978).

In summary, firms with EO are likely to exploit valuable resources and combine them with valuable capabilities. Such novel combinations of resources and capabilities further enable firms to respond effectively to their external environments via product/service differentiation or cost reduction (Newbert, 2008). Kaya's (2006) empirical study also finds that the combinations of valuable human resources and capabilities are significantly influenced by EO. Therefore, it is hypothesized that:

H_1: Entrepreneurial orientation is positively associated with the value of resource-capability combinations.

EO and the rareness of resource-capability combinations

Although the significance of valuable resources and capabilities has long been proposed in the literature, in reality, many organizations do not possess valuable resources or capabilities. This implies that in addition to the value of resources and capabilities, their rareness also matters (Barney, 1991).

Some valuable resources are cognized by few entrepreneurial firms, and the valuable resources may also be rare or limited. In general, the emergence of organizations derives from entrepreneurs who find and exploit opportunities to make strategic decisions (Jones, 2007), and then individual entrepreneurship gradually transforms over time into firm-level EO (Casson et al., 2006). In order to survive in all stages of the organizational cycle, firms with EO aggressively seize rare resources to reduce uncertainty that they face, while

conservative firms without innovation, proactiveness and risk-taking might only exploit munificent and common resources (Jones, 2007). For example, when a firm with EO cognizes new opportunities and enters new markets, the critical resources/capabilities utilized by this firm may not be viewed as valuable resources/capabilities by it competitors. The critical resources/capabilities are thus controlled by very few firms and become rare in the industry.

Some studies point out that entrepreneurship occurs when economic actors have an insight into the value of resources while others do not, implying that such resources are rare (Casson, 1982; Shane and Venkataraman, 2000). Although firms with a higher level of EO may be able to take risks and create innovative products or services, a successful firm must exploit limited resources as much as possible in a multistage manner with minimal exposure at each stage, especially given the rapid change in today's world (Brown et al., 2001).Newbert's (2007) empirical study also reports that a firm with EO knows better how to exploit scarce resources and is more motivated to identify rare resource-capability combinations, a finding that is consistent with earlier studies. Therefore, a firm with high EO is more likely to facilitate rare combinations of resources and capabilities.

In summary, in contrast with other competitors, a firm with EO is expected to be able to use a common capability to exploit a very distinct resource, or to exploit a common resource with a distinctive capability (Newbert, 2008). Therefore, it is hypothesized that:

H_2: Entrepreneurial orientation is positively associated with the rareness of resource-capability combinations.

Resource attributes and competitive advantage

Many scholars suggest that a resource-based approach underlines the competitive advantage of firms (Barney, 1991; Makadok, 2001; Penrose, 1959; Peteraf, 1993; Teng, 2007). Barney (1991) argues that resources that successfully create a competitive advantage must show two attributes: value and rareness.

Value and competitive advantage

As earlier mentioned, competitive advantage is derived from valuable resources and capabilities that enable a firm to reduce costs, exploit market opportunities, and neutralize competitive threats. Therefore, valuable resources and capabilities that firms possess are an important source of competitive advantage (Amit and Schoemaker, 1993; Barney, 2001; Newbert, 2007).

Economists argue that products and services arise from resources (Penrose, 1959), and in order to utilize the resources, firms must exploit them efficiently and effectively (Amit and Schoemaker, 1993). Peteraf (1993) uses the term "ex ante limits to competition" to indicate a situation in which the cost of acquiring superior resources is not too high to offset future benefits (Teng, 2007). Makadok (2001) demonstrates that selecting resources and capabilities complement each other under some circumstances.

Amit and Schoemaker (1993) also view the firm as a combination of valuable resources and capabilities that have the potential to provide the firm with a sustainable competitive advantage. For instance, when sufficient resources to serve customers are available, a firm can make its products/service valuable. However, if managers are unable or incapable of using these resources, that is, managers lack the managerial ability to use service-related resources, the value of such resources cannot be exploited, and competitive advantage is less likely to be achieved.

The empirical study of Irwin et al. (1998) on 189 hospitals, finds a significant and positive relationship between the acquisition of medical innovations and the financial performance of hospitals when the medical technologies are valuable. The empirical study of Newbert (2008) also finds that the value of resource-capability combinations is positively associated with the competitive advantage of firms.

It can be concluded from the ongoing discussion that the combination of valuable resources and capabilities can lead to the competitive advantage of firms. Valuable resources can be combined with valuable capabilities, and its value after the combination will further create competitive advantage for firms. It is thus hypothesized that:

H_3: The value of resource-capability combinations is positively associated with the competitive advantage of firms.

Rareness and competitive advantage

In addition to the value of resource-capability combinations, the rareness of the combination also influences firm performance. Firms may own valuable resources but are not able to create competitive advantage because they lack the rare abilities to fully exploit these valuable resources (Barney, 1991). In other words, although there might be many companies that own valuable resources, only few companies can fully exploit such resources and create competitive advantage.

Scholars have identified a variety of rare resource-capability combinations, ranging from technology (Greve, 2009) and brand capital (Capron and Hulland, 1999) to knowledge and know-how (Fang et al., 2007). Amit and Schoemaker (1993) addressed that the scarcity of a firm's resources and capabilities is related to its returns. Peteraf (1993) proposes that heterogeneous resources are

scarce and unique resources that allow a firm to generate competitive advantage because such a firm is likely to have lower costs than those of its competitors. Collis and Montgomery (1995) also assert that scarce resources are an important determinant of firm profits.

Empirical studies also provide evidence. Fang et al. (2007) investigated Japanese subsidiaries and found that knowledge, a rare resource, influences subsidiary performance. Newbert (2008) found that the rareness of resource-capability combinations is positively related to the competitive advantage of the U.S. micro- and nanotechnology firms.

In summary, the competitive advantage of firms can derive from the rareness of resource-capability combinations. It is thus hypothesized that:

H_4: The rareness of resource-capability combinations is positively associated with the competitive advantage of firms.

EO, resource-capability combinations, and competitive advantage

Regarding the association between EO and competitive advantage, scholars have proposed a number of factors that might influence the EO-performance relationship, such as international diversification strategy (Thoumrungroje and Tansuhaj, 2005), new products/technologies and new markets (Moreno and Casillas, 2008), external environment (Covin and Slevin, 1991), and integration of organizational activities (Lumpkin and Dess, 1996). Although different factors have been raised, most prior studies share, at least, one thing in common - EO does not directly influence the competitive advantage of firms. Some mediated or moderated variables exist.

This study follows the resource-based perspective of entrepreneurship and suggests that the value and rareness of resource-capability combinations might mediate the relationship between EO and competitive advantage. Firms with EO entail creating new resources or combining valuable resources with capabilities to develop new products or enter new markets (Kuratko et al., 2001; Smith and Gregorio, 2002).

An entrepreneurial firm accumulates resources and capabilities with the intention to develop them in the portfolio of resource bundles and to exploit new opportunities, further generating firm profits (Barney and Arikan, 2001). Ireland et al. (2001, 2003) suggest that an entrepreneurial firm is able to identify and bundle unique packages of resources and leverages them capably, ultimately facilitating the competitive advantage and wealth of the firm. With respect to the value of resource-capability combinations, the empirical study of Kaya (2006) finds that the value of resource-capability combinations, operationalized as resource management practices, partially mediate the relationship between entrepreneurship and firm performance.

Irwin et al. (1998) also find that the medical technologies, which are valuable, positively mediate the relationship between innovations and firm profits. Based on 213 UK firms, Wang (2008) finds that learning orientation, a valuable resource, positively mediates the relationship between EO and firm performance. With regard to the rareness of resource-capability combinations, the study of Wu et al. (2008) confirms a positive relationship between EO and performance when the intellectual capital that mediates this link is rare. All these studies strongly suggest that resources and capabilities function as a bridge that links EO with firm performance (Grant, 1996; Ireland et al., 2003; Spender, 1996; Zahra et al., 2006).

In summary, a firm with EO can exploit valuable resources and capabilities; thus, its competitive advantage is enhanced. In contrast with other competitors, a firm with EO can exploit either a distinctive resource or a common resource with distinctive capability to correspond to external environmental opportunities, cope with threats, or reduce costs. Restated, the higher level of EO that a firm possesses implies a higher level of valuable and rare resource-capability combinations, and such combinations further generate competitive advantage of firms. In other words, EO does not directly influence the competitive advantage of firms; its influences on competitive advantage are mediated by the value and rareness of resource-capability combinations. It is thus hypothesized that:

H_5: Resource-capability combinations positively mediate the relationship between EO and competitive advantage.
H_{5a}: The value of resource-capability combinations positively mediates the relationship between entrepreneurial orientation and the competitive advantage of firms.
H_{5b}: The rareness of resource-capability combinations positively mediates the relationship between entrepreneurial orientation and the competitive advantage of firms.

Figure 1 illustrates the conceptual framework of this study.

RESEARCH METHODS

Sample and data

Taiwanese companies that are publicly listed in Taiwan Stock Exchange (TSE) and over-the-counter (OTC) securities exchange market are used as the research sample. Taiwanese firms are used because Taiwan represents a developing economy that owns relatively limited production factors while its advanced factors, such as innovativeness, proactiveness and entrepreneurship, play an important role in its economic development (Wu et al., 2008). Secondly, Taiwanese firms have a long-held reputation of developing core competences based on intellectual and human capital. Moreover, recently Taiwanese firms have undergone a so-called financial tsunami and are under pressure from a dynamic environment; many firms have developed appropriate practices and business models for meeting the challenges of uncertain

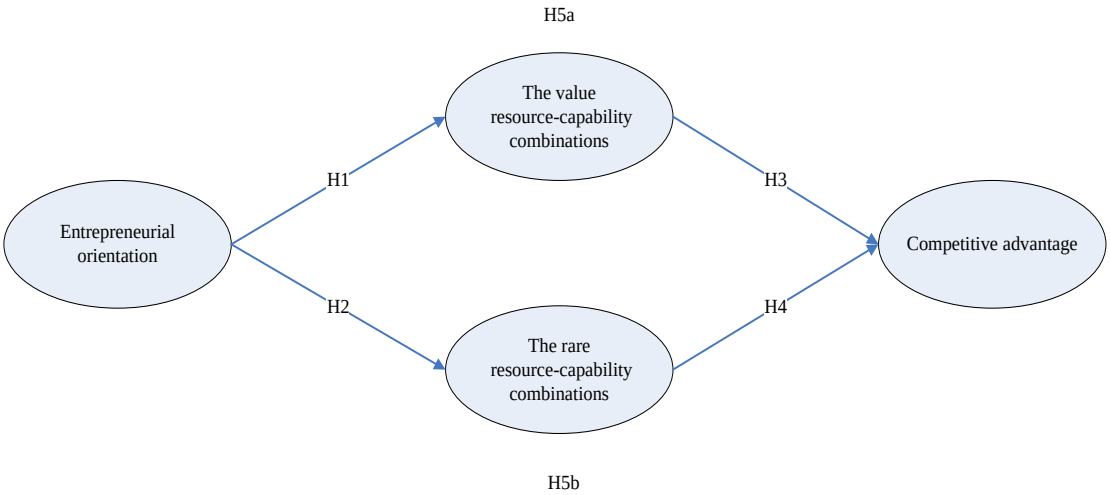

Figure 1. Theoretical model of the relationships among entrepreneurial orientation, value, rareness, and competitive advantage.

environment (Tseng and Goo, 2005).

In 2009, there have been 716 non-financial-sector TSE companies and 531 non-financial-sector OTC companies that provide complete data for analysis. Financial service firms are excluded from the research sample because their accounting practices are incompatible with those of other industries. Two methods are used for data collection. First, data on EO, resource attributes and competitive advantage are obtained via a questionnaire survey, with top management as the respondents. The CEOs and top management of firms were initially contacted via telephone or personal visits, with the purpose of this study explained. We sent a total of 1,247 questionnaires to the non-financial-sector TSE/OTC companies via post mail. A total of 247 questionnaires responded, with a response rate of 20%. The final sample is comprised of 201 firms after eliminating some incomplete questionnaires.

Secondly, some control variables (such as firm size, firm age, debt-to-market ratio, and industry affiliation) that are needed in the regression analysis are collected via a secondary database maintained by the Taiwan Economic Journal (TEJ), a leading credit analysis research agent and the most comprehensive business database in Taiwan, subscribed by many international research agents such as Datastream, Dialog, Reuters, and Capital International.

Measures

EO

The independent variable in this study is EO. Three dimensions are used to measure EO, including innovation, proactiveness, and risk-taking. The three dimensions are measured by using nine questions developed by Miller (1983) and Covin and Slevin (1988, 1989). Following these studies, a semantic differentials method is used in the questionnaire. That is, for each question, two opposite phrases are offered; the respondents are asked to rank the indices on a seven-point Likert scale, ranging from 1 to 7. The higher the score, the stronger the EO is the firm. Reliability is estimated by using both coefficient alpha (Peter, 1979) and composite reliability (Fornell and Larcker, 1981). The Cronbach's alpha values of the three dimensions are 0.778, 0.764, and 0.907 respectively, with an overall Cronbach's alpha of 0.756. The composite reliability of EO is 0.747. The test of reliability in our sample is consistent with past studies (Runyan et al., 2008).

Resource-capability combination

These are the mediated variables of this study and are operationalized as two dimensions of resource attributes: value and rareness. The dimensions of value and rareness are measured by using the scales developed by Newbert (2008). Again, a seven-point Likert scale is used.

Value: The value of resource-capability combination is operationalized as an attribute in which the value of a resource (or a capability) can be enhanced when it is combined with a capability (or a resource) to reduce costs and exploit market opportunities (Newbert, 2008). It is measured using four questions, each with five items developed by Newbert (2008), including financial, human, intellectual, organizational, and physical resources/capabilities. An averaged score of the questions is then calculated to indicate the overall value of a firm's resource-capability combination. The higher the score of a firm, the higher is the value of the resource-capability combination of the firm.[2] This construct has an overall Cronbach's α of 0.884, and its composite reliability is 0.877.

Rareness: The rareness of resource-capability combination is operationalized as a firm's exploitation of a common resource (or capability) with a unique capability (or resource) or a firm's exploitation of unique resource-capability combinations, in order to reduce costs, utilize market opportunities, or withstand competitive threats. Following Newbert (2008), this construct is measured using three questions, each with five items—financial, human, intellectual, organizational and physical resources/capabilities. Similarly, the averaged score of the questions is then calculated to indicate the overall rareness of a firm's resource-capability combination. The higher the score of a firm, the higher is the rareness of its resource-capability combination.[3] This construct has an overall Cronbach's α of 0.935, and composite reliability of 0.935.

[2]The respondents are asked to rank the extent to which they agree on a seven-point Likert scale, ranging from extremely disagree (=1) to extremely agree (=7).

[3] Ibid, footnote 2.

Table 1. Descriptive statistics and correlation coefficients of variables (n = 201).

Variable	Mean	S.D.	1	2	3	4	5	6	7	8
Competitive advantage	27.77	3.93	1.00							
Firm age	29.15	13.38	–0.038	1.00						
Firm size	2.50	0.57	0.11	0.20***	1.00					
Environment dynamism	3.86	1.18	0.04	–0.34***	0.09	1.00				
DEMKT	0.70	1.04	0.11	0.11	–0.23***	–0.08	1.00			
EO	4.10	1.05	0.14*	–0.06	0.18**	0.54***	–0.15**	1.00		
Value	27.76	3.59	0.70***	–0.05	0.04	0.15**	0.09	0.23***	1.00	
Rareness	26.88	3.76	0.74***	–0.09	0.06	0.08	0.14*	0.18**	0.51***	1.00

The VIF values are less than 0.2, implying no significant multicollinearity problems in our model. * P < 0.10, ** P < 0.05, *** P < 0.01.

Competitive advantage

Following Newbert (2008), this variable is based on the respondents' answers to three questions, including cost reduction, opportunity exploration, and the defense of competitive threats. Each question includes five items to indicate different types of resource-capability combinations—financial, human, intellectual, organizational, and physical resources/capabilities.[4] It has an overall Cronbach's α of 0.890, and composite reliability of 0.901.

Control variables

Several variables that might influence the competitive advantage of firms are controlled in the regression models, including firm size, firm age, debt-to-market ratio (DEMKT), environmental dynamism, and industry affiliation. Firm size reflects the economies and diseconomies of scale and may form barriers to entry (Bain, 1968) and is operationalized as the natural logarithm of the three-year average of total employees.

Firm age is controlled because prior studies suggest that the established organizations are more bureaucratic than those factors that influence their competitive advantages (Hannan and Freeman, 1989). A firm's age is measured as a company's age since its establishment. DEMKT is controlled because a firm with a low debt-to-market ratio is more likely to create competitive advantage (Chatterjee and Wernerfelt, 1991; Palepu, 1986).

Industrial environments are controlled by using two variables: environmental dynamism and industry affiliation (Khandwalla, 1976; Lumpkin and Dess, 2001; Miller and Friesen, 1982). Environmental dynamism is measured by five questions, with an inter-item reliability coefficient of 0.824. Possible performance differences resulting from industrial affiliation are also controlled. Based on the industry classification of TSE, 17 dummy variables are used to classify the sample firms into 18 industries.[5]

Table 1 reports the mean, standard deviations, and correlation coefficients of all variables. The correlation coefficients among independent, mediated, and control variables are very low, with the highest correlation of 0.51 existing between value and rareness. In addition, we assess the variance inflation factor (VIF) values in the regression models and find no significant multicollinearity problems (VIF < 2.0). This implies that no serious multicollinearity problems exist in our models.

Analytical methods

This study first uses the structural equation modeling (SEM) technique to test the proposed model.[6] The data are analyzed by using the LISREL 8.54 software, and the maximum likelihood estimation (MLE) method is used to estimate the factor structure of the proposed model. We follow a standard two-step process, in which CFA is first performed to assess the measurement model, while the structural model is then constructed when the measurement model is upheld (Anderson and Gerbing, 1988).

The model fit is assessed by using χ^2/df, goodness-of-fit index (GFI), comparative fit index (CFI), normal fit index (NFI), and root mean square error of approximation (RMSEA). The threshold for χ^2/df should be less than 3.0 or less than 2.0 in a more restrictive sense (Premkumar and King, 1994). Values of GFI, CFI and NFI should be over 0.90, while the value of RMSEA should be less than 0.08. In order to confirm the validity of the measurement model, both the convergent and discriminant validity are further tested (Venkatraman, 1989).

The ordinary-least-squared (OLS) hierarchical regression analysis is then used to examine the possible mediation effect of resource attributes on the relationship between EO and competitive advantage. Following Baron and Kenny (1986), three processes are used to test the mediation effect: (a) regression models are constructed by using only the mediated variable (that is, resource-capability combinations) as the regressor; (b) regression equations are constructed by using only the independent variable (that is, EO) as the regressor; and (c) regressions are conducted by introducing both the independent (EO) and mediated variables (resource-capability combination) into the models.

RESULTS

The confirmatory factor analysis (CFA) of SEM technology is used to test the construct validity of the measurement model. This confirmatory assessment approach comprises both convergent validity and discriminant validity. The hypotheses are tested via a path analysis. Finally,

[4] Ibid, footnote 2.

[5] According to the TSE database, these industries include cements, food and beverage, plastics, textile, electric machinery, electrical wire and cable, chemicals and biotechnology, glass and ceramic, paper, iron and steel, rubbers, information and electronics, building and construction, shipping and transportation, tourism, wholesale and retail trading, electricity, and other miscellaneous industries.

[6] In contemporary studies, the measurement (that is, factor analysis) and structure (that is, path analysis) have been integrated into SEM since the 1970s (Aryee, Budhwar, and Chen, 2002; Bagozzi, 1988; Moreno and Casillas, 2008).

Table 2. Parameters of measurement model (n = 201).

Construct	Factor loading (λ)	Reliability (λ^2)	t-value	CR	AVE
EO	0.53-0.98	0.28-0.96	5.41-6.28	0.74	0.52
Value	0.72-0.86	0.52-0.74	10.87-11.68	0.87	0.65
Rareness	0.90-0.93	0.81-0.86	20.77-21.27	0.93	0.83
Competitive advantage	0.80-0.94	0.67-0.86	14.31-16.34	0.90	0.75

EO includes innovation, proactiveness, and risk-taking. CR represents composite reliability; AVE represents average variance extracted.

Table 3. Analysis of discriminant validity (n = 201).

Construct	EO	Value	Rareness
Value	54.54*** (0.153, 0.309)		
Rareness	51.41*** (0.101, 0.257)	16.09*** (0.533, 0.807)	
Competitive advantage	60.26*** (0.058, 0.214)	17.39*** (0.561, 0.898)	110.73*** (0.585, 0.899)

The statistics compare the differences between the unconstrained model and the constrained model. The estimated confidence intervals are in parentheses. * $P < 0.10$, ** $P < 0.05$, *** $P < 0.01$.

multiple regression equations are constructed to confirm the robustness of the path analysis findings.

Measurement assessment procedures

This study specifies innovation, proactiveness, and risk-taking as the three dimensions of EO. The CFA provides an acceptable fit for the full measurement model in which EO, value, rareness, and competitive advantage are all included (χ^2 (59) = 97.91, GFI = 0.93, CFI = 0.99, NFI = 0.97, RMSEA = 0.057). Table 2 shows the results.

As to the construct validity and reliability of measures, this study employs CFA rather than EFA because CFA contains inferential statistics that allow a strict interpretation of validity (Gerbing and Anderson, 1988). First, reliability is assessed by using both individual item reliability and composed reliability. Table 2 shows the square of the factor loading for each item (λ^2) in order to analyze their individual reliability, and their values are all larger than 0.2, an indicative threshold recommended by Bentler and Wu (1983) and Jöreskog and Sörbom (1989). In addition, all estimates for the composite reliability (CR) are equal to or higher than 0.6 (Bagozzi and Yi, 1988). Therefore, all indicators for testing reliability are above the acceptable level.

Secondly, two sets of statistics, the significant of factor loading and the average variance extracted (AVE), are used for the verification of convergent validity. The results of Table 2 confirm the convergent validity of the scales because the estimated coefficients of all indicators are significant on their posited underlying constructs ($t > 1.96$) (Anderson and Gerbing, 1988). All the AVEs are above 0.5, implying that the indicator variables can respond to the constructs (Bagozzi and Yi, 1988). Therefore, convergent validity is confirmed.

Finally, in Table 3, regarding discriminant validity, the results show that the confidence intervals of the correlations for the constructs excluded 1.0, implying the discriminant validity of inter-constructs. In addition, discriminant validity is assessed by comparing the unconstrained model with the constrained model in which the correlation between the two constructs is constrained to 1.0 (Anderson and Gerbing, 1988; Jöreskog and Sörbom, 1989). The result shows that each pair of constructs has a significant difference (Table 3). Therefore, discriminant validity is also achieved.

Assessment of model fit and path significance

We first test the full mediated model, the results of which are presented in Figure 2. The fit indices for this model are adequate: χ^2 (61) = 99.14, $p < 0.001$; GFI = 0.93; CFI = 0.99; NFI = 0.97; RMSEA = 0.057. EO is found to be positively related to the value of resource-capability combinations (β= 0.26 for value, $p < 0.01$) and is also positively related to the rareness of resource-capability combinations (β= 0.19 for rareness, $p < 0.05$). Therefore, H_1 and H_2 are supported.

In H_3 and H_4 (the associations between resource attributes and competitive advantage), the value of resource-capability combinations is positively associated with a firm's competitive advantage (β= 0.48, $p < 0.001$), and the rareness of resource-capability combinations shows a positive association, too (β= 0.46, $p < 0.001$). H_3 and H_4 are thus supported. With respect to the mediated effect of resource attributes (H_5), the full mediated model is found to be preferred, thus supporting H_{5a} and H_{5b}.

The results of our analyses strongly support the mediated model proposed in this study. That is, the influence of EO on a firm's competitive advantage is

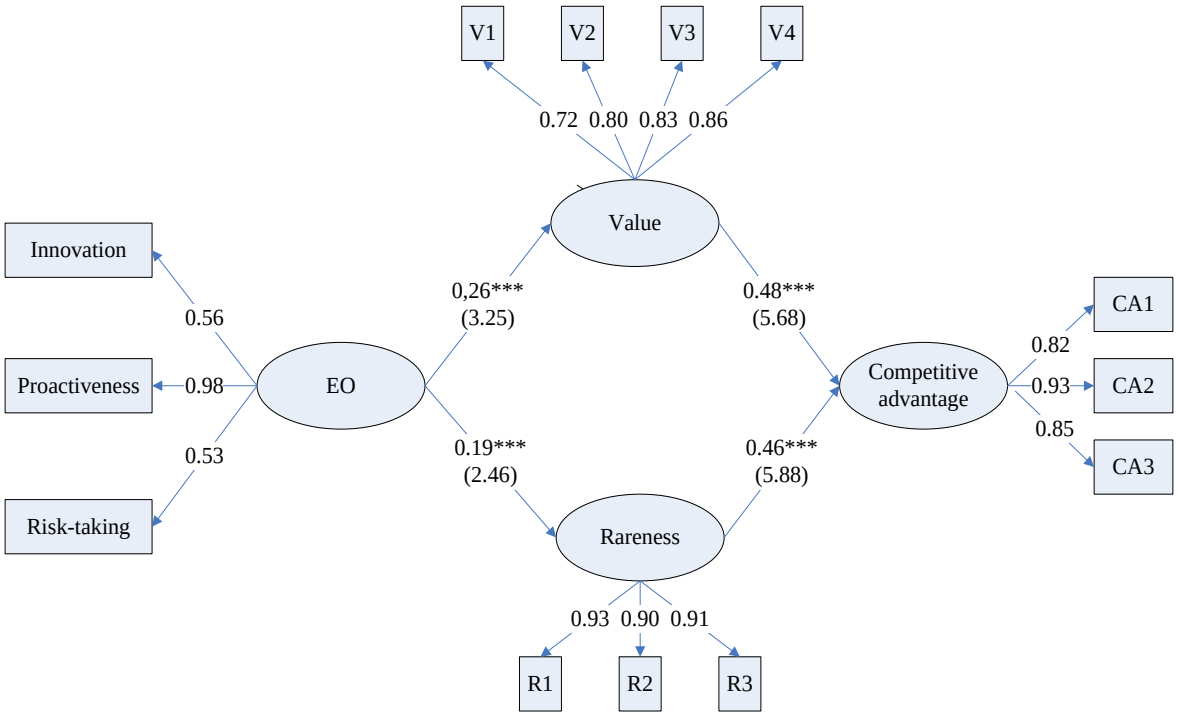

Figure 2. Structure model: results of the SEM model with latent constructs (n = 201).Standardized factor loadings and path coefficients are presented. The estimates of t-value are reported in parentheses. * $P < 0.10$, ** $P < 0.05$, *** $P < 0.01$. (χ^2 (61) = 99.14; GFI = 0.93; CFI = 0.99; NFI = 0.97; RMSEA = 0.057).

channeled through its attributes, specifically, value and rareness, of resource-capability combinations.

Comparison of alternative models

To confirm whether our proposed model fits the data well, we compare the efficacy of several alternative models (Aryee et al., 2002). The results are presented in Table 4. Model 1 is the hypothesized model (completely mediated model). Model 2 is a direct model and contains three paths: from EO to competitive advantage, from value to competitive advantage, and from rareness to competitive advantage.

Model 3 is the partially mediated model (James et al., 2006) and it adds an additional path: from EO to competitive advantage. Model 4 is another partially mediated model, with paths from EO to value, from value to competitive advantage, and from EO to competitive advantage. Model 5 is also a partially mediated model, containing three paths: from EO to rareness, from rareness to competitive advantage, and from EO to competitive advantage. Model 6 is the non-nested alternative model that treats EO as a mediator of the relationships between value, rareness and competitive advantage.

The results of Table 4 show that our hypothesized model (Model 1) fits the data better than the alternative models do. Also, the differences in the chi-square values (χ^2) between Model 1 and other models (Models 2, 3, 4 and 5) are 0.62, 1.23, 1.21, and 0.44 respectively. The differences are all insignificant. Therefore, the results confirm the efficacy of the hypothesized model.

Regression model

We further follow Baron and Kenny's (1986) procedure to use its regression techniques to confirm the robustness of our research findings. The OLS multiple regression analysis is used after controlling for a number of variables. Table 5 summarizes the results. Model 3 is the null model, with only control variables included in the regression equation. Value and rareness are added in Models 1 and 2 respectively, while EO is further introduced into the regressions in Model 4. Two mediated variables, value and rareness, are incorporated in Models 5 and 6 respectively. In Model 7, both mediated variables are added.

EO is found to be positively related to the value of resource-capability combination in Model 1 ($\beta = 0.669$, $p < 0.05$). EO is also positively related to rareness in Model 2 ($\beta = 0.634$, $p < 0.05$). Therefore, Hypotheses 1 and 2 are supported. Model 4 indicates that EO is positively associated with competitive advantage ($\beta = 0.683$, $p < 0.05$). When value is added into the equation in Model 5, the relationship between EO and competitive advantage

Table 4. Comparison of competing models (n = 201).

Model	χ^2	*df*	(χ^2/ *df*)	$\Delta\chi^2$	Δdf	$\Delta\chi^2/\Delta df$	GFI	CFI	RMSEA	NFI
1	99.14	61	1.62				0.93	0.99	0.056	0.97
2	97.91	59	1.66	1.23	2	0.62(insignificant)	0.93	0.99	0.057	0.97
3	97.91	60	1.63	1.23	1	1.23(insignificant)	0.93	0.99	0.057	0.97
4	64.13	32	2.00	35.01	29	1.21(insignificant)	0.93	0.98	0.071	0.96
5	82.74	24	3.45	16.40	37	0.44(insignificant)	0.92	0.96	0.111	0.95
6	228.55	61	3.75	-	-	insignificant	0.85	0.93	0.117	0.92

GFI = goodness-of-fit index; CFI = comparative fit index; RMSEA = root mean square error of approximation; NFI = normed fit index. $\Delta\chi^2$ is the difference between the hypothesized model (Model 1) and the competing models (Models 2-6). If the value ($\Delta\chi^2/\Delta df$) is smaller than 3.84, the model will not be adapted. Model 1 is the hypothesized model (completely mediated model). Model 2 is a direct model. The path is from EO, value, and rareness to competitive advantage. Model 3 is a partially mediated model. In comparison to the hypothesized model, Model 3 adds the path from EO to competitive advantage. Model 4 is another partially mediated model. The path is from EO to value, from value to competitive advantage, and from EO to competitive advantage. Model 5 is also a partially mediated model. The path is from EO to rareness, from rareness to competitive advantage, and from EO to competitive advantage. Model 6 is a non-nested alternative model. It treats EO as a mediator of the relationships between value, rareness and competitive advantage. There are two paths in this model. One is from value to EO and from EO to competitive advantage. The other is from rareness to EO and from EO to competitive advantage.

is no longer significant, while value is still significant (β = 0.779, $p < 0.001$). When rareness is added into the equation in Model 6, the relationship between EO and competitive advantage is no longer significant, but rareness still stands out significant (β = 0.769, $p < 0.001$). Finally, when value and rareness both entered the equation in Model 7, the relationship between EO and competitive advantage is no longer significant, while value and rareness are both still significantly associated with competitive advantage. Overall, the results strongly indicate that value and rareness perfectly mediate the relationship between EO and competitive advantage. Therefore, H_3, H_4, H_{5a}, and H_{5b} are strongly supported.

As to the control variables (Table 5), firm size is positive related to competitive advantage in the partial models (Models 2, 3, 4, and 5), implying that the larger the size of a firm, the greater is its competitive advantage. Environment dynamism is negatively associated with value (that is, Models 5 and 7), suggesting that when a firm faces constant environment, it could better facilitate the value and rareness of resource-capability combinations. Finally, DEMKT is positively associated with the rareness of resource-capability combinations (Model 2), implying that a firm with EO tends to invest a great deal of expenses in attempting the rare of resource-capability combinations. Moreover, DEMKT is also positively related to competitive advantage (Models 4 and 5), suggesting that competitive advantage can be promoted when an EO firm is willing to spend expenses on improving resources, capabilities and equipments.

Finally, in order to further examine the mediated effects of resource-capability combinations on the EO-competitive advantage relationship, we utilize the tests proposed by Sobel (1982), Aroian (1947) and Goodman (1960). Their method is particularly useful in examining the influence of a mediated variable on the relationship between an independent and a dependent variable. In other words, their method estimates whether or not a mediated variable reflected the influence of an independent variable on a dependent variable. Table 6 shows that the results of the relationship between EO and competitive advantage are significantly mediated by value and rareness, re-confirming the robustness of our predications on H_{5a} and H_{5b}.

Conclusion

Entrepreneurship is at the heart of strategic management (Meyer et al., 2002), and the resource-based view is likely to advance our insights on entrepreneurship (Alvarez and Busenitz, 2001; Barney, 2001; Brown et al., 2001; Conner, 1991). This study thus aims to examine the relationships between EO, the attributes of resource-capability combinations (that is, value and rareness), and the competitive advantage of firms.

Based on the data collected from 201 Taiwanese public firms, the results of this study provide support to our predictions. That is, firms with strong EO are likely to utilize valuable and rare resource-capability combinations, and the value and rareness of resource-capability combinations further mediate the relationship between EO and competitive advantage. The results of this study support the resource-based perspective of entrepreneurship (Covin and Slevin, 1991; Lumpkin and Dess, 1996).

One contribution of this study may be the development of a theoretical and empirical link between EO, resource attributes, and competitive advantage. This study challenges the conventional wisdom of the resource heterogeneity approach, which might over-emphasize the relationship between the role of a specific resource/ capability and firm performance (Deephouse, 2000). This study argues that EO and resources/capabilities attributes represent different constructs (Ireland et al., 2003;

Table 5. Results of OLS regression (n = 201).

Variable	Model (EO, Rareness, Competitive advantage)						
	Value	Rareness	Competitive advantage				
	Model	Mode 2	Mode 3	Mode 4	Mode 5	Mode 6	Mode 7
Control variable							
Firm age	0.004	−0.030	−0.001	−0.008	−0.010	0.015	0.006
	(0.025)	(0.027)	(0.028)	(0.028)	(0.020)	(0.018)	(0.018)
Firm size	0.684	10.082**	10.355**	10.210**	0.677*	0.378	0.369
	(0.506)	(0.542)	(0.560)	(0.559)	(0.399)	(0.377)	(0.359)
DEMKT	0.361	0.754**	0.577*	0.644**	0.363*	0.064	0.106
	(0.277)	(0.296)	(0.307)	(0.305)	(0.218)	(0.208)	(0.193)
Environmental dynamism	0.098	−0.228	−0.068	−0.423	−0.499**	−0.248	−0.348*
	(0.283)	(0.303)	(0.266)	(0.312)	(0.222)	(0.209)	(0.206)
Industry	includes	includes	includes	Includes	includes	includes	includes
Independent variable							
EO	0.699**	0.634**		0.683**	0.148	0.195	0.064
	(0.293)	(0.313)		(0.323)	(0.233)	(0.218)	(0.214)
Mediated variable							
Value					0.779***		0.421***
					(0.059)		(0.068)
Rareness						0.769***	0.512***
						(0.052)	(0.065)
R^2	0.133	0.102	0.091	0.113	0.555	0.607	0.681
Adjusted R^2	0.084	0.052	0.045	0.063	0.528	0.582	0.659
F statistics	2.720***	2.015**	1.974**	2.258**	19.986***	24.670***	31.070***
Sign F	0.004	0.034	0.045	0.017	0.000	0.000	0.000
△ R^2				0.022	0.442	0.493	0.567

Standardized regression coefficients are presented. Standard errors are in parentheses. The dependent variable is competitive advantage. The independent variable, entrepreneurial orientation, is measured using several alternative methods, encompassing EO model (innovation, proactiveness, and risk-taking). The mediated variables encompass value and rareness. The remaining variables report the control variables, including firm size, firm age, DEMKT, environmental dynamism, and industry affiliation. * P < 0.10, ** P < 0.05, *** P < 0.01.

Table 6. Mediating effect of value and rareness (n = 201).

Mediated relationship	Sobel test	Aroian test	Goodman test
The influence of EO on competitive advantage is mediated by the value of resource-capability combinations.	2.348**	2.341**	2.354**
The influence of EO on competitive advantage is mediated by the rareness of resource-capability combinations.	2.007**	2.002**	2.011**

* P < 0.10, ** P < 0.05, *** P < 0.01.

Lumpkin and Dess, 1996). A firm's EO stems from its innovation, proactiveness and risk-taking, which in turn determine the value and rareness of resource-capability combinations. Firms with EO are likely to enhance their competitive advantage by reducing costs or differentiating products/services via the combinations of resources and capabilities. Through the analysis of the competing models (Table 4), this study also clarifies the causal relationship between EO, resource attributes and competitive advantages (Covin and Slevin, 1991; Foss et

al., 2008). When EO serves as a mediator of the relationship between resource attributes and competitive advantages, its model fit unsatisfactory (Model 6).

Despite its contributions, this study has some limitations that possibly pave the way for future research. First, this study collects self-reporting data from top managers, so it might be involved with the common method variance (CMV) problem. Regarding the procedural remedies (ex ante preventive methods), we guaranteed anonymity and mailed the questionnaires directly to the managers. We also reduced item ambiguity and separated related items to avoid respondents guessing the relationship between variables (Podsakoff et al., 2003). As to the statistical remedies (ex post testing methods), we use Harman's single-factor test, a widely adopted post hoc remedy, to estimate whether our data has CMV problem or not (Podsakoff and Organ, 1986). The result shows that the first factor accounts for only 28% of variance among variables. This implies that there are no serious CMV problems in our data. Second, in order to assess systematic and reliable data, this study focused only on public firms, which are usually large firms. Future studies that investigate the relationship between EO, resources and competitive advantage in small- and medium-sized firms might take into account whether other variables influence their relationships, such as external environment (Covin and Slevin, 1991) and organizational slack (Lumpkin and Dess, 1996). Finally, the construct of resource attributes developed by Newbert (2008) only include value and rareness. Future studies might add other attributes, such as inimitability and non-substitutability, to develop more comprehensive measures for resource attributes.

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