



# Entrepreneurial Orientation and Business Performance: An Assessment of Past Research and Suggestions for the Future

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Entrepreneurial orientation (EO) has received substantial conceptual and empirical attention, representing one of the few areas in entrepreneurship research where a cumulative body of knowledge is developing. The time is therefore ripe to document, to review, and to evaluate the cumulative knowledge on the relationship between EO and business performance. Extending beyond qualitative assessment, we undertook a meta-analysis exploring the magnitude of the EO-performance relationship and assessed potential moderators affecting this relationship. Analyses of 53 samples from 51 studies with an N of 14,259 companies indicated that the correlation of EO with performance is moderately large ( $r = .242$ ) and that this relationship is robust to different operationalizations of key constructs as well as cultural contexts. Internal and environmental moderators were identified, and results suggest that additional moderators should be assessed. Recommendations for future research are developed.

## Introduction

Many reviews and assessments of the entrepreneurship research field have concluded that the development of a cumulative body of knowledge has been limited and slow because there is lack of agreement on many key issues regarding what constitutes entrepreneurship (e.g., Shane & Venkataraman, 2000), because researchers fail to build upon each others' results (Davidsson & Wiklund, 2001), and because measurements of key variables are typically weak. Although the larger field of entrepreneurship may be struggling with central

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conceptual issues, the development has been more promising in certain areas of entrepreneurship research. A large stream of research has examined the concept of entrepreneurial orientation (EO). EO has become a central concept in the domain of entrepreneurship that has received a substantial amount of theoretical and empirical attention (Covin, Green, & Slevin, 2006). More than 100 studies of EO have been conducted, which has led to wide acceptance of the conceptual meaning and relevance of the concept.

EO refers to the strategy-making processes that provide organizations with a basis for entrepreneurial decisions and actions (e.g., Lumpkin & Dess, 1996; Wiklund & Shepherd, 2003). Drawing on prior strategy-making process and entrepreneurship research, measurement scales of EO have been developed and widely used, and their relationships with other variables have been examined. Thus, EO represents one of the areas of entrepreneurship research where a cumulative body of knowledge is developing. Consequently, we believe that the time has come to document, to review, and to evaluate the cumulative knowledge on the relationship between EO and business performance. Given that similar measurement instruments have been applied across a wide array of studies, it is possible to extend this review beyond qualitative assessments (see Newbert, 2007, for a qualitative assessment of resource-based research) and conduct a meta-analysis. A number of theoretical, methodological, and empirical contributions can be derived from our review and analyses.

First, a meta-analysis can help guide future studies into areas that are of particular importance. As the number of studies examining the relationship between EO and performance is ever increasing (using publication date as an indicator), this is an important function of a meta-analysis. Such an analysis can tell us if an area has reached maturity, if further work in the area is warranted and, going forward, what kinds of EO-performance studies need to be done. It can also provide more fine-grained information, pointing to specific issues that remain unresolved and need additional attention. Specifically, our analyses provide guidance as to where theories that include moderators of relationships should be developed to more precisely explain the relationship of EO to performance, and where moderators are less likely to be empirically supported.

Second, firms pursuing high EO are faced with decisions involving risk taking and the allocation of scarce resources. There is a potential downside to taking risks and resources can potentially be allocated to other ends. Therefore, it is essential to know not only whether EO has positive or negative effects on performance, as is typically indicated when the null hypothesis of zero effect is rejected, but also to estimate the magnitude of the effect of EO on performance. Unless the effect size is substantially positive, wholehearted recommendations that firms use a high degree of EO in management decisions appear misdirected (see Wiklund, 1999) because of the risk associated with EO and its demanding resource requirements. Such considerations reflect evidence-based management, which is strongly called for in the literature (Pfeffer & Sutton, 2006; Rousseau, 2006) and are common in other fields of research (Tranfield, Denyer, & Smart, 2003).

Third, previous studies have indicated that EO or certain dimensions thereof may differ across countries (e.g., Knight, 1997; Thomas & Mueller, 2000). Whether or not this also relates to the strength of the relationship between EO and performance is still an open question. For example, it is possible that an aggressive “undo the competitor”<sup>1</sup> strategic stance, as suggested by an EO, is perceived as positive by important stakeholders and rewarded in some cultures but negative and punished in others, suggesting that the influence of EO on performance may vary as a function of cultural norms. As early as 1983, Hofstede noted that management theories were culturally bounded. Journal

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1. Undo the competitor represents part of a questionnaire item in the EO measurement instrument.

contributors and samples studied today represent a wider set of countries than ever before. The formulation of the EO model and the original empirical tests were mainly done in the North American context (e.g., Covin & Slevin, 1989; Lumpkin & Dess, 1996; Miller, 1983). Clarifying the extent to which these results replicate or not across a wide set of countries may not only contribute to future EO research but more generally to theorizing about entrepreneurship because it helps in establishing boundary conditions of theories.

Fourth, our review assists in providing methodological advice for future EO research. The possibility of conducting a meta-analysis depends largely on the quality of the underlying studies. The research design, operationalization, sampling, and reporting of statistics are key considerations in a meta-analysis. Consequently, reviewing the empirical EO literature, we are able to identify potential shortcomings in prior EO research and to provide recommendations for enhancing the quality of future studies.

The article proceeds as follows. In the next section, we introduce the EO concept, the dimensions of EO, and the implications of EO on business performance. Moreover, we develop arguments that the effect of EO on performance is likely dependent on moderator variables, such as type of industry, business size, and cross-national contexts. Next, we describe our search for studies, the samples selected, and the meta-analytic techniques used in our research. Finally, we report our findings and discuss their implications.

## Entrepreneurial Orientation and Firm Performance

EO has its roots in the strategy-making process literature (e.g., Mintzberg, 1973). Strategy making is an organization-wide phenomenon that incorporates planning, analysis, decision making, and many aspects of an organization's culture, value system, and mission (Hart, 1992). Consistent with Mintzberg, Raisinghani, and Theoret who noted that strategy making is "important, in terms of the actions taken, the resources committed, or the precedents set" (1976, p. 246), EO represents the policies and practices that provide a basis for entrepreneurial decisions and actions. Thus, EO may be viewed as the entrepreneurial strategy-making processes that key decision makers use to enact their firm's organizational purpose, sustain its vision, and create competitive advantage(s).

## The Dimensions of EO

The salient dimensions of EO can be derived from a review and integration of the strategy and entrepreneurship literatures (e.g., Covin & Slevin, 1991; Miller, 1983; Miller & Friesen, 1978; Venkatraman, 1989a). Based on Miller's conceptualization, three dimensions of EO have been identified and used consistently in the literature: innovativeness, risk taking, and proactiveness. *Innovativeness* is the predisposition to engage in creativity and experimentation through the introduction of new products/services as well as technological leadership via R&D in new processes. *Risk taking* involves taking bold actions by venturing into the unknown, borrowing heavily, and/or committing significant resources to ventures in uncertain environments. *Proactiveness* is an opportunity-seeking, forward-looking perspective characterized by the introduction of new products and services ahead of the competition and acting in anticipation of future demand.

Lumpkin and Dess (1996) suggested that two additional dimensions were salient to EO. Drawing on Miller's (1983) definition and prior research (e.g., Burgelman, 1984; Hart, 1992; MacMillan & Day, 1987; Venkatraman, 1989a), they identified competitive aggressiveness and autonomy as additional components of the EO construct. *Competitive*

*aggressiveness* is the intensity of a firm's effort to outperform rivals and is characterized by a strong offensive posture or aggressive responses to competitive threats. *Autonomy* refers to independent action undertaken by entrepreneurial leaders or teams directed at bringing about a new venture and seeing it to fruition.

The salient dimensions of EO usually show high intercorrelations with each other, ranging, for example, from  $r = .39$  to  $r = .75$  (Bhuian, Menguc, & Bell, 2005; Richard, Barnett, Dwyer, & Chadwick, 2004; Stetz, Howell, Stewart, Blair, & Fottler, 2000; Tan & Tan, 2005). Therefore, most studies combined these dimension into one single factor (e.g., Covin, Slevin, & Schultz, 2004; Lee, Lee, & Pennings, 2001; Naman & Slevin, 1993; Walter, Auer, & Ritter, 2006; Wiklund & Shepherd, 2003). However, there has been some debate in the literature concerning the dimensionality of EO. Some scholars have argued that the EO construct is best viewed as a unidimensional concept (e.g., Covin & Slevin, 1989; Knight, 1997) and, consequently, the different dimensions of EO should relate to performance in similar ways. More recent theorizing suggests that the dimensions of EO may occur in different combinations (e.g., Covin et al., 2006; Lumpkin & Dess, 2001), each representing a different and independent aspect of the multidimensional concept of EO (George, 2006). As a consequence, the dimensions of EO may relate differently to firm performance (Stetz et al.). Specifically referring to the dimensionality of EO, Covin et al., p. 80) note that "intellectual advancement pertaining to EO will likely occur as a function of how clearly and completely scholars can delineate the pros and cons of alternative conceptualizations of the EO construct and the conditions under which the alternative conceptualizations may be appropriate." While different conceptual arguments can be used for and against treating EO as a uni- or multidimensional construct, meta-analysis can establish empirically whether the different dimensions of EO relate to performance to the same or varying extent.

## The EO-Performance Relationship

The conceptual arguments of previous research converge on the idea that firms benefit from highlighting newness, responsiveness, and a degree of boldness. Extensive discussion of the arguments can be found in Lumpkin and Dess (1996). Indeed, these suggestions form the basis for the interest in studying the relationship between EO and performance (Miller, 1983). In an environment of rapid change and shortened product and business model lifecycles, the future profit streams from existing operations are uncertain and businesses need to constantly seek out new opportunities. Therefore, firms may benefit from adopting an EO. Such firms innovate frequently while taking risks in their product-market strategies (Miller & Friesen, 1982). Efforts to anticipate demand and aggressively position new product/service offerings often result in strong performance (Ireland, Hitt, & Sirmon, 2003). Thus, conceptual arguments suggest that EO leads to higher performance. However, the magnitude of the relationship seems to vary across studies. While some studies have found that businesses that adopt a strong EO perform much better than firms that do not adopt an EO (with an  $r > .30$ , e.g., Covin & Slevin, 1986; Hult, Snow, & Kandemir, 2003; Lee et al., 2001; Wiklund & Shepherd, 2003), other studies reported lower correlations between EO and performance (e.g., Dimitratos, Lioukas, & Carter, 2004; Lumpkin & Dess, 2001; Zahra, 1991) or were even unable to find a significant relationship between EO and performance (Covin et al., 1994; George, Wood, & Khan, 2001). Thus, there is a considerable variation in the size of reported relationships between EO and business performance. Consequently, using meta-analysis, we provide a point estimate on the relationship between EO and performance across previous studies and we ask the question whether the variation is high

enough to warrant an empirical examination of moderators of the EO–performance relationship.

## Type of Performance Assessment

Performance is a multidimensional concept and the relationship between EO and performance may depend upon the indicators used to assess performance (Lumpkin & Dess, 1996). The empirical literature reports a high diversity of performance indicators (cf. reviews by Combs, Crook, & Shook, 2005; Venkatraman & Ramanujam, 1986); a common distinction is between financial and nonfinancial measures. Nonfinancial measures include goals such as satisfaction and global success ratings made by owners or business managers; financial measures include assessments of factors such as sales growth and return on investments (ROI; Smith, 1976). Regarding financial performance, there is often a low convergence between different indicators (Murphy, Trailor, & Hill, 1996). On a conceptual level, one can distinguish between growth measures and measures of profitability. While these concepts are empirically and theoretically related, there are also important differences between them (Combs et al.). For example, businesses may invest heavily in long-term growth, thereby sacrificing short-term profits. The conceptual argument of the EO–performance relationship focuses mainly on financial aspects of performance. Businesses with high EO can target premium market segments, charge high prices, and “skim” the market ahead of competitors, which should provide them with larger profits and allow them to expand faster (Zahra & Covin, 1995). The relationship between the EO construct and nonfinancial goals, such as increasing the satisfaction of the owner of the firm, is less straightforward. We argue that there is little direct effect of EO on nonfinancial goals because this relationship is tenuous. For example, if nonfinancial goals are of prime importance, the uncertainty associated with the bold initiatives and risk taking implied by an EO could potentially lead to agony, sleepless nights, and less satisfaction. However, satisfaction may increase because of better financial performance. However, indirect effects are usually smaller than direct effect. Therefore, it appears reasonable to assume that the relationship should be higher for EO and financial performance than for EO and nonfinancial performance.

In terms of financial performance, studies can rely on self-report or archival data collected from secondary sources. While self-reported data may offer greater opportunities for testing multiple dimensions of performance, such as comparisons with competitors (e.g., Wiklund & Shepherd, 2005), such measures may be subject to bias because of social desirability, memory decay, and/or common method variance. Therefore, an important task of this meta-analysis is to establish the effect size of EO on performance for self-reported financial performance, archival financial performance, and nonfinancial performance measures.

## Moderator Variables

Research indicates that performance can be improved when key variables are correctly aligned (e.g., Naman & Slevin, 1993). This is the basic premise of contingency theory, which suggests that congruence or “fit” among key variables such as industry conditions and organizational processes is critical for obtaining optimal performance (Lawrence & Lorsch, 1967). Contingency theory holds that the relationship between two variables depends on the level of a third variable. Introducing moderators into bivariate relationships helps reduce the potential for misleading inferences and permits a

“more precise and specific understanding” (Rosenberg, 1968, p. 100) of contingency relationships. Because of its concern with performance implications, contingency theory has been fundamental to furthering the development of the management sciences (Venkatraman, 1989b). Therefore, to understand differences in findings across studies, we investigated potential moderators of the relationship between EO and performance.

The literature discusses a number of variables that potentially moderate the EO–performance relationship (Lumpkin & Dess, 1996; Zahra & Covin, 1995; Zahra & Garvis, 2000). There is little consensus on what constitutes suitable moderators, however, and both internal variables such as knowledge (Wiklund & Shepherd, 2003), and various environmental variables (e.g., Tan & Tan, 2005) have been included in studies of EO. Although several conceptual arguments have been suggested in favor of moderating variables, few potential moderators have been used across a sufficient number of EO studies to facilitate a meta-analysis of contingency relationships. However, it is not necessary that previous studies have explicitly tested moderator relationships in order to determine moderating effects. Meta-analysis makes it possible to examine moderating influences on the basis of the samples included in different studies. If the relationship between EO and performance varies across samples that differ on a given attribute, such findings suggest that the attribute may be a moderator (Miller & Toulouse, 1986).

## Methods

### Locating Studies

Consistent with recommendations of other meta-analyses (see Lowe, Kroeck, & Sivasubramiam, 1996), we used several strategies to locate studies. First, we searched databases (PsycInfo, 1987–2007; EconLit, 1967–2007; Social Science Citation Index, 1972–2007; and ABI/Inform, 1971–2007). We used the search terms entrepreneurial behavior, strategic orientation, strategic posture, and EO, which is consistent with the labeling of the EO construct found in previous reviews of the literature (Wiklund, 1998). Second, we conducted manual searches of journals that publish research on entrepreneurship: *Academy of Management Journal*, *Journal of Applied Psychology*, *Journal of Business Venturing*, *Entrepreneurship Theory & Practice*, *Journal of Small Business Management*, *Small Business Economics*, and *Strategic Management Journal*. Additionally, we analyzed conference proceedings of the Academy of Management (1984–2005), Babson College-Kaufman Foundation Entrepreneurship Research Conference (1981–2004), and International Council of Small Businesses (1993–2004). The fourth strategy involved examining the reference lists of located articles and reviews. These procedures produced an extensive list of studies. In order to be included in the meta-analysis, studies needed to report sample sizes, measurement procedures, and zero-order correlations or equivalent calculations (Ellis, 2006). Upon reading the abstracts or full papers, it rapidly became clear that several studies deviated substantially from the core aspects of EO. These studies were removed.

This initial screening left us with 134 publications potentially relevant for the scope of our meta-analysis. This number was then further reduced to 51 for the following reasons. First, it was impossible to locate some of the journals publishing EO articles (e.g., *Journal of African Business*) through interlibrary loans ( $k = 18$ ). Second, some samples were used for multiple publications ( $k = 15$ ). Third, some studies used EO to predict individual-level rather than firm-level performance ( $k = 5$ ); although potentially interesting, these studies are not compatible with studies of firm performance. Fourth, several studies did not report the statistics needed for estimating the effect size of

the EO–performance relationship, i.e., the zero-order correlation between EO and performance (or convertible equivalents) were missing ( $k = 45$ ). This resulted in 51 studies that reported in all 53 independent samples with a total of 14,259 cases for our meta-analysis. Such an extensive reduction in studies that can actually be included in meta-analysis is not uncommon. For example, Ellis (2006) located 175 empirical studies dealing with marketing orientation, out of which 56 could be included in a meta-analysis.

## Study Description

In order to make a qualitative assessment of the 51 studies to show the relevance of conducting a meta-analysis, and to derive suitable moderator variables for the meta-analysis, we present details of the studies in Table 1.<sup>2</sup> A first interesting observation is how the number of studies has increased over time. The increase in the number of studies coincides with a spreading of EO research around the globe. In the 1980s, three studies were published—all from North America. The 1990s saw 14 studies, 12 from the United States, one from Europe, and one from Australia. Between the years 2000 and 2006, no less than 34 studies have been published. Twenty-two of these used data from outside of the United States with seven from Asia, eight from Europe, two from Australia, and five utilizing data from more than one continent. The remaining 12 studies were carried out in the United States. These findings suggest that EO research is becoming increasingly popular around the globe. The recent research thrust in EO warrants carrying out a meta-analysis to assess the value added of further EO research and for determining if there are specific issues that may need additional attention in future studies.

As EO research has continued spreading, so have the variants for measuring the construct. There is little doubt that the original studies of Miller (1983) and Covin and Slevin (1989) provided the foundations for the scales used in subsequent studies. However, different variations of the scales are being used. In particular, three types of modifications were made to these original scales. First, the number of dimensions included varied somewhat across studies. Miller's and Covin and Slevin's original nine-item formulation of the three dimensions innovativeness, proactiveness, and risk taking dominated with a total of 28 studies. However, this also means that close to half of all the studies view EO as consisting of alternative or additional dimensions. In particular, futurity and/or competitive aggressiveness, both taken from Venkatraman (1989a), appear to be popular additions to the EO construct.

Second, the number of scale items utilized to assess EO varied across studies. This applies even when the same dimensions of EO were investigated. For example, across the studies in our analysis, the number of items used to tap the dimensions of innovativeness, proactiveness, and risk taking varied from six to eleven. Finally, many studies converted the original semantic differential statements response format used by Covin and Slevin to Likert scales. It appears that EO researchers preferred to experiment with adaptations of the scale rather than consistently sticking to one particular measurement.

As for the dimensionality of the EO construct, 37 studies viewed it as a unidimensional construct, summing the different aspects of EO into a singular scale, whereas 14 studies viewed EO as multidimensional, estimating separate effects on performance for each dimension. Taken together, these findings related to the measurement of EO speak to

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2. Note that Table 1 is based on 51 publications, whereas Table 2 is based on 53 independent samples—these 53 independent samples were reported in the 51 publications.

## Study Description

Author name (year)	Dimensions	Measurement scale	Uni-/ Multidimensional	Performance indicator	Country of origin	Size of firms	Industry of firms	Sample size
M. Hult, Robert F. Hurley, and Gary A. Knight (2004)	Innovativeness adapted from Hurley (1998), EO adapted from Covin and Slevin (1989) on 7-point Likert scale	5-item adapted from Naman and Slevin (1993) and Covin and Slevin (1989) on 7-point Likert scale	Unidimensional	Perceived financial performance	United States	Large enterprises	Mix	181
Stanley F. Slater and John C. Narver (2000)	Innovativeness, risk taking, and competitive aggressiveness	7-item Naman and Slevin (1993) on 5 Likert-type scale	Unidimensional	Perceived financial performance	United States	—	Mix	53
Fredric William Szwietecek and Tha Thanh Ha (2003)	Risk taking, proactiveness, and innovation	9 items on 5-point Likert scale adapted from Covin (1991)	Multidimensional	Perceived financial and nonfinancial performance	Vietnam and Thailand	Micro and small enterprises	Mix	478
Shahid N. Bhuiyan et al. (2003)	Innovativeness, proactiveness, and constructive risk taking	11 items from Miller and Friesen (1982), and Morris and Paul (1987)	Unidimensional	Perceived nonfinancial performance	United States	—	Nonhigh-tech (not-for-profit hospital)	231
Robert E. Morgan and Carolyn A. Strong (2003)	Aggressiveness, analysis, defensiveness, fluency, proactiveness, and riskiness	6 sets of statements by Venkataraman (1989a) for strategic orientation	Multidimensional	Perceived financial and nonfinancial performance	UK	Small and large firms	High-tech	149
Phil E. Stetz et al. (2000)	Proactiveness, risk taking, and fluency	Venkataraman (1989a)	Multidimensional	Perceived financial and nonfinancial performance	United States	Micro and small organization	Nonhigh-tech (health care)	865
Li Haiyang, A.-G. Kwaku, and Z. Yan (2000)	Innovation, marketing differentiation, market breadth, marketing alliance	Innovation is measured with four items drawn from Miller (1987) and Zahra (1993). Marketing differentiation is measured with six items drawn from Dess and Davis (1984) and Miller (1987). Market breadth is measured with three items drawn from McDonald and Robinson (1990). Marketing alliance is measured with six items based on the work of Bucklin and Sengepa (1993).	Multidimensional	Perceived financial and nonfinancial performance	China	Small company (mean)	High-tech (computer software and hardware, electronics, and information technology, integrated optical, new energy and new material, pharmaceutical and biotechnology, and others)	184
Rainer Harns and Thomas Ehrmann (2003)	Innovation and risk taking	Covin and Slevin (1986)	Unidimensional	Perceived financial and nonfinancial performance	Germany	—	Mix	82
Jeffrey G. Covin, J.E. Prescott, and D.P. Stevin (1990)	Risk taking, proactiveness, and innovation	9-item scale of Covin and Stevin (1989)	Unidimensional	Perceived financial performance	United States	Micro and small company (majority small company)	Mix	113

Jeffrey G. Covin et al. (1994)	Innovation, proactiveness, and risk taking	9 items, 7-point scale Covin and Stevin (1989)	Unidimensional	Perceived financial performance	United States	Micro and small company (minority small company)	High-tech (glassware, electro-mechanical pressure switches, jewelry, computer-aided transcription devices, ear care products, pacemakers and related biomedical devices, coatings for food and beverage containers, specialty steels, thermoplastic compounds, audio transducers, water treatment chemicals, orthopedic foot products, metal cutting tools, activated carbon, breathing apparatus, and printed circuits.	143
Jeffrey G. Covin and Teresa Joyce Covin (1990)	Competitive aggressiveness	3-item scale of Khandwalla (1976/1977)	Unidimensional	Perceived financial performance	United States	Micro and Small company (mean = small, 66 employees)	High-tech	137
Choonwoo Lee et al. (2001)	Innovativeness, risk-taking propensity, and proactiveness	Innovation is measured with suggestion of Lumpkin and Dess (1996), Miller and Friesen (1982), and Hage (1980). Risk-taking is measured with Miller (1983).	Unidimensional	Perceived financial performance	Korea	Micro and small company (mean = micro, 31 employees)	High-tech	94
G.T. Lumpkin and Gregory G. Dess (2001)	Innovativeness, risk taking, proactiveness, and competitive aggressiveness	Proactiveness is measured with Miller (1983) and Naman and Stevin (1993)	Multidimensional	Perceived financial performance	United States	—	—	647
Louis Marino et al. (2002)	Proactiveness, risk taking, and innovative	Khandwalla (1977), Miller (1983), Covin and Stevin (1986), and Covin and Covin (1990)	Unidimensional	Perceived financial performance	Finland, Greece, Indonesia, Mexico, The Netherlands, and Sweden	Micro and small firm	Mix (food and related products, wood and related products, printing machines and ancillary products, rubber and related products, machine tools and related products, electronics and related products, computer programming, textiles, and related products, services, construction and related services, oil and gas extraction and related services)	152
Pavlos Dimitratos et al. (2004)	Risk taking, proactiveness, and innovativeness	7-point Likert-type scales, risk taking are drawn from Khandwalla (1977), Miller and Friesen (1982), Naman and Stevin (1993); proactiveness is drawn from Covin and Covin (1990); innovativeness is drawn from Miller and Friesen (1982)	Unidimensional	Perceived nonfinancial performance	Greece	Micro, mostly small company	Mix (food, beverages, garments, footwear and software sectors)	152
Gerard George et al. (2001)	Risk taking, proactiveness, innovativeness, autonomy, and competitive aggressiveness	14-item, 7-point scale, of which nine items are from Naman and Stevin (1993) and five items were from Lumpkin and Dess (1996)	Unidimensional	Archival financial performance	United States	Small and medium bank (revenue <US\$50 Million)	Nonhigh-tech (bank)	70

Table 1

## Continued

Author name (year)	Dimensions	Measurement scale	Uni-/ Multidimensional	Performance indicator	Country of origin	Size of firms	Industry of firms	Sample size
G. Tomas M. Hult et al. (2003)	Innovativeness	Entrepreneurship was measured by five items adapted from Naman and Slevin (1993). Innovativeness was measured by five items adapted from Hurley and Hult (1998).	Unidimensional	Perceived financial performance	United States	Large enterprises	Mix	764
Ari Janunen, Kaiju Pummalaisten, Sami Saarelahti, Kalevi Kyllonenko (2005)	Innovativeness, proactiveness, and risk taking	The measure was adapted from Naman and Slevin (1993), and Wiklund (1998), which were based on measures developed in Covin and Slevin (1989) and Miller and Friesen (1982)	Unidimensional	Perceived and archival financial performance, and perceived non-financial performance	Finland	Small and large firms	Mix (food, forestry, furniture, chemicals, metals, electronics, information and communications technology [ICT], and services)	217
Bruce H. Kenelegor (2002)	Innovation, risk taking, and proactiveness	9 items. Covin and Slevin (1986)	Unidimensional	Archival financial performance	The Netherlands and the United States	Small firms	Hightech (electronics, computer software, and pharmaceutical industries)	8
Patrick Kreiser, Louis Martis, and K. Mark Weaver (2002)	Innovation, proactiveness, and risk taking	Covin and Slevin (1989) on 5-point Likert scale.	Multidimensional	Perceived nonfinancial performance	Australia, Costa Rica, Finland, Greece, Indonesia, Mexico, The Netherlands, Norway, Sweden	Micro and small enterprises	Mix	1671
Jeffrey G. Covin et al. (2006)	Innovation, risk taking, and proactiveness	9 items 7-point scale Covin and Slevin (1989), and partially from Khandwalla (1976/1977) and Miller and Friesen (1982)	Unidimensional	Archival financial performance	United States	Micro, small, and large firms. Mostly small company	Mix	110
Albert Cartana, Michael T. Ewing, and B. Ramaseshan (2002)	Risk taking, innovation, and competitive aggressiveness	13 items developed from 5 items Miller and Friesen (1982).	Unidimensional	Perceived financial and nonfinancial performance	Australia	Middle to large organization	Nonhigh-tech (public sector entities/government departments)	136
Richard C. Becheter and John G. Maurer (1999)	Proactiveness	9-item Likert scale adapted from Covin and Slevin (1989)	Unidimensional	Perceived financial performance	United States	Micro to small companies, mostly micro companies	Mix	215
Hilton Barrett and Art Weinstein (1998)	Innovativeness, proactiveness, and risk taking	9 items. Covin and Slevin (1989) on 7-point Likert scale	Unidimensional	Perceived nonfinancial performance	United States	Micro to large companies	Mix (manufacturing)	142

Kwaku Aduahene-Gima (2001)	Risk taking, proactiveness, aggressiveness, innovation	6 items, Covin and Slevin (1989)	Unidimensional	Perceived financial performance	Australia	Small firms	Mix	181
Shaker A. Zahra (1991)	Innovation, risk taking, and proactiveness	9 items, Miller (1983)	Unidimensional	Perceived and archival financial performance	United States	Large companies	Mix	119
Shaker A. Zahra and Dennis M. Jarvis (2000)	Innovation, proactiveness, and risk taking	7 items modified version of Miller (1983), on 5-point scale	Unidimensional	Archival financial performance	United States	Small to large companies	Mix	98
Shaker A. Zahra (1993)	Innovation	4 measurements (technology policies scale, aggressive technological posture scale, automation and process innovation scale, and new product development scale) on 7-point scale	Multidimensional	Archival financial performance	United States	—	Mix (mature industries, such as: textiles, metal household furniture, steel paperboard boxes, paving mixtures and blocks, blast furnaces, and steel mills)	103
Shaker A. Zahra (1996)	Innovation, venturing, and strategic renewal	14-item on 5-point scale, adapted from Miller (1983)	Multidimensional	Archival financial performance	United States	Large companies	—	127
Shaker A. Zahra and Donald O. Neibraum (1998)	Innovation, proactiveness, and risk taking	7-item Miller (1983) on 5-point scale	Unidimensional	Perceived financial performance	United States	Micro to small companies, mostly micro companies	Mix	99
Rob Vitale, Joe Gagliarano, and Morgan Miles (2003)	Innovation, proactiveness, and risk management	Covin and Slevin (1989), and subsequent refinement done by other researchers	Unidimensional	Perceived nonfinancial performance	United States	—	Mix	89
Danny Miller and Jean-Marie Toulouse (1986)	Innovation	Miller (1983)	Unidimensional	Perceived financial performance	Canada	Micro to small companies	Mix (electronics, financial services, home appliances, food and beverages, industrial equipment, lumber, construction, retailing and mining)	97
John L. Naman and Dennis P. Slevin (1993)	Risk taking, proactiveness, and innovativeness	9 items on 7-point Likert scale, Covin and Slevin (1986, 1989) based on the work of Miller and Friesen (1982), and Khandwalla (1976/1977)	Unidimensional	Perceived financial performance	United States	Micro to small companies	High-tech	82
Jane M.L. Poon, Rajah Azimah Aniuddin, and Sa'edah binti Junit (2006)	Innovativeness, proactiveness, and risk taking	9 item adapted from Covin and Slevin (1989) and Miller and Friesen (1982), on 5-point Likert scale	Unidimensional	Perceived financial performance	Malaysia	Micro to small companies	Mix	96
Justin Tan and David Tan (2005)	Futurity, proactiveness, risk affinity, analysis, and defensiveness	5 strategic orientation variables by Tan and Tan	Multidimensional	Perceived financial performance	China	—	High-tech (electronics industry)	104

**Table 1****Continued**

Author name (year)	Dimensions	Measurement scale	Uni-/ Multidimensional	Performance indicator	Country of origin	Size of firms	Industry of firms	Sample size
N. Venkatesan (1990)	Aggressiveness, analysis, definitiveness, fury, proactiveness, riskiness	6-dimensional model of STROBE (a matrix of zero-order correlations of 29 indicators) of Venkatesan (1990)	Multidimensional	Perceived financial performance	United States	—	Mix (consumer goods, capital goods, raw or semi-finished goods, components for finished goods, and service)	202
Achim Walker et al. (2006)	Proactiveness, innovation, risk taking, and assertiveness	6 items; three items are adapted from Dess, Lumpkin, & Covin (1997), and the other three items are based from Lumpkin and Dess (1996)	Unidimensional	Perceived financial and nonfinancial performance	Germany	Micro, average 16 people	Mix (technical services, consulting, and technical manufacturing)	149
K. Chadwick et al. (1999)	Risk taking, innovation, and proactiveness	9 items on 7-point Likert type Strategic Posture scale developed by Khandwalla (1977)	Unidimensional	Perceived financial performance and archival performance	United States	—	Nonhigh-tech (banking industry)	535
Dirk De Clercq, Harry I. Sapienza, and Hans Crijns (2003)	Innovation, proactiveness, and risk taking	5-item scale by Miller (1983)	Unidimensional	Perceived financial performance	Belgium	Micro and small enterprises	Mix (agriculture, construction, manufacturing, transportation, wholesale trade, retail trade, and service)	92
Erik Monsen (2005)	Risk taking, innovativeness, proactiveness, and autonomy	3-item scales from Covin and Slevin (1989) are used to measure risk taking, innovativeness, and proactiveness; while autonomy is measured using 3-item self-determination subscale from Spreitzer's (1995, 1996) four factor empowerment	Multidimensional	Perceived nonfinancial performance	United States	Large	Nonhigh-tech (healthcare)	1505
Orlando C. Richard et al. (2004)	Innovation, risk taking, and proactiveness	9-item entrepreneurial orientation scale by Covin and Slevin (1989)	Multidimensional	Archival financial performance	United States	Average medium companies	Nonhigh-tech (bank)	153
Johan Wiklund and Dean Shepherd (2003)	Innovation, proactiveness, and risk taking	9 items of Covin and Slevin (1989)	Unidimensional	Perceived financial and nonfinancial performance	Sweden	Micro and small enterprises	Mix (manufacturing, wholesale/retail, and services)	384

Johan Wiklund and Dean Shepherd (2005)	Innovation, risk taking, and proactiveness	8 items of Miller	Unidimensional	Perceived financial performance	Sweden	Micro enterprises	Mix (knowledge-intensive manufacturing, labor-intensive manufacturing, professional services, and retail)	413
So-Jin Yoo (2001)	Innovation, Proactiveness, and risk taking	Modified version of 9-item scale Covin and Slevin (1989) on 7-point Likert-type scale	Unidimensional	Perceived financial and nonfinancial performance	Korea	Micro and small firms	Technology-based firms	277
Jeffrey G. Covin and Dennis P. Slevin (1986)	Risk taking, innovativeness, and proactiveness	6 items, Khadwalla (1977) to measure risk taking; 2 items from Miller and Friesen (1982) to measure innovation; 2 items from Miller and Friesen (1983) to measure proactiveness	Unidimensional	Perceived financial and nonfinancial performance	United States	Large firms	Mix	76
Denise T. Smart and Jeffrey S. Conant (1994)	Risk-taking, strategic planning activities, customer needs and wants identification, innovation, vision to reality, identify opportunities	7-point scale of Churchill and Peter (1984)	Unidimensional	Perceived financial performance	United States	Micro companies	Nonhigh-tech (apparel retailers)	599
A. Rauch, M. Frese, C. Keeng, and Z. M. Wang (2006)	Innovation, risk-taking, and proactiveness	6 items of Covin and Slevin (1986) scale	Unidimensional	Perceived financial and nonfinancial performance	China and Germany	—	Mix (car and machinery components manufacturing, software development, hotel and catering, and building and construction)	364
A. Richter (1999)	Autonomy, competitive aggressiveness, innovation achievement, risk	15 items, developed based on Covin & Slevin (1989)	Multidimensional	Perceived nonfinancial performance	Germany	Micro	Mix	208
J. L. VanGelder (1999)	Innovation, proactivity, competitive aggressiveness	9 items, developed based on Covin & Slevin (1989)	Multidimensional	Perceived nonfinancial performance	Fiji	Micro	Mix	71
J. B. Arbaugh, Larry W. Cox, and S. Michael Camp (2005)	Innovativeness, proactiveness, risk taking	9 items of Covin & Slevin (1989)	Unidimensional	Perceived financial performance	17 countries	Small firms	Mix	1045
Wouter Sian and Ton Elifing (2006)	Innovativeness, proactiveness, and risk taking	9 items of Covin & Slevin (1989)	Unidimensional	Perceived financial performance	The Netherlands	Micro enterprises	OS (open source software products and services)	90

the value of examining the dimensionality of EO in a meta-analysis in order to determine if these dimensions relate differently to performance or not.

Concerning the measurement of performance, seven studies relied solely on archival financial performance measures, two combined archival and perceived financial measures of performance, while one study combined all three aspects of performance (archival financial, perceived financial, and perceived nonfinancial) into a global performance measure. Of the remaining studies, 11 utilized combinations of perceived financial and nonfinancial while 21 used perceived financial performance only. Finally, nine studies relied on perceived nonfinancial performance only. Thus, similar to the measurement of EO, there is substantial variation in terms of business performance measurement, but self-perceived performance measures clearly dominate EO research. Meta-analysis can help establish if this is an appropriate practice.

## Meta-Analytic Procedure

We used the meta-analytic approach suggested by Hunter and Schmidt (1990, 2004). Since we were interested in relationships between EO and performance, we transformed study statistics into an "r" statistic and corrected for sample size and reliabilities. Additionally, we calculated the 95% confidence interval around the weighted mean correlation and assumed a correlation to be significant if the interval did not include zero. To test for homogeneity of the correlation, Hunter and Schmidt (1990) suggest using the 75% rule. According to this rule, if more than 75% of the observed variance is due to sampling error, then the results are homogeneous; if this number is less than 75%, Hunter and Schmidt (1990) assumed heterogeneity (for details consult Hunter & Schmidt, 2004; Sagie & Koslowsky, 1993). For testing the significance of a moderator effect, we analyzed differences in the weighted correlations by using a z-test as a critical ratio (Hunter & Schmidt, 1990, p. 348). Since the Hunter & Schmidt (1990) approach requires independent statistics we aggregated results for studies that reported multiple indicators. Statistical software by Schwarzer (1989) and Borenstein and Rothstein (1999) supported the analyses.

## Results

The meta-analytic results are presented in Table 2. First, we computed the sample size weighted correlations between EO and performance for each study. In studies where several performance measures were included, we computed a single average effect across these performance measures. The first section of the table displays the relationship between the global measure of EO and performance. The correlation between EO and performance, corrected for measurement and sampling errors, was .242. This correlation can be regarded as moderately large (Cohen, 1977). The percentage of variance attributable to sampling variance was 22.38%. This was less than the 75% needed for assuming homogeneity. Therefore, according to the 75% rule (Hunter & Schmidt, 1990), there are likely moderators influencing the size of the EO–performance relationship, which we return to in the discussion below.

In the cases where the individual dimensions of EO were included and appropriate statistics exist, we repeated the procedure for innovativeness ( $k = 10$ ), risk taking ( $k = 12$ ), and proactiveness ( $k = 13$ ). Section 2 of Table 2 shows the correlations between each of the dimensions of EO and performance. The highest corrected correlation was .195 for the innovativeness dimension and the lowest was .139 for risk taking. Testing the magnitude

Table 2

## Weighted Correlations between Entrepreneurial Orientation and Performance: Main Effect and Moderator Analysis

Correlations	K	N	Rw	So	Se	Sampling error (% variance)	Corrected r	95% Confidence interval	Sign. test
EO	53	14,259	.192	.0155	.0035	22.38	.242	.158 to .225	
1. Innovation	10	4,637	.154	.0094	.0021	22.03	.195	.094 to .214	$z^1 = 1.09$
2. Risk taking	12	5,735	.110	.0081	.0021	25.35	.139	.059 to .161	$z^2 = 0.38$
3. Proactiveness	13	5,773	.140	.0052	.0022	42.01	.178	.101 to .179	$z^3 = 0.91$
1. EO and perceived nonfinancial performance	17	7,069	.190	.0153	.0023	14.68	.240	.131 to .249	$z^1 = 0.21$
2. EO and perceived financial performance	26	5,944	.198	.0147	.0041	27.57	.250	.151 to .245	$z^2 = 0.45$
3. EO and archival financial performance	11	1,461	.168	.0161	.0072	44.48	.213	.093 to .243	$z^3 = 0.66$
4. EO and growth	7	1,686	.206	.0093	.0038	41.20	.245	.135 to .277	
5. EO and profitability	26	4,746	.211	.0157	.0050	32.00	.259	.163 to .259	$z^7 = 0.10$
1. EO for micro businesses	8	1,875	.273	.0110	.0037	33.32	.345	.200 to .346	$z^1 = 2.56^*$
2. EO for small businesses	19	6,763	.157	.0127	.0027	21.05	.198	.106 to .208	$z^2 = 1.78$
3. EO for large businesses	19	4,803	.190	.0150	.0037	24.58	.240	.135 to .245	$z^3 = 0.86$
1. EO of high-tech businesses	9	1,005	.314	.0218	.0074	33.76	.396	.217 to .410	$z^1 = 2.24^*$
2. EO for nonhigh-tech businesses	44	13,254	.183	.0138	.0031	22.59	.231	.148 to .217	
1. Covin & Slevin scale	37	10,928	.186	.0153	.0032	20.76	.235	.145 to .226	$z^1 = 0.64$
2. Other instruments	16	3,331	.210	.0158	.0044	28.00	.265	.148 to .271	
1. United States	27	7,015	.207	.0145	.0035	24.35	.261	.162 to .252	$z^1 = 0.24$
2. Europe	12	2,050	.223	.0109	.0053	48.66	.281	.164 to .282	$z^2 = 1.86$
3. Asia	7	1,000	.320	.0222	.0057	25.63	.404	.210 to .430	$z^3 = 1.52$
4. Australia	2	256	.340	.0369	.0062	16.71	.429	.074 to .606	$z^4 = 0.97$
								$z^5 = 0.84$	
								$z^6 = 0.14$	

\*  $p < .05$ 

1. Difference in Rw between 1 and 2 double-sided test.

2. Difference in Rw between 1 and 3 double-sided test.

3. Difference in Rw between 2 and 3 double-sided test.

4. Difference in Rw between 1 and 4 double-sided test.

5. Difference in Rw between 2 and 4 double-sided test.

6. Difference in Rw between 3 and 4 double-sided test.

7. Difference in Rw between 4 and 5 double sided test.

K, number of studies; N, overall number of observations; Rw, sample weighted mean correlation; So, observed variance; Se, variance due to sampling error; Corrected r, size effect corrected for low reliabilities.

of these differences, the z-statistic indicated that these differences were too small to be statistically significant. Their relationships with performance seem to be relatively similar in magnitude. It thus appears premature to suggest a multidimensional rather than unidimensional conceptualization of EO based on how the dimensions relate to performance. When we applied the 75% rule to the individual dimensions of EO, we could see that the sampling error variance was below 75% for all three dimensions, suggesting that potential moderators should be included in future studies for all these dimensions.

## Context Moderators

As noted in the analysis carried out previously, the 75% rule suggests that there are moderators of the EO–performance relationship. Two types of moderators are commonly considered in meta-analysis. The first relates to the research context in which the studies have been carried out and the second relates to measurement issues (Brown, Davidsson, & Wiklund, 2001; Ellis, 2006). We first examine research context.

The examination of moderators in meta-analysis is limited to these variables that can be coded based on the included studies and which also have theoretical justification (Ellis, 2006). Previous EO studies have discussed and tested some potential moderator variables but there is no agreement on suitable moderators. The summary of the studies reported in Table 1 allows us to identify and code some contextual moderators, which also are theoretically justifiable.

The first moderator relates to the size of the business. The EO of a business is typically investigated through top management. This is an accepted approach (Covin & Slevin, 1989). The smaller the organization, the greater direct influence can be exerted by top management, not needing to rely on involving middle managers. Furthermore, smaller organizations are more flexible, allowing them to quickly change and take advantage of new opportunities appearing in the environment. There is reason to believe, therefore, that the effect of EO on performance is greater in small organizations. Three size categories were therefore created: micro (1 to 49 employees), small (50–499 employees), and large enterprises (more than 500 employees). Section 4 of Table 2 displays the relationship between EO and performance for these three size classes. The corrected correlation was .345 for micro, .198 for small, and .240 for large businesses. The z-test indicated that the effect size of micro businesses was significantly higher than among small businesses ( $z = 2.56, p < .05$ ). The other differences were not statistically significant. These results provide some support for the fact that business size moderates the relationship between EO and performance. The examination of the sampling error variance indicated that it was well below 75% for all three size categories, indicating the presence of additional moderators.

Industry is another variable that may moderate the relationship between EO and performance. Businesses operating in dynamic industries where technology and/or customer preferences change rapidly are more likely to benefit from entrepreneurial initiatives. We therefore coded the studies into high-tech and nonhigh-tech industries. High-tech industries included computer software and hardware, biotechnology, electric and electronic products, pharmaceuticals, and new energy. Section 5 of Table 2 shows that the corrected EO–performance correlation was .396 in high-tech industries and .231 in other industries. This difference is statistically significant ( $z = 2.24, p < .05$ ), supporting the argument that businesses in high-tech industries benefit more from pursuing an EO.

The concept of EO was initially conceptualized as culturally universal, assuming that it should be valid in various different countries. However, Lumpkin and Dess (2005) suggested that examining cultural effects on the strength of the EO–performance

relationship is a promising avenue for future research. While one study shows that national culture (femininity and collectivism) moderates the relationship between EO and strategic decisions (Marino et al., 2002), we are not aware of studies that explicitly examine how national culture variables moderate the EO–performance relationship. Therefore, we do not expect any specific culture dimension to be associated with stronger or weaker effects. Furthermore, although a large number of studies have examined the relationship between EO and performance, the number of observations is small in each individual country. Since there are certain culture similarities in continents (see the GLOBE study, House, Hanges, Javidan, Dorfman, & Gupta, 2004), we aggregated the data to refer to different continents. Section 6 of Table 2 shows that the corrected effect sizes were .261 in the United States, .281 in Europe, .404 in Asia, and .429 in Australia. The differences in these effect sizes were not significant, suggesting that relationships with performance seem to be relatively similar in magnitude across countries.

## Measurement Moderators

Next we turn to measurement moderators. The studies were first coded based on three types of performance categories: perceived nonfinancial, perceived financial, and archival financial performance. Perceived nonfinancial performance includes studies using satisfaction, goal attainment, or global success ratings as performance indicators. These measures share a subjective assessment of nonfinancial success measures. For example, Yoo (2001) studied 277 firms and included employee job satisfaction and public image of a firm in the dependent variable. Measures of financial performance include studies using growth measures, such as sales growth, and accounting-based criteria, such as ROI or ROA. These subdimensions partially overlap, both theoretically and statistically (see Combs et al., 2005). If the financial performance was based on information provided by key informants, such as the CEO, we coded the study as using perceived financial performance. A typical example of perceived financial performance is the study by Becherer and Maurer (1999) who asked company presidents to indicate the change in annual sales and profits compared to three years ago. If the financial information is based on objective sources, such as company records, we coded the study as using archival financial performance. For example, George et al. (2001) collected the performance measures from the Bank Directory of Columbia a year after the date when EO was collected. In an attempt to account for the dimensionality of financial performance, we further distinguished between growth and profitability. Growth consisted of studies measuring changes in sales, profits, and employment (e.g., Becherer & Maurer). Profitability was predominantly assessed by accountant bases indicators (e.g., Zahra, 1996).

Section 3 of Table 2 presents the relationships between the global EO measure and the three categories of performance, indicating that they were of similar magnitude. The corrected correlation of the EO-perceived financial measures of performance was the highest (corrected  $r = .250$ ); next followed the EO-perceived nonfinancial performance measures (corrected  $r = .240$ ); the EO-archival financial performance measures had the lowest correlation (corrected  $r = .213$ ). Testing the statistical significance of the differences, the z-statistic indicated that the differences were not statistically significant. Dividing financial performance into growth and profitability revealed effect sizes of similar magnitude. The corrected correlation between EO and growth was .245 and the corrected correlation between EO and profitability was .259; this difference was not statistically significant. The finding that different performance indicators produce effect sizes of similar magnitude is surprising in part because Ellis (2006) found that self-perceptive performance measures produced larger correlations of the relationship between market

orientation and performance. Given that the vast majority of EO studies relying on self-perceived performance measures are cross-sectional in nature relying on single informants, this inevitably introduces the risk of common method bias, which could inflate the relationship between EO and perceptive performance measures. Our analysis revealed, however, that common method bias is not an important issue here.

Next, we divided studies into two groups depending on whether or not they used the Covin and Slevin (1986, 1989) instrument ( $k = 37$ ) or if they relied on some modification of this instrument ( $k = 16$ ). The original Covin and Slevin scale produced similar EO–performance relationships (corrected  $r = .235$ ) as other variants of the instrument (corrected  $r = .265$ ). Thus, experimenting with different scale formats did not lead to a lower degree of validity of the EO scale.

## Discussion

The academic interest in entrepreneurship has virtually exploded in recent years. For example, the number of studies on EO and performance increased more than five-fold in the past decade compared to the previous one. At the same time, the field is struggling with establishing a common body of knowledge. Does EO represent a promising area for building such a body of knowledge? Controversies and conflicting results on how EO relates to performance and the dimensionality of the construct hampers further development. Moreover, moderators have not yet been sufficiently emphasized in this literature. This situation—controversy, different results, lack of research on moderators, conceptual imprecision, and a substantial number of empirical studies—suggest that meta-analysis is a promising way forward and a natural next step.

## Effects and Measurement of EO

Our results support the notion that EO has positive performance implications. By statistical standards, the effects of EO on performance can be regarded as moderately large (Cohen, 1977). For example, the corrected correlation of .242 found in our meta-analysis is of a similar magnitude as the relationship between sleeping pills and short-term improvements in insomnia (see Meyer et al., 2001). Thus, our results clearly show that businesses are likely to benefit from pursuing an EO, which points to the relevance of EO research. In other words, EO influences outcomes that are relevant to a wide set of management scholars and to managers. Theories of contingencies in explaining performance relationships (Lawrence & Lorsch, 1967) are also supported by our findings. Therefore, it is reasonable to conclude that EO represents a promising area for building a cumulative body of relevant knowledge about entrepreneurship. Our results also suggest some recommendations for how future EO research should be conducted.

Consistent with Covin and Slevin's (1989) belief that EO represents a unidimensional construct, most studies have summed across all dimensions of EO to create a single variable. Only 13 of the studies analyzed show how the individual dimensions of EO were related to performance. Our findings support the idea that EO dimensions (innovation, risk taking, and proactiveness) are of equal importance in explaining business performance. This would suggest that it is reasonable to support the use of a summed index of the three dimensions in future studies aiming at explaining performance. The data also show that the validity does not suffer if researchers attempt careful modifications of the original scale by Covin and Slevin. Future research would benefit from pursuing alternative

approaches to measuring EO. We realize, for example, that additional dimensions suggested in the literature, such as competitive aggressiveness and autonomy (that could not be included in our analysis because there were not enough studies that measured these variables), may produce different relationships with performance. Moreover, our data did not allow us to test whether or not different dimensions interact differently with third variables. Therefore, we conclude that there is room for the Covin and Slevin instrument as well as for new measurement alternatives.

Taken together, these findings suggest that developing new and improved measures of EO can possibly benefit future EO research. Moreover, our meta-analysis provides estimates of convergent validities of different instruments used to measure EO; the Covin and Slevin (1989) scale and other instruments measuring EO exhibit correlations with performance that are similar in size. Additional work is still needed to establish the psychometric properties of instruments addressing additional dimensions of EO. Most of the studies included in our meta-analysis used measures of EO that converged into a single factor of EO (e.g., Chadwick, Dwyer, & Barnett, 1999; Covin, Prescott, & Slevin, 1990; Lee et al., 2001; Walter et al., 2006; Wiklund, 1998). However, arguments provided in the EO literature (George, 2006; Stetz et al., 2000) suggest that it may be more appropriate to study antecedences and consequences of EO at the level of the dimensions of EO. Thus, future research effort needs to develop reliable and valid scales of the dimensions of EO.

## Moderators

Across studies, we found considerable variation in the magnitude of the correlation between EO and performance and this variance could not be explained by sampling error alone. This indicates that other variables moderate the strength of the EO-performance relationship. We identified three such moderator variables that we could include in our meta-analysis: national culture (aggregated into continents); business size; and technological intensity of the industry. Surprisingly, we did not find any statistically significant differences between the continents, although the point estimates for continents ranged from .261 to .429. Nevertheless, these differences were not significant, because variation within continents were also high. Thus, the best conclusion at this moment is that the relationship between EO and performance is of similar magnitude in different cultural contexts. Given that EO–performance research has spread rapidly across the world in recent years, this is an encouraging finding because it appears that this type of research is valid and valuable in many contexts and that the instruments used are robust to cultural contexts and to translations. Knight (1997) noted some response differences between French- and Anglo-Canadian respondents and Marino et al. (2002) found that national culture moderated the relationship between EO and strategic alliance portfolio extensiveness. However, such differences do not overthrow the relatively strong positive relationship between EO and performance in different cultures. These findings suggest that examining the EO–performance relationship in an additional country is not a sufficient contribution in and of itself. In contrast, additional theoretical cultural hypotheses can be tested profitably. For example, specific EO dimensions (such as competitive aggressiveness) may be less valid in certain cultural contexts that frown upon high competitiveness.

We found some indications that size moderates the EO–performance relationship. The association was stronger in micro businesses than in small businesses, but there were no differences between micro and large businesses or between small and large businesses. It is difficult to draw any definite conclusions from this finding other than testing size as a moderator in individual studies. Presently, size is typically used as a control variable, but it would be valuable to test it also as a moderator. Moreover, it would be interesting to

establish at which size the effects of CEO perceptions of EO on company performance are reduced, because it tells us something about the direct influence that the CEO has on the company.

Differences were also found between high-tech and nonhigh-tech firms, with a stronger EO–performance relationship in the former group. Given the dynamism and rapid technological changes in high-tech industries, it appears logical that EO pays off more in such industries. Although industry is often included as a control variable, industry has not been frequently examined as a moderator variable. However, aspects of the firm's task environment appear in many studies, also as a moderator variable. When tested, task environment constructs such as dynamism and hostility have been shown to moderate the relationship between EO and performance. This approach is supported by our findings. Although industry and task environment represent different conceptualizations of the firm's environment, we believe both represent valuable moderators, and continued effort along these lines are valuable in order to gain a deeper understanding of the EO–performance relationship.

Considerable variance across studies remained in all our analyses. This suggests moderator variables in addition to the ones we could address in our meta-analysis. Apart from the specific moderators pointed out previously, we recommend that future research, to a greater extent, test moderator effects. To date, the vast majority of the reviewed studies assume a direct effect of EO on performance. However, studies empirically testing and reporting moderator effects found support for them (e.g., Frese, Brantjes, & Hoorn, 2002; Wiklund & Shepherd, 2003). Detailed examination of the conditions under which EO is particularly beneficial (or detrimental) to performance is an area where substantial theoretical and empirical contributions can be made in future research. The research designs of previous studies limited the assessment of moderators in our meta-analysis. However, the literature has identified several interesting moderator variables that remain to be tested (e.g., Covin & Slevin, 1989; Lumpkin & Dess, 1996).

## Performance Measures

Our results indicated that EO has similar relationships with perceived financial performance, perceived nonfinancial indicators of performance, and archival performance. It is well established in the literature that the strategic activities implied by an EO, such as developing new products, have financial consequences. An implication of this finding is that the primary function of an EO is to enhance financial outcomes rather than to advance other goals that organizations and their managers may pursue. However, although the correlation between EO and both perceived and archival financial performance was strongly positive, it was not significantly larger than the correlation between EO and perceived nonfinancial performance measures. This suggests that the EO–performance relationship is robust not only to different measures of EO, as previously reported, but also to differences in the measurement of performance. Given the difficulty of assessing objective financial performance measures in most countries, this is good news to scholars interested in EO research. It appears that the potential problem of common method variance, memory decay, or social desirability associated with self-reporting of performance does not generally pose a serious threat to the validity of the EO–performance relationship. The use of archival performance data produced relationships of similar magnitude.

## Limitations and Future Research

Our meta-analysis has some limitations. These limitations can be attributed in part to the limitations of the underlying studies leading to suggestions for improvements in future

studies. First, all studies on EO apply only to surviving firms. None of the studies examined survivor bias. It seems likely that risk taking implied by EO might also lead to higher chances of failure. By definition, risk is associated with greater outcome variance. We strongly encourage future research to address whether the characteristics that lead to higher performance among surviving businesses are also associated with a higher risk of failure.

A second observation is that the causal direction between EO and performance has not been addressed. Most of the studies could not test the effect of EO on performance in a strict sense because they used either cross-sectional data or else measured EO at one point in time and performance some years later. While there are conceptual arguments in favor of EO affecting performance, the other causal direction is also possible: Better performance might also stimulate EO. Access to slack resources, for example, encourages experimentation within firms, allowing them to pursue new opportunities (March & Simon, 1968). Large resource pools also cushion the firm from environmental shocks, should new initiatives fail, thus encouraging riskier initiatives (Zahra & Covin, 1995). Panel studies that repeatedly measure both EO and performance would be valuable because they could help to tease apart the causal relationship between EO and performance and can be used to address survivor bias by correcting for sample attrition.

Our third observation highlights that many studies ( $n = 45$ ), even those published in reputable academic journals, did not report basic descriptive statistics, making meta-analysis difficult. Thus, we concur with calls to increase the methodological standards of the field (Low & MacMillan, 1988), including requirements to report descriptive statistics in all publications.

Finally, our study provides an estimate of the “true” relationship between EO and firm performance. The correlation of .242 is a benchmark that other studies can use to ask the question whether they have been able to increase explained variance, for example, by improving the scales of EO or by examining relevant moderators that may affect the EO–performance relationship. Potential moderator variables include firm age (older ones with more established habits being less positively affected by EO), environmental dynamism (rewarding a higher EO), national culture (performance- and future-oriented cultures positively moderating EO), strategy pursued (low-cost strategy firms being less positively affected by EO than differentiation strategy firms), and organizational structure (formalization). Our study suggests that it is time to open up EO research to new ideas and to further examine the role of moderators (e.g., Lumpkin & Dess, 1996). Thus, it is our hope that future research can build on the findings of this meta-analysis to enhance understanding of entrepreneurship and strengthen its theoretical base.

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\*Included in the meta-analysis.

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