ENTREPRENEURIAL ORIENTATION AND BUSINESS PERFORMANCE: AN ASSESSMENT OF PAST RESEARCH AND SUGGESTIONS FOR THE FUTURE

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Post-review version

Published in:Entrepreneurship Theory and Practice, in press
Link: http://www.blackwellpublishing.com/journal.asp?ref=1042-2587&site=1

The authors wish to thank Greg Dess for his helpful suggestions on earlier drafts of this paper and Edith Halim for assisting with the review . An earlier version of this paper was presented at the 2004 Babson-Kauffman Entrepreneurship Research Conference in Glasgow, Scotland.

Key words: Entrepreneurial orientation, strategic posture, meta-analysis.

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ABSTRACT

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, review, and 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..

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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 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, Greene, & 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, review, and 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 (cf. 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 down-side 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 (cf. 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[1]" 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 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., Miller, 1983; Covin & Slevin, 1989; Lumpkin & Dess, 1996). 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 paper proceeds as follows. In the next section, we introduce the entrepreneurial orientation 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

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

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

Entrepreneurial orientation has its roots in the strategy making process literature (e.g., Mintzberg, 1973). Strategy making is an organizationwide 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: 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 (1983) 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 entrepreneurial orientation. 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 & Schults, 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 entrepreneurial orientation 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., Lumpkin & Dess, 2001; Covin, Greene, & Slevin, 2006), 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., 2000). Specifically referring to the dimensionality of EO, Covin et al. (2006: 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 multi-dimensional 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 entrepreneurial orientation perform much better than firms that do not adopt an entrepreneurial orientation (with an $r > .30$,

e.g., Covin & Slevin, 1986; Hult, Snow, & Kandemir, 2003; Lee, Lee & Pennings, 2001; Wiklund & Shepherd 2003), other studies reported lower correlations between EO and performance (e.e., Dimitratos, Lioukas, & Carter, 2004; Lumpkin & Dess, 2001; Zahra, 1991) or were even unable to find a significant relationship between EO and performance (George, Wood, & Khan, 2001; Covin, Slevin, & Schultz, 1994). 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; Venkataraman & Ramanujam, 1986); a common distinction is between financial and non-financial measures. Non-financial 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 ROI (Smith, 1976). Regarding financial performance, there is often a low convergence between different indicators (Murphy, Trailer, & 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., 2005). 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 non-financial 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 non-financial goals because this relationships is tenous. For example, if non-financial 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 non-financial 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 non-financial 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 (cf. Lowe, Kroeck, & Sivasubramaniam, 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 entrepreneurial orientation, 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[2]. 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 fourteen studies, twelve from the USA, 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 USA with seven from Asia, eight from Europe, two from Australia and five utilizing data from more than one continent. The remaining twelve studies were carried out in the USA. These findings suggest that EO research is becoming increasingly popular around the

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

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 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 combine archival and perceived financial measures of performance, while one study combined all three aspects of performance (archival financial, perceived financial and perceived non-financial) into a global performance measure. Of the remaining studies, eleven utilized combinations of perceived financial and non-financial while 21 used perceived financial performance only. Finally, nine studies relied on perceived non-financial 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, 1990 and Sagie & Kozlowski, 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, pp.348). Since the Hunter and 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.

Insert TABLE 2 about here

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

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 above, 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. Further, 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 1 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 non high-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 (2004) 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, Strandholm, Steensma, & Weaver, 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. Further, 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 (cf. 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 US, .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 non-financial, perceived financial, and archival financial performance. Perceived non-financial performance includes studies using satisfaction, goal attainment, or global success ratings as performance indicators. These measures share a subjective assessment of non-financial 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 sub-dimensions partially overlap, both theoretically and statistically (cf., Combs, Crook, & Shook, 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, Wood, and Khan (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, 1999). Profitability was predominantly assessed by accountant bases indicators (e.g., Zhara, 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 non-financial 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's (1986; 1989) instrument (k=37) or if they relied on some modification of this instrument (k=16). The original Covin & 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 "entrepreneurial orientation" (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 (cf., Meyer, et al., 2001). Thus, our results clearly show that businesses are likely to benefit from pursuing an entrepreneurial orientation, 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, 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 & Slevin (1989). 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 (1989) 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 entrepreneurial orientation; 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, Lee, & Pennings, 2001; Walter, Auer, & Ritter, 2006; Wiklund, 1998). However, arguments provided in the EO literature (George, 2006; Stetz, Howell, Stewart, Blair, & Fottler, 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 non high-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 in the above, 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 non-financial 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 entrepreneurial orientation 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 non-financial performance measures. This suggests that the EO–performance relationship is robust not only to different measures of EO, as reported above, 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 & McMillan, 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.

REFERENCES

* Arbaugh, J. B., Cox , L. W., & Camp, S. M. (2005). Nature or nurture? Testing the direct and interaction effects of entrepreneurial orientation, national culture, and growth strategy on value creation. In S. A. Zahra, C. G. Brush, R. T. Harrison, J. E. Sohl, P. Davidsson, M. Lerner, J. Wiklund, J. Fiet, C. M. Mason, M. Wright, P. C. Greene & D. Shepherd (Eds.*), Frontiers of Entrepreneurship Research* Wellesley, MA: Babson College.

*Atuahene-Gima, K. (2001). An empirical investigation of the effect of market orientation and entrepreneurship orientation alignment on product innovation. *Organization Science*; 1(2), 54-74.

*Barrett, H., & Weinstein, A. (1999). The effect of market orientation and organizational flexibility on corporate entrepreneurship. *Entrepreneurship Theory and Practice*, Fall, 57-70.

*Becherer, R. C., & Maurer, J. G. (1999). The proactive personality disposition and entrepreneurial behavior among small company presidents. *Journal of Small Business Management*, January 1999, 28-36.

*Bhuian, S. N., Menguc, B., & Bell, S. J. (2005). Just entrepreneurial enough: The moderating effect of entrepreneurship on the relationship between market orientation and performance. *Journal of Business Research, 58*, 9-17.

Borenstein, M., & Rothstein, H. (1999). *Comprehensive meta-analysis*. Englewood, N. J.:

Biostat, Inc.

Brown, T. E., Davidsson, P., & Wiklund, J. (2001). An operationalization of Stevenson`s conceptualization of Entrepreneurship as opportunity based firm behavior. *Strategic Management Journal*, 22, 953-968.

Burgelman, R. A. (1984). Designs for corporate entrepreneurship in established firms. *California Management Review*, 26(3), 154-166.

*Caruana, A., Ewing, M. T, & Ramaseshan, B. (2001). Effects of some environmental challenges and centralization on the entrepreneurial orientation and performance of public sector entities. T*he Service Industries Journal*, 22, 2, 43-58.

*Chadwick, K., Dwyer, S., & Barnett, T, (1999). An empirical investigation among entrepreneurial orientation, organizational culture, and firm performance. *AOM proceedings* of the 1999 conference.

Cohen, J. (1977). *Statistical power analysis for the behavioral science*. New York: Academic Press.

Combs, J. G., Crook, T. R., & Shook, C. L. (2005). The dimensionality of organizational performance and its implications for strategic management research. In D. J. Ketchen & D. D. Bergh (Eds.), *Research methodology in strategic management*. (pp. 259-286). San Diego, CA: Elsevier.

*Covin, J. G., & Slevin, D. P. (1986). The development and testing of an organizational-level

entrepreneurship scale. In R. Ronstadt, J. A. Hornaday, R. Peterson, & K. H. Vesper (Eds.), *Frontiers of entrepreneurship research* - 1986 (pp. 628-639). Wellesley, MA: Babson College.

Covin, J. G., & Slevin, D. P. (1989). Strategic management of small firms in hostile and benign environments. *Strategic Management Journal*, 10, 75-87.

*Covin, J. G., & Covin, T. J. (1990). Competitive aggressiveness, environmental context, and firm performance. *Entrepreneurship Theory and Practice*, Summer, 35-50.

* Covin, J. G., Prescott, J. E., & Slevin, D. P. (1990). The effects of technological sophistication on strategic profiles, structure and firm performance. Journal of Management Studies, 27(5), 485- 507.

Covin, J. G., & Slevin, D. P. (1991). A conceptual model of entrepreneurship as firm behavior. *Entrepreneurship Theory and Practice*, Fall, 7-25.

*Covin, J. G., Slevin, D. P., & Schultz, R. L. (1994). Implementing strategic missions: Effective strategic, structural, and tactical choices. *Journal of Management Studies*, 31(4), 481- 503.

* Covin, J. G., Green, K. M., & Slevin, D. P. (2006). Strategic process effects on the entrepreneurial orientation - sales growth rate relationships. *Entrepreneurship Theory and Practice*, 30(1): 57-81.

* De Clercq, D., Sapienza. H. J., & Crijns, H. (2003). The internationalization of small and

medium sized firms. Working paper, Vlerick Leuven Gent. 2003.

*Dimitratos, P., Lioukas, S., & Carter, S. (2004). 'The relationship between entrepreneurship and international performance: The importance of domestic environment. *International Business Review*, 13, 19-41.

Ellis, P. D. (2006). Market orientation and performance: A meta-analysis and cross-national comparisons. *Journal of Management Studies*, 43(5), 1089-1107.

Frese, M., Brantjes, A., & Hoorn, R. (2002). Psychological Success Factors of Small Scale Businesses in Namibia: The Roles of Strategy Process, Entrepreneurial Orientation and the Environment. *Journal of Developmental Entrepreneurship*, 7, 3, 259-282.

*George, G., Wood, D. R. Jr, Khan, R. (2001). Networking Strategy of Boards: Implications for Small and Medium-Sized Enterprises. *Entrepreneurship-and-Regional-Development*, 13(3), 269-285.

George, B. A. (2006). Entrepreneurial orientation: A theoretical and empirical examination of the consequences of differing construct representations. Paper presented at the 2006 Babson College Entrepreneurship Research Conference. Bloomington, Indiana, June 8-10.

*Haiyang, L., Kwaku, A.-G., & Yan, Z. (2000). How does venture strategy matter in the environment - performance relationship. *Academy of Management Proceeding*.

*Harms, R., & Ehrmann, T. (2003). The Performance Implications of Entrepreneurial

Management: Linking Stevenson's and Miller's Conceptualization to Growth. Paper presented at 2003 *Babson-Kaufman foundation conference,* June 4 - 8, Babson.

Hart, S. L. (1992). An integrative framework for strategy-making processes. *Academy of Management Review*, 17(2), 327-351.

House, R. J., Hanges, P. J., Javidan, M., Dorfman, P. W., & Gupta, V. (Eds.). (2004). *Cultures, Leadership and Organizations: A 62 Nation GLOBE Study*. Thousand Oaks CA: Sage.

*Hult, G. T. M., Hurley, R. F., & Knight, G. A. (2004). Innovativeness: Its antecedents and impact on business performance. *Industrial Marketing and Management*, 33, 429-438.

*Hult, G. T. M., Snow, C. C., & Kandemir, D. (2003). The role of entrepreneurship in building cultural competitiveness in different organizational types. *Journal of Management*, 29(3), 401-426.

Hunter, J. E., & Schmidt, F. L. (1990). *Methods for meta-analysis: Correcting error and bias in research findings*. Newbury Park, CA: Sage.

Hunter, J. E., & Schmidt, F. L. (2004). Methods for meta-analysis: Correcting error and bias in research findings. Newbury Park, CA: Sage.

Ireland, R. D., Hitt, M. A., & Sirmon, D. G. (2003). A model of strategic entrepreneurship: The construct and its dimensions. *Journal of Management*, 29(6): 963-989.

*Jantunen, A., Puumalainen, K., Saarenketo, S., & Kyläheiko, K. (2005). Entrepreneurial orientation, dynamic capabilities and international performance. *Journal of International Entrepreneurship, 3,* 223-243.

*Kemelgor, B. H. (2002). A comparative analysis of corporate entrepreneurial orientation between selected firms in the Netherlands and the USA. *Entrepreneurship and Regional Development,* 14(1), 67-87.

Khandwalla, P. N. (1976). Some top management styles, their context and performance. Organization and Administrative Sciences, 7(4), 21-51.

Knight, G. A. (1997). Cross-cultural reliability and validity of a scale to measure firm entrepreneurial orientation. *Journal of Business Venturing,* 12, 213-225.

*Kreiser, P.M., Marino, L. D., & Weaver, K. M. (2002). Assessing the relationship between entrepreneurial orientation, the external environment, and firm performance scale: A multi-country analysis. *Frontiers of Entrepreneurship Research*.

Lawrence, P., & Lorsch, J. (1967). *Organization and environment*. Cambridge MA: Harvard University Press.

*Lee, C., Lee, K. & Pennings, J. M. (2001). Internal capabilities, external networks, and performance: A study of technology bases ventures. *Strategic Management Journal*, 22, 615-640.

Low, M. B., & MacMillan, B. C. (1988). Entrepreneurship: Past research and future

challenges. *Journal of Management*, 14(2), 139-162.

Lowe, K. B., Kroeck, K. G., & Sivasubramaniam, N. (1996). Effectiveness correlates of transformational and transactional leadership: A meta-analytic review of the MLQ literature. *Leadership Quarterly*, 7(3), 385-425.

Lumpkin, G. T., & Dess, G. G. (1996). Clarifying the entrepreneurial orientation construct and linking it to performance. *Academy of Management Review*, 21(1), 135-172.

*Lumpkin, G. T., & Dess, G. G. (2001). Linking two dimensions of entrepreneurial orientation to firm performance: The moderating role of environment and industry life cycle. Journal of Business Venturing, 16, 429-451.

Lumpkin, G.T. & Dess, G. G. (2004). Entrepreneurial Orientation. In Hitt, M.A.& R. D. Ireland (Eds.) *The Blackwell Encyclopedic Dictionary of Entrepreneurship* (Blackwell Encyclopedia of Management). Oxford: Blackwell Publishing.

March, J. G., & Simon, H. (1968). *Organizations*. New York: Wiley.

*Marino, L., Strandholm, K., Steensma, H. K., & Weaver, K. M. (2002). The moderating effect of national culture on the relationship between entrepreneurial orientation and strategic alliance portfolio extensiveness. *Entrepreneurship Theory and Practice*, 26(4), 145- 160.

MacMillan, I. C., & Day, D. L. (1987). Corporate ventures into industrial markets: Dynamics of aggressive entry. *Journal of Business Venturing*, 2(1), 29-39.

Meyer, G. J., Finn, S. E., Eyde, L. D., Kay, G. G., Moreland, K. L., Dies, R. R., et al. (2001). Psychological testing and psychological assessment: A review of evidence and issues. *American Psychologist, 56*, 128-165.

Miller, D. (1983). The correlates of entrepreneurship in three types of firms. *Management Science*, 29(7), 770-791.

Miller, D., & Friesen, P. H. (1978). Archetypes of strategy formulation. *Management Science*, 24(9), 921-933.

Miller, D., & Friesen, P. H. (1982). Innovation in conservative and entrepreneurial firms: Two models of strategic momentum. *Strategic Management Journal*, 3, 1-25.

*Miller, D., & Toulouse, J.-M. (1986). Chief executive personality and corporate strategy and structure in small firms. *Management Science*, 32(11), 1389-1409.

Mintzberg, H. (1973). Strategy-making in three modes. *California Management Review*, 16(2), 44-53.

Mintzberg, H., Raisinghani, D., & Theoret, A. (1976). The structure of "unstructured" decision processes. *Administrative Science Quarterly*, 21: 246-275.

*Monsen, E. (2005). Employees do matter: Autonomy, teamwork and corporate entrepreneurial culture (Doctoral dissertation, University of Colorado at Boulder). *Dissertation Abstracts International*, 66, 2293.

*Morgan, R. E., & Strong, C. A. (2003). Business Performance and dimensions of strategic orientation. *Journal of Business Research*, 56, 163-176.

Murphy, G. B., Trailer, J. W., & Hill, R. C. (1996). Measuring performance in entrepreneurship research. *Journal of Business Research*, 36, 15-23.

*Naman, J. L., & Slevin, D. P. (1993). Entrepreneurship and the concept of fit: A model and empirical tests. *Strategic Management Journal*, 14, 137-153.

Newbert, S. L. (2007). Empirical research on the resource-based view of the firm: an assessment and suggestions for future research. Strategic *Management Journal*, 28(2), 121-146.

*Poon, J. M. L., Ainuddin, R. A., & Junit, S. H. (2006). Effects of self-concept traits and entrepreneurial orientation of firm performance. *International Small Business Journal*, 24(1), 61-82.

Pfeffer, J., & Sutton, R. I. (2006). Evidence based management. *Harvard Business Review*, 84(1), 62.

* Rauch; A., Frese, M., Koenig, C., & Wang, Z.M. (2006) *A universal contingency approach to entrepreneurship: Exploring the relationship between innovation, entrepreneurial orientation and success in Chinese and German entrepreneurs.* Paper accepted for presentation at the 2006 Babson Kaufman Foundation Research Conference, Indiana June 8th to June 10th.

*Richard, O. C., Barnett, T., Dwyer, S., & Chadwick, K. (2004). Cultural diversity in management, firm performance, and the moderating role of entrepreneurial orientation dimensions. *Academy of Management Journal, 47*(2), 255-268.

*Richter, A. (1999). *Die unternehmerische Orientierung, Planung, Strategien und Erfolg bei neugegründeten Kleinunternehmen*. Unpblished Master Thesis: University of Giessen.

Rosenberg, M. (1968). *The logic of survey analysis*. New York: Basic Books.

Rosseau, D. M. (2006). Presidential address: Is there such a thing as "evidence-based management"?. *Academy of Management Review, 31*(2), 256-269.

Sagie, A., & Koslowski, M. (1993). Detecting moderators with meta-analysis: An evaluation and comparison of techniques. *Personnel Psychology, 46*(3), 629-641.

Schwarzer, R. (1989). *Meta-analysis programs* (computer software). Berlin, Germany: Institute of Psychology, Free University Berlin.

Shane, S., & Venkataraman, S. (2000). The promise of entrepreneurship as a field of research. *Academy of Management Journal*, 25(1), 217-226.

*Slater, S. F., & Narver, J. C. (2000). The positive effect of a market orientation on business profitability: A balanced replication. *Journal of Business Research*, 48, 69-73.

*Smart, D. T., & Conant, J. S. (1994). Entrepreneurial Orientation, distinctive marketing

competencies and organizational performance. *Journal of Applied Business Research,* 10(3).

Smith, P. C. (1976). Behavior, results, and organizational effectiveness: The Problem of Criteria. In M. D. Dunette (Ed.), *Handbook of Industrial and Organizational Psychology* (pp. 745- 775).

* Stam, W., & Elfring, T. (2006). Entrepreneurial orientation and new venture performance: The mediating effect of network strategies. *Academy of Management Best Paper Proceedings*.

*Stetz, P. E., Howell, R., Stewart, A., Blair, J. D. & Fottler, M. D. (2000). Multidimensionality of entrepreneurial firm-level processes: Do the dimensions covary? In *Frontiers of Entrepreneurship Research*: Wellesley, MA: Babson College.

*Swierczek, F. W., & Ha, T. T. (2003). Entrepreneurial orientation, uncertainty avoidance and firm performance. *Entrepreneurship and Innovation*, 46-58.

*Tan, J., & Tan, D. (2005). Environment-strategy coevolution and coalignment: A staged-model of Chinese SOEs under transition. *Strategic Management Journal*, 26(2), 141 – 157.

Thomas, A. S., & Mueller, S. L. (2000). A case for comparative entrepreneurship: Assessing the relevance of culture. *Journal of International Business Studies*, 31(2), 287-302.

Tranfiend, D., Danyer, D. & Smart, P. (2003). Towards a methodology for developing

evidence-informed management knowledge by means of systematic review. *British Journal of Management,* 14, 207 – 222.

*VanGelder, J. L. (1999) *Fijian Entrepreneurship*. Master Thesis, University of Amsterdam.

*Venkatraman, N. (1989a). Strategic orientation of business enterprises: The construct, dimensionality, and measurement. *Management Science,* 35(8), 942-962.

Venkatraman, N. (1989b). The concept of fit in strategy research: Toward verbal and statistical correspondence. *Academy of Management Review,* 14, 423-444.

Venkatraman, N., & Ramanujam, V. (1986). Measurement of business performance in strategy research: A comparison of approaches. *Academy of Management Review,* 11, 801-814.

*Vitale, R., Giglierano, J., & Miles, M. *Entrepreneurial orientation, market orientation, and performance in established and start-up firms*. Working Paper.

*Walter, A., Auer, M., & Ritter, T. (2006). The impact of network capabilities and entrepreneurial orientation on university spin-off performance. *Journal of Business Venturing*, 21, 541-567.

Wiklund, J. (1998). Entrepreneurial orientation as predictor of performance and entrepreneurial behavior in small firms. In P. D. Reynolds, W. D. Bygrave, N. M. Carter, S. Manigart, C. M. Mason, G. D. Meyer, & K. G. Shaver (Eds.), *Frontiers of entrepreneurship research* (pp. 281-296). Babson Park, MS: Babson College.

Wiklund, J. (1999). The sustainability of the entrepreneurial orientation -- performance relationship. *Entrepreneurship Theory and Practice*(Fall), 37-48.

*Wiklund, J., & Shepherd, D. (2003). Knowledge-based resources, entrepreneurial orientation, and the performance of small and medium sized businesses. *Strategic Management Journal*, 24, 1307-1314.

* Wiklund, J., & Shepherd, D. (2005). Entrepreneurial orientation and small business performance: a configurational approach. *Journal of Business Venturing*. 20(1), 71-89.

*Yoo, S-J. (2001). Entrepreneurial orientation, environment scanning intensity, and firm performance in technology-based SMEs. *Frontiers of Entrepreneurship Research*.

*Zahra, S. A. (1991). Predictors and financial outcomes of corporate entrepreneurship: An exploratory study. *Journal of Business Venturing*, 6, 259-285.

*Zahra, S. A. (1993). Business strategy, technological policy, and firm performance. *Strategic Management Journal*, 14, 451-478.

Zahra, S. A., & Covin, J. G. (1995). Contextual influences on the corporate entrepreneurship performance relationship: A longitudinal analysis. *Journal of Business Venturing*, 10(3), 43-58.

*Zahra, S. A. (1996). Governance, ownership, and corporate entrepreneurship: The moderating impact of industry technological opportunities. *Academy of Management*

Journal, 39(6), 1713-1735.

*Zahra, , S. A., & Neubaum, D. O. (1998). Environmental adversity and the entrepreneurial activities of new ventures. *Journal of Developmental Entrepreneurship*, 3(2), 123-140.

*Zahra, S. A., & Garvis, D. M. (2000). International corporate entrepreneurship and firm performance: The moderating effect of international environmental hostility. *Journal of Business Venturing*, 15, 469-492.

* Included in the meta-analysis.

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	14259	.192	.0155	.0035	22,38	.242	.158 to .225	
1. Innovation	10	4637	.154	.0094	.0021	22,03	.195	.094 to .214	z^1=1,09
2. Risk-taking	12	5735	.110	.0081	.0021	25,35	.139	.059 to .161	z^2=0,38
3. Proactiveness	13	5773	.140	.0052	.0022	42,01	.178	.101 to .179	z^3=0,91
1. EO and perceived non-financial performance	17	7069	.190	.0153	.0023	14,68	.240	.131 to .249	z^1=0,21
2. EO and perceived financial performance	26	5944	.198	.0147	.0041	27,57	.250	.151 to .245	z^2=0,45
3. EO and archival financial performance	11	1461	.168	.0161	.0072	44,48	.213	.093 to .243	z^3=0,66
4. EO and growth	7	1686	.206	.0093	.0038	41,20	.245	.135 to .277	
5. EO and profitability	26	4746	.211	.0157	.0050	32,00	.259	.163 to .259	z^7=0,10
1. EO for micro businesses	8	1875	.273	.0110	.0037	33,32	.345	.200 to .346	z^1=2,56*
2. EO for small businesses	19	6763	.157	.0127	.0027	21,05	.198	.106 to .208	z^2=1,78
3. EO for large businesses	19	4803	.190	.0150	.0037	24,58	.240	.135 to .245	z^3=0,86
1. EO of high tech businesses	9	1005	.314	.0218	.0074	33,76	.396	.217 to .410	z^1=2,24*
2. EO for non-high tech businesses	44	13254	.183	.0138	.0031	22,59	.231	.148 to .217	
1. Covin & Slevin scale	37	10928	.186	.0153	.0032	20,76	.235	.145 to .226	z^2=0,64
2. Other instruments	16	3331	.210	.0158	.0044	28,00	.265	.148 to .271	
1. USA	27	7015	.207	.0145	.0035	24,35	.261	.162 to .252	z^1 = 0,24
2. Europe	12	2050	.223	.0109	.0053	48,66	.281	.164 to .282	z^2 = 1,86
3. Asia	7	1000	.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

Notes: 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. *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.

Table 1 Study description

Author Name	Year	Dimensions	Measurement Scale	Uni-/Multidimensional	Performance Indicator	Country of Origin	Size of Firms	Industry of Firms	Sample Size
G. Thomas M. Hult, Robert F. Hurley, Gary A. Knight	2003	Innovativeness adapted from Hurley (1998). EO adapted from C&S (1989)	5 items adapted from Namen & Slevin (1993) and C&S (1989) on 7-point Likert scale	Unidimensional	Perceived Financial Performance	USA	Large enterprises	Mix	181
Stanley F. Slater and John C. Narver	2000	Innovativeness, risk-taking, and competitive aggressiveness	7 items Naman and Slevin (1993) on 5 Likert-type scale	Unidimensional	Perceived Financial Performance	USA	-	Mix	53
Fredric William Swierczek and Thai Thanh Ha	2003	Risk-taking, pro-activeness, and innovation	9 items on 5 point Likert scale adapted from Covin's (1991)	Multidimensional	Perceived Financial & Non-financial Performance	Vietnam and Thailand	Micro and Small enterprises	Mix	478
Shahid N. Bhuian, Bulent Menguc, Simon J. Bell	2003	Innovativeness, proactiveness, and constructive risk taking	11 items from Miller and Friesen (1982), and Morris and Paul (1987)	Unidimensional	Perceived non-financial performance	USA	-	Non-High tech (not-for-profit hospital)	231
Robert E. Morgan, Carolyn A. Strong	2003	Aggressiveness, analysis, defensivenss, futurity, proactiveness, and riskiness	6 sets of statements by Venkatraman(1989) for strategic orientation	Multidimensional	Perceived Financial & Non-financial Performance	UK	Small and Large firms	High tech	149
Phil E. Stetz, Roy Howell, Alex Stewart, John D. Blair, Myron D. Fottler	2004	proactiveness, risk-taking, and futurity*	Venkatraman (1989)	Multidimensional	Perceived Financial & Non-financial Performance	USA	Micro and Small Organization	Non-High 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 and Covin (1993). Marketing differentiation is measured with six items draw from Dess and Davis (1984) and Miller (1987). Market breadth is measured with three items drawn from McDougall and Robinson (1990). Marketing Alliance is measured with six items based on the work of Bucklin and Sengupta (1993)	Multidimensional	Perceived Financial & Non-financial Performance	China	Small company (mean)	High tech (Computer software and hardware, electronics and information technology, integrated optical, new energy and new material, pharmaceuitcal and bioengineering, and others)	184
Rainer Harms and Thomas Ehrmann	2001	Innovation and Risk-taking	Covin and Slevin 1986	Unidimensional	Perceived Financial & Non-financial Performance	Germany	-	mix	82
Jeffrey G. Covin, John E. Prescott, and Dennis P. Slevin	1990	Risk-taking, pro-activeness, and innovation	nine items scale of Covin and Slevin (1989)	Unidimensional	Perceived Financial Performance	USA	Micro and Small company (majority small company)	Mix	113

Jeffrey G. Covin, Dennis P. Slevin, and Randall L. Schultz	1994	Innovation, Proactiveness, and risk taking	9 items, 7-point scale Covin and Slevin (1989)	Unidimensional	Perceived Financial Performance	USA	Micro and Small company (majority small company)	High tech(glassware, electro-mechanical pressure swithces, jewellry, computer-aided transcription devices, car care products, pacemakers and related biomedical devices, coatings for food and beverage containers, speciality steels, thermoplastic compounds, audio transducers, water treatment chemicals, orthopaedic foot products, metal cutting tools, activated carbon, breathing apparatus, and printed circuits.	91
Jeffrey G. Covin and Teresa Joyce Covin	1990	Competitve Aggressiveness	3-item scale of Khandwalla (1976/1977)	Unidimensional	Perceived Financial Performance	USA	Micro and Small company (mean=small, 66 employees)	Mix	143

Choonwoo Lee, Kyungmook Lee, and Johannes M. Pennings	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's (1983). Proactiveness is measured with Miller (1983) and Naman and Slevin (1993)	Unidimensional	Perceived Financial Performance	Korea	Micro and Small company (mean=micro, 31 employees)	High tech	137
G.T. Lumpkin and Gregory G. Dess	2001	innovativeness, risk-taking, proactiveness, and competitive aggressiveness	Khandwalla (1977), Miller (1983), Covin and Slevin (1986, 1989a), and Covin and Covin (1990)	Multidimensional	perceived financial performance	USA	-	Mix	94
Louis Marino, Karen Strandholm, H. Kevin Steensma, and K. Mark Weaver	2002	Proactiveness, risk taking, and innovative	Covin and Slevin (1988, 1989)	Unidimensional	Perceived non-financial Performance	Findland, Greece, Indonesia, Mexico, Netherlands, and Sweden	micro and small firm	Mix(food & related products, wood & related products, printing machines and ancillary products, rubber & related products, transportation & related products, machine tools & related products, electronics & related products, computer programming, textiles & related products, services, construction & related services, oil & gas extraction & related services)	647

Pavlos Dimitratos, Spyros Lioukas, and Sara Carter	2004	risk-taking, proactiveness, and innovativeness	7-point Likert type scales, Risk-taking are drawn from Khandwalla (1977), Miller & Friesen (1982), Naman & Slevin (1993); Proactiveness is drawn from Covin & Covin (1990); Innovativeness is drawn from Miller & Friesen (1982)	Unidimensional	Perceived non-inancial performance	Greek	Mix, mostly small company	Mix (food, beverages, garments, footwear and software sectors)	152
Gerard George, D. Robley Wood JR, Raihan Khan	2001	Risk-taking, Proactiveness, Innovativeness, Autonomy, and Competitive aggressiveness	14-item, 7-point scale, of which nine items are from Naman and Slevin (1993) and five items were from Lumpkin and Dess (1996).	Unidimensional	Archival Financial Performance	USA	small and medium bank (revenue <US500 Million)	Non-High tech (bank)	70
G. Tomas M. Hult, Charles C. Snow, and Destan Kandemir	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	USA	Large enterprises	Mix	764
Ari Jantunen, Kaisu Puumalainen, Sami Saarenketo, Kalevi Kyläheiko	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 (1988) and Miller and Friesen (1982)	Unidimensional	Perceived and archival financial performance, and perceived non financial performance	Finnish	Small and Large firms	Mix (food, forestry, furniture, chemicals, metals, electronics, information and communications technology (ICT), and services	217
Bruce H. Kemelgor	2002	Innovation, risk-taking, and proactiveness	9-items Covin and Slevin(1986)	Unidimensional	Archival Financial Performance	Netherlands and USA	Small firms	High tech(electronics, computer software, and pharmaceutical industries)	8???
Patrick Kreiser, Louis Marino, and K. Mark Weaver	2002	Innovation, Proactiveness, and risk taking	Covin and Slevin (1989) on five-point Likert scale.	Multidimensional	Perceived non-financial performance	Australia, Costa Rica, Finland, Greece, Indonesia, Mexico, Netherlands, Norway, Sweden	Micro & Small Enterprises	Mix	1671

Jeffreg G. Covin, Kimberly M. Green, Dennis P. Slevin	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	USA	Micro, Small, and Large firms. Mostly small company	mix	110
Albert Caruana, 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 non-financial performance	Australia	Middle to Large organization	Non high tech (public sector entities/government departments)	136
Richard C. Becherer and John G. Maurer	1999	proactiveness	9-items Likert scale adapted from Covin and Slevin (1989)	Unidimensional	Perceived financial performance	USA	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-points Likert scale	Unidimensional	Perceived non-financial performance	USA	micro to large companies	Mix (manufacturing)	142
Kwaku Atuahene-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	USA	Large companies	mix	119
Shaker A. Zahra and Dennis M. Garvis	2000	Innovation, Proactiveness, and risk taking	7-items modified version of Miller (1983), on 5-points scale.	Unidimensional	Archival Financial Performance	USA	small to large companies	mix	98

Shaker A. Zahra and Jeffrey G. Covin	1995	Innovation	4 measurements (technology policies scale, aggressive technological posture scale, automation and process innovation scale, and new product development scale) on 7-points scale	Multidimensional	Archival Financial Performance	USA	-	mix (mature industries, such as: textiles, metal household furniture, setup paperboard boxes, paving mixtures and blocks, blast furnaces, and steel mills)	103
Shaker A. Zahra	1996	Innovation, venturing, and strategic renewal	14-items on 5-point scale, adapted from Miller (1983)	Multidimensional	Archival Financial Performance	USA	Large companies		127
Shaker A. Zahra, and Donald O. Neubaum	1998	Innovation, Proactiveness, and risk taking	7-item Miller (1983) on 5-point scale	Unidimensional	perceived financial performance	USA	micro to small companies, mostly micro companies	mix	99
Rob Vitale, Joe Giglierano, and Morgan Miles	2003	Innovation, Proactiveness, and risk management	Covin and Slevin (1989), and subsequent refinement done by other researchers	Unidimensional	perceived non-financial performance	USA	-	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-item on 7-point Likert scale, Covin and Slevin (1986, 1988) based on the work of Miller and Friesen (1982), and Khandwalla (1976/77)	Unidimensional	Perceived financial performance	USA	micro to small companies	High-tech	82

June M. L. Poon, Raja Azimah Ainuddin, and Sa'odah haji junit	2006	innovativeness, proactivness, and risk-taking	9-items 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, arisk affinity, analysis, and defensiveness	5 strategic orientation variables by Tan and Tan	Multidimensional	perceived financial performance	China	mix	High-tech(electronics industry)	104
N. Venkatraman	1989	aggressiveness, analysis, defensiveness, futurity, proactiveness, riskiness	6-dimensional model of STROBE (a matrix of zero-order correlations of 29-indicators) of Venkatraman	Multidimensional	perceived financial performance	USA	-	mix(consumer goods, capital goods, raw or semi-finished goods, components for finished goods, and service)	202
Achim Walter, Michael Auer, Thomas Ritter	2006	proactiveness, innovation, risk-taking, and assertiveness	six items, three items are adapted from Dess et al. (1997), and the other three items are based from Lumpkin and Dess (1996).	Unidimensional	Perceived financial and non-financial performance	Germany	micro, average 16 people	mix(technical services, consulting, and technical manufacturing)	149
K. Chadwick, S. Dwyer, and T. Barnett	1999	risk-taking, innovation, and proactiveness	9-item on 7-point Likert type Strategic Posture scale developed by Khandwalla (1977)	Unidimensional	perceived financial performance & archival perfroamance	USA	-	Non High-tech(banking industry)	535
Dirk De Clercq, Harry J. Sapienza, and Hans Crijns	2003	Innovation, proactiveness, and risk-taking	5-item scale by Miller (1983)	Unidimensional	perceived financial performance	Belgium	Micro & 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 non-financial performance	USA	large	non high-tech (healthcare)	1505
Orlando C. Richard, Tim Barnett, Sean Dwyer, and Ken Chadwick	2004	Innovation, risk-taking, and proactiveness	9-item entrepreneurial orientation scale by Covin and Slevin (1989)	Multidimensional	Archival financial Performance	USA	average medium companies	non high-tech (bank)	153
Johan Wiklund, and Dean Shepherd	2003	Innovation, proactiveness, and risk-taking	9-item of Covin and Slevin (1989)	Unidimensional	Perceived financial and non-financial performance	Sweden	Micro & Small Enterprises	mix(manufacturing, wholesale/retail, and services)	384
Johan Wiklund, and Dean Shepherd	2005	Innovation, risk-taking, and proactiveness	8-item of Miller	Unidimensional	perceived financial performance	Sweden	Micro enterprises	mix(knowledge-intensive manufacturing, labor-intensive manufacturing, pforessional 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 non-financial 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 & Friesen (1982) to measure innovation, 2-items from Miller and Friesen (1983) to measure proactiveness	Unidimensional	perceived financial and non-financial performance	USA	large firms	mix	76

Smart, Denise T. and Conant, Jeffrey S.	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	USA	micro companies	non-high tech (apparel retailers)	599
Rauch, A. Frese, M., Koening, C. and Wang, Z. M.	2006	innovation, risk-taking, and proactiveness	6-item of Covin and Slevin (1986) scale	Unidimensional	Perceived financial and non-financial performance	China & Germany	-	mix(car and machinery components manufacturing, software development, hotel and catering, and building and construction)	364
Richter, A.	1999	Autonomy, competitive aggresiveness, innovation achievement, risk	15-item, developed based on Covin & Slevin, 1989	Multidimensional	Perceived non-financial performance	Germany	micro	mix	208
Van Gelder	1999	Innovation, proactivity, competitive aggressiveness	9-item, developed based on Covin & Slevin, 1989	Multidimensional	Perceived non-financial performance	Fijian	micro	mix	71
Arbaugh, J. B., Larry W. Cox, & S. Michael Camp	2005	Innovativeness, proactiveness, risk-taking	9-item of Covin & Slevin (1989)	Unidimensional	perceived financial performance	17 countries	small firms	Mix	1045
Wouter Stam, Tom Elfring	2006	Innovativeness, proactiveness, and risk-taking	9-item of Covin & Slevin (1989)	Unidimensional	perceived financial performance	The Netherlands	micro enterprises	OSS open source software produces and sevices	90