



The Epistemology of Entrepreneurial Orientation: Conceptual Formation, Modeling, and Operationalization

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In this manuscript, we examine the evolution of the Entrepreneurial Orientation (EO) concept in an effort to identify areas of concern for the future development of knowledge around the construct and provide conceptual analyses to suggest how we might best move forward in the construct's development. We suggest that the continued accumulation of knowledge in the field is best facilitated by conceptualizing EO as a reflective model utilizing three dimensions that can be extended through the use of a classical classification scheme and that additional subcategories of EO should be developed within the EO conceptual family utilizing new measurement items.

Introduction

Social science researchers use constructs which represent unobservable phenomenon as a way of organizing knowledge and providing a framework for developing and testing theory. Key to this process is the consistent use of clearly defined focal concepts that are measured and tested with a high degree of construct validity in order to ensure the correspondence between the unobservable construct and our means of measuring the construct (Peter, 1981).

Prior to determining if measures faithfully represent our theoretical constructs, we must understand what it is we are trying to measure. As such, the heart of construct validity lies in a clear definition of the focal construct. The lack of a clear, agreed-upon definition prevents us from building our knowledge, which is the ultimate purpose behind scientific inquiry. If each researcher defines and measures a construct differently, then we seriously impede our ability to enhance our knowledge base as the results from one study cannot be used to build theory for another study utilizing a different conceptualization of the construct.

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Entrepreneurial orientation (EO) has suffered from such a problem and as a result, a number of debates have surfaced in the literature with regard to the nature of the construct, its dimensionality (Knight, 1997; Lumpkin & Dess, 1996; Zahra, 1993), the interdependence of the dimensions (Dess, Lumpkin, & McGee, 1999; Lumpkin & Dess), the nature of the dimensions (Morris & Paul, 1987), and the theoretical relationship between the construct and its antecedent and consequent constructs (George, 2011). Each of these issues is inextricably tied to the theoretical definition of the construct and illustrate that it is imperative that we reach agreement on a definition if we are to move forward with substantive research on EO.

The introduction of the EO construct by Miller (1983) and the construct's further development by Covin and Slevin (1989, 1990) have established what has become a commonly accepted conceptualization of what it means for a firm to be "entrepreneurial." Within Miller's original conceptualization "entrepreneurial" firms are those that are simultaneously proactive, risk taking, and innovative. The construct's acceptance by the scholarly community was furthered when Covin and Slevin built on the work of Miller and Khandwalla (1976) to develop a nine-item operationalization of the EO construct that was not only parsimonious but which has also been shown to demonstrate sound psychometric properties. This conceptualization and the concomitant measurement have been employed in more than 200 studies in a broad variety of fields ranging from management, to marketing (e.g., Luo, Sivakumar, & Liu, 2005) to health care (e.g., Davis, Marino, & Aaron, 2006), and have become firmly embedded in the nomological network of entrepreneurship research.

Despite the wide acceptance of the construct in the field, a careful examination of the studies in which it has been employed highlight issues that need to be resolved if we are to continue to build knowledge around this concept. For example, there has been a lack of consistency in defining the conceptual domain of the construct. For example, Miller's original construct applied to a broad range of organizational processes while other authors (e.g., Lumpkin & Dess, 1996) have linked the construct solely to new entry or to other more specific characteristics. While the application of a construct to new contexts is a valid means of advancing knowledge, it is important for researchers to consider the nature of the construct with which they are dealing and its level of abstraction in order to properly extend the use of the concept to these areas.

Additionally, various authors have suggested that the conceptual domain should encompass additional dimensions (e.g., Lumpkin & Dess, 1996) or fewer dimensions (e.g., Merz & Sauber, 1995). While each of these conceptualizations may have merit, each fundamentally alters the class of firms characterized as "entrepreneurial." Such alterations should be undertaken with great care as they can result in one study of EO labeling firms differently than another and adversely affect our ability to build on previous research which would inhibit the accumulation of knowledge that is necessary to move the field forward.

For higher order constructs such as EO that have underlying dimensions, it is also critical that we clearly define the relationship between the dimensions and the higher-order construct as this informs both the development of our theoretical arguments as well as our empirical models and results. For example, the meaning of a construct may be reflected in its measures or dimensions (for a multidimensional construct) or it may be created, or formed, from them. Not only do each of the conceptualizations result in different theoretical arguments for relationships with other constructs in the nomological net, but discrepancies between the measurement model and the conceptual definition yield empirical tests that are not truly reflective of our theoretical models, which can hinder our ability to build a useful body of knowledge.

Finally, it is important to understand how concept definition and context affect the measures we use in our studies. As the level of abstraction of a concept changes, the attributes of the construct should also change as it becomes more or less specific. This means that we should not measure concepts at different levels of abstraction using the same items. The vast majority of studies on EO have used variations of the Covin and Slevin (1989) scale and this may not be appropriate for all conditions. Furthermore, it is important that we consider measurement invariance across different settings. Recent research has shown that while the Covin and Slevin scale has a relatively consistent factor structure across national boundaries, it is not invariant across these settings (Hansen, Deitz, Tokman, Marino, & Weaver, 2011), which again points to the importance of understanding the variety of issues involved in measuring EO if we are to be able to build an actionable body of knowledge.

In this study, we will examine the conceptual and methodological development of the EO construct and scale in an effort to highlight key issues that may inhibit our ability to progress in future EO research. By illustrating the implications of various definitional and measurement issues and making recommendations going forward, we aim to help future researchers to better understand how their definitional and measurement choices position their research in relation to other EO studies and how to best portray this such that we can build an even more fruitful body of knowledge around this key construct.

In the following sections, we examine four critical aspects of construct definition as they relate to EO in order to provide researchers with a common understanding of the issues we face and provide recommendations as to how we should treat these going forward. These include the conceptual domain of the construct, its level of abstraction, the categorization of the concept, and its relationship with the dimensions that comprise the conceptual domain. In so doing, we will highlight key areas of concern and discuss their implications for researchers as well as develop recommendations for future studies based on the conceptual development of the EO construct. Next, we will look at the measurement model and measurement items to discuss recent studies regarding the implications of inconsistency between our measurement models and our conceptual definitions as well as the validity of the items in the Covin and Slevin (1989) scale, particularly as they relate to using the EO construct in different contexts and the increasing use of versions of this scale in international studies. We will conclude by offering specific advice on the future development of the EO construct and its measurement.

Conceptual Domain

Good construct definition begins with specifying the domain of the construct in a manner that allows researchers to clearly differentiate a construct from others. This requires that the researcher not only distinguish what is included in the definition, but what is excluded as well (Churchill, 1979). The EO construct has its roots in the work of Mintzberg (1973) and Khandwalla (1976) who found that entrepreneurial firms tended to take more risks than other types of firms and were more proactive in searching for new business opportunities. However, the construct as it is commonly defined today was probably first discussed in Miller's (1983) study that identified entrepreneurship as a multidimensional concept encompassing the firm's actions relating to innovation, risk taking, and proactiveness. He specifically stated that a nonentrepreneurial firm "is one that innovates very little, is highly risk averse, and imitates the moves of competitors instead

of leading the way" (p. 771). The use of the word "and" implies that all three components must be present. Miller was even more explicit in this regard when he wrote, "In general, theorists would not call a firm entrepreneurial if it changed its technology or product line ('innovated' according to our terminology) simply by directly imitating competitors while refusing to take any risks. Some proactiveness would be essential as well. By the same token, risk-taking firms that are highly leveraged financially are not necessarily considered entrepreneurial. They must also engage in product market or technological innovation. Thus, our focus upon the composite dimension is intuitively reasonable" (Miller, p. 780). Covin and Slevin (1988, p. 218) further refined Miller's definition by stating that, "the entrepreneurial orientation of a firm is demonstrated by the extent to which the top managers are inclined to take business-related risks (the risk-taking dimension), to favour change and innovation in order to obtain a competitive advantage for their firm (the innovation dimension), and to compete aggressively with other firms (the proactiveness dimension) (Miller, 1983)."

However, despite the fact that EO is arguably one of the most studied constructs in the entrepreneurship literature, it has since seen a wide range of definitions, many of which are incompatible with each other. While a number of authors have adopted definitions similar to that of Miller (1983) and Covin and Slevin (1989), many others have made subtle changes that dramatically alter the meaning of the construct. For example, Zahra and Neubaum (1998) state that "EO is defined as the sum total of a firm's radical innovations, proactive strategic action, and risk taking activities that are manifested in its support of projects with uncertain outcomes" (p. 125). This definition clearly encompasses a different conceptual domain where only radical innovations are included. Furthermore, while the Miller and Covin and Slevin (1988) definitions suggest a strategic posture that is manifested in managerial preferences regarding a number of possible strategic decisions, Zahra and Neubaum's definition is limited to decisions related to the support of specific projects. Thus, a firm may have a high EO based on the Covin and Slevin definition, but not necessarily have a high EO according to the Zahra and Neubaum definition.

Other authors have defined the domain of EO as containing fewer dimensions as well as limiting the context in which the construct applies. Merz and Sauber (1995) define entrepreneurial orientation as "the firm's degree of proactiveness (aggressiveness) in its chosen product-market unit and its willingness to innovate and create new offerings" (p. 554). Utilizing this definition, the conceptual domain of the construct is limited to proactiveness and innovation, and excludes risk taking. Furthermore, it applies only to a firm's actions within a unit of the organization as opposed to an overall strategic posture and it applies only to innovations that result in new offerings, excluding firms that may engage in process innovations that create a competitive advantage, which would fall into the conceptual domain of EO in the Covin and Slevin definition.

Conversely, other authors have extended the domain of the construct to include additional dimensions. Lumpkin and Dess (1996) suggested that, "Five dimensions—autonomy, innovativeness, risk taking, proactiveness, and competitive aggressiveness—have been useful for characterizing and distinguishing key entrepreneurial processes, that is, a firm's entrepreneurial orientation (EO)" (p. 136). The addition of two more dimensions could result in different levels of EO for firms using the Lumpkin and Dess definition versus that of Covin and Slevin (1988). Lumpkin and Dess go on further to state that, "an EO refers to the processes, practices, and decision-making activities that lead to new entry" (p. 136). This is again in contrast to the definition proposed by Covin and Slevin, which suggests that EO is a strategic posture reflecting the decisions and processes of the firm, but not explicitly limited to those that lead to new entry, but rather

representative of an overall gestalt within the firm. For example, a firm that takes business-related risks and is proactive in developing new, innovative solutions for current markets as a means to stay ahead of the competition and maintain a competitive advantage may have a high EO based on the Covin and Slevin definition, but because their activities do not necessarily lead to new entry, they would not constitute an EO under the Lumpkin and Dess conceptualization.

These two examples are indicative of the lack of consistency and clarity in the conceptual domain of EO which have developed in the literature and that give rise to at least two challenges. First, if the domain is not clearly defined, we are unable to judge the validity of our measures of the construct. Second, if researchers define EO in different ways, then we cannot build our knowledge around the relationships between the construct and other constructs in the nomological network of concepts in the field of entrepreneurship. Thus, rather than creating a body of knowledge around the concept and improving our understanding of its position and relationships in the nomological net, we end up with a number of unique studies that cannot be compared and whose results do not reinforce or refute common theoretical linkages.

While we often focus on extending our knowledge by testing relationships with a focal construct in a variety of settings and contexts, our ability to build on previous work requires that our conceptualizations and definitions be consistent and that our work *refine* our theoretical definitions rather than *redefine* them. In addition to understanding the conceptual domain of the construct, correctly applying and defining the construct in different contexts requires that we consider the particular category of concept we are working with as well as its level of abstraction.

Level of Abstraction

When considering the formation of a concept, researchers must take into consideration the level of abstraction at which the concept exists. As noted by Satori (1970), a concept can be described by two basic properties, its extension (or denotation) and its intension (or connotation) (Osigweh, 1989). A concept's extension refers to the breadth of the concept's application and describes "the class of things to which it applies, or the totality of objects which it identifies" (Osigweh, p. 584), whereas a concept's intension, or its connotation, refers to the collection of properties encompassed by a concept (Osigweh; Satori). A concept's extension and intension are diametrically opposed such that as a concept's intension increases, its specificity increases as does its discriminatory power (i.e., its ability to clearly identify unique cases to which the concept applies), but its extension, or its generalizability (i.e., the number of cases to which the concept applies), decreases. Alternately, as a concept's extension increases its breadth and generalizability increase but its specificity and discriminatory power decrease. In other words, as we attempt to make a construct apply to a wider range of contexts and cases, the construct must become less specific and, in so doing, our measurement of the construct must also change.

The relationship between a concept's intension and extension can be reflected in what Satori (1970) and Osigweh (1989) refer to as the ladder of abstraction. Within this ladder there are three levels of abstraction, the high abstraction level (HAL), the medium abstraction level (MAL), and the low abstraction level (LAL). At the HAL, the extension of a concept is high, but the intension is low, resulting in a concept that refers to a very broad class of cases in general, but which does not fully describe any specific case. At the MAL the extension is decreased, but the intension is increased. Thus, the concept will be

applicable to fewer cases overall, but will capture the unique attributes of more individual cases. Finally at the LAL, a concept will have a low level of extension, but a high level of intension such that it describes a relatively few cases with a higher degree of specificity. Moving from the HAL to the LAL increases the specificity by increasing the number of attributes, but in doing so it decreases the number of cases to which it applies. As may be inferred from the example, moving from HAL to LAL does not involve discrete steps or stopping points, but represents a continuum of levels. It should also be noted that at different levels of abstraction, constructs may be related, but they are not the same in that they apply to different classes of objects. As such, one should not use the same definition or name for concepts at different levels of abstraction.

In addition to understanding the primary level at which a concept resides, researchers often seek to expand the knowledge base and to establish the boundary conditions for key variables by analyzing additional cases in new settings. Researchers can apply a concept to a new setting either through *concept travelling*, which entails increasing the extension of a concept while decreasing its intension, or through *concept stretching*, increasing the concept's extension while either maintaining or increasing the intension. Concept travelling is the preferred method for increasing a concept's generalizability as it allows the researcher to maintain conceptual precision. In concept travelling, as the concept moves to higher levels of abstraction it becomes more general and is characterized by fewer attributes such that it fits more cases precisely. What is gained in generalizability is lost in specificity. Concept stretching, on the other hand, involves increasing a concept's extension without a concurrent decrease in its intension. This can result from attempting to increase a concept's extension and intension simultaneously, increasing a concept's extension while maintaining its intension, or maintaining a concept's extension while increasing its intension. Concept stretching implies that additional attributes can be added to the concept while simultaneously attempting to increase the number of cases to which it is applicable. This method generally results in a concept that is extremely broad and that is difficult to discriminate from other concepts in a meaningful way. Concept travelling is preferred over concept stretching as the end result of the latter is a reduction in the preciseness of a concept (Osigweh, 1989; Satori, 1970).

Using the previous examples, we can see how the various definitions of EO not only encompass a different conceptual domain, but also lie at different levels of abstraction. For example, by limiting their conceptualization to radical innovation and decisions specific to particular projects, Zahra and Neubaum's (1998) definition of EO is more specific (i.e., has a higher level of intension) and would apply to a smaller group of firms compared to those captured by Covin and Slevin's (1988) definition. However, if we attempt to argue that both constructs are at the same level of abstraction and should be applied to an equally broad range of cases, we would be engaging in concept stretching. Similarly, adding additional dimensions to the EO construct as suggested by Lumpkin and Dess (1996) and other authors increases the intension of the concept and necessitates a corresponding decrease in extension to maintain conceptual clarity. Alternatively, if the field were to concur that the five-dimension model was the commonly accepted conceptual definition of EO, then Covin and Slevin's conceptualization would be more general in that it has fewer properties (lower intension) and would encompass a broader range of firms (higher extension). This would also be the case in utilizing conceptual definitions that include fewer dimensions (e.g., Knight, 1997; Merz & Sauber, 1995), and have fewer properties, and thus, should apply to a broader class if one engages in concept travelling. However, while it is clear that the concepts as they are defined by the respective authors lie at different levels of abstraction researchers have given them the same name and have employed them as if they were at similar levels of abstraction. The result of this is that it

is difficult for researchers to build upon previous work as we have a number of studies purporting to measure the same concept at the same level of abstraction, but who are actually defining the concept at different levels of abstraction that clearly indicates that they would not necessarily apply to the same set of firms.

We suggest that the field would be better served by considering EO as a conceptual family of constructs and continuing to build on the original three-dimension definition, which has been used by the majority of researchers through effective concept travelling. In doing so, it is important that we maintain consistency in our definition, and if we choose to engage in concept travelling by defining a construct with additional characteristics in order to examine more specific cases, that we label such a construct as a secondary category within the EO conceptual family. This will allow us to avoid confusion and confounding results between studies that are not truly measuring the same phenomenon. It is important to emphasize that this does not mean that alternate conceptualizations of EO such as that proposed by Lumpkin and Dess (1996) or by Zahra and Neubaum (1998) do not exist or have the potential to provide us with useful knowledge. It is possible that such conceptualizations, in being more specific, will identify stronger or new relationships within that nomological network that are critical for increasing understanding of entrepreneurial activity. However, researchers must recognize that such definitions have a different conceptual domain and lie at a lower level of abstraction than the three-dimension conceptualization of EO. Giving these constructs the same name results in confusion in the field rather than clarity as we attempt to build our knowledge base. This argument gains additional support when we consider the categorization of the EO concept.

Concept Categorization

The goal of Satori's conceptual development methodology is to create discrete categories of concepts with well-defined attributes. Understanding the proper treatment of concepts as they move on the ladder of abstraction also depends on understanding the category of concept with which one is dealing. Two types of categories that are generally used in the social sciences are referred to as classical categories and radial categories (Collier & Mahon, 1993; Lakoff, 1987). Each of these category schemes delineates between cases using a primary category, or the overarching category, and secondary categories, whose meaning is at least partially based on the primary category (Lakoff). Within the classical scheme, the primary category is the superordinate category and the secondary category is the subordinate category such that the subordinate categories contain all of the elements of the superordinate category plus additional components that make them unique. This means that the cases included in the subordinate category are a subset of the cases included in the superordinate category. For concepts classified as classical, moving from a primary category to a secondary category would involve an increase in intension (i.e., they become more specific) and a corresponding decrease in extension (i.e., they apply to fewer cases). Conversely, one could move from a secondary to a primary category by increasing the extension (i.e., applying to more cases) while decreasing the intension (i.e., becoming less specific). As discussed previously, attempting to increase the intension without decreasing the extension (or vice versa) would result in concept stretching.

In the radial scheme, the secondary categories each contain some, but not all, of the properties of the primary category. In this type of concept, the secondary categories would be comprised of concepts that may share some or no properties with each other, but whose unique characteristics are each components of the primary category (Collier & Mahon,

Table 1

Conceptual Categorization Schemes

EO modeled as a classical categorization [†]			Components		
Primary category	Entrepreneurial orientation		A	B	C
Secondary category	Social EO		A	B	C
	Family business EO		A	B	C
	Health care EO		A	B	C
EO modeled as a radial categorization [‡]			D	E	F
Primary category	Entrepreneurial orientation		A	B	C
Secondary category	Arbitrage EO		A	B	
	First mover EO		A	C	
	Innovative EO		A		

[†] In a classical categorization the secondary categories which represent hypothetical types of EO that could be developed based on contexts in which EO has been studied share all of the characteristics of the primary category while each also contains additional characteristics that differentiate from other secondary categories. Thus the secondary categories are more specific than the primary category. A, B, and C would include Risk Taking, Proactiveness, and Innovativeness while D, E and F, represent the features that would differentiate specific types of EO.

[‡] In the radial categorization the characteristics of the secondary categories of EO must be contained in the primary category. Therefore secondary categories are more general than are primary categories. So if A, B, and C include Risk Taking, Proactiveness, and Innovativeness, respectively, the secondary categories must be subsets of these characteristics as our hypothetical examples demonstrate. Thus First Mover EO would be conceptualized as representing firms that are risk taking and proactive, but not necessarily innovative.

EO, entrepreneurial orientation.

1993). In the radial classification, the cases included in the secondary categories are not a subset of the primary category and may include unique cases that would not be included in the domain of the primary category. In this case, proper conceptual travelling is exactly the opposite. The primary category, by containing all of the characteristics of the secondary categories is the most specific definition, resulting in a high level of intension and a low level of extension. The secondary categories in a radial scheme only contain some of the characteristics of the primary category and are thus less specific (lower intension). As a result, they encompass a broader class of cases (higher extension). If one were to try to decrease the intension by the reducing the number of characteristics that define the concept without recognizing a corresponding increase in extensions (the concept is more general and applies to a broader range of cases) they would be guilty of concept stretching.

In the case of EO, the difference between the two classification schemes can be illustrated in Table 1. If we use the classical category scheme and we take the three-dimension conceptualization of EO as the superordinate category, then adding additional characteristics to denote new contexts or finer conceptualizations will create secondary categories that share the core elements of EO but which are distinct through the addition of these additional elements. For example, we may wish to study entrepreneurship in a social context. Clearly this would require a change in the definition of EO in order to capture unique aspects of this context. For example, using the Covin and Slevin definition as an example, we may modify the concept as follows:

The Social Entrepreneurial Orientation of a firm is demonstrated by the extent to which the top managers are inclined to take business-related risks (the risk-taking dimension), to favor change and innovation in order to obtain a competitive advantage for their firm (the innovation dimension), and to compete aggressively with other firms (the proactiveness dimension) in order to achieve a social rather than financial mission.

Some firms high on EO may have a social mission, firms that are high in Social EO, as defined here, would be expected to also be high in EO. In other words, these firms are a subset of the larger class of entrepreneurial firms (those with a high EO). Under this classification scheme moving from the primary to the secondary categories results in increased intension but decreased extension and involves moving down the ladder of abstraction via concept travelling. By doing this we would be increasing the specificity of the focal construct, EO, while decreasing its generalizability. Importantly, theoretical and empirical relationships found between concepts in these secondary categories and other constructs would not necessarily be expected to hold true for the higher-level concept of EO. In terms of our example, relationships found between Social EO and firm performance may not necessarily be expected to apply to the relationship between broader EO concept and firm performance.

Examples of hypothetical types of EO that could be identified under a radial scheme are also presented in Table 1. In these instances, the primary category is required to have all of the characteristics of the concepts in the secondary categories as each of the secondary categories is made up of some, but not all, of the properties of the primary category. It is worth noting that the extension of the secondary categories under the radial classification scheme is greater than that of the primary categories in that a firm may have a high score in a secondary category, but not the primary category as it contains additional characteristics. Additionally, it could be argued that none of the secondary categories represents a “true” reflection of the primary category since the secondary category does not share all of the primary categories’ components. As such, engaging in concept travelling involving a radial concept involves moving from the most specific concept to more general categories while concept stretching could be encountered by adding additional characteristics to the secondary category that are not part of the primary category.

Miller’s original conceptualization based on three components has provided the basis for a significant number of research projects in the entrepreneurship literature. A majority of these studies has sought to extend the EO concept by maintaining Miller’s three-component conceptualization and to examine its relationships with other key variables in the nomological network of the entrepreneurship field (e.g., Green, Covin, & Slevin, 2008; Kreiser, Marino, & Weaver, 2002; Zahra & Garvis, 2000). However, not all researchers have conceptualized EO in a manner consistent with Miller or in a manner that promotes concept traveling. As we illustrated in our discussion of the conceptual domain, this sometimes takes the form of adding additional characteristics that are either contextual (e.g., radical innovation) or theoretical (e.g., autonomy and competitive aggressiveness). The two most common deviations from Miller’s conceptualization are the use of two dimensions rather than three and the employment of a five-dimension conceptualization. We can analyze these two departures from the three-component definition and their implications from both the classical and radial conceptualization schemes.

Several researchers have conceptualized EO as being comprised of only two components. Merz and Sauber (1995), and Knight (1997) conceptualized EO as including only innovation and proactiveness, while Avlonitis and Salavou (2007) conceptualized EO as being composed of proactiveness and risk taking. From the perspective of a classical

categorization scheme, the use of only two components while representing the construct as still comprising EO is an example of construct stretching since the intension of the concept has been decreased, but the extension has not changed. If, however we assume EO is best represented using a radial classification scheme, then these two-dimension conceptualizations can be classified as secondary categories and could represent an increase in the extension of the concept if the authors had identified these conceptualizations as alternate types, or subcategories of EO rather than as comprising EO. Again, since the authors do maintain that their conceptualization represents EO this reflects concept stretching.

Rather than limiting the components of EO, Lumpkin and Dess (1996) conceptualized EO as being comprised of five dimensions: risk taking, proactiveness, innovativeness, competitive aggressiveness, and autonomy. In proposing the five-dimension conceptualization it appears that Lumpkin and Dess intended to replace Miller's three-dimension conceptualization with their five-dimension conceptualization. However in doing so, from the perspective of the classical categorization scheme Lumpkin and Dess's conceptualization has increased the intension of the concept while attempting to maintain the concept's extension. If the field does not adopt the five-item conceptualization as the "true" conceptualization of EO and replace the three-item conceptualization with it then the consequence of this is that the five-dimension conceptualization results in concept stretching. Under this scheme, the five-item conceptualization can be seen as representing an important element of the EO conceptual family as a subcategory of EO. The addition of the two dimensions would clearly represent a construct that would apply to a smaller number of firms. For example, there may be firms that are high in the three-dimension definition but would not necessarily be high in all five dimensions proposed by Lumpkin and Dess. As such, their conceptualization has a higher level of intension than the three-item definition and applies to only a subset of those captured by the three-dimension definition. It is important to note that this increase in intension may result in a construct that has even stronger relationships with other constructs of interest, but labeling it as the same construct as the three-dimension characterization implies that it captures the same conceptual domain and may result in confusion as to what represents EO.

Conversely, under a radial classification scheme, if we take Miller's conceptualization as the "true" representation of EO, then the addition of the two dimensions would remove the concept represented by the five dimensions from the EO family as the secondary categories must contain a subset of the characteristics of the primary concept. However, if we believe that the five-dimension conceptualization of EO is the "accurate" conceptualization, then Miller's three-dimension classification would be viewed as a secondary category of EO that is broader than Dess and Lumpkin's conceptualization.

The classification scheme also highlights key issues as researchers attempt to move between levels of analysis (e.g., moving up from the firm to the country or society, or down from firm to the subunit, the team, or the individual) or when we began to explore other areas that EO impacts such as internal operations. EO was originally defined as a firm level construct and extending the domain of the construct to other levels of analysis is clearly not appropriate as it captures an entirely different class of objects (nations, teams, or individuals vs. firms) rather than a subset of the primary category of EO. In such cases we are clearly dealing with a concept that does not reside in the EO conceptual family and labeling it as such can only lead to confusion within the field. Rather, if we are interested in the degree to which a nation is entrepreneurial, we should define what that means and develop appropriate measures to capture the domain of this new construct. Unfortunately, we have seen EO increasingly used in a number of different levels of analysis using the same construct name with only minor modifications to the conceptual

definition and the measures, which is clearly inappropriate and inhibits our ability to truly understand the nature of the concepts in question.

While few, if any, researchers will disagree that understanding the conceptual domain of a construct is critical, we have also illustrated how understanding the category of concept we are dealing with informs us as to how to define secondary categories of the concept properly. To that end, we suggest that EO clearly fits in the classical classification scheme. Because a radial conceptualization requires that the primary category be the most specific and contain all of the characteristics of any secondary category, we suggest that this type of construct works well for concepts with clearly defined and known properties. Collier and Mahon (1993) use the concept of Mother as an example for this type of construct. The characteristics of the primary concept, Mother, include female, gives birth to the child, provides 50% of the genetic make-up, provides nurturance, and is married to the father. These characteristics, in various combinations, form the secondary categories of Birth Mother, Stepmother, Genetic Mother, etc. For a latent construct such as EO, we do not know all of the characteristics *a priori*. Therefore, it appears to be more consistent with the original conceptualization of EO, and with subsequent development of the concept, that EO lies at a relatively higher level of abstraction and that we add contextual or other characteristics as a means of making the concept more specific, in line with the classical classification scheme.

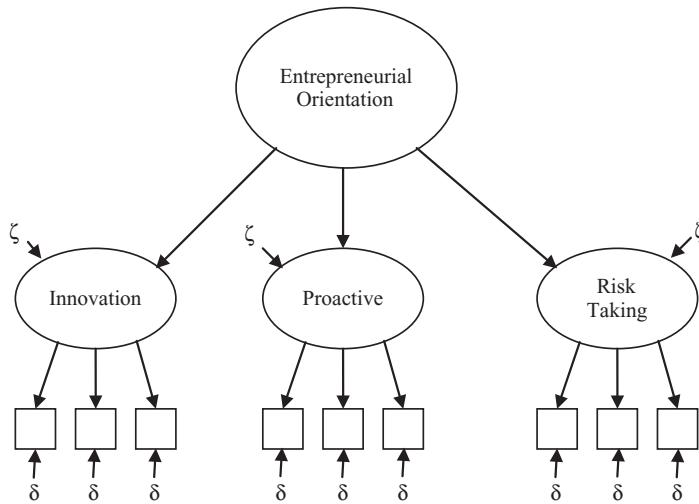
Relationship Between EO and Its Dimensions

Another issue we would like to raise with regards to the definition of EO is the relationship between EO and its dimensions. In the case of multidimensional constructs such as EO, the definition should specify the relations between the dimensions and the superordinate construct (MacKenzie, Podsakoff, & Jarvis, 2005). Unfortunately, our definitions of EO have not been consistent in this regard and as a result it has been left open to interpretation and dispute. It is the authors' contention that these definitional problems can be traced back to the early work by Miller (1983). As noted earlier, Miller's definition suggests that all three components are required to be present if a firm is considered to be entrepreneurial. Similarly, Covin and Slevin (1989) wrote, "The entrepreneurial-conservation orientation of a firm is demonstrated by the extent to which the top managers are inclined to take business-related risks, to favor change and innovation in order to obtain a competitive advantage for their firm, and to compete aggressively with other firms" (p. 77) and Stam and Elfring (2008) state that EO is "the simultaneous exhibition of innovativeness, proactiveness, and risk taking" (p. 98). In each of these cases, a firm that has an entrepreneurial orientation will exhibit characteristics of proactiveness, risk-taking, and innovation and an increase in EO would be expected to increase the level of each of these dimensions. As such, meaning emanates from EO to the dimensions as depicted in Figure 1. A construct whose definition consists of structural relationships with other constructs is considered a higher-order construct. In the case of EO there are two levels: that of the superordinate construct of EO and that of its dimensions. Because the meaning of a construct of this nature is "reflected" in the lower-order dimensions, we will refer to this as a second-order reflective model of EO (MacKenzie et al.).

However, at the same time Miller (1983) writes that "we can tentatively view entrepreneurship as a composite weighting of these three variables" (p. 771). This definition proposes an entirely different relationship between EO and its dimensions. By suggesting that EO is a composite of the three, it is implied that EO is created by the aggregation of

Figure 1

Second-Order Reflective Model



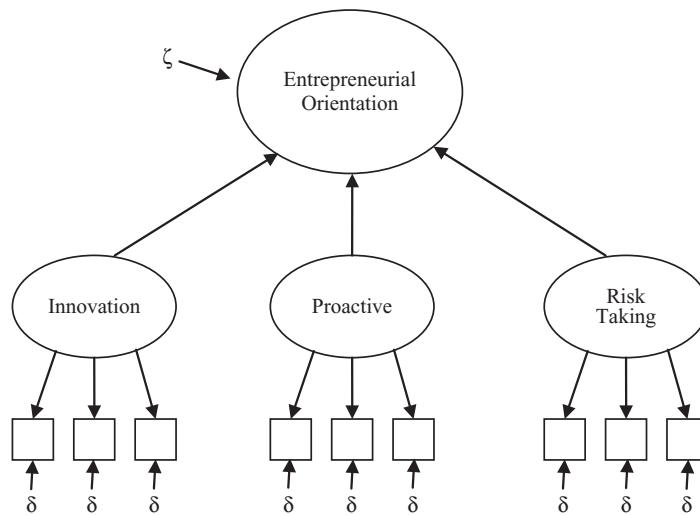
the dimensions. This view has been implicitly adopted by other authors who have studied EO by examining individual dimensions of the construct (e.g., Lumpkin & Dess, 2001; Merz & Sauber, 1995; Naldi, Nordqvist, Sjöberg, & Wiklund, 2007). If we can study EO by studying its individual dimensions, independent of their interrelation, we are arguing that these individual dimensions combine to form EO. This definition of EO implies that EO is created by its dimensions, rather than the dimensions being manifestations of EO. In this type of model, EO is defined, or “formed,” by its dimensions and meaning emanates from the dimensions to EO, as shown in Figure 2. As such, we will refer to this conceptualization as a second-order formative model (MacKenzie et al., 2005).

A useful way of understanding how these definitions of EO differ is to think of them in terms of the observed variances. As noted by Nunnally (1978), observed variances consist of four parts: (1) common variances that are shared by all elements; (2) group variances that are shared by some elements; (3) specific variances, which are unique to an individual variable or construct; and (4) random variances. If EO is defined as a second-order reflective model, then the variance in EO would be represented solely by the common variance of its dimensions. The other three types of variance would be considered to be part of the error variance when measuring EO when defined in this manner (Law & Wong, 1999). Because EO’s meaning emanates from the higher-order construct to its dimensions, changes in EO would only be evidenced by changes in all three dimensions. This means that the construct is empirically defined in terms of the common variance among the dimensions and that the dimensions would be expected to be correlated as they are each representative of a common factor.

Conversely, if EO is defined as being created by the combination of its dimensions, the variance of EO will be composed of the common variance, group variance, and specific variance rather than only the common variance. In this type of model the error variance would exist at the higher-order construct (EO) and represents the extent to which the combination of the factors did not account for the variance in EO. In this type of model the dimensions could be highly correlated (high common variance), two could be highly

Figure 2

Second-Order Formative Model



correlated, but not all three (high group variance), or they need not be correlated at all with each representing a totally unique aspect of the construct (low group and common variance, high specific variance).

There has been much discussion in the literature with regards to whether or not the dimensions of EO can vary independently of each other (Dess et al., 1999; Lumpkin & Dess, 1996; Stetz, Howell, Stewart, Blair, & Fottler, 2000). If we examine this in light of the preceding discussion, we can see that this is a fruitless line of inquiry. If EO is defined as a second-order reflective construct, then the dimensions would be expected to covary, which has consistently been the case in the empirical studies in the field. However, this does not mean that the dimensions cannot vary independently of each other. Rather, because EO is only represented by the common variance under this definition, any variance due to factors other than EO will be attributed to error variance. Conversely, if EO is defined as a second-order formative construct the dimensions can vary independently and may or may not covary. As a result, the dimensions can vary independently in either measurement model and illustrating this provides us with little additional knowledge as to the nature of the construct.

Understanding the nature of the definitional relationship between the superordinate construct and its dimensions has implications for our theoretical development of causal relationships with EO. Because the dimensions in a second-order formative model represent different aspects of the conceptual domain of the multidimensional construct, they would not necessarily be expected to have similar antecedents and consequences (MacKenzie et al., 2005). While it is conceptually feasible to have consequences of EO that result from the combination of the dimensions, antecedents to the higher-order construct are more conceptually difficult to rationalize. If a construct were causally antecedent to EO and EO exists only as a combination of its lower-order dimensions, then it must be antecedent to one or more of those dimensions. Modeling the construct as antecedent to the higher-order EO construct unnecessarily hides what could be important information on how the individual dimensions are influenced by the construct in question.

If EO were defined as a reflective second-order construct, we would expect the lower-order dimensions of innovation, proactiveness, and risk taking to share some common antecedents and consequences and these would be represented as structural paths into and out of the higher-order EO construct. This is not to say that the dimensions share all antecedents and consequences. In fact, several studies have shown that the individual dimensions have different relationships with various constructs such as environmental hostility (Kreiser et al., 2002), product performance (Avlonitis & Salavou, 2007; Hughes & Morgan, 2007), sales growth (Covin, Green, & Slevin, 2006), firm performance (Naldi et al., 2007; Richard, Barnett, Dwyer, & Chadwick, 2004), and customer performance (Hughes & Morgan). However, because EO is represented by the variance shared by the dimensions in this type of model, any variance that is not shared by all of the dimensions will be treated as error variance with regards to measures of EO (ζ in Figure 2). If the dimensions are examined in isolation, only the random variance will be attributed to error. For example, one could argue that governance structure may be related to risk taking, but it may have a different effect on proactiveness. In a model of EO as a reflective second-order construct, this variance would be attributed to error variance. However, it would be included in the variance of the dimensions when calculating path coefficients if they are examined individually.

In light of the definitions and conceptual development of EO, it is our belief that a firm with an entrepreneurial orientation has a strategic posture that is reflected in proactiveness, risk taking, and innovativeness rather than the strategic posture being created by these characteristics. While we have noted a number of discrepancies among EO definitions and its conceptual domain, a large number of studies have defined EO as an organizational phenomenon related to the firm's processes, methods, and decision-making activities (e.g., Covin & Slevin, 1989; Hughes & Morgan, 2007; Jantunen, Puumalainen, Saarenketo, & Kyläheiko, 2005; Lumpkin & Dess, 1996; Rauch, Wiklund, Lumpkin, & Frese, 2009; Stam & Elfring, 2008; Wiklund & Shepherd, 2005). As such, it would seem that EO represents a larger concept than simply the sum of its dimensions and that these dimensions are merely reflections of this larger, unobservable construct that represents the firm's strategic posture. We would also suggest that conceptually we would expect an increase in EO, as an organizational phenomenon, to result in an increase in all of its dimensions. For example, if we were to take a firm and increase their innovativeness without increasing risk taking and proactiveness, would they be more entrepreneurial? We would argue that changing one dimension in isolation does not represent a change in strategic posture but rather only one aspect of it. As such, we believe that a reflective model of EO is more consistent with the theoretical and conceptual definition of the construct.

Measurement Model

Once we have established the conceptual definition, including the domain of the construct and the nature of the relationship between EO, we must ensure that our measurement model is consistent with that conceptual definition. As noted by MacKenzie (2003), measurement model misspecification can threaten both construct validity and statistical conclusion validity. While MacKenzie et al. (2005) found that model misspecification could lead to an inflation of structural parameters by up to 429% in a general model, a recent Monte Carlo simulation examining the effects of model misspecification on EO specifically found that incorrectly modeling the construct can inflate structural parameter estimates by over 240% and critical ratios by up to 68% (George, 2011).

This illustrates the importance of ensuring that our measurement model is consistent with our theoretical definitions. While there have been discrepancies with regard to the definition and nature of the EO construct, as indicated earlier, the way in which EO has been measured has been remarkably consistent. An examination of 61 empirical studies of EO shows that 54 of these have used a summated scale of one form or another. This presents a potential problem that must be reconciled. For example, studies using a summated scale often report Cronbach's alpha as a measure of internal consistency reliability (e.g., Barringer & Bluedorn, 1999; Covin & Slevin, 1989; Knight, 1997). Since Cronbach's alpha indicates how well the individual items reflect a common, underlying concept this would only be appropriate if EO were defined as a second-order reflective model (Figure 1). Second, regardless of the theoretical definition and development of hypotheses in our studies, if we empirically model EO using a summated scale, we are testing relationships with a second-order reflective model of the construct. Mathematically, summated scales are a means of gathering a more reliable measure of the construct of interest by allowing us to average out the random error in individual measures. However, the underlying assumption behind this is that the items are attempting to measure the same thing. This would be true in the case of a reflective model in that each of the items capture variance attributable to EO.

In a formative model the measures of the lower-order construct combine to create EO, therefore each item is not trying to capture a common construct. If we refer to Figure 2 we can see that the error term associated with EO reflects the extent to which the composite of the sub-dimensions fails to capture the variance in EO. The use of a summated scale does not allow the estimation of this error term. A reflective model can estimate the error from the reliability of the scale, but measures of internal consistency reliability such as Cronbach's alpha are not valid indicators of reliability for a formative construct because they are based on the assumption that the items are measuring the same phenomenon (for a detailed discussion of the mathematics behind this, we refer readers to Bollen, 1989; Bollen & Lennox, 1991). If we define EO as a second-order formative construct, then we should be developing and using an index measure of the construct rather than a summated scale and the degree to which each sub-dimensions contributes to the overall EO becomes a critical issue. As illustrated by Bollen and Lennox (and MacKenzie et al. (2005), the use of a summated scale will lead to biased estimates of the structural relationships involving a formative model of EO (Bollen & Lennox; MacKenzie et al.).

As we indicated earlier, we believe that a reflective model of EO is more consistent with the theoretical development of the concept. As we noted previously, formative and reflective models of EO result in very different theoretical arguments in the development of proposed causal relationships. While the vast majority of empirical studies have explicitly or implicitly modeled EO as a reflective construct through the use of a summated scale, we have tried to illustrate here that it is important for researchers to ensure that their measurement models are consistent with their theoretical models if they are to truly test their hypothesized relationships and the implications of measurement model misspecification.

Measures

Once we understand the construct definition and the measurement model we can then turn our attention toward the specific items used to measure EO. This history of the items used to measure EO can be traced by to Miller and Friesen (1982) who used five items related to risk taking and innovation to distinguish between entrepreneurial and

conservative firms. Morris and Paul (1987) expanded further on this and incorporated the work of Khandwalla (1976) and Ginsberg (1985) to develop a 13-item scale. Covin and Slevin (1989) built on the work of Khandwalla and Miller and Friesen to develop the 9-item scale that has become the standard for measuring EO. The nine items that comprise the original scale can be seen in Appendix.

We can see in Table 2 that the Covin and Slevin (1989) scale or a variation of it has been used in 34 of the 54 empirical studies of EO we examined since that time. However, there is research that suggests it may be time to revisit these items. Numerous studies have found that one of the items measuring innovativeness has consistently shown evidence of low reliability, causing many researchers to simply drop the item and use an 8-item scale (e.g., Kreiser et al., 2002; Tang, Tang, Zhang, & Li, 2007; Weaver, Dickson, Gibson, & Turner, 2002). Tang, Tang, Marino, Zhang, and Li (2008) noted that this item was used by Miller (1987) to measure proactiveness rather than innovativeness and, as such, may constitute a contaminated measure. While in some instances it could be argued that dropping the item provides a more parsimonious measurement scale, there are advantages to using a larger number of items including (1) the ability to average out specific error attributable to any single item, (2) it tends to increase reliability and decrease measurement error, and (3) it enables finer distinction between subjects (Churchill, 1979). Given these advantages, it may be better to develop more reliable measures rather than simply reduce the size of the scale.

There have also been questions raised with regards to the definition of risk taking as it pertains to EO. Miller and Friesen defined risk-taking as “the degree to which managers are willing to make large and risky resource commitments—i.e., those which have a reasonable chance of costly failure” (Miller & Friesen, 1978, p. 923). Lumpkin and Dess (1996) noted that Miller and Friesen’s definition of risk did not capture the concept of strategic risk identified by Baird and Thomas which entails “venturing into the unknown” (Baird & Thomas, 1985, p. 231) while Morris and Paul (1987) argue that this dimension should be defined as calculated risk taking. It is clear that each of these issues can be traced back to the definition of EO and provides further evidence for the need to clarify the definition in unambiguous terms.

As evidenced in Table 2, EO has become increasingly popular in international research yet there is recent evidence to suggest that the items used to measure EO do not necessarily carry the same meaning in different cultural settings. Knight’s (1997) examination of English- and French-speaking firms in Canada revealed a consistent factor structure, as well as convergent and discriminant validity of the ENTRESCALE which included innovativeness and proactiveness factors leading Knight to conclude that the scale had a high degree of cross-cultural validity. Consistent with Knight’s work, Kreiser et al. (2002) examined the psychometric properties of the EO scale across six countries and found that in each country EO was best modeled with a three-factor structure, thus further supporting the cross-cultural validity of the scale. Despite these findings supporting a consistent factor structure of EO in cross-cultural settings, there are concerns regarding the cross-cultural invariance of the scale. For example, Kemelgor (2002) found that firms in the Netherlands demonstrated a significantly lower level of EO than did firms from the United States. Thus, what it means to have a high EO in the Netherlands may not be the same as in the United States. Additionally in developing a cross-culturally valid measure of Corporate Entrepreneurship using samples from Slovenia and the United States Antoncic and Hisrich (2001) had to remove several of the items that are used in the EO scale as there were problems with obtaining consistent factor loadings and coefficients. In the most extensive study of the cross-cultural invariance of the EO Scale to date Hansen et al. (2011) employed a sample of 1279 firms in the United States, Australia,

Table 2

Empirical Studies of EO

Authors	Dimensions	Sample	Aggregate?	# items	Items
Khandwalla (1976)	RT, flexibility, centralization	103 public Canadian firms	NA	1	In top-level decision making, the use of the entrepreneurial mode, characterized by active search for big new opportunities: large, bold decisions despite the uncertainty of their outcomes; a charismatic decision maker at the top wielding great power; and rapid growth as the dominant organization goal. 1 = Little resemblance to style of top-level decision making in firm; 7 = Very great resemblance to style of top-level decision making in firm
Miller and Friesen (1982)	Innovation, risk taking	52 Canadian firms	Yes	5	1. There is a strong emphasis on the marketing of true and tried products and services = 1; There exists a very strong emphasis on R&D, technological leadership, and innovations = 7 2. How many new lines of products or services has your firm marketed in the past 5 years? Please exclude mere minor variations. 1 = No new lines of product or services in past 5 years; 7 = Hundreds of new lines of products or services in the past 5 years 3. Changes in product lines have been mostly of a minor nature (e.g., putting in towel with the soap) = 1; Changes in product lines have usually been dramatic (e.g., changing from mechanical to electric calculators) = 7 4. There is a strong proclivity to low risk projects (with normal and certain rates of return) = 1; The firm has a strong proclivity for high risk projects (with chances of very high return) = 7 5. Owing to the nature of the environment it is best to explore it gradually via timid, incremental behavior = 1; Bold, wide-ranging acts are viewed as useful and common practice = 7
Miller (1983)	Innovation, RT, proact	52 Canadian firms	Yes	7	Specific items were not published
Miller and Friesen (1983)	Analysis, innovation	50 Canadian firms; 36 U.S. firms	Yes	5	1. The rate, relative to competitors, of new product/service introduction by the firm: 1 = Has decreased very much; 7 = Has increased very much 2. The rate of change in your methods of production or rendering of services: 1 = Rate of change has declined much; 7 = Change has accelerated rapidly 3. Risk taking by key executives of the firm in seizing and exploring "chancy" growth opportunities: 1 = Has decreased very much; 7 = Has increased very much 4. In dealing with its competitors, the firm: 1 = Resorts much more to a live and let live philosophy; 7 = Has become more aggressive 5. Seeking of unusual, novel solutions by senior executives to problems via the use of "idea men," "brainstorming," etc: 1 = Has become less common; 7 = Has become much more common

Table 2

Continued

Authors	Dimensions	Sample	Aggregate?	# items	Items
Morris and Paul (1987)	Innov, RT, proact	116 U.S. firms in Florida	Yes	12	Scale items based on work by Miller and Friesen (1983), Khandwalla (1976), and Ginsberg (1985) 7-point scale, characterizing the extent to which each item was descriptive of their organization. 1. Rate of new product/service introduction. 2. Changes in methods of production or delivery. 3. Seizing chancy growth opportunities. 4. Aggressiveness in dealing with competitors. 5. Seeking unusual or novel solutions to problems. 6. Emphasis on R&D, technical leadership, and innovation. 7. Active search for big opportunities. 8. Bold decisions despite uncertainties. 9. Rapid growth as dominant goal. 10. Cautious, pragmatic adjustments to problems. 11. Decisions as compromises of conflicting demands. 12. Steady growth and stability.
Covin and Slevin (1988)	Innovation, RT, proact	80 U.S. mfg and service firms	Yes	6	1. The operating management philosophy of the top management of my business unit is . . . 1 = Strong emphasis on the marketing of true and tried products or services and the avoidance of heavy research and development costs; 7 = Strong emphasis on research and development, technological leadership, and innovations 2. In top-level decision making, the use of the entrepreneurial mode, characterized by active search for big new opportunities; large, bold decisions despite the uncertainty of their outcomes; a charismatic decision maker at the top wielding great power; and rapid growth as the dominant organizational goal. 1 = Little resemblance to style of top-decision making in business unit; 7 = Very great resemblance to style of top-level decision making in business unit. 3. How many new lines of products or services has your business unit marketed in the past 5 years? 1 = No new lines of products or services in past 5 yrs; 7 = Very many new lines of products or services in past 5 yrs 4. 1 = Changes in product/service lines have been mostly of a minor nature; 7 = Changes in product/service lines have usually been dramatic

Covin and Slevin (1989)	Innov, RT, proact	161 U.S. mfg firms	9	Yes	Adapted from Miller and Friesen (1982), Khandwalla (1976), or Covin and Slevin (1989)
	Innov, RT, proact	90 U.S. firms in W. PA	Yes	9	Covin and Slevin (1989) scale
	Innov, RT, proact	217 members of a national furniture mfr. trade assoc.	Yes	9	
	Formal, informal	119 U.S. companies	Yes	9	Responses followed a 7-point scale (1 = little emphasis to 7 = major emphasis). The items were: 1. Implementing new programs to enhance innovation throughout the company over the past three years;

Continued

Authors	Dimensions	Sample	Aggregate?	# items	Items
Miles, Arnold, and Thompson (1993)	Innov, RT, proact	169 U.S. companies	Yes	9	Covin and Slevin (1989) scale
Naman and Slevin (1993)	Innov, RT, proact	82 mfg firms in PA	Yes	9	Covin and Slevin (1986, 1988) scale
Zahra (1993)	Venturing and innovation, self-renewal	102 U.S. mfg firms	Yes	27	All items measured using a 1-5 Likert scale with 1 being the low end and 5 the high. 1. <i>New Business Creation (a-80)</i> . Indicate the extent to which your company has emphasized each of the following items: stimulating your new demand on your existing products in your current markets through aggressive advertising and marketing, broadening your business lines in your current industries, pursuing new businesses in new industries that are related to your current business, finding new niches for your products in your current markets, entering new businesses by offering new lines and products. 2. <i>Product Innovation (a-X0)</i> . Indicate the extent of changes that might have taken place in your company over the past three years: your company's emphasis on developing new products, rate of your new product introduction into the market, your company's spending on new product development activities, the number of new products added by your company, the number of new products introduced by your company. 3. <i>Percent of Revenue Generated from New Business</i> . Executives estimated the percent of their company's revenue generated from products that did not exist three years earlier. Only 78 companies provided data on this variable.

4. *Technological Entrepreneurship* (*a-63*). Indicate the extent of changes that may have taken place in your company over the past three years: your investment in developing proprietary technologies, your emphasis on creating proprietary technology, your adoption of technologies developed by other companies or industries, your company's emphasis on technological innovation, your company's emphasis on pioneering technological developments in your industry.
5. *Mission Reformulation* (*a-86*). Indicate the extent to which your company has emphasized each of the following items: defining your company's mission, revising your business concept, redefining the industries in which your company will compete.
6. *Reorganization* (*a-70*). Indicate the extent to which your company has emphasized each of the following items: reorganizing units and divisions to increase innovation, coordinated activities among units to enhance company innovation, increasing the autonomy (independence) of different units to enhance their innovation, adopting flexible organizational structures to increase innovation.
7. *System-Wide Changes* (*a-74*): training employees in creativity techniques, rewarding employees for creativity and innovation, establishing procedures to solicit employee ideas for innovations, establishing procedures to examine new innovation ideas, designating formal idea (project or venture) champions, making resources available for experimental projects.

Smart and Conant (1994)	NA	599 independently owned apparel specialty retailers	Yes	6	1. Propensity to take risks 2. Tendency to engage in strategic planning activities 3. Ability to identify customer needs and wants 4. Level of innovation 5. Ability to persevere in making your vision of the business a reality 6. Ability to identify new opportunities	Measures of proactiveness and innovativeness used in the present study were taken from Miller (1983) and Miller and Friesen (1982)
Merz and Sauer (1995)	Innovation, proact	370 CEOs of firms in a U.S. midwestern state	No	7	Miller (1983) and Miller and Friesen (1982)	
Zahra and Covin (1995)	Innov, RT, proact	108 U.S. firms	Yes	9	Miller and Friesen's (1982) index was used as the measure of CE	
Bucherer and Maurer (1997)	Innov, RT, proact	147 U.S. orgs	Yes	9	Scale adapted from Covin and Slevin (1989)	
Dickson and Weaver (1997)	Innov, RT, proact	433 Norwegian manufacturing firms	Yes	8	Items came from Covin and Slevin (1988, 1989)	
Knight (1997)	Innovation, proact	258 responses from French- and English-speaking Canadian firms	Yes	8	Khandwalla's (1976) 9-item "ENTRESCALE" minus one proactiveness item was used	
Zahra and Neubaum (1998)	Innovation, RT, proact	228 new ventures in the southeastern U.S.	Yes	7	Miller (1983) scale	
Barringer and Bluedorn (1999)	Innov, RT, proact	169 U.S. manufacturing firms	Yes	9	Covin and Slevin (1986) scale	

Table 2

Continued

Authors	Dimensions	Sample	Aggregate?	# items	Items
Wiklund (1999) Zahra and Garvis (2000) Lee, Lee, and Pennings (2001)	Innov, RT, proact Innov, RT, proact Innov, proact, RT Innov, proact, RT	132 Swedish firms 98 U.S. companies 137 Korean technological start-up companies	Yes Yes Yes	8 7	Miller's original scale in Miller and Friesen (1982) Modified version of Miller's (1983) 7-item measure
				6	We measured <i>innovativeness</i> by two indices: (1) the number of R&D employees in 1997 and (2) the number of products/services that created a new market niche, penetrated established markets successfully, or significantly substituted imports from foreign countries in 1998.
					<i>Risk-taking propensity</i> at the firm level was measured by two indices: (1) the number of risky R&D projects in 1997 and (2) expenditure on the risky R&D projects in 1997.
					<i>Proactiveness</i> was measured by two indices: (1) the number of first mover pursuing projects based on an idea suggested by Miller (1983) and Naman and Slevin (1993), (2) first mover pursuing project expenditure in 1997.
Lumpkin and Dess (2001)	Proactiveness and competitive aggressiveness were main focus but included innovativeness and RT	Final sample of 124 executives in 94 firms	No	11	Measured using scales developed and tested for reliability by Khandwalla (1976), Miller (1983), Covin and Slevin (1986, 1989), and Covin and Covin (1990). These scales were supplemented by items developed to capture aspects of the subconstructs that were not included in the previously used scales. For this analysis, only two items—one proactiveness item and one competitive aggressiveness item—was added to the nine-item scale developed and used by Covin and Slevin (1986, 1989).
Marino, Strandholm, Steensma, and Weaver (2002) Kreiser et al. (2002)	Innov, proact, RT Innov, proact, RT	138 Indonesian, 58 Finnish, 156 Greek, 127 Mexican, 71 Dutch, and 97 Swedish SME's 78 Australian SME's, 116 Dutch SME's, 366 Norwegian SME's, 153 Swedish SME's, 241 Mexican SME's, and 113 Finnish SME's	Yes No	8 8	Based on Covin and Slevin—dropped one item from Proactiveness scale (specific item not listed) Covin and Slevin (1989) measure—3 innovativeness, 3 proactiveness, and 2 risk taking items. 9th item from original scale measuring bold posture was dropped.
Kemelgor (2002)	Innov, proact, RT	4 matched pairs of firms in U.S. and the Netherlands	Yes	9	Covin and Slevin (1986) scale

Weaver et al. (2002)	Innov, proact, RT	180 Swedish, 433 Norwegian, 206 Australian firms	Yes	Unknown	8	Covin and Slevin (1989)
Auger, Barnir, and Gallagher (2003)	RT, competitive aggressiveness, proactiveness	150 firms from magazine publishing industry	Yes	Adapted from Covin and Miles (1999)		
Wiklund and Shepherd (2003)	Innov, proact, RT	384 Swedish small and medium-sized businesses	Yes	9	Covin and Slevin's (1989) instrument	
Alexandrova (2004)	Innov, proact, RT, autonomy, comp aggress.	382 Bulgarian micro-enterprises	No	15	Specific items not given	
Neubaum, Mitchell, and Schminke (2004)	Innov, proact, RT	304 individuals in 37 U.S. firms	Yes	5	Knight's (1997) five item proactiveness measure of organizational entrepreneurship	
Richard et al. (2004)	Innov, RT, proact, but ended up with a two-factor solution with RT and Innov as the factors	153 HR executives in U.S. banks	Yes	9	Covin and Slevin (1989) scale	
Hult, Hurley, and Knight (2004)	Innov	181 marketing execs	Yes	5	Adapted from Naman and Slevin (1993) and Covin and Slevin (1989)	
Wiklund and Shepherd (2005)	Innov, proact, RT	413 Swedish small business mngrs	Yes	8	Miller's original scale for EO was used	
Jantunen et al. (2005)	Innov, proact, RT	217 Finnish manufacturing and service firms	Yes	9	(1 = disagree completely, 7 = agree completely)	
					1. We are among the first ones to implement progressive and innovative production processes and practices	
					2. The management of our company supports the projects that are associated with risks and expectations for returns higher than average	
					3. We actively observe and adopt the best practices in our sector	
					4. We actively observe the new practices developed in other sectors and exploit them in our own business	
					5. We recognize early on such technological changes that may have an effect on our business	
					6. We are able to take on unexpected opportunities	
					7. We search for new practices all the time	
					8. In uncertain decision making situations we prefer bold actions as to make sure that possibilities are exploited	
					9. We allocate our resources continuously to new promising operation areas	

Table 2

Continued

Authors	Dimensions	Sample	Aggregate?	# items	Items
Chow (2006) Covin et al. (2006)	Innov, proact, RT Innov, proact, RT	3,562 Chinese firms 110 nondiversified U.S. manufacturing firms in Pennsylvania, Ohio, and West Virginia	Yes Yes	6 9	Specific items not given Covin and Slevin (1989) scale
Hughes and Morgan (2007)	risk-taking, innovativeness, competitiveness, aggressiveness, and autonomy Proact, RT	211 UK firms 149 Greek SMEs	Yes Yes	Not listed	Most items adapted from Lumpkin and Dess (1996). Specific items not published.
Avlonitis and Salavou (2007) Keth, Nguyen, and Ng (2007) Naldi et al. (2007)	Innov, proact, RT Innov, RT, proact Innov, RT, proact	294 firms in Singapore 265 family and 431 nonfamily Swedish SME's 166 firms in Northern China	Yes No Yes	8 9 8	Adopted from Covin and Slevin (1989) and Miller and Friesen (1982) but using 5 point Likert scales instead of 7 point Covin and Slevin (1986, 1989) scale
Tang et al. (2007) Tang et al. (2008) Stam and Elfring (2008)	Innov, RT, proact Innov, proact, RT Innov, proact, RT	185 Chinese firms 87 Dutch firms in the open source software industry	Yes Yes Yes	8 9 9	Same scale from Kreiser et al. (2002) adapted from Covin and Slevin (1989) scale Same scale from Kreiser et al. (2002) adapted from Covin and Slevin (1989) scale Covin and Slevin (1989) scale replacing one item “asking whether a firm prefers to ‘undo competitors’ or to ‘live and let live’” from that scale with “whether a firm ‘has a strong tendency to follow the leader’ or to ‘be ahead of other competitors’ in introducing new products and services” from Lumpkin and Dess (2001).
Green et al. (2008)	Innov, proact, RT	110 manufacturing firms in Southwestern Pennsylvania	Yes	9	Covin and Slevin (1989) scale

Moreno and Castillas (2008)	Innov, proact, RT	434 Spanish SMEs	Yes	11	Lumpkin (1998) scale based on scales from Khandwalla (1976), Miller and Friesen (1983), Covin and Slevin (1989), and Covin and Covin (1990) with the addition of the following 4 items. Innov4: "my firm prefers to design its own unique new processes and methods of production," versus "my firm prefers to adapt for our own use methods and techniques that others have developed and proven"; Innov5: "in general, the top managers of my firms favor experimentation and original approaches to problem solving," versus "imitating methods other firms have used for solving their problems"; Rsk3: "in general, the top managers of my firm prefer to study a problem thoroughly before deploying resources to solve it," versus "are quick to spend money on potential solutions if problems are holding us back"; and Prc3: "the top managers of my firm have a strong tendency to 'follow the leader' in introducing new products or ideas," versus "a strong tendency to be ahead of other competitors in introducing novel ideas or products."
Wang (2008)	Innov, proact, CA, RT	213 Med to large UK firms	Yes	11	Miller/Covin and Slevin scale with items from Lumpkin and Dess (1996)
Li, Zhao, Tan, and Liu (2008)	Innov, proact, RT	213 Chinese firms	Yes	9	Covin and Slevin (1989) scale
Runyan, Droege, and Swinney (2008)	Innov, RT, proact	267 SME's in midwestern U.S. towns	Yes	9	Covin and Slevin (1989)
Kropp, Lindsay, and Shoham (2008)	Innov, proact, RT	539 individuals from international South African firms	Yes	15	Developed scale from Covin and Slevin (1989); Khandwalla (1976); Miller and Friesen (1983); Lumpkin and Dess (1996, 2001)
Lumpkin et al. (2009)	Autonomy, innov, proact, RT, CA	319 MBA students in Study 1 and 125 students in Study 2	Yes	22 total items	Covin and Slevin (1989) scale for Innov, Proact, RT. Autonomy scale was developed in the research
Monsen and Boss (2009)	RT, innov, proact	1,975 manager and staff individuals from two large not-for-profit hospitals that merged	Yes	9	Covin and Slevin (1989) scale
Anderson, Covin, and Slevin (2009)	Innov, proact, RT	110 manufacturing firms in southwestern Pennsylvania	Yes	8	Covin and Slevin (1989) scale minus one item
Baker and Sinkula (2009)	Innov, proact, RT	88 small firms with a minimum of three million and a maximum of 100 million dollars in sales	Yes	8	Naman and Slevin (1993) scale

Table 2

Continued

Authors	Dimensions	Sample	Aggregate?	# items	Items
Renko, Carsrud, and Brännback (2009)	Innov, proact, RT	85 CEOs and Bus. Development Mgr. of Biotech startups in U.S., Finland, and Sweden	Yes	8	Based on Knight (1997) scale
Simsek, Heavey, and Veiga (2010)	Innov, RT, proact	129 Irish firms	Yes	9	Covin and Slevin (1986)
De Clercq, Dimov, and Thongpapanl (2010)	Innov, proact, RT	232 Canadian firms	Yes	7	Miller (1983)
Pearce, Fritz, and Davis (2010)	Autonomy, innov, proact, RT, CA	252 religious organizations	Yes	19 total items	Covin and Slevin (1989) scale, with the addition of items from Lumpkin and Dess (1996). Items were tailored for use in a nonprofit, religious setting
Hansen et al. (2011)	Innov, proact, RT	171 U.S., 139 Australian, 154 Swedish, 244 Mexican, 258 Indonesian, 122 Dutch, and 191 Greek SME's	No	8	Covin and Slevin (1989) scale minus one RT item

NA, not applicable; RT, Risk Taking; CA, Competitive Aggressiveness.

Sweden, Mexico, Indonesia, the Netherlands, and Greece and found several issues of concern. For example it was found that item EO4 failed to achieve metric invariance. The loading for the U.S. sample was significantly higher than it was in the Swedish, Indonesian, and Dutch samples, indicating that this item was a better reflection of the proactiveness construct in the U.S. sample (Hansen et al.). They also found that at least one item lacked scalar invariance, meaning essentially that on a 7-point scale a score of four does not mean the same thing to U.S. respondents as it does to respondents from other countries. Further this study found that U.S. respondents scored significantly higher on risk taking than non-U.S. respondents, and that non-U.S. respondents generally exhibited a higher level of variance on the sub-dimensions. Despite other research to the contrary, these results call into question our ability to generalize results from studies incorporating international samples to other contextual settings. As such while evidence suggests that the EO scale has a consistent factor structure across cultures, we would caution researchers to be wary of this in developing theoretical models and in drawing conclusions from their studies especially in situations where metric and/or scalar invariance may exist between the countries employed in the sample.

Discussion and Recommendations for Future Research

The advancement of science requires that researchers employ concepts that are consistently defined, operationalized, and interpreted. To accomplish this, researchers must be disciplined in how they employ concepts in their work, especially when they are seeking to apply concepts to a new application, context, or a new set of cases. In the best case, failure to do so results in concepts that are imprecise, making it difficult to compare and build upon the results of studies that do not consistently employ equivalent constructs. In the worst case a discipline that employs such poorly constructed concepts devolves into a pseudo-science whose key premises are nothing more than mere generalities and whose key concepts become stretched to the verge of becoming meaningless. To prevent this from happening, researchers working in a field must insist on maintaining clearly delineated conceptualizations of key constructs and on rigorously employing consistent definitions and operationalizations of these constructs. Maintaining this level of rigor is especially difficult as researchers attempt to expand the generalizability of a concept by employing it in research projects that span a variety of research settings and types of cases.

Within the entrepreneurship literature, one of the key concepts that has increasingly been used in a variety of research settings over the last two decades is EO. However, the increasing usage of the EO construct has led some researchers to develop and employ imprecise alternative conceptualizations and operationalizations of the construct that are leading to concept stretching. As such, the primary purpose of this paper has been to facilitate the continued knowledge accumulation in the entrepreneurship literature regarding the entrepreneurial orientation construct by attempting to resolve conceptual and methodological inconsistencies that have arisen in the use of this concept. From a conceptual perspective the most significant challenges to knowledge accumulation lie in authors' use of inconsistent conceptualizations of EO that result in concept stretching rather than in systematic concept travelling.

In order to enhance the potential for concept travelling by EO and to avoid concept stretching, researchers must consider the conceptual domain of the construct, the appropriate classification scheme for the construct, and its level of abstraction. Consistent with Kuhn's (1962) conceptualization of a paradigm shift, if evidence suggests that the current conceptualization of EO is insufficient to explain the phenomena we are observing in the

field, then we should begin to seek alternate conceptualizations of this construct. However, to date there has been very little evidence to suggest that the use of the original conceptualization has led to the identification of anomalies that would call this conceptualization into question. Barring an identification of such anomalies, it is incumbent on researchers in the field to abide by the best conceptual and methodological practices while working in this domain and to guard against concept stretching.

The first step in ensuring that we maintain the psychometric integrity of the EO construct is to clearly delineate the nature of the concept. We suggest this can be best facilitated by expanding our view of Entrepreneurial Orientation from a single construct to a family of constructs that can be developed and expanded through the application of a classical categorization scheme. The implication of this is that adding dimensions to EO, such as recommended by Lumpkin and Dess (1996), represents movement down the ladder of abstraction and the resulting concept represents a secondary category that is a subset of the primary category of EO. Lumpkin and Dess' conceptualization has additional characteristics that separate it both from the original conceptualization of EO as well as from other potential subsets of EO (i.e., focused on new entry and including autonomy and competitive aggressiveness). Thus, we believe that the five-dimension operationalization of EO is a valid construct within the EO conceptual family that has been productively utilized in recent research (e.g., Pearce et al., 2010), and that it will continue to offer valuable insight in entrepreneurial organizations. However, it should not necessarily be regarded as a replacement for the original, higher-level conceptualization EO concept. Rather it should be viewed as a prime example of how the EO conceptual family can be productively expanded to facilitate further knowledge accumulation.

An example of the role such a construct may play is when we examine the concept of corporate entrepreneurship. Some authors have suggested that EO is a direct measure of Corporate Entrepreneurship (e.g., Kemelgor, 2002). However, other authors such as Zahra (1991) have suggested that EO represents "a firm's orientation toward, rather than actual engagement in, corporate entrepreneurship activities" and Dess and Lumpkin (2005) state that EO is a required antecedent to corporate entrepreneurship. Both of these studies suggest that EO represents a firm's proclivity towards entrepreneurship, but that additional characteristics are required that entail action in order to capture the concept of corporate entrepreneurship. This may be where additional dimensions such as autonomy come into play and help us to understand where the five-dimensional concept proposed by Lumpkin and Dess fits into the nomological net of entrepreneurship research. For example, as noted by Lumpkin, Cogliser, and Schneider (2009), autonomy is key in enabling organizational members to enact entrepreneurial initiatives. As such, a high degree of autonomy, coupled with the other three dimensions of EO, may result in faster or more effective entrepreneurial action. However, this now clearly represents something beyond the firm's orientation towards entrepreneurship and begins to capture the idea of engagement which Zahra suggested was missing in examining the concept of corporate entrepreneurship.

In delineating the nature of the concept, researchers also need to judge whether the construct is most properly regarded as formative or a reflective measure. While Miller (1983) provides arguments that could justify either type of model a close examination of EO research supports the proposition that EO requires the presence of all three dimensions. While one could make an argument for this being true for the high end of the EO scale for either type of model, a closer examination of the definition and development of the construct suggests that a reflective model is more appropriate. If EO represents organizational processes, methods, and decision making as suggested by numerous authors or an overall strategic posture, then it is clearly intended to capture an unobservable construct representative of a firm's inclination toward entrepreneurial behavior and

one that is much broader than simply the sum of its dimensions. Such a proclivity would be reflected in the key dimensions of innovativeness, proactiveness, and innovation, but would not be defined by them. Thus, we believe that EO is best modeled as a second-order reflective construct. This does not mean that a formative construct comprised of innovation, proactiveness, and risk taking does not exist whose meaning is created by the combination of these three dimensions (or others), just that this construct is not EO as it was originally conceptualized or defined.

This is also not to say that we should avoid examining the components of EO and how they relate to antecedents and consequences of entrepreneurial activity. However, in examining the individual dimensions of EO care should be exercised to avoid blurring the distinction between EO and its components. For example, it would be difficult to generalize the findings of Avlonitis and Salavou's (2007) examination of the relationships between EO, innovativeness, and performance in which the authors conceptualized EO as including only proactiveness and risk taking while still employing Covin and Slevin's (1989) 9-item scale. From a conceptual perspective, this study would have been more accurately described as an examination of risk taking and proactiveness on innovativeness and performance, and from a methodological perspective by not carefully differentiating EO from its components the authors have included measures commonly used to reflect the innovativeness component of EO to predict firm-level innovation. Thus, while there is undoubtedly substantial value in understanding these specific relationships between the concepts that comprise EO and other key constructs in the nomological network of entrepreneurship, in examining these relationships researchers must clearly delineate the components of EO from the combined construct, which we have proposed here relies on the coexistence of all three dimensions.

Finally, we need to ensure that the key constructs are being measured consistently both between studies and within studies. This means that we need to ensure that our measurement models are consistent with our conceptual models and theoretical arguments if we are to truly test the relationships we are proposing. Additionally, while it is likely that the extension of EO to new cases and settings will necessitate the adaptation and evolution of the specific items used to measure EO these adaptations should not be undertaken lightly. If we truly want to explore the extent to which EO applies in a given context, care should be taken to consistently use the same items in measuring the construct. If we find it does not apply, then this provides boundaries for the construct and its relationships and suggests the need for new conceptualizations of EO for this context that would represent secondary categories of EO in the classical categorization framework. In developing these new conceptualizations of secondary categories, researchers should increase the specificity of the construct and thereby decrease its generalizability to avoid concept stretching. If the operationalization of key constructs is not executed with great care we run the risk of contaminating the measures, which will make it difficult, if not impossible, to cumulatively add to our knowledge base in this area. Therefore, as the specific measurement of EO is modified it must be done with great care to ensure equivalency with existing measures. Additionally if new scales are developed to capture subcategories of EO it will be necessary to undertake a full-scale development initiative and to ensure scalar invariance in key measures.

Conclusion

Future research initiatives should include not only expanding our understanding of EO and its role in the nomological network of entrepreneurship, but also on the role of the

EO conceptual family on the broader field of organizational studies. To do this, researchers should be encouraged to employ this concept in a broad array of cases and organization settings. However, in facilitating the travelling of this concept researchers must use the ladder of abstraction to avoid concept stretching. For example, when researchers are applying EO to a new context they should question whether it is most appropriate to use Miller's conceptualization of EO or if they need to move up, or down, the ladder of abstraction to test the relationships they are considering. Indeed, by employing a classical classification scheme and moving down the level of abstraction there are undoubtedly a number of subcategories that exist in the conceptual family of EO that need to be thoughtfully developed, rigorously operationalized, and thoroughly tested in the nomological network of entrepreneurship and the organizational sciences.

Appendix

EO Items

Innovativeness:

EO1: In general, the top managers of my company favor:

- (1) . . . a strong emphasis on the marketing of tried and true products or services.
- (7) . . . a strong emphasis on R&D technology leadership and innovations.

EO2: How many new lines of products or services has your company marketed during the past 5 years?

- (1) No new lines or products or services.
- (7) Very many new lines of products and service.

EO3: Changes in product or service lines have:

- (1) . . . been mostly of a minor nature.
- (7) . . . usually been quite dramatic.

Proactiveness:

EO4: In dealing with its competitors, my firm:

- (1) . . . typically responds to actions which competitors initiate.
- (7) . . . typically initiates actions which competition then respond to.

EO5: In dealing with its competitors, my firm:

- (1) . . . is very seldom the first business to introduce new products/services, administrative techniques, operating technologies, etc.
- (7) . . . is very often the first business to introduce new products/services, administrative techniques, operating technologies, etc.

EO6: In dealing with its competitors, my firm:

- (1) . . . typically seeks to avoid competitive clashes, preferring a "live-and-let-live" posture.
- (7) . . . typically adopts a very competitive, "undo-the-competitors" posture.

Risk Taking:

EO7: In general, the top managers of my firm have:

- (1) . . . a strong proclivity for low risk projects (with normal and certain rates of return).
- (7) . . . a strong proclivity for high risk projects (with chances of very high returns).

EO8: In general, the top managers of my firm believe that:

- (1) . . . owing to the nature of the environment, it is best to explore it gradually via timid, incremental behavior.
- (7) . . . owing to the nature of the environment, bold, wide-ranging acts are necessary to achieve the firm's objectives.

EO9: When confronted with decision-making situations involving uncertainty, my firm:

- (1) . . . typically adopts a cautious, "wait-and-see" posture in order to minimize the probability of making costly decisions
- (7) . . . typically adopts a bold, aggressive posture in order to maximize the probability of exploiting potential opportunities

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