Introduction to Special Issue

**Measurement Issues in Entrepreneurship Studies**
By Jill Kickul, Simmons School of Management; Norris Krueger, Boise State University; and Sylvia Maxfield, Simmons School of Management

**Referred Articles**

**Entrepreneurship Research Through Databases: Measurement and Design Issues**
By Karl Wennberg, Center for Entrepreneurship and Business Creation, Stockholm School of Economics

**Founding Time and the Growth of Firms**
By G. R. Chandrashekhar, XLRI School of Management, and R. Srinivasan, Indian Institute of Management

**Developing and Validating a Construct of Entrepreneurial Intensity**
By Jianwen Liao, Northeastern Illinois University; Patrick J. Murphy and Harold Welsch, DePaul University

**Measure for Measure: Modeling Entrepreneurial Self-Efficacy onto Instrumental Tasks Within the New Venture Creation Process**
By Jill Kickul, Simmons School of Management, and Robert S. D'Intino, Rowan University

**From the “Practitioner’s Corner”**

**Entrepreneurial Hunger—Shall We Try Chinese?**
By Joseph E. Levangie, Vice Chairman, Ardour Capital, L.L.C
New England Journal of Entrepreneurship

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Call for Articles

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The study of entrepreneurship spans disciplines ranging from individual psychology to macroeconomics. In the future, scholars of entrepreneurship are just as likely to study the neurochemistry of risk aversion as the impact of global trade policy. In short, the interdisciplinary breadth of entrepreneurship studies is mind-boggling. However, that breadth compels the field to continuously improve the logical rigor of the underlying theory and the empirical rigor of the methodology deployed. In fact, research design becomes absolutely critical, with poor design often resulting in fatally flawed work. A great design is useless without adequate measurement. This special issue offers several articles that help advance the field’s ability to properly measure its constructs.

Research methods range with the disciplinary focus of the scholarship. Economists exploring entrepreneurship tend to take the firm as their unit of analysis and are accustomed to pursuing inductive work through multiple regression analysis and mathematical modeling to inform theory building. Individuals are the typical unit of analysis for psychologists studying entrepreneurship. While economists can imagine finding more or less linear causal relationships in the study of entrepreneurship, psychologists expect the road to causal understanding of the entrepreneurial process will be long and very complex. No matter the discipline or whether research methods are quantitative or more qualitative, measurement issues cut across all approaches to entrepreneurship research.

Measurement issues are acute in entrepreneurship studies because the field embraces extremely diverse disciplines and divergent definitions of the primary object of study, not to mention the wide range of deductive and inductive approaches to explaining variation in the object of study. This special issue reflects a general trend in entrepreneurship scholarship. This is a return to first principles in research design by focusing on and justifying definition, validity, operationalization, and measurement of central constructs in the study of entrepreneurship. This trend, of which our issue forms a part, is signal of maturation in the field. Careful formulation and use of central constructs in entrepreneurship scholarship are the building blocks necessary for cumulating knowledge in a field that has labored to deliver that holy grail of social science.

Wennberg’s paper in this volume highlights this problem. He compares sample-based survey research findings about underperformance of women-owned firms with the study of gender and entrepreneurial performance using a large public database covering 90 percent of the defined population. These two studies came to opposite conclusions about female underperformance. While Wennberg suggests results from the large-N database study are more credible, debate about female underperformance will continue until similar results accrue through further empirical study.

Widespread agreement about constructs is among the first signs of maturation in any field of the social sciences; a very important second stage in the accumulation of social scientific knowledge comes with successful data “triangulation” based on widespread agreement about basic constructs. Triangulation refers to validating empirical results, with the goal of knowledge accumulation, by seeking consistent descriptions/results across studies even when investigators

Jill Kickul
Norris Krueger
Sylvia Maxfield
use different data to explore the same phenomenon and/or similar data collected from different sources.

The papers in this issue contribute to both steps in the march toward maturation of the field of entrepreneurship: construct concordance and data triangulation. Three of the papers presented here contribute to the specification and operationalization of entrepreneurship concepts. These concepts are founding time, entrepreneurial intensity, and entrepreneurial self-efficacy. The fourth paper explores how researchers can use large databases including official statistics and private collections to validate the results of the more typical study relying on sample survey data.

The relative balance in this special issue between papers focused on construct validation and data triangulation is quite appropriate given the importance of getting the constructs right before starting to try to triangulate results. While pointing out the tremendous research opportunities afforded by these databases, Wennberg warns that it is important to understand their shortcomings, including often hard to identify problems with specification and measurement of the central constructs. The temptation to create one’s own measure is difficult to resist, especially where we are not confident in existing measures.

The vast majority of scholars in the field construct their own databases usually by survey a small population sample rather than laboring to work with existing databases precisely because it is easier to create, validate, and operationalize one’s own constructs than unravel someone else’s. The well-known GEM database offers an interesting example of both the rewards and the pitfalls of working with large databases. Researchers have come to worry that several important GEM constructs suffer potential validity problems because of variation over time in the details of how the standard GEM surveys were administered. However, the field is displaying its increased maturity as the GEM data improves annually and the clarity of the measurement increases.

Nonetheless, for the researcher seeking to explore the promise of using large databases Wennberg’s paper is a useful “how to” manual that covers how to combine databases, making sure that variables are theoretically grounded and the value of large databases in assessing causal direction and effect size and for multilevel analysis, making sure that variables are theoretically relevant, ensuring consistent definition and measurement to avoid the minefields strewn the field.

The other three articles help us to understand a bit more about key constructs and how to measure them, both validly and reliably. In each case, the authors focus first on constructs before turning to measurement. In one case, we will see the introduction of a relatively new construct (and still a work in progress), that of “founding time.” As such, this may be the most controversial article in this special issue—and thus perhaps the most valuable as here the measurement issues hinge completely on the theoretical logic.

The construct of entrepreneurial intensity is less novel, yet still underexplored. Pistrui’s short, elegant (4 items) measure was the first to tap into the more volitional aspect of entrepreneurial behavior. Until we identify and test a more direct measure of entrepreneurial passion, intensity represents a useful measure. Let us examine the “back story” to entrepreneurial intensity.

Krueger and Kickul (2005) have deployed intensity as a potential third “leg” of entrepreneurial intentions, using intensity to add the missing “I will” to “I want to” (perceived desirability) and “I can” (perceived feasibility). Shapero’s seminal model of the entrepreneurial event (Krueger 2000) posited a propensity to act on opportunities that was a moderating effect on intent. If passion is the missing link in entrepreneurial intentions, it behooves us to measure it reliably and validly.

Past attempts to capture this propensity to act include locus of control (Shapero’s proposed proxy), desire for control (Krueger 1993) and Seligman’s learned optimism (Krueger, Reilly and Carsrud 2000). The latter two explained significant unique variance, but remain only proxies. Pistrui’s measure provided the first direct measure of a most critical construct.

Liao, Murphy, and Welsch here show the power of using this measure, demonstrating that entrepreneurial intensity can be a key differentiator between entrepreneurs and non-entrepreneurs. Is this the final word on intensity? No, but at worst it should inspire us to redouble our efforts to develop a theoretically rigorous and empirically-robust measure of entrepreneurial passion (Cardon et al. 2005; Krueger 2005). Until then, Welsch and Liao offer evidence that Pistrui’s measure is well worth incorporating into models addressing entrepreneurial volition or intent.

Entrepreneurial self-efficacy first appears in the literature in 1988 in work by Scherer and colleagues (1989); Albert Bandura’s landmark book had only appeared in 1986. One of the key links in Bandura’s popular social learning theory, self-efficacy offered scholars a strong theoretical basis to examine the initiation of (and persistence at) goal-directed behavior. This inspired others to begin testing its impact in various incarnations (Krueger 1989; Krueger and Dickson 1994), finding that self-efficacy is linked closely to critical entrepreneurial phenomena such as perceptions of opportunity (and thus intent).

Measuring entrepreneurial self-efficacy is not without its issues. If self-efficacy is the belief that one can execute a target behavior (such as entrepreneurial behavior), it still begs the question of what behavior (or set of behaviors) are being targeted. Is it the set of behaviors needed for launch? Is it a combination of startup and managerial behaviors? We end up...
with competing measures that need not correlate closely with one another. So, which scale to choose?

Regardless, it becomes a challenge to identify a parsimonious list of behaviors and a parsimonious list of measurement items. Baron (e.g., 1998) would argue that we should slice the Gordian knot by using a measure of general self-efficacy. Bandura argued persuasively that self-efficacy is not a person variable; rather it is a person X situation variable just like opportunity perception and intentions. However, harking back to Shapero’s propensity to act—and Pistrui’s entrepreneurial intensity—there is room conceptually for a person variable such as general self-efficacy, especially as a moderating effect. In fact, the moderating effect is likely to be the most interesting result. Moreover, measurement theory would suggest that it may well be worth making the tradeoff of situational specificity for a shorter but reliable and valid measure like the eight-item general self-efficacy scale.

Kickul et al. tackle the issue of measuring entrepreneurial self-efficacy head on. Results indicated the divergence of De Noble et al.’s and Chen et al.’s entrepreneurial self-efficacy measures in that several of the subscales were related to different tasks within the entrepreneurial creation process. The results suggest that if we must have a single scale for entrepreneurial self-efficacy, then the optimal scale should draw items from the competing scales. In essence, we may not necessarily need to go back to the drawing board but rather carefully adopt subscales that would help us uncover those most important in influencing entrepreneurial intentions and actual behavior. Following Brown & Kirchhoff (1997), it also permits us to better target specific components of the entrepreneurial process.

As with intensity, is this the final word on entrepreneurial self-efficacy? Again, hardly. But even if we have not made enough progress on measuring it, we have now made significant progress in understanding what it takes to build better measures.

We invite our readers to pick up where all these authors have left off and help advance measurement in the field of entrepreneurship. For example, just as we saw how Liao et al. independently tested Pistrui’s measure, we look forward to independent testing of the “founding time” measure. The editors themselves now realize how far we have come but also just how far we have to go. Fortunately, we are also seeing that moving forward is “simply” a matter of disciplined effort, guided by theory.

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Entrepreneurship Research Through Databases:
Measurement and Design Issues

Karl Wennberg

This article provides an account of how databases can be effectively used in entrepreneurship research. Improved quality and access to large secondary databases offer paths to answer questions of great theoretical value. I present an overview of theoretical, methodological, and practical difficulties in working with database data, together with advice on how such difficulties can be overcome. Conclusions are given, together with suggestions of areas where databases might provide real and important contributions to entrepreneurship research.

The purpose of this article is to outline the potential of secondary databases in entrepreneurship research. I will describe different pros and cons of using databases for entrepreneurship research, and provide some suggestions on how to handle problems related to the analysis of such data. I will also discuss different ethical considerations of using databases and conclude with examples of areas where databases might provide answers to theoretically vital questions.

Entrepreneurship research has sparsely made use of databases compared to other fields such as economics or the organizational and managerial sciences. As Aldrich (1992) noted: “Given the increasing number of publicly available data sets, and the openness of governments and some private firms to make their records available, the low number of articles based on public data sets is somewhat surprising” (p.201). However, the past couple of years have seen a greater usage of databases in entrepreneurship research (Bouckenooghe et al. 2004; Grégoire, Meyer, and De Castro 2002). There are several reasons for this development. The quality of official records in many countries has improved, raising the promise of public databases as it applies to entrepreneurship research community to address vital theoretical questions. For example, by combining data on new and emerging firms with labor market and tax data of individuals’ education, working history, and personal finances, it should be possible to follow people’s ‘entrepreneurial careers’ over time. In addition, longitudinal analysis of databases has the potential to contribute methodologically to the field of entrepreneurship. Because theories of entrepreneurship have increasingly come to stress the process nature of entrepreneurship, longitudinal methods offer much more promise than cross-sectional tools for improving our understanding of entrepreneurship and entrepreneurial processes (Davidsson 2004; Van de Ven 1992; Chandler and Lyon 2001).

This article focuses on how secondary databases can be effectively used in entrepreneurship research, addressing potential pros and cons compared to other types of data, and what can be done to overcome some of the methodological obstacles in working with databases. The article specifically addresses the following issues: First, the focus will be on general and large-scale databases such as those available from public authorities and organizations. I will not address, for instance, specific corporate databases, although many of the ideas put forward in the article are relevant to these as well. Second, I will not go into details on methods of analysis, although examples and suggestion will be given along the way. Third, the aim is to specify what has previously been found to work and what has been found not to, and to suggest interesting avenues for future research where databases might be gainfully applied.

Prior Usage of Databases

How has the field of entrepreneurship research made use of secondary databases up until now? Surveys of trends in research methodology indicate that until recently, most research has tended to use cross-sectional analyses of survey data (Aldrich 1992; Chandler and Lyon 2001). However, a trend during the latter years is that research to a greater extent makes use of longitudinal methods (Chandler and Lyon 2001). Since collection of survey data for longitudinal analysis is problematic for several reasons such as accumulating nonresponses (Samuelsson 2004; Wiklund 1998) and time expenditure (Chandler and Lyon 2001), secondary databases provides a feasible way to conduct analyses over longer periods of time.

The general features of secondary databases include long time series, often spanning several years or even decades. Another feature is large samples, often collected in real-time where cases of missing data are concurrently noted. The large samples often lead to demographic approaches in analyses of databases (Aldrich and Wiedenmayer 1993). This need not, however, be the case. Considering that entrepreneurship in
its nature can be considered an outlier phenomenon (Schumpeter 1934), general population-like approaches might instead be inhibiting for theory development (Davidsson 2004). As will be indicated in the “How to Do It” section, a rarely used approach is to use databases to sample more specific groups of cases, strengthening the explanatory power of theories built from these groups.

Most commonly, official data from various countries and public bodies and census bureaus have been used. These are too many and too diverse to be described at length. In the United States, official data have been less accessible than in many other countries and therefore alternative, private sources have been employed. One of the first is Dun and Bradstreet Inc.’s Market Identifier Files (DMI), the source for Birch’s (1979) seminal work on the job contribution of small firms. This database has been criticized because of its origin as a source of commercial credit information: Since the customers of such information are generally not very interested in small firms with little credit worthiness, the market identifier files have a bias against large- and middle-sized firms (Kalleberg et al. 1990; Phillips and Kirchhoff 1989; Storey and Johnson 1987), and problems with identifying the correct year a firm is closed (Williams 1993). Luger and Koo (2005) compared the DMI with several different sources of data, arguing that the Quarterly Unemployment Insurance files found in the U.S. Bureau of Labor Statistics reporting system is superior to the DMI files. However, the Unemployment Insurance files exclude self-employed individuals with sole proprietorships, and cannot distinguish between part-time and full-time workers.

To overcome the problems inherent in the DMI files, the U.S. Small Business Administration used the files to create the Small Business Data Base (SBDB), an extensive representative sample of all firms founded in the U.S. economy from 1976 until the late 1980s (Kirchhoff and Phillips 1992; Phillips and Kirchhoff 1989). Also the SBDB had a problematic sampling frame since (1) the underlying DMI files are based on self-reporting information, and (2) registration of firm foundings and firm discontinuances are often lagging one or two years (Phillips and Kirchhoff 1989). A more inclusive database is the Longitudinal Establishment and Enterprise Microdata (LEEM) developed by the U.S. Census Bureau (Acs and Armington 1998). This database includes all establishments in existence between 1989 and 1998, but only establishments with employees (i.e., excluding self-employed individuals). Acs and Malecki (2003) used the LEEM database to show that in contrast to what is often believed, the proportion of high growth firms in the United States is relatively larger within the smaller, nonmetropolitan labor market areas. Since the LEEM files can be linked to other census data, there might be possibilities to address other interesting questions.

One reason for the construction of new databases in the United States is the nonexistence of any complete business register or inclusive individual-level databases. In smaller countries with extensive social welfare systems such as Denmark, Sweden, and the Netherlands, many large-scale databases have been constructed by public bodies to evaluate welfare programs and policies. These databases have just recently begun to be explored for entrepreneurship research. In a working paper called “Do Small Firms Produce Better Entrepreneurs?” Sørensen and Phillips (2004) tracked the employment history of all people in Denmark who engaged in entrepreneurship for the first time in 1995. They found that those who had been working for smaller firms prior to entering entrepreneurship were more likely to remain in entrepreneurship and have higher incomes than those who had been working for larger firms. In another recent paper, Giannetti and Simonov (2004) investigated a random sample of Swedes who became entrepreneurs between 1995 and 2000, finding that in social groups where entrepreneurship is more widespread, individuals are more likely to become entrepreneurs and invest more in their own businesses, even though their entrepreneurial profits are lower.

Since databases from public sources are typically quite coarse-grained and often provide only limited information on each case (individual, firm, region, etc.), the bulk of entrepreneurship research utilizing information from databases has focused on the industry, region, or national level of analysis. Examples of such research are when data of, for example, new business start-ups or patented innovations is used to provide an indicator of aggregate levels of entrepreneurship (i.e. rates; Aldrich and Wiedenmayer 1993). However, the theoretical setting of such studies often do not relate directly to “mainstream” entrepreneurship research such as the creation of new ventures (Gartner 1990) or the discovery and exploitation of entrepreneurial opportunities (Shane 2003). The field of entrepreneurship has therefore yet to address Aldrich’s (1992) comment on the scant usage of database data.

**Merits of Databases**

As suggested earlier in this article, the longitudinal and often very comprehensive nature of secondary databases can be employed to answer theoretical questions where interrelated factors or the heterogeneous nature of firms and individuals necessitates large, unbiased samples with the possibility to simultaneously investigate a variety of factors. One example of where databases have been successfully employed to investigate important questions is in the case of the suggested “female underperformance hypothesis.” This idea was built on the survey-based research findings that women-owned firms tend to exhibit lower growth levels (Fischer, Reuber, and Dyke 1993) as well as lower profits and higher failure
rates (Carter, Williams, and Reynolds 1997). However, using a public database with data coverage exceeding 90 percent, Watson (2003) found no significant differences in failure rates between men- and women-owned firms after controlling for the type of industry that these firms are in. Du Rietz and Henrekson (2000) utilized a more comprehensive secondary database to investigate the hypothesis. After controlling for both type of industry and firm size, they concluded that, with the exception of sales, there were no significant differences in performance between men’s and women’s firms on any one of the three measures—growth, profit, and survival.

In addition to ease the testing and untangling of important concepts such as the female underperformance hypothesis, databases can help to facilitate the development of research design and methodology in entrepreneurship research as well. I will describe three such developments: improved sampling specification, correcting for endogenous effects, and multilevel methods of analysis. Looking first at sampling issues, it has been noted that a notoriously difficult issue in research on emerging organizations and activities has been different types of selection bias (Kalleberg et al. 1990). This is a problem both in quantitative and qualitative research designs, and most often these difficulties are related to a survival bias in the sampling frames. For example, if a study tries to explain the variance in performance among a set of firms, the results risk being overly inflated if the cases chosen are more common to what the study is looking for. Higher performance will be more common among surviving firms (e.g., Carroll and Hannan 2000). However, utilizing databases does not provide us with very good sampling frames per se. What is important is that sampling frames of databases are usually very precise, something which is still rare in selections of cases in entrepreneurship research (Aldrich 1992). As secondary databases are fundamentally based on a specific sampling frame, it is thus important that researchers using databases explicitly consider how such a sampling frame mirrors the population that is being investigated.

Another merit of databases is that the longitudinal nature of data facilitates drawing causal inference, as well as a coping with endogeneity problems. Endogeneity occurs when we try to explain an outcome where an independent variable—a predictor—in a statistical model is itself codetermined within the model (Wooldridge 2002). In other words, if we include an independent variable in our model that is potentially a choice variable that might be correlated with other unobservable variables, the variable is endogenous to the effect or choice we are trying to predict. This is a common and often underestimated problem in much of the managerial and organizational sciences since research often seeks to infer an event, such as firm performance, to prior actions taken by individuals or organizations (Hamilton and Nickerson 2003). As secondary databases usable in entrepreneurship research are often created by public bodies to assess the effects of political instruments and environmental changes on economic structure, such data provides a way to overcome the endogeneity problem. This can be accomplished by the inclusion of an exogenous instrument—a variable determined by something other than the system measured—which is correlated with the independent variable(s) but not with the error term (Hamilton and Nickerson 2003; for an example of endogeneity correction in entrepreneurship see Giannetti and Simonov 2004). There should also preferably be a theoretical rationale for such an exogenous instrument. As example, let us say that our goal is to determine the effect of some public entrepreneurship education program on the performance of a sample of small business managers. If we suspect that the more competent entrepreneurs would not participate in such a program but instead go directly into business, having participated in the education program could be seen as endogenous to performance in entrepreneurship and failing to control for this might yield a spurious estimated effect that program participation actually lowers performance. Having a longitudinal database can facilitate the inclusion of an exogenous instrument, which in this specific example would be a variable that we would expect to affect people’s decision to engage in a short-term program but have a minor effect on their entrepreneurial performance (e.g., a measure of how many elective courses the individual took in college).

The third and final merit of databases to be addressed is the potential to conduct studies on different levels of analysis—and also to link these to each other. This is an important issue since entrepreneurship research has long been troubled with confusion on levels of analysis (Aldrich 1992; Davidsson and Wiklund 2001; Sarasvathy 2004). One example of such confusion is the effect of the founder’s level of education on the performance of new ventures. A considerable amount of research has stressed founders’ education to have a positive relationship with venture performance. However, studying individuals’ characteristics and trying to draw inferences to the outcomes of their venture can be problematic as some ventures are founded by one person and others by several individuals. In addition, some individuals are simultaneously active in several ventures and might put differing amounts of effort into each one of these. Accordingly, the length and type of education of a group of founders might very well affect firm performance in other ways than the education of a single owner-managed firm. If venture level outcome is studied, venture level resources such as human, financial, or social forms of capital should be the natural inputs (Davidsson 2004). Here, data on individuals’ length and type of education, together with their personal finances and occupational experiences, could be used to
assess the importance of such inputs for the performance of venturing activities. These types of databases have been greatly exploited on aggregate levels of analysis in, for instance, labor economics but have yet to see applicability in more fine-grained studies of, for example, the creation and development of new ventures. Such analyses can be especially powerful if ventures can be linked to their individual founder(s) (Scott and Rosa 1996). This can be achieved by using multi-level research methods (DiPrete and Forristal 1994; Kozlowski and Klein 2000). The possibilities of using different levels of analysis are important considering theorists’ arguments that entrepreneurship researchers have been focusing on a rather narrow set of outcomes. Venkataraman (1997) argues that entrepreneurship research should move from focusing on firm-level outcomes of entrepreneurship to focus on societal-level outcomes, whereas Sarasvathy (2004) argues that entrepreneurship research should focus more on individual-level outcomes from entrepreneurial acts. Addressing Venkataraman’s call for society-level outcomes, databases on firms can be used to investigate how technological shifts, for example, affect the number of new firms, products, or activities, as well as the productivity and profitability of certain industries. In this case, industry-level factors, such as changes in demographics, legislation, or technological inputs should be used to infer the outcomes from entrepreneurship. Addressing Sarasvathy’s call for individual-level outcomes, databases on individuals—possibly linked with data on the firms where they are active as employees or entrepreneurs—can be used to investigate how participating in different types of entrepreneurial activities affect the subsequent careers and wealth levels of these individuals. In this case, individual-level resources, such as education, personal finances, or social network, should be used to infer the outcomes from entrepreneurship (Davidsson 2005).

Potential Problems with Databases

As argued in the onset of this article, databases have been underutilized in entrepreneurship research. There are some likely reasons for this: secondary databases differ from research methods such as experiments or surveys where researchers themselves can choose a sampling frame to study a population they are interested in. Most databases build fundamentally on organized sets of control systems used by authorities to record the existence of, for example, taxes paid by firms and individuals. Alternatively, databases might be based on census information used by authorities to gain knowledge of the demographics of firms and individuals. In either case, secondary databases are not designed to easily accommodate researchers’ demands on theory-driven definitions or types of measurement (Phillips and Kirchhoff 1989). This section outlines some of the problems inherent in using data from databases. Most notable are sampling problems and problems related to how, and for what purposes, variables in a database were assembled initially. The section concludes with a critical assessment of the validity of such variables. Specifically, I will address internal and construct validity.

Regarding the issue of sampling of cases from databases, it has been pointed out that data collected for purposes other than research often show severe undercoverage of parts of the population that might be the most relevant to entrepreneurship researchers, such as young and/or small ventures (Aldrich et al. 1989). For example, lists of new firms provided in industry directories or government records often exclude new ventures that fail very early in their existence (Aldrich and Wiedenmayer 1993; Katz and Gartner 1988). Furthermore, statistical authorities are often lagging in creating identification codes for new types of industries or organizational populations (Aldrich 1999). This leads to problems in applying such data to entrepreneurship research if we accept the principle that entrepreneurship is comprised of new and emerging economic activities (Schumpeter 1934). A consequence of this is that secondary databases can seldom be straightforwardly utilized in entrepreneurship research; researchers need to select or combine data carefully from different databases to reach a data sample that is theoretically useful. Another problem is that the kind of data found, although comparatively consistent and reliable, is often quite coarse and might not be a feasible approximation of more complex theoretical concepts (Davidsson 2004). For example, information on an individual’s type and amount of human capital (e.g., education and work experience) in databases is often limited to levels of education and job tenure at the current workplace—more seldom on the type of education and work experience. It is doubtful what such crude approximations actually tell us about an individual’s human capital. Also, official statistics on individuals’ employment at a specific location (firm) is often estimated at a single point in time (Acs and Armington 1998; Delmar, Sjöberg, and Wiklund 2003). Such data will underestimate employment flows and small firm processes in dynamic or seasonal industries.

Secondary databases are generally considered to be more reliable than data collected in surveys. However, this is a “truth” with modifications since information found in databases are generally collected (1) automatically, or (2) through survey-like methods. The first type of information, for instance, provides demographic details, such as household composition, which is generally very reliable with few systematic errors. The second kind of information, however, suffers from the same type of problem as any type of survey (i.e., internal and/or external nonresponses). This is especially the case for SIC-codes that in many European countries are based on “mandatory” information regarding the new firm’s (will-be) line of business. However, disregarding this information will not prohibit the new firm from being registered.
Census authorities will use the mail and occasionally telephone calls to remind the firm to submit information on its line of business. This procedure is akin to most type of surveys—with one exception: Very rarely will the SIC-codes in a database tell whether the information was obtained through voluntary registration or in one of the subsequent reminders.

To what extent can we then assess if a secondary database is valid for our specific purpose? Validity problems with databases are often attributed to internal and construct validity. In regards to internal validity, the proliferation of large sets of databases increase the risk that (any) available data that seems somehow fit for the purpose might be used to test a theoretical model—although the data in practical terms are very distal proxies of the theoretical concept in question (Davidsson 2004). In other words, despite a seemingly consistent model and significant relationships, there are either no, lacking, or faulty theoretical underpinnings for why one or several independent variables should affect the dependent variable in a model.

In regards to construct validity, an inherent problem of using data assembled by someone else is that it is impossible to design specific measurements in ways we would like. Consequently, there is a risk that what seems apparent in data assembled in a database is not what was actually measured.

How to Do It: Design and Measurement Issues
As outlined in the earlier sections, there exist some specific problems on the successful usage of databases in entrepreneurship research. A main problem is that most databases are just designed for purposes other than (entrepreneurship) research. Simply looking for associations in a large enough data set could bring results in one or two finds. However this is probably not the ideal way to conduct exploratory research. It would be more preferable to start out with a careful research design—considering the questions why we choose to work with a certain type of data, and how this relates to the theoretical problem that is being investigated. It is difficult to improve upon research efforts when one has simply used a database and tried to do something with it. Also, using data collected by someone else is problematic for two quite different reasons: First, there is a fairly large risk that the type, number, and specification of variables are not well suited to the theoretical framework that one wants to use. Minor model adjustments in the design of a study is of course not unusual, but there is an apparent risk that many small adjustments in the end means major “squeezing of the model” to fit the data. The second problem is that even if the data seems suitable to our theoretical framework, not having participated in the first-hand outlining, sampling, and collecting means that there could be significant difficulties in becoming familiar with the data. Specifically, the great number of variables often found in secondary databases means that detailed definitions of variables and how these were collected are crucial. Such definitions are often inadequate for the simple reason that statistical bodies work primarily with collecting data, not analyzing it.

Combining Databases
As opposed to using databases assembled elsewhere, theoretically derived sampling frames might actually help to create new databases by drawing upon different types of publicly or privately available data. To conduct entrepreneurship research using databases in such a way, Davidsson (2004; 2005) argues that success to a large extent is dependent on how much influence the researcher can have on the type of sampling frame, variables, units, and time span that is used:

… the trick behind this [success] was careful and thorough work in close collaboration with experts at the statistical organization in order to use and combine the best available data for creating reliable, customized data sets that could actually answer the research questions that we were asking…. (Davidsson 2005, p. 26 in manuscript).

For example, databases that maintain identification keys to firms, individuals, or workplaces might at a later date be used by researchers to match against other databases with complementary information (Linder 2004). This means that the researcher has access to both contacts within such relevant statistical authorities as well as the ability to fund the extraction of customized data. If we assume that the state of affairs is somewhere between this “ideal” put forward by Davidsson and that of exploiting a preexisting database, what kinds of problems are we then likely to encounter, and what can be done to handle them?

Theory-Driven Research
A fundamental requirement for successful research is that key variables in a database are actually theoretically relevant. If the data does not seem to be suitable to the kind of theory we intend to test, it is recommendable to go back to the drawing board to reconsider the study. Frost and Stablein (1992) argue that being immersed in the data is a fundamental requirement for conducting exemplary research. If the database should prove to be unsuitable for a particular purpose, getting “immersed” does not necessarily mean a waste of time. Explore alternative paths! Is it possible to change the level of analysis? Did you un成功fully look for approximations of behavior variables but instead found data more suitable as sociodemographic variables? Theories other than the one(s) you originally relied on might prove useful. By getting “immersed” in the data, you might actually discover some-
thing that existing theories cannot readily explain. Chance and surprise account for many good ideas in science. For example, Acs and Audretsch’s (1989) original findings that small firms account for the relative majority of innovations in competitive industries originated while the researchers were investigating other questions, using a large secondary database (Acs 2004).

**Defining and Sampling**

Let us now turn to how databases can be related to definitions of entrepreneurial activities. Take for example individual level data that usually denote people’s occupation as their “main” activity (e.g., employee, homemaker, self-employed, etc.) These kinds of definitions easily clash with our theoretical concepts, since an employee or a homemaker can very well make a stab at entrepreneurship by starting a business “on the side.” Even if this new business is something the individual spends most of her mental energy and resources on, it might not be registered in official data as her “main” activity. In addition, occupation is often defined in census-like data as “the place where an individual receives her largest earnings from.” The result is that an unemployed person will be considered to have a full-time income even if only making $5,000 a year, but an investment banker with a firm on the side that she strives to expand might be excluded from the new firm definition, even if his business’s turnover is $100,000 a year (Aldrich 1999). When using databases, one should consequently be careful not to accept definitions that might exclude some of the most relevant cases. If the cases we are looking at are not suitable for theory-testing, it is quite irrelevant how many, how good, or how valid variables we have at our disposal. The results will still be of very little value. This problem might be alleviated by validating a measure by comparison with other types of data. In regards to individuals’ occupation for example, one could compare how an individual’s labor market activities are denoted in one type of database compared to another. If data in a public labor market database defines occupation as the activity from where the individual receives the largest earnings, this can be weighed against, for example, tax registers that list an individual’s total income and its sources. Thus, it is possible to circumvent the limitations imposed by a particular data source to better fit our theoretical definition of a concept. It has been pointed out that oddly, such cross-validations seem to be lacking in entrepreneurship research (Chandler and Lyon 2001).

**Measurement**

An important measurement issue is that while good research requires consistent definitions and measurements of theoretical concepts, this might not be the case for data assembled for other purposes. In any case, it is necessary to ensure whether the variables in a specific database are consistently defined and measured; if not there is no way to control for differences in measurement. To ensure consistent measurement procedures, discussions with statistics experts in charge of assembling and updating databases are crucial. Such discussions will probably also reveal important details of how a certain database was actually created. For example, most individuals and firms are obliged to report certain types of financial information to the authorities for taxation and other reasons. For one reason or another, both individuals and firms might over- or underreport their financial statements (Gentry and Hubbard 2004), thus creating biases in database information on, for instance, net sales of small firms. Therefore, researchers relying on databases need to consider questions similar to that of survey design, namely, what is it that people actually report? when asked to provide certain information. Such questions could be posed to the experts in charge of the database, or researchers with prior experience of working with the same data set. If the biases are random in nature, it might be possible to disregard them as measurement errors. If the biases are systematic and consistent in nature, it might be possible to control for this if we know the direction of the bias.

**Causal Directions and Effect Size**

As pointed out in the previous section, the nature of secondary data often tells us less about the absolute number or quantity of something that we wish to know. On the other hand, longitudinal databases can, with a high degree of reliability, help us to assess how changes in one (set of) factor(s) affect another factor. What we learn is primarily about effects, and then secondarily, the exact magnitude of these. Therefore, despite the fact that research using databases state specific magnitudes as outcomes of their studies, more important are the general causal directions that can be determined through changes in variables over periods of time. From this perspective, findings such as Hamilton’s (2000) conclusion that self-employed entrepreneurs in general pay a 25 percent premium in terms of lower long-term income is less important than the more general fact that entering self-employment has a negative effect on subsequent personal income. Levels of earnings are often measured through tax registers in ways that make it impossible to determine whether the salary came as a lump-sum payment for a short period of work or as regular wages, or if the wages came from one or several different sources. Salary levels and other observable attributes should therefore be considered “indicators” of personal earnings instead of actual levels comparable across time and individuals, a common procedure in much of sociology research (Eckhardt and Ermann 1977). This does not mean that we need to stop at simple analyses when utilizing census-like databases. For instance, after testing theoretical models and mapping causal factors on macro or meso
levels, it is often worthwhile to break down more general samples of individuals based on, for example, age, sex, education, job tenure or number of firms founded. If the objects of the study are firms, these can be grouped based on industry or geographical belonging, ownership structure, age, etc. Investigating more homogenous groups of cases mean that the actual level of variables will be much more informative and comparable across individuals and time.

**Validity**

This section addresses the possible validity problems that were earlier described. Usually, low internal and construct validity can be dealt with through multimethod measures (Chandler and Lyon 2001). To validate information drawn from databases, Carroll and Hannan (2000, p.166) offer three suggestions. First, external information of the population (of firms, individuals, etc) that the data is drawn from can be used to authenticate the database. If external information covering the population in a database is not available, Carroll and Hannan suggests that publicly available information about a set of well-known cases might be used. However, such validation is much weaker since looking only at well-known cases will lead to undersampling of smaller or newer cases already failed or disbanded (Denrell 2003). A second approach offered by Carroll and Hannan is to compare the aggregate numbers—or marginal distribution—tabulated from a data set with numbers reported elsewhere. From the author’s own experience, I would specifically suggest that distribution and rough means of key variables should be cross-checked against other sources whenever possible. In regards to firm-level databases, similar information on some or all cases might be found in industry registers, trade magazines or other types of public or semi-public sources. In regards to individual-level databases, similar information on some or all cases can often be found in public censuses. Even if census data overlapping the time period covered in a database is available only for one or a few years, the information from census data is generally broad and accurate enough to validate most individual-level data in other secondary databases. The third way of validation offered by Carroll and Hannan (2000, p.167) is to evaluate a potential data source prior to actually collecting the data by asking experts on this type of data regarding its credibility and usefulness. Such experts can be statisticians or other researchers in the field, for individual-level databases they can be sociologist or demographers, and for firm-level databases they can be historians or industry experts with a general overview of the population in question. One of the strongest validating methods would be to contact some of the cases covered in a specific database, for example, through surveys or “embedded” interviews. However, since databases with information on identifiable units (i.e., individuals or registered firms) are often anonymous and classified, contacting a few persons from the sample is not a straightforward issue. In addition, the data might be several years old and thus make validating questions of time-specific events or concepts unfeasible.

**Combining Databases and Surveys**

One way to obtain validating information is to use a database in combination with surveys of the same cases. In, for example, epidemiological or social medical research, there are long traditions of using established databases on a specific population or a set of patients and then combine this information with surveys sent directly to all or a (random) set of individuals drawn from the database. Linder (2004) describes how surveys can be micro-linked to administrative databases. This not only provides more detailed and specific information, but also the information is more reliable and complete when there are two or more sources with respect to the same subject. Such a procedure might be possible even if the cases in a database cannot be directly identified. Data providers such as statistical authorities can frequently administer and distribute surveys in conjunction with providing a certain data set (Petersen et al. 2004). How can this then be useful to entrepreneurship research? If we, for instance, return to the case of social medical research, it is not uncommon to use databases to identify sociodemographic conditions, such as family and labor market status and then combine this with attitude or behavior variables measured through surveys. The same kind of approach might also be productive in entrepreneurship research where, for example, economic, sociological or cognitive theories might be aligned and tested within the same empirical setting. A word of caution is required here if databases are combined with surveys measuring behavioral constructs at the end of the measurement period. One problem with the inclusion of behavior variables where attributes and potential outcomes are measured at different points is that since behavior is not a stable psychological construct, a person’s behavioral style might have changed from the time it is measured to the time an outcome is measured (Wiklund, Davidsson, and Delmar 2005). This problem might be alleviated by using theoretically more valid operationalizations of how behavioral variables (e.g., perceptions, intentions, or self-efficacy) relate to actual actions taken by entrepreneurs (Delmar 2000; Krueger 2005).

**Multilevel Analyses**

Databases provide an ideal empirical setting for multilevel entrepreneurship research. Methods for such research have been utilized and discussed at length in, for instance, organizational behavior (Kozlowski and Klein 2000) and sociology research (DiPrete and Forristal 1994). Many have argued that confusion has existed in the entrepreneurship field between
firm and individual levels of analysis (Aldrich 1992; Davidsson and Wiklund 2001; Sarasvathy 2004). Acknowledging this prior confusion and also the methodological difficulties in conducting multilevel analyses, Davidsson (2005) suggests thinking of an entrepreneurship research project as a single design level before starting to make crossovers to other levels. The starting point of such a design demands the predictor variables and the criterion variable(s) should refer to the same level of analysis. For example, instead of using the education of an entrepreneur (individual level) to infer the financial performance of her firm (firm level), we should use the total amount of human capital in a firm (firm level) to infer financial performance (firm level). Alternatively, we could use the education of an entrepreneur (individual level) to infer her earnings from self-employment (individual level). The cautious or less-experienced researcher would thus be suggested to start out with a more straightforward single-level research design before moving on to more advanced methods of combining and analyzing data.

**Ethical Considerations**

A delicate issue with regards to large-scale databases of firms, and especially individuals, is the ethical dimension. In most countries, individuals and firms are obligated to report certain types of financial information to the authorities for taxation and other purposes. This information is largely dependent on individuals’ conviction that the information will not be used for purposes they disagree to. For example, census authorities often ask or demand newly registered businesses to report their current or planned “line of business,” which is subsequently transformed into SIC-compatible codes by the census office. If people believe that information they give out is being used in ways they do not agree to, they might be disinclined to give out information in the future, or worse—when reporting is mandatory, they might provide inaccurate information. Careful consideration of how the subjects featured in a database would consider being part of the current research project is thus an important question. Worst case scenario: a sloppy or unethical project might damage the usefulness of important databases.

A final word on the ethics of using databases concerns the risk of “data mining” empirical material. Since database research often carries large investments in time and costs for acquiring and learning about data, researchers might be pressed to show that this was a justified investment. As discussed previously, data might not readily be used as proxies of theoretical concepts. Researchers using secondary databases therefore need to obtain information on sampling details and variable specification. Failing to do so, the researcher might find herself standing with a large amount of data with little value for the original objective. Hence the ethical dilemma: Vacuuming the material for significant correlations might eventually reveal some variable(s) that can be used to explain something vaguely related to something entrepreneurial. With larger sample sizes, the t-values used for statistical inference testing becomes larger, making it easier to reject a null hypothesis of no relationship between two variables. It is also possible to omit a variable that is found to interfere with the theoretical model, causing the variables in the tested model to be inflated and thus overestimating the effect of our model. From an ethical standpoint, all such procedures are of questionable value.

**Discussion**

I have argued in this article that entrepreneurship research has yet to make use of the possibilities inherent in databases. I suggested several ways to cope with the problems and practicalities of database research: using theory-driven sampling specification and variable definitions, discussing the data with experts and those familiar with it, and getting immersed in the data to learn about its possibilities and inherent limitations. To ensure validity, I particularly argued for combining different types of databases with each other or with other types of data. It is also important to uphold the higher norms of research and resist the temptation of “data mining.” So, what good can these details, arguments, and suggestions put forward, do us as researchers in entrepreneurship? I will round off by giving three examples of theoretically important questions where databases might provide some answers.

As first example, the possibilities to provide analyses on entrepreneurs and nonentrepreneurs with similar skills and experiences over time might help us to pinpoint the elusive concept of “opportunity costs,” which is often put forward in theoretical and empirical work as well as in public policy documents. Although opportunity cost is frequently mentioned as a possible explanation for empirical findings, there has been little research to date that explicitly investigate the existence, magnitude, and effects of opportunity costs of engaging in entrepreneurship. The studies in existence (notably Amit, Muller, and Cockburn 1995) have been relying on somewhat crude proxies, such as prior salary before engaging in entrepreneurship, as a measure of opportunity costs.

As a second example, by using database on many individuals over a longer period of time, it would be possible to look at entrepreneurs’ career performance instead of trying to infer variables related to the individual entrepreneur to the performance of his or her firm (Sarasvathy 2004). This can be done by using both “long” and “broad” research designs: With a long design, data on a comprehensive set of individuals’ characteristics and resources can be looked at to see how (periods of) entrepreneurship affect individual level outcomes such as long-term wealth and earnings, as
well as personal health and other nontangible affects. With a broad design, individual-level data are combined with firm-level data to determine the workplaces where individuals are active as employees or entrepreneurs—and thus to test how participating in different types of entrepreneurial activities affect the long-term careers, social standing, and wealth levels of these individuals. Such an approach also has the potential to examine the long-term differences between novice and serial entrepreneurs (Westhead and Wright 1998).

As a third example, databases of (new) firms might be combined with data on patented innovations to assess how technological opportunities affect the development and performance of new firms. Save for a few studies making use of survey (Klevorick et al, 1995) or qualitative data (Shane 2000), empirical work on how different types of opportunities affect the establishment and development of new ventures is still lacking (Shane 2003; McMullen and Shepherd 2005). Based on the suggestions given in this article, secondary databases provide a source of great yet untapped value that can help us to expand the depth and scope of entrepreneurship research.

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Endnotes
1. By “secondary databases” I mean databases that were not collected as primary data by researchers (e.g., not data such as the PSED). Since there are much secondary (or “archival”) data that could be used in research, the focus in this article is mainly on large-scale databases such as those available from public authorities and organizations. The terms “database” and “secondary database” are used interchangeably.

References


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**About the Author**

**KARL Wennberg** (karl.wennberg@hhs.se) is a Ph.D. candidate at the Center for Entrepreneurship and Business Creation, Stockholm School of Economics. His dissertation work combines individual- and firm-level databases to investigate entrepreneurial performance and exit from a behavioral perspective.
Founding Time and the Growth of Firms

G. R. Chandrashekhar
R. Srinivasan

This research recognizes the importance of the founding conditions of a firm. A new construct, Founding Time (FT) has been conceptualized, measured, and validated to represent one of the founding conditions of a firm. FT is then used to understand the phenomena of growth of firms.

The impact of FT on the growth of a firm has been examined. This examination reveals that there is a certain zone of FT, which seems to result in high firm growth rates. This research also establishes that there is an optimum for the FT of a firm.

A multimethod approach has been used which includes econometric modeling and case studies. This approach has allowed us to triangulate the results of FT in this research.

Growth and evolution of firms has fascinated management thinkers for more than a century and various scholars have proposed many theories on the topic of growth of the firm during the last century or so. A literature review on growth of the firm was conducted to understand and evaluate the various contributions toward enhancing the understanding of the growth process. The Industrial Organization (IO) schools of thought seem to have prevailed for almost a century ever since Edgeworth proposed the Neo Classical model of growth in 1881. The Neo Classical theory and the Bain type IO seem to have evoked responses from Schumpeter and the economists of Chicago school which were then codified as separate schools of thought. Oliver Williamson, building on the work of Ronald Coase, developed further the Transaction Cost Economics (Williamson 1989). Each one of these schools of thought had an influence on the evolution of the Resource Based View of the firm (Wernerfelt 1984).

Edith Penrose’s classic work on the growth of firms (Penrose 1959; 1984), which evolved in parallel to the IO schools of thought, examined the growth process of the firms and addressed three key issues related to the growth of the firm. In Penrose’s view firms are organizations of people that have administrative control over productive assets and whose fields of operations are not limited to particular markets. Thus, the growth of this sort of firm is qualitatively different from the simple increase of output of a neo-classical “firm.”

The general rules governing this sort of an organization may be thought of as:

1. Constant returns to scale in the long run,
2. The possibility of diversification, and
3. Increasing costs of growth

Penrose (1959; 1984) integrated all three concepts to form a sustained criticism of the earlier static Neo Classical theory, in which a firm was a construct with a cost curve and a demand curve which functioned with the underlying logic of input combination and optimal pricing. Penrose’s work influenced either directly or indirectly the evolution of subsequent schools of thought including the Resource-based view, diversification and diversification strategy, and spillover models to name some.

Penrose’s work seems to have motivated other researchers such as Baumol (1962, c.f. Slater 1979), Marris (1964, c.f., Slater, 1979) and Gander (1991) to examine various aspects related to growth of the firm. Gander (1991) examined the impact of Managerial Diseconomies of Scale proposed by Penrose, on the growth of firms, in his empirical work, while Marris (1964, c.f., Slater 1979) examined the impact of Owner-Manager Dichotomy on the growth of the firm. However, modeling the growth of firm has seen both a constant return to scale approach based on the Neo Classical production function as well as on decreasing returns to scale approach, such as the one adopted by Jovanovic (1982).

Historically, empirical findings that firm growth is roughly independent of firm size have led to the development of a number of IO theories in which Gibrat’s law is taken as an assumption or as a desirable implication. Gibrat’s law proposes that firms grow in a random manner without any specific relation to their respective sizes. Theoretical work in the 1980s on industry evolution has emphasized the importance of learning on firm growth and changes in market structure. Jovanovic (1982) and Lippman and Rumelt (1982) examine the implications of the assumption that firms can learn about their efficiencies from realizations of costs. Jovanovic’s (1982) model predicts that firm growth decreases with firm age when firm size is held constant. This version of Jovanovic’s model also assumes that output is a decreasing convex function of managerial inefficiency.

The study of new ventures is increasingly viewed as an important aspect of organizational research (c.f., Bamford, Dean, and McDougall 2000). However, new ventures fail at an alarming rate and hence as a result some management researchers have focused on the determinants of new ven-

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ture performance (Carter et al. 1994; McDougall and Robinson 1990; c.f., Bamford, Dean, and McDougall 2000).

Bamford, Dean, and McDougall (2000) have examined new bank start-ups from three perspectives: external control, strategic choice, and resource. They found that a set of initial founding conditions explained performance variations of the banks they studied. They also found that the impact of initial founding conditions appeared to diminish over time for at least two of the three performance measures they had considered. This research attempts to understand in more precise terms as to how long does a firm take to found itself, by which time it has an established business model, a set of customers, a set of employees, and a set of investors.

The organization effectiveness measurement literature seems to suggest that the intuitive choice of earnings as an ultimate criterion of effectiveness is endemic to policy empirical research in spite of numerous articles, books and rhetoric on the multiple goal character of effectiveness (Kirchhoff 1977:353). We have defined a concept called Founding Time (FT) in this research and validated it using data from the Indian Information Technology Services (IT) industry. The concept of FT defined by us could be a comprehensive firm measure that would indicate that point in time in the evolution of a firm, from which a firm becomes more professional and self-sustainable. Hence, from an organizational effectiveness measurement point of view, the concept of FT provides a multidimensional measure of the firm that in many ways indicates the success of a firm from its inception.

Thus, FT could be construed as the first measure of organizational effectiveness of a firm from its inception. Understanding and unraveling the FT of a firm forms the motivation of this research.

The Concept of FT of a Firm

Organization theorists, beginning with the seminal work by Stinchcombe (1965, c.f. Bamford, Dean, and McDougall 2000), have advocated that new firms are imprinted at the time of founding and that this imprinting has lasting effects on the subsequent strategy, structure, and performance of those firms. Stinchcombe emphasized the role of social structure on the forms of new firms, arguing that their forms were temporally stable due to the institutionalization at the time of founding (Bamford, Dean, and McDougall 2000).

Similarly, Pennings (1980:254) viewed organization birth as the “overriding factor in molding and constraining the organization’s behavior during subsequent stages of its life cycle.” Boeker (1988, c.f., Bamford, Dean, and McDougall 2000) and Boeker (1999) emphasized the critical importance of initial founding conditions in determining the strategy that new firms pursue throughout their lives and concluded that firms are set on a course at founding.

Stinchcombe and other researchers who have investigated new firms remain silent on the duration for which a firm would retain its founding imprint, or be influenced by its founding imprint. We propose FT as that time duration, after which a founding imprint has relatively less impact on the subsequent evolution of a firm. This is also characterized by a firm displaying rapid economic growth around and after the FT with stable levels of profitability and consistent returns on the capital employed.

Our case study based research indicates that three of the firms we have observed so far (Infosys Technologies Limited, Trigent Software Limited, and Prologix) grew out of their founding imprints around the time they displayed a rapid growth in sales with consistent levels of profits and returns. These firms formalized their review and planning process and involved many others in the decision-making process, which was hitherto limited to the founders and a few others in the respective organizations. Thus, our measure of FT, which is predicated on sales, profits and returns, seems to identify an important stage of evolution of a firm wherein a firm has founded itself and is poised for subsequent sustainable and rapid growth.

Economists, on the other hand, have approached the firm growth phenomena in a different manner. Leibenstein (1966, 1968, 1969, 1972) advocated the concept of X-Efficiency to understand and describe the phenomena of firm growth. According to Leibenstein (1969:600), “Firms do not produce on the outer bounds of their production possibility surface but well within it.” Thus, he defines “X-inefficiency as the degree to which actual output is less than the maximum output for a given set of inputs.” He also defines increases in outputs for the same inputs as increases in X-Efficiency. Leibenstein (1969) concludes that firms frequently do not take advantage of many opportunities to decrease costs per unit or to increase output with existing inputs. He is, however, silent on the duration it may take for a firm to reach the state of full X-Efficiency (i.e., to operate either on the production possibility surface or very close to it) from inception.

We propose that FT as conceptualized and measured by us, is that duration which elapses from the inception of a firm, around or after which a firm reaches a state of full X-Efficiency and operates as close as it possibly could to its production possibility surface. We have measured this by observing peak sales growth with stable levels of profitability and returns on capital. Conceptually, we have proposed the FT as follows:

\[
FT = f \{Sales, Profits\text{ before tax}, \text{Return on Capital Employed}\}
\]

Conceptual Derivation of FT

The spillover models of growth form the basis of this research.
Romer (1986) introduced the concept of technology to the Neo Classical growth model. Conceptually, this could be considered as:

Output (of a firm) = f \{Capital, Labor & Technology\} \quad 1.3.1

this could then be expanded as

Output = f \{(Founding Capital + Accrued Capital), Labor, Technology\} \quad 1.3.2

or

Output = f \{(Founding Capital, Changes in Capital\textsuperscript{1} + Profit after Tax\textsuperscript{2}), Employees, Research and Development (R & D) investment\} \quad 1.3.3

Accrued capital would include increases in the capital and also the profits from operations that are added to the reserves of the firm. The technology factor would be adequately represented by the R&D investment made by the firm.

In this research, output and growth of a firm is measured by the sales and changes in sales revenue of a firm. Thus, 1.3.3 becomes

Sales = f \{(Founding Capital, Changes in Capital, Profit after tax, Employees, R & D Spend\} \quad 1.3.4

A firm would operate close to its production possibility curve if its total output were to be maximized; in this case if its sales revenues were to be maximized. The combinations of outputs for a given set of inputs, which maximize profits, also maximize revenues.

Hence, it is concluded that maximizing sales revenues for a given set of inputs (as shown in the right-hand side of equation 1.3.4) would lead a firm to operate on its production possibility curve. Thus, we argue that maximization of sales revenues for a set of constant inputs defines that point in time of a firm which indicates its operations on its production frontier.

If a firm’s inputs were held constant (i.e., total capital employed, profit after tax, employees, R&D spending were constant for a certain period, and sales revenue were maximized in that period), it would indicate that a firm is operating on its production frontier. FT is the period of time which elapses after which a firm operates on its production frontier for the first time since inception, for a given set of inputs:

\[ FT = f \{Sales, \text{Profit after Tax, Return on Capital Employed}\} \]

The basis of the conception in this research is that a firm exhibits sustainable sales growth after it has founded itself in all aspects of business. In this research it is proposed to observe sustainable peaks of sales growth in a firm’s evolution and mark that time corresponding with the highest sustainable peak as the FT of a firm. Sustainable growth would require stable levels of profits and returns while a firm is on a high sales growth path which provides the basis for our conception.

This proposed concept of FT bridges two foundational concepts, the first one being that of “founding imprint” as advocated by Organization Theory researchers starting from the seminal work of Stinchcombe (1965, c.f., Bamford, Dean, and McDougall 2000) and the other being that of “X-Efficiency,” another seminal work by Leibenstein (1966).

\[ FT = f \{Sales, \text{Profit after Tax, Return on Capital Employed}\} \]

Definitions

**Firm**

A firm is defined as a combination of resources it possesses and processes it engenders toward meeting a set of objectives. Resources and processes are considered disengaged and combine to address the objectives of the firm. This definition of a firm has been influenced by Dierickx and Cool (1989) and has been arrived at after examining the various definitions of firms in the literature.

**Growth**

Growth of a firm has been considered as an increase in sales revenue of a firm, since percentage change in sales is a key indicator of performance for small and new firms (Brush and Vanderwerf 1992). Sales revenue is a product of the price of a service and the amount of units of service rendered. An increase or decrease in price alone could change the sales revenue. It is also possible that fluctuations in foreign exchange rates between the Indian Rupee and other foreign currencies could affect the net sales recorded.
However, in this research we shall consider the total net sales of each firm only for the purpose of measuring growth of a firm. With the context of this research being Indian IT service firms, it is expected that increase in number of employees of a firm each year shall ensure that there is an increase in the total number of units of service rendered. However, not all employees contribute to the revenue earning activity of a firm as the capacity utilization of the Indian IT service firms has seldom been 100 percent. Hence, net sales revenues shall be the measure of growth of a firm.

**Founding Time (FT)**

FT is measured as that time elapsed between the year of incorporation of the firm and the first sharp upward inflexion of sales revenue of the firm since inception. Any sharp inflexion of sales revenue in the first three years (robustness check have been done for two and four years) since inception is to be ignored for the purpose of defining the FT, especially as there could be an abnormal growth in sales from a small revenue base. This sharp upward inflexion should be followed by stable or rapid growth for at least three years and there should be no negative growth following the upward inflexion for three years. The firm in consideration should also have either stable or increasing profits during this period. Such a state would uniquely define the completion of the founding phase of a firm based on which the FT would be measured. The founding completion year (FCY) is the year immediately preceding the year in which there is an observed sharp upward inflexion of sales. Thus, FT = Founding Completion Year – Year of Incorporation + 1.

The underlying assumptions about the FT concept includes the fact that a firm has generated the needed assets for its business according to a business plan and has also evolved a business model for its various activities addressing specific customer segments, by the time of the completion of the founding phase. The concept of FT, though measured on the time dimension, actually covers almost all aspects of a firm’s initial development and is not only an elegant measure but also an insightful one.

The concept of FT is strategic in nature and transcends any operational measure used to understand businesses or portfolios, such as break-even points, payback periods, etc. In the course of founding, a firm may pursue only a single business opportunity or may enter multiple businesses and/or even exit some of them. The more operational measures used to understand business portfolios cannot be used to measure the FT, hence the need for a new definition and measure.

**Method for Estimating the FT**

The steps for estimating FT are:

1. Find the year of incorporation of a firm in any form—proprietary, partnership, limited liability company, etc. (the year in which a firm was incorporated and not when it was listed on stock exchanges).
2. Prepare a table containing the sales, profits (PAT), and return on capital employed (ROCE) data of the firm for around two decades starting from the year of incorporation.
3. In the table develop a column for sales growth rate, year by year.
4. Observe the growth rate from the year of incorporation and observe all sharp upward surges in the sales growth rate of the firm.
5. Upward surges should be distinctly different from the preceding and succeeding years (the distinction could range from 20% to 150% or higher).
6. Initial upward surges in the sales growth for a period of three years are to be avoided, as they would be from a low base of revenue and may or may not be sustainable.
7. Thus FT of a firm cannot be less than or equal to three years.
8. Choose the highest upward surge in sales growth rate from all other such surges.
9. The firm should have recorded positive growth after this year of upward surge for a period of three (2–4) years; if not, discard this upward surge and choose the next highest upward surge.
10. Examine the profits of the firm during the year of this upward surge. The profits of the firm should either be stable or growing for a period of three years after the year of the upward surge; if not, discard this upward surge and choose the next highest upward surge.
11. The ROCE of the firm should be positive during the year of the upward surge chosen and for a period of three years after.
12. Founding Completion Year (FCY) is the year immediately preceding the year in which there was a sharp upward surge and which satisfied other conditions mentioned above.
13. FT = Year of Incorporation – Founding Completion Year + 1.
14. If two peaks are separated only by a period of two years, then the more prominent peak should be considered.
15. If the prominent peak in (n) is unstable, then the lower peak of the two should not be considered and instead some other peak should be considered.
16. If the firm is not founded by the above method, then F = Age of the firm + 1. The assumption here being that a firm which has not been founded so far may be founded in the subsequent year.
Research Design and Methodology

The objectives of this research are to measure FT and to validate the concept of FT.

The measurement of FT was done by using the method outlined in the previous section. The validation of FT was done by using the following regression model:

\[ G = B_0 + B_1F + B_2F^2 + V \]

where:

- \( G \) equals growth rate of firms (sales growth, year on year)
- \( F \) is FT of firm (measured in number of years)
- \( B_0 \) represents the intercept term of the above regression model
- \( B_1 \) is the coefficient of \( F \)
- \( B_2 \) equals the coefficient of \( F^2 \)
- \( V \) is random (stochastic) term

We chose the above model because we wanted to investigate and establish if there was an optimum for the FT which resulted in superior growth of the firm. If the linear term \( F \) had a positive coefficient and the squared term \( F^2 \) had a negative coefficient, there would be an optimum for the FT.

In addition to the econometric model developed, case studies were used to understand the founding phenomena in three different firms and in this process triangulate the results of this research.

Data and Sample

This research requires a longitudinal study of firms from their inception. The choice of industry is predicated on a relatively new industry rather than an older one. The Indian Information Technology Services (IT) industry is a relatively new one having originated in the 1980s and come of age in the 1990s. Thus, the Indian IT sector shall be the focus of this research.

The origin of this industry can be traced back to December 19, 1986, when the government of India promulgated the software policy, and analysis of this policy is available in the January 1987 issue of Dataquest which is the oldest and probably the most respected of the Indian Information Technology magazines. In 1987, only two Indian firms were involved in software exports from India: Tata Consulting Services (TCS) and Tata Unisys Ltd (now Tata Infotech). Total software exports from India were estimated to be around 600 MNIR (Million Indian National Rupee).

The National Association of Software and Service Companies (NASSCOM) was formed in 1988. It has since become the apex organization for all software and service firms in India and also other information technology-related firms. The structure of the Indian IT industry is outlined in Table 1.

NASSCOM’s membership of Indian IT firms totals more than 600, or 95 percent of revenue of the Indian IT firms.

Data Selection Method

A specific sample was constructed for this research. The challenge this presented was to cull the relevant data from various directories and track them consistently over the years. The other challenge was the choice of the industry. Since the Indian IT Services industry was a nascent and emerging industry during the 1980s and 1990s, there were numerous changes of ownerships, name changes, and mergers all of which had to be carefully tracked.

The databases accessed were NASSCOM’S Indian Software Directory (1992–2003). Data obtained from this process was then cross-validated with the data from the annual surveys of DATAQUEST (1987–2004). Annual reports of firms, drawn from Insight – Corporate Database, wherever available and necessary were used to complete the sample construction.

The following method was used to arrive at a final sample of 48 firms for this research.

1. All firms considered belong to the private sector as that is the focus of this research.
2. All joint ventures considered also involve private firms from the Indian side (e.g., BAeHAL, a joint venture between British Aerospace and Hindustan Aeronautics Limited, is not part of this study; whereas, Mahindra–British Telecom, a joint venture between Mahindra’s and British Telecom is part of this study).
3. Multinational firms with their Indian subsidiaries or operations have not been considered in this research (e.g., IBM, Novell, Digital, etc.).

### Table 1. Industry Structure of Indian IT Firms

<table>
<thead>
<tr>
<th>Annual Sales Revenue (2001)</th>
<th>No. of Firms</th>
</tr>
</thead>
<tbody>
<tr>
<td>Above $ 200 Million</td>
<td>5</td>
</tr>
<tr>
<td>$ 100 Million - $ 200 Million</td>
<td>5</td>
</tr>
<tr>
<td>$ 50 Million - $ 100 Million</td>
<td>15</td>
</tr>
<tr>
<td>$ 20 Million - $ 50 Million</td>
<td>27</td>
</tr>
<tr>
<td>$ 10 Million - $ 20 Million</td>
<td>55</td>
</tr>
<tr>
<td>$ 2 Million - $ 10 Million</td>
<td>220</td>
</tr>
<tr>
<td>Below $ 2 Million</td>
<td>2,483</td>
</tr>
</tbody>
</table>

1 US $ = 45.86 Indian National Rupee  
(Source: www.rbi.org.in, 12-Oct-04.)

4. Offshore hubs of firms based in the United States, such as Metamor, IMR, SYNTEL, Mastech/Igate, have not been considered.
5. IT firms which originated in other areas such as training (Aptech, NIIT), hardware (PCL Mindware, HCL Consulting/Technologies, DCM Data Systems, Microland), and other businesses (WIPRO, DDE ORG), whose reporting of software and services results were not distinctly clear, have not been considered in this research.
6. All firms considered were in business during a major portion of the period 1995–2004.
7. Firms founded after 1997 have not been considered, as there would not be at least an eight-year data view available for these firms.
8. All firms chosen have or had their own websites.
9. All firms considered are in the business of commercial software development; firms operating in specific niches of process and industrial automation software and any other real-time/embbedded software have not been considered in this research.
10. Firms in the areas of data capture, desktop publishing, publishing, CD-ROM developers, and multimedia (e.g., Pentafour) are not part of this research.
11. In-house IT/IS departments of firms and groups do not form a part of this research.
12. Firms in the specific areas of voice communication-related activities are not part of this research.
13. Firms in the specific areas of anti-virus software and document management software are not part of this research.
14. Firms with inconsistent reporting over the period of the study have not been considered (e.g., Datamatics, Mafatlal Consultancy Services, Log-In Systems, Kanbay Software).
15. Firms involved in the specific areas of map making and geographic information systems are not part of this research.
16. All firms in various types of Business Process Outsourcing have been excluded from this research.
17. Firms involved only in DSP, embedded systems, firmware development, and hardware design (e.g., Silicon Automation (Sasken)) are not part of this research.
18. Firms primarily involved in hardware manufacturing (in Telecom and CNC areas) who also manufacture software are not part of this research.

**Sample Description**

The 48 firms selected through the 18-step method are classified in Table 2.

The sample in Table 2 represented about 50 percent of the entire Indian IT services industry by sales revenue in 2004 and about 52 percent of the entire industry in 2003.

**Results and Discussions**

The concept of FT was examined for the Indian IT services firms. The results of this examination are presented below. Table 3 lists the firms examined in this research.

The square term has been used to mathematically arrive at the turning point in the relationship which is indicative of the optimum. A model based on Ordinary Least Squares (OLS) estimates of growth predicated on F and F Square suggests an optimum FT which results in high firm growth rates. The estimated optimum is about eight years for this sample, after which the growth rates taper off.

\[
\text{Growth} = 34.889 + 0.765 \times F - 0.0624 \times F^2 \quad (R^2 = 0.05)
\]

**Evidence from the Case Studies**

**Infosys.** The formalization of the review processes at Infosys occurred in 1994 with the Strategic Planning initiative (STRAP) being put in place. This period of 13 years from its inception, coincides with the FT measured for Infosys which is also 13 years. The primary case study provides evidence to support the premise from the secondary data and in that way triangulates this research in terms of multiple types of data being used to understand the FT construct.

**Trigent.** The formalization of the review processes at Trigent occurred after six years from its inception in 2000, a period which coincides with the FT measured for Trigent which is also six years. The primary case study provides evidence to support the premise from the secondary data and in that way triangulates this research in terms of multiple types of data being used to understand the FT construct.

**Table 2. Descriptive Statistics**

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>CAT: Frequency</td>
<td>CAT: Frequency</td>
<td>CAT: Frequency</td>
<td>CAT: Frequency</td>
</tr>
<tr>
<td>1</td>
<td>1 &lt; 10: 1</td>
<td>8 &lt; 200: 1</td>
<td>5 &lt; 10: 1</td>
<td>16 4–7:</td>
</tr>
<tr>
<td>4</td>
<td>40–55 11</td>
<td>4 1000–5000: 16</td>
<td>6 20–25: 4</td>
<td>6 14–16:</td>
</tr>
<tr>
<td>5</td>
<td>&gt; 55: 6</td>
<td>2 &gt; 5000: 3</td>
<td>3 &gt; 25: 2</td>
<td>3 &gt; 16:</td>
</tr>
</tbody>
</table>

Legend: CAT=Category; Frequency=Number of firms in the category
in that way triangulates this research in terms of multiple types of data being used to understand the FT construct.

**Prologix.** The formalization of the review processes at Prologix occurred in 2005—six years from its inception. This also coincided with the sharp increase in sales of its product licenses by many times its normal sales over the previous years. The primary case study provides evidence to support the premise from the secondary data and in that way triangulates this research in terms of multiple types of data being used to understand the FT construct.

**Further Research Planned**

The primary objective of this research was to establish the FT as a concept. This has been conceptualized, measured, and validated for the Indian IT services firms. However, this concept would now have to be generalized for other IT services firms across the world, before it is generalized to all types of service firms. This concept also needs to be examined for wildly fluctuating industries such as the capital machinery industry.

The larger goal of modeling the growth of firms still remains. The fit index of the model estimated in

Table 3. Firms Examined (Period: 1995–2004)

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Firm</th>
<th>Growth (CAGR)</th>
<th>FT - Years</th>
<th>S. No.</th>
<th>Firm</th>
<th>Growth (CAGR)</th>
<th>FT - Years</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>ITC Infotech</td>
<td>-0.35</td>
<td>4</td>
<td>25</td>
<td>Infotech Enterprises</td>
<td>52.82</td>
<td>10</td>
</tr>
<tr>
<td>2</td>
<td>Perot Systems–TSI</td>
<td>85.86</td>
<td>4</td>
<td>26</td>
<td>Kale Consultants</td>
<td>20.22</td>
<td>10</td>
</tr>
<tr>
<td>3</td>
<td>Cognizant</td>
<td>71.1</td>
<td>5</td>
<td>27</td>
<td>MAARS Software</td>
<td>20.95</td>
<td>10</td>
</tr>
<tr>
<td>4</td>
<td>KPIT Cummins</td>
<td>41.74</td>
<td>5</td>
<td>28</td>
<td>Orient Information Technology</td>
<td>32.66</td>
<td>10</td>
</tr>
<tr>
<td>5</td>
<td>Mahindra British Telecom</td>
<td>39.13</td>
<td>5</td>
<td>29</td>
<td>Birla Technologies</td>
<td>34.11</td>
<td>11</td>
</tr>
<tr>
<td>6</td>
<td>Sierra Atlantic Software</td>
<td>35.31</td>
<td>5</td>
<td>30</td>
<td>DSQ Software</td>
<td>30.22</td>
<td>11</td>
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<tr>
<td>7</td>
<td>Tata Infotech</td>
<td>18.85</td>
<td>5</td>
<td>31</td>
<td>Future Software</td>
<td>36.34</td>
<td>11</td>
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<td>ADITI</td>
<td>44.1</td>
<td>6</td>
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<td>L&amp;T Infotech</td>
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<tr>
<td>9</td>
<td>Geometric Software</td>
<td>50.98</td>
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<td>Linx Software</td>
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<td>Hexaware Technologies</td>
<td>31.3</td>
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<td>Polaris</td>
<td>57.22</td>
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<td>R S Software</td>
<td>18.16</td>
<td>6</td>
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<td>Trigent</td>
<td>43.97</td>
<td>6</td>
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<td>Infosys</td>
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<td>Xansa</td>
<td>23.25</td>
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<td>Patni Computer Systems</td>
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<td>J K Technosoft</td>
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<td>55.75</td>
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<td>Mastek</td>
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<td>Aftek Infosys</td>
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<td>Satyam Computer Services</td>
<td>58.68</td>
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<td>Nucleus Software</td>
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<td>Sonata</td>
<td>20.84</td>
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<td>RAMCO Systems</td>
<td>32.18</td>
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<td>i-Flex</td>
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<td>Zensar</td>
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<td>Tata Consultancy Services</td>
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<td>24</td>
<td>CG-VAK</td>
<td>14.25</td>
<td>10</td>
<td>48</td>
<td>Softek</td>
<td>10.08</td>
<td>23</td>
</tr>
</tbody>
</table>

Source: NASSCOM Software Directories, Dataquest annual surveys.

Legend: CAGR=Cumulative Aggregate Growth Rate over the period of investigation

Figure 2. Growth vs. FT
this research indicates that while there is an optimum FT, which seems to result in high rates of firm growth, FT alone is not sufficient to model the growth of firms. We propose a polynomial growth modeling for future research. We have found that the 48 firms studied in this research have grown in 12 different ways, in terms of sales growth. This could be represented in 12 higher order polynomials of different orders. Researching these polynomial models could provide possible predictive insights into firm growth trajectories which could then be associated with their respective path dependencies. Such an approach would possibly allow us to predicable firm growth trajectory on its FT.

Endnotes
1. This research examines only the changes in subscribed capital; long-term debt has not been considered due to nonavailability of consistent data over the study period.
2. This research assumes that profits after tax are transferred to general reserves and/or carried to the balance sheet; dividends have not been considered due to non availability of consistent data over the study period.
3. Literature seems to indicate that research spend is usually internally financed, faces financial constraint, and has a relationship with cash flows, more so for new ventures and start-ups (Himmelberg and Petersen 1994; Hall and Page 2002).
4. Return on Capital Employed = Operating Profits/Capital Employed.
5. Refer to the Supplemental Material for an illustration of the measurement of the FT of Infosys Technologies Limited.

References
NASSCOM. www.nasscom.org (last accessed in March, 2004).
Supplemental Material Estimating the FT of Infosys
The graphical plot presented in Figure 3 allows us to visualize the various peaks of sales growth for Infosys Technologies Limited from 1982–2004. The firm was established in 1981 and its reported financial results are available from 1982.

There are seven peaks of sales growth measured on a year-on-year (YOY) basis for the firm over the period of observation. The first peak is within the three-year period from inception and the same shall be ignored for FT computation. Among the remaining sales growth peaks, peaks 2, 5, 6 and 7, in the order of occurrence, are the prominent peaks.

Let us consider peak 2 first which occurs in 1987. There is a negative growth recorded by Infosys in 1989 and the profits decline in 1989, both of which occur within three years of 1987; hence this is not a stable peak for consideration of the FT.

The next prominent peak in the order of occurrence is the peak 5 which occurs in 1994. This peak satisfies all the conditions stipulated in the estimating method in terms of positive growth for three years after 1994, stable or increasing profits for three years after 1994, and stable returns on the capital employed for a period of three years from 1994.

The founding completion year is 1993 and the FT for Infosys is 13 years. The top management of Infosys agrees with the period of time it took for them to build the firm, stabilize it, and set it on a high growth path.
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Developing and Validating a Construct of Entrepreneurial Intensity

Jianwen Liao
Patrick J. Murphy
Harold Welsch

In this article we define, validate, and propose a construct of entrepreneurial intensity, or the degree of entrepreneurship in firms. First, in defining the construct, we explore theoretical differences between entrepreneurial intensity and orientation in order to distinguish it. Second, we empirically validate a measure of entrepreneurial intensity using data based on a sample of 563 entrepreneurs. Third, we propose avenues for research on how entrepreneurial intensity distinguishes entrepreneurs and entrepreneurial action. Finally, we detail theoretical implications of using entrepreneurial intensity as an antecedent and outcome.

The entrepreneurship field has been concerned traditionally with questions such as “Who are entrepreneurs?” or “What distinguishes them from other types of people?” Significant attention has been devoted to identifying entrepreneurial characteristics and personal attributes to differentiate them from general public and small businessowners (Shaver and Scott 1991). There has also been considerable interest in the ability to identify the psychological characteristics of these individuals so as to describe how entrepreneurs differ from other individuals (Low and MacMillan 1988). For example, many personality traits have been used to typify entrepreneurs, including ambition, need for achievement, risk taking, and locus of control (Brockhaus 1982; Casson 1982; McClelland 1961). However, this body of research is fragmented and inconclusive. It has produced no clear evidence that psychological attributes differentiate entrepreneurs from other individuals. Some research goes even further, saying it is the wrong research question (Gartner 1985), not a viable research approach (Bull and Willard 1993), or simply futile (Low and Macmillan 1988).

In a study involving members of the National Federation of Independent Business (NFIB), Cooper and Dunkelberg (1986) indicate several paths by which one might become a small businessowner, including founding the business, purchasing business, inheriting the business, and being promoted or brought in by other owners. Using NFIB data, they tested hypotheses delineating significant individual-level differences in entrepreneurship intensity (EI), or “degree of entrepreneurship.” Although Cooper and Dunkelberg suggest the construct may not be directly measurable or observable, they do imply that it may be inferred through reflection in a set of characteristics identified in previous research (Keats and Bracker 1988: 62). These characteristics include background, attitudes, and a complex set of factors associated with previous careers, incubator organizations, and the processes of starting. These characteristics collectively reflect EI. To date, despite this attention, no widely accepted empirical or operational measure of “entrepreneurial intensity” exists.

Entrepreneurial intensity has foundations in the notion of a “Protestant work ethic” (Weber 1905) and the need for achievement (McClelland 1961). Additionally, it has a secondary basis in commitment, internal locus of control, diligence, and determination. Despite religious pluralism in U.S. society, the cultural effects of Protestantism have exerted a powerful influence on thoughts and action since the early history of the country, with the main thrust asserting that spiritual salvation is attainable through hard work. More recently, the concept has evolved outside of a religious context. In this role, it assumes hard work is for material benefit and personal recognition only. Thus, it has evolved into a version of a Type-A behavior.

In early characterizations, Type-A behavior was identified by an excessive competitive drive with enhanced sense of time urgency. Later, additional aspects were defined, including (1) an intense sustained desire to achieve, (2) eagerness to compete, (3) persistent drive for recognition, (4) continuous involvement in deadline activities, (5) habitual propensity to accelerate mental and physical functions, and (5) consistent alertness. Price (1982) suggested these behavioral patterns are learned in open, competitive economies where high upward mobility is possible. The overall notion assumes success is a function of individual effort and progress is definable in terms of material or tangible achievements. The visualization of a successful entrepreneurial venture, combined with sources of parental and spousal support, the “right” circumstances (e.g., life stage, education, rich environments), can cause an individual to generate a “fire in the belly” or high “environmental intensity.” This level of commitment, when channeled into an entrepreneurial endeavor, characterizes the passion required for entrepreneurial success (Selz 1992). The same passion is contextualized by a single-minded focus to start a business and work toward its survival and growth, often at the expense of other important goals.
Defining Entrepreneurial Intensity

Much of the theoretical rationale for EI was developed and refined through issues generated from empirical research attempts in Europe regarding the specific nature (e.g., regarding culture) of intentions and behaviors heralded by the construct. The first issue posits that central and eastern Europeans unlearned certain aspects of the work ethic by being provided with secure jobs and social benefits from socialist governments. As a result, entrepreneurial intensity is misapplied or nonexistent. The counterargument to this position points out that Weber’s (1905) Protestant work ethic originated in Europe and is inherent to all European culture. Thus, individuals are indeed hard workers who exhibit sacrifice, determination, diligence, and a focused commitment to entrepreneurship suppressed temporarily by the socialist governments. From this, the counterargument holds, entrepreneurial intensity is relevant and exists in those environments, too. As a result, this issue begs the question, “What causes entrepreneurial intensity—nature or nurture?” Whereas comparative research across countries focusing on this question does not yet exist, our preliminary results show EI to be more related to entrepreneurial motivations, willingness to make sacrifice and incur opportunity costs, intentions to grow the business, and various demographic variables. Thus, EI reflects aspects of nature and nurture, promising to throw light on how culture and historical variables. Thus, EI reflects aspects of nature and nurture, promising to throw light on how culture and history impact EI from an anthropological perspective as well as an individual one.

EI measures the focus and commitment of entrepreneurs regarding their entrepreneurial ventures. Focus refers to the extent to which an entrepreneur gives up other pursuits to create and own a business and work for the health of the venture. Commitment refers to the extent to which an entrepreneur spends time and resources on venture creation with a passion for development and growth. To illustrate, individuals have multiple potential commitments, both professional and organizational. There are many potential commitments at different levels for entrepreneurs, across short or long stretches of time, such as unions, professional associations, work groups, jobs, or tasks. Entrepreneurs may also be committed to themselves or elements outside of the workplace, such as recreational groups or family. Entrepreneurs may be committed to other people as well as the values and goals of those people. However, the EI construct assumes that entrepreneurs channel the highest effort toward and place the highest value on the success of their enterprise instead of focusing on any of these other possible commitments. We propose that dimensions of focus and commitment are the primary dimensions of entrepreneurial intensity.

Entrepreneurial Intensity versus Entrepreneurial Orientation

Entrepreneurship orientation (EO) is defined as processes, practices, and decision-making activities leading to the creation of a new venture (Lumpkin and Dess 1996). Its key dimensions are autonomy, innovativeness, risk taking, proactiveness, and competitive aggressiveness. Each dimension is useful in predicting the creation, survival, and performance of a venture (Wiklund 1999).

EO, when measured at the individual level, is related to categorical directionality and describes the propensity for someone to lead a new venture. By contrast, EI captures the degree of entrepreneurship, the level of commitment and focus in leading a new entry. Thus, EO and EI are complementary and distinct from each other. Research has placed great attention on EO and its relationship to venture creation and performance. However, questions remain regarding how EI further affects venture creation and performance, and how it interplays with contextual and other individual-level factors (Morris and Kuratko 2002). By clarifying and validating EI, studies will shed much needed new light on many contentious and inconclusive findings in entrepreneurship research.

Development of the Entrepreneurial Intensity Scale

The EI scale described in this article has been administered successfully in the United States, Mexico, Russia, Poland, Romania, Hungary, and several Baltic countries. Entrepreneurs in various stages of development and various industries in these countries have responded to the items on a five-point scale. Preliminary alpha coefficients indicate scale reliability ranges in the low seventies to low eighties (Pistrui et al. 1997; 2000).

Based on the assumption that EI is not directly observable but inferable through reflection in a complex set of factors (Cooper and Dunkelberg 1996), we developed a scale of 12 EI items pretested successfully in 10 different countries (Welsch 1998; Gundry and Welsch 2001).

Table 1 shows that the initial pilot study data using the Entrepreneurial Profile Questionnaire (EPQ) suggests 4 of the 10 items capture entrepreneurial intensity and achieve acceptable scale reliability (Welsch 1998). These items are:

1. Owning my own business is more important than spending time with my family.
2. There is no limit as to how long I would give a maximum effort to establish my business.
3. I would rather own my own business than pursue another promising career.
4. My personal philosophy is to do "whatever it takes" to establish my own business.
We included the EI scale items in a survey containing other items related to locus of control, self-efficacy, and socialbility. The survey was administered to entrepreneurs and a neutral comparison group. For both groups, the items were preceded by the statement, “The following statement can be used to describe most people. How accurately would they describe you?” Respondents indicated accuracy via a Likert-type scale ranging from 1 (completely untrue) to 5 (completely true).

### Method

**Sample and Procedure**

The data for this study were obtained from the Panel Study of Entrepreneurial Dynamics (PSED). The PSED is a longitudinal data set of individuals in the process of starting businesses who were identified from a random-digit dialing telephone survey of 31,261 adults in the United States who are 18 years of age or older. A nascent entrepreneur is identified if he or she answered yes to the following two questions: (1) Are you, alone or with others, now trying to start a new business? (2) Are you, alone or with others, now starting a new business or new venture for your employer? Is the effort a part of your job assignment? All of these individuals were considered candidates for the nascent entrepreneur interview if they met three additional criteria. First, they expected to be owners or part owners of the new firm. Second, they had been active in trying to start

<table>
<thead>
<tr>
<th><strong>EI Item</strong></th>
<th><strong>PSED Item Number</strong></th>
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<tr>
<td>My personal philosophy is to do “whatever it takes” to establish my own business.</td>
<td>QL1F</td>
</tr>
<tr>
<td>I plan to eventually sell my business.</td>
<td>QL1D</td>
</tr>
<tr>
<td>I would rather own my own business than earn a higher salary employed by someone else.</td>
<td>QL1G</td>
</tr>
<tr>
<td>Owning my own business is more important than spending more time with my family.</td>
<td></td>
</tr>
<tr>
<td>I would rather own a business than pursue another promising career.</td>
<td>QL1E</td>
</tr>
<tr>
<td>My business is the most important activity in my life.</td>
<td></td>
</tr>
<tr>
<td>I will do whatever it takes to make my business a success.</td>
<td></td>
</tr>
<tr>
<td>There is no limit as to how long I would give a maximum effort to establish my business.</td>
<td></td>
</tr>
<tr>
<td>I would be willing to make significant personal sacrifices in order to stay in business.</td>
<td></td>
</tr>
<tr>
<td>I would go to work somewhere else only long enough to make another attempt to establish my own firm.</td>
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the new firm in the last 12 months. Third, the effort was still in
the start-up or gestation phase and was not an infant firm.
Follow-up surveys were conducted at 12-month intervals to
evaluate the status of the start-up effort. Data related to nascent
entrepreneurs were collected using a combination of survey
and telephone interviews. Survey questionnaires included
items related to opportunity recognition, entrepreneurial cli-
mate, start-up problems, start-up context, and reasons for start-
ing a new venture as well as nascent entrepreneurs’ demo-
graphics, background, and personal dispositions. Telephone
interview questions were concerned with the nature of the
start-up, start-up activities, start-up team, and the start-up fund-
ing requirements, future expectations for the new business,
personal decision-making style, and market and competition
assessments as well as nascent entrepreneurs’ social networks.
The data set consists of 830 nascent entrepreneurs and 431
general public. A more detailed description of the background
and methodology of the PESD data set can be found in Gartner,

Preliminary Screening and Analyses
For all parametric analyses that assume certain population
characteristics (e.g., normal distribution, homogeneity of
variance), post-stratification weights accompany the PESD
data set based on estimates from the U.S. Census Bureau’s
most recent population survey. The weights adjust sample
findings based on gender, age, household income, and geo-
graphic region. This produces 144 cells for weighting adjust-
ment (Reynolds 2000: 177). These weights promote wide generaliz-
ability of study findings using PESD data (Reynolds 2000: 181).
Further details regarding the cre-
ation and application of weights
are described in Reynolds (2000).
The primary data consisted of
751 combined observations, and
listwise deletion (SPSS 12.0),
based on missing data, yielded a
usable sample of 563 cases repre-
senting entrepreneurs and a
nonentrepreneur control group.

Multivariate Normality. Structural Equation Modeling
(SEM) assumes multivariate nor-
mality of study variables and all
linear combinations of variables.
Using PRELIS, we screened scale
items for univariate and multivari-
te normality. In all cases, items
were skewed and kurtotic.
However, by virtue of sample size
and inspection of relevant indices (e.g., the variance inflation
factor), skewness and kurtosis did not indicate extreme
departures from normality of the sort to threaten the reliabil-
ity or validity of study results (Tabachnik and Fidell 1996).

Confirmatory Factor Analysis. Using LISREL 8
(Joreskog and Sorbom 1993), we estimated reliability and
validity of our measurements based on SEM results. We ex-
amined all relevant indices and coefficients for unsuitable esti-
mates or values outside acceptable limits. This examination
included negative error variance of observed variables,
extraordinarily large coefficients, and unduly large standard
errors for estimated coefficients. All values were satisfactory,
and we detected no violations of analysis criteria.

Results
Main Analyses
Multiple measures assessed overall model fit to the observed
pattern of correlation in the data (Hair, Anderson, Tatham,
and Black 1995). Our $\chi^2$ statistic was 3.08 ($df = 2; p = .214$),
demonstrating the model did not differ significantly from the
data. The goodness-of-fit index (GFI) assesses fit between the
observed covariance matrix and the one forecasted by the
model. Our GFI statistic was .99, exceeding the generally
acceptable value of .90, giving evidence of good fit between
model and data. The adjusted goodness-of-fit index (AGFI),
which assesses model parsimony by evaluating model fit in
terms of the number of estimated parameters required to
achieve the level of fit, was .98, greater than the recommend-

![Figure 1. Confirmatory Factor Analysis: Entrepreneurial Intensity](https://digitalcommons.sacredheart.edu/neje/vol8/iss2/1)
ed level of .90. The root mean square residual (RMSR) is the average of the residuals between observed and estimated input covariance matrices. Our RMSR statistic was .031, superior to the recommended value of .06. Overall, these fit indices show strong evidence that our model is representative of the observed data.

We evaluated our measurement model by construct convergent validity. Convergent validity can be tested by examining the significance of the path coefficient on its posited latent variables. As indicated in Figure 1, all the path coefficients included in the measurement models are statistically significant ($p < .05$), providing evidence of convergent validity.

Following Hair et al. (1995), we used the following formula to calculate the composite reliability of entrepreneurial intensity:

$$\text{Construct reliability} = \frac{(\sum sd, \text{loading})^2}{(\sum sd, \text{loading})^2 + (\sum \varepsilon)}$$

where standardized loadings are obtained directly from the program output and $\varepsilon$ is the measurement error for each indicator. Construct reliability for our model was .769, exceeding the recommended value of .50 for this statistic.

**External Validity: Entrepreneurial Intensity as a Differentiator**

As described above, prior research on traits and person-centric attributes has failed to yield factors differentiating entrepreneurs and nonentrepreneurs. For example, high degrees of risk-taking characteristics do not describe entrepreneurs because nonentrepreneurs frequently exhibit high risk-taking characteristics. Using a construct of EI, which derives from personal and contextual foundations, we tested whether EI differentiates entrepreneurs from nonentrepreneurs. We did this by creating two groups (392 entrepreneurs and 175 non entrepreneurs) and examining the differences between groups across the four EI items. Table 2 presents results. The two groups differed significantly across the entrepreneurial intensity items, providing evidence that entrepreneurial intensity is an important factor in differentiating nascent entrepreneurs.

**Discussion and Conclusions**

A construct of EI is central and pivotal to the entrepreneurial process. When operationalized as a study variable, it promises to contribute substantially to the development of future entrepreneurship theory. As such, future entrepreneurship research should build on this foundation and explore EI further in different contexts, in terms of antecedents and outcomes, as illustrated in Figure 2.

**Contributions to Future Research**

**Entrepreneurial Intensity Antecedents.** EI is related to environmental as well as individual-level antecedents. Future research on EI should investigate and delineate the degree to which entrepreneurs reporting high EI engage in behaviors leading to entrepreneurial successes in the start-up phase.

### Table 2. Analysis of Variance: Nascent Entrepreneurs and Comparison Group

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<th>MEANS</th>
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<th>ANOVA F-test</th>
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<tbody>
<tr>
<td></td>
<td>Nascent Entrepreneurs</td>
<td>Comparison Group</td>
<td></td>
</tr>
<tr>
<td>QL1D: I would rather own my own business than earn a higher salary employed by someone else.</td>
<td>4.05</td>
<td>3.27</td>
<td>69.712*</td>
</tr>
<tr>
<td>QL1E: There is no limit as to how long I would give a maximum effort to establish my business.</td>
<td>3.90</td>
<td>3.36</td>
<td>30.219*</td>
</tr>
<tr>
<td>QL1F: My personal philosophy is to do “whatever it takes” to establish my own business.</td>
<td>3.77</td>
<td>2.91</td>
<td>77.662*</td>
</tr>
<tr>
<td>QL1G: Owning my own business is more important than spending more time with my family.</td>
<td>1.77</td>
<td>1.65</td>
<td>6.068*</td>
</tr>
</tbody>
</table>

* $p < .01$
such as receiving funding, generating sales, profitability, and achieving survivability and growth. The theoretical framework suggests that EI impacts task motivation along with the degree to which an individual perceives he or she has the ability for high achievement and success. Thus, EI should be researched in concert with other constructs, such as locus of control or entrepreneurial orientation. A second research issue is whether EI is a stable variable over time, throughout the entrepreneurial process, or a transient variable with different impacts in different contexts. In addition, there may be substantial differences in the degree of entrepreneurial intensity between types of entrepreneurs, for example, those in high-technology industries versus those running family firms.

Issues of whether EI is intrinsic versus learned remain open; similar to issues of whether entrepreneurs are born versus made. Both explanations, to be sure, are likely correct: certain dispositions such as aggressiveness, impulsiveness, tendency for action, or extroversion vary across people, and these seem to be related to EI. However, learned or acquired behaviors stemming from experiences of observing family members or role models perform successful entrepreneurial behaviors may also impact EI. Future research must consider both kinds of antecedents as research clarifies the EI construct and relates it to outcomes.

Individuals were chosen as the unit of analysis in this research. The primacy of the individual in entrepreneurial research is described by Shaver and Scott (1991). Man, Lau, and Chan (2002) contend the role of the individual entrepreneur is a major factor of venture competitiveness because of the concentration of decision-making power, which affects firm strategy directly. In addition, Slevin and Covin (1995) suggest the influential role of the entrepreneur is a critical factor in determining the performance of the firm, especially when it remains small. However, future research may investigate average levels of EI in firms, for example, in order to contextualize the construct further.

**Entrepreneurial Intensity Outcomes.** As shown in Figure 2, EI relates to a series of outcomes that can be categorized into three major groupings of capability, performance, and process. Possessing high EI, as defined, is quite different than the low degree of focus demonstrated by individuals who dabble in multiple projects for only periods of time. Rather, EI individuals have long-term orientations, long attention spans in the context of their ventures, and are not distracted by immediate gratification because they possess entrepreneurial vision.

Other possible outcomes that may result from EI are the ability to start a business, engage in extensive learning behavior, incur broad experiences, acquire high skill, engage in variable activity, develop entrepreneurial competency, engage in personal growth and development, and possess a high EO. This characterization would include having strategic vision with clarity and a greater probability of implementing the vision. Accompanying attitudes include maturity, seriousness, environmental attunement, liability to act, proactivity, and financial success. Performance out-
comes may include external financing, market share, short-term success factors such as incorporation and growth, as well as long-term factors such as acquiring companies, longevity, and mergers. Process outcomes to be investigated by future research may include engaging in information absorption, adaptability, developing a wide network with significant relationships, being competitive, enhancing the innovative capability, engaging in and adopting innovations, setting goals and plans, goal accomplishment, and having a greater ability to acquire capital (e.g., financial, human, or informational).

**Conclusions**

We have introduced EI as a theoretically distinctive and empirically defensible construct. Using data from real-world entrepreneurs, we have also provided evidence useful for examining its validity and reliability. This contribution to the literature adds a new dimension to explain entrepreneurial phenomena, cutting across traditional theoretical dichotomies (intrinsic versus learned). In concert with other perspectives on entrepreneurship and relevant entrepreneurship-related constructs, this contribution enriches the field with a new construct to help drive future theory building.

**Endnotes**

1. This definition of “complementary” is precisely the same as Bohr’s (1949: 224; Popper, 1957: 90), which describes complementary approaches or factors as (a) complementary in the usual sense but also (b) mutually exclusive such that to the degree the first is adopted it precludes the adoption of the second.

**References**


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Measure for Measure: 
Modeling Entrepreneurial Self-Efficacy onto Instrumental Tasks Within the New Venture Creation Process

Jill Kickul
Robert S. D’Intino

Entrepreneurship has always been a vibrant productive force in the economy and at the forefront of adaptation and growth of new markets (Gavron, Cowling, Holtham and Westall 1998). Future entrepreneurs must continually find innovative ways to introduce new products, services, and technological processes. Entrepreneurship educators are experiencing a growing demand to help facilitate the development of a nascent entrepreneur’s success. Many entrepreneurial-oriented students are searching for universities that offer courses to assist them in developing the knowledge, skills, and abilities to manage a new venture, and entrepreneurial intentions to start a new venture. We discuss relationships between entrepreneurship research and university teaching and make specific suggestions on how further work on improving measurement in entrepreneurship will benefit both research and teaching effectiveness.

Entrepreneurial Self-Efficacy

The construct of self-efficacy has been widely applied in psychology as an individual difference variable. Self-efficacy is defined by Bandura (1977) as people’s judgments of their capabilities to organize and execute courses of actions required to attain designated types of performances. It is concerned not with the skills one has but with the judgments of what one can do with whatever skills one possesses. Self-efficacy is believed to be related to one’s choice of activities, one’s effort and persistence, thought processes, and emotional reactions when confronted by obstacles (Bandura 1977; Lent, Brown, and Hackett 1994). Self-efficacy is acquired gradually through the development of complex cognitive, social, linguistic, and physical skills that are obtained through education and life experience (Bandura 1982; Gist 1987). Thus, the acquisition of skills and task competencies based on past performance and achievements reinforces self-efficacy and contributes to higher aspirations and future performance (Herron and Sapienza 1992). Research examining self-efficacy and knowledge gained has found that pretraining self-efficacy measures positively predict learning outcomes (e.g., Gist, Schwoerer, and Rosen 1989; Martocchio and Weber 1992).

Self-efficacy has a number of theoretical and practical implications for entrepreneurial success because initiating a new venture requires unique skills and abilities. In this study we examine two published research studies that developed entrepreneurial self-efficacy measurement instruments and compare them. The entrepreneurial self-efficacy research by De Noble, Jung, and Ehrlich (1999) identified the following six theoretical dimensions of entrepreneurial self-efficacy:

1. Risk and uncertainty management skills
2. Innovation and product development skills
3. Interpersonal and networking management skills
4. Opportunity recognition
5. Procurement and allocation of critical resource
6. Development and maintenance of an innovative environment
Chen, Greene, and Crick (1998) has also proposed and identified the following five entrepreneurial self-efficacy factors:

1. Marketing (e.g., set and marketing goals and expand business)
2. Innovation (e.g., new venturing and new ideas)
3. Management (e.g., reduce risk and uncertainty)
4. Risk-taking (e.g., makes decisions under uncertainty and risk)
5. Financial control (e.g., develop financial system and internal controls)

Both of these researcher teams found many of these self-efficacy factors to be related to entrepreneurial intentions. As mentioned earlier, one of the purposes of our article is to examine how these entrepreneurial self-efficacy factors advocated by De Noble et al. (1999) and Chen et al. (1998) converge on several of the underlying self-efficacy dimensions. That is, from a measurement standpoint, we will begin to investigate the convergent and discriminant validity of the two published entrepreneurial self-efficacy measures. Many of these factors may not only be associated with the broad construct of intentionality but also associated with many of the critical tasks and roles that have been identified within the entrepreneurial life-cycle.

**Method**

**Overview**

Study participants were 138 graduate students enrolled in a part-time MBA (Master of Business Administration) program at a large, midwestern university. These students were recruited from entrepreneurship or management courses included within the graduate curriculum. Of the 138 participants, 53 percent were male and 47 percent were female. The average age was 26.20 years. All participants were informed that we were conducting research to better understand their attitudes and beliefs regarding entrepreneurial ventures. In their study questionnaire, students were asked to provide responses about their interest in starting their own business (entrepreneurial intentions) as well as their perceived skills and abilities in performing entrepreneurial roles and tasks.

**Measures**

**Entrepreneurial Self-Efficacy (De Noble et al. 1999).**

We employed De Noble et al.'s 34-item self-efficacy measure that includes six core dimensions:

1. Risk and uncertainty management skills ("I can work..."
productively under continuous stress, pressure and conflict.)
2. Innovation and product development skills (“I can originate new ideas and products.”)
3. Interpersonal and networking management skills (“I can develop and maintain favorable relationships with potential investors.”)
4. Opportunity recognition (“I can see new market opportunities for new products and services.”)
5. Procurement and allocation of critical resources (“I can recruit and train key employees.”)
6. Development and maintenance of an innovative environment (“I can develop a working environment that encourages people to try out something new.”)

Participants rated themselves on how capable they believe they are in performing each task using a 7-point Likert scale where 1 represents “Strongly Disagree” and 7 represents “Strongly Agree.”

Entrepreneurial Self-Efficacy (Chen et al. 1998). We also had participants rate themselves on Chen et al’s 22-item self-efficacy measure. As mentioned earlier, their scale included five factors (marketing, innovation, management, risk-taking, and financial control. Again, participants rated themselves on how capable they believe they are in performing each task using a 7-point Likert scale where 1 represents “Strongly Disagree” and 7 represents “Strongly Agree.”

Entrepreneurial Life-Cycle Tasks and Roles
Cox, Mueller, and Moss (2002) created a scale to measure participant’s perceptions of their ability to perform many of the instrumental functions within each stage of the entrepreneurial life-cycle. Our study participants were asked to think about the process of starting a new business venture in terms of the following ten tasks statements of the Cox et al. instrument (see Figure 1 for the statements). For each statement, participants rated their level of confidence on a 7-point Likert scale (1 = “Not Confident”; 7 = “Completely Confident”).

Entrepreneurial Intentions to Start a New Venture
Two items from Crant (1996) were used to measure entrepreneurial intentions: “I will probably own my own business one day,” and “It is likely that I will personally own a small business in the relatively near future.” Moreover, two additional items specifically designed for this study were also used: “Being ‘my own boss’ is an important goal of mine,” and “I often think of having my own business.” Responses to these items were indicated on a 7-point Likert scale (1 = “strongly disagree”; 7 = “strongly agree”).

Results
To examine the degree of convergence and divergence on the two measures of self-efficacy, the data were submitted to a factor analysis using principal components extraction and oblique rotation. An 11-factor solution resulted as indicated through our interpretation of the scree plot and the eigenvalues greater than 1.0. Comrey (1973) suggests that loadings in excess of .71 (50% overlapping variance) are considered excellent, .63 (40% overlapping variance) very good, .55 (30% overlapping variance) good, .45 (20% overlapping variance) fair, and .32 (10% overlapping variance) poor. Using this framework, items were chosen that were .45 or higher on one of the factors and were .32 or lower on the other factor. Table 1 displays the results of the factor analysis.

<table>
<thead>
<tr>
<th>Initial Eigenvalues</th>
<th>Extraction Sums of Squared Loadings</th>
<th>Rotation Sums of Squared Loadings</th>
</tr>
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<tbody>
<tr>
<td>Factor</td>
<td>Total</td>
<td>% of Variance</td>
</tr>
<tr>
<td>1</td>
<td>24.401</td>
<td>43.574</td>
</tr>
<tr>
<td>2</td>
<td>5.194</td>
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</tr>
<tr>
<td>3</td>
<td>2.581</td>
<td>4.608</td>
</tr>
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<td>4</td>
<td>2.275</td>
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<td>5</td>
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<td>6</td>
<td>1.607</td>
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</tr>
<tr>
<td>11</td>
<td>1.034</td>
<td>1.846</td>
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<tr>
<td>Factors</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>------------------------------------------------------------------------</td>
<td>-------</td>
<td>-------</td>
</tr>
<tr>
<td>Expand business</td>
<td>.984</td>
<td>-.104</td>
</tr>
<tr>
<td>New products and services</td>
<td>.942</td>
<td>.128</td>
</tr>
<tr>
<td>Set and meet sales goals</td>
<td>.936</td>
<td>.173</td>
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<tr>
<td>Set and attain profit goals</td>
<td>.921</td>
<td>.197</td>
</tr>
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<td>New venturing and new ideas</td>
<td>.903</td>
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<td>New methods of production, marketing, and management</td>
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<td>Set and meet market share goals for my company</td>
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<td>Establish position in product market</td>
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<td>New markets and geographic territories</td>
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<td>Conduct a market analysis</td>
<td>.752</td>
<td>-.192</td>
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<tr>
<td>Strategic planning and develop information system</td>
<td>.614</td>
<td></td>
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<tr>
<td>Reduce risk and uncertainty</td>
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<td></td>
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<td>Make decisions under uncertainty and risk</td>
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<tr>
<td>I can develop new relationships with key people who are</td>
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<td></td>
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<td>connected to capital sources</td>
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<td>.114</td>
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<tr>
<td>I can see new market opportunities for new products and services</td>
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<tr>
<td>I can develop and maintain favorable relationships with potential</td>
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<td></td>
</tr>
<tr>
<td>investors</td>
<td>.868</td>
<td>-.109</td>
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<tr>
<td>I can identify new areas for potential growth</td>
<td>.765</td>
<td></td>
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<tr>
<td>I can react quickly to take advantage of business opportunities</td>
<td>.759</td>
<td></td>
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<tr>
<td>I can convince others to join with me in pursuit of my vision</td>
<td>.154</td>
<td>.755</td>
</tr>
<tr>
<td>I can persuade others to accept my viewpoint</td>
<td>.638</td>
<td>.156</td>
</tr>
<tr>
<td>I can encourage people to take initiative and responsibilities for</td>
<td>.634</td>
<td>.166</td>
</tr>
<tr>
<td>their ideas and decisions, regardless of outcomes</td>
<td></td>
<td></td>
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<tr>
<td>I can inspire others to embrace the vision and values of the</td>
<td>.474</td>
<td>.175</td>
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<td>company</td>
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<td>I can work productivity under continuous stress, pressure, and</td>
<td>-.263</td>
<td>.464</td>
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<td>conflict</td>
<td></td>
<td></td>
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<tr>
<td>I can originate new ideas and products</td>
<td>.432</td>
<td>.148</td>
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<tr>
<td>Take calculated risks</td>
<td>.359</td>
<td>.405</td>
</tr>
<tr>
<td>I can manage the negotiation process to obtain outcomes favorable to</td>
<td>.357</td>
<td>.322</td>
</tr>
<tr>
<td>me</td>
<td>.354</td>
<td>.223</td>
</tr>
<tr>
<td>I can determine what the business will look like.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>I can react quickly to unexpected change and failure</td>
<td>-.101</td>
<td>.692</td>
</tr>
<tr>
<td>I can tolerate unexpected changes in business conditions</td>
<td>.312</td>
<td>.638</td>
</tr>
<tr>
<td>I can discover new ways to improve existing products</td>
<td>.185</td>
<td>.588</td>
</tr>
<tr>
<td>I can maintain a positive outlook despite setbacks and negative</td>
<td>.212</td>
<td>.101</td>
</tr>
<tr>
<td>feedback from naysayers</td>
<td></td>
<td></td>
</tr>
<tr>
<td>I can formulate a set of actions in pursuit of opportunities</td>
<td>.115</td>
<td>.198</td>
</tr>
<tr>
<td>I can develop a new working environment that encourages</td>
<td></td>
<td></td>
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<tr>
<td>people to try out something new</td>
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</tbody>
</table>
Correlational and Regression Analyses
To examine the relationship between the resulting factors and entrepreneurial tasks, we first investigated the relationship between the new factors (composites established for each) and entrepreneurial intentions. Correlational analysis revealed that Factors 2, 3, 8, 11 (four of De Noble et al.’s items) were related to intentions to start a new venture. These factors, as shown in Figure 2, were also significantly associated with each of the entrepreneurial instrumental tasks.

Additional analyses were also completed to examine the influence on the four phases and corresponding tasks on entrepreneurial intentions. Table 3 depicts the results of the regression analysis. The table displays the unstandardized regression coefficient (β), the standard error associated with B (SE B), and the standardized regression coefficient (β). As shown in Table 3, tasks involving raising money to start a business (Marshaling, Task 5) and convincing others to invest in your business (Marshaling, Task 6) as well as the implementing task of managing a small business (Implementing, Task 9) were significantly related to intentions to start or launch a new business.

Discussion
Many entrepreneurial intentions models describing the context of entrepreneurial intentionality can be revised and strengthened by including the concept of self-efficacy. Entrepreneurial self-efficacy can be employed to better understand and explain both the development of entrepreneurial intentions and the conditions under which these intentions may be best translated into entrepreneurial actions. That is, the individual who has identified key efficacy perceptions about starting a business may set higher personal goals and may be more persistent in overcoming entrepreneurial challenges and obstacles, particularly early on in the launch of their venture.

Our factor analysis results revealed that the self-efficacy measures differed across multiple areas. Factor items and
loadings showed the divergence of De Noble et al.'s and Chen et al.'s entrepreneurial self-efficacy factors. Since they were both intended to measure the same construct, it seems further work may be needed to clarify how researchers operationalize and validate these scales. Four of De Noble et al.'s factors were found to be related to the instrumental tasks within the entrepreneurial process. These tasks, particularly those involved in the marshalling and implementing phases of a new venture, were linked to entrepreneurial intentions. None of the tasks involved within the searching phase (e.g., conceive a unique idea for a business, and identify market opportunities for a new business) were found to be associated with intentions.

Many of these opportunity recognition tasks are critical in the initial building stages and ongoing growth stages of a new venture. The opportunity recognition process has been described as multidimensional, incorporating the search process for new ideas as well as the recognition of feasible business opportunities (Hills, Schrader, and Lumpkin 1999). While some entrepreneurs start ventures prior to identifying opportunities, as the venture moves beyond the start-up phase, the opportunity recognition process becomes vital to the venture's growth capability as it confronts new environmental changes and seeks new innovations for growing the business (Zietsma 1999).

Conclusions
This study begins an initial step toward understanding entrepreneurial self-efficacy and how various researchers have operationalized the construct. It is our hope that future studies will examine how this entrepreneurial belief can assist nascent entrepreneurs as they become involved in the planning and launch of their venture. Considering the relationship between the entrepreneurial self-efficacy and the entrepreneurial intention, one can expect to enhance the entrepreneurial intention by putting systematic and continuous efforts on entrepreneurial self-efficacy. Many entrepreneurship courses focus on commonly identified entrepreneurial management and planning skills, but often ignore entrepreneurial skills, such as innovation and risk-taking. The teaching of entrepreneurial skills often tends to be technical, with insufficient attention paid to the cognition and belief systems of the entrepreneur. Educators should take into account entrepreneurial attitudes and perceptions when designing or assessing their entrepreneurship program and course objectives.

Finally, another approach to enhancing entrepreneurial

Figure 2. Relationship Between New Factors and Entrepreneurial Intentions

Source: Cox, Mueller and Moss 2002.
self-efficacy is to study the environment of potential and actual entrepreneurs. An environment perceived to be more supportive will increase entrepreneurial self-efficacy because individuals assess their entrepreneurial capacities in reference to perceived resources, opportunities, and obstacles existing in their environment. Setting up a supportive environment in our classrooms that focus on essential entrepreneurial skills, tasks, and abilities may give future entrepreneurs the necessary competencies and confidence to launch and grow their own businesses within a marketplace that demands agility and continual innovation.

Recommendations for Future Measurement Research

A cognitive perspective on entrepreneurship and individual entrepreneurs is currently being established to help build an important aspect of theoretical and empirical entrepreneurship research. One major facet of social cognition research involves the empirical measurement of cognitive style and entrepreneurship self-efficacy discussed in this article. In addition, we propose a broader perspective suggesting that to make further progress researchers must systematically construct reliable and valid empirical measurement tools prior to conducting further laboratory and field research. Baron (2004:169) states that “entrepreneurship, as a field, can benefit greatly from expanding the array of conceptual tools at its disposal.” Specifically, we propose that our current entrepreneurship research toolbox of measurement instruments focusing on cognitive measures of entrepreneurship readiness, potential, and behavior should be systematically compared and tested for reliability and validity. In particular, for cognitive constructs where two or more competing measuring instruments have been constructed and published, we propose that research studies should be designed to test these measures one against the other for reliability and validity.

We suggest that entrepreneurship researchers working from the cognitive perspective will benefit from employing more reliable and valid measurement instruments to better understand the cognitive constructs. Some construct measures that could be tested include the following entrepreneurship research topics: counterfactual thinking (Baron 2000);
creativity potential and creativity skills (creative intelligence); decision making—both systematic and heuristic strategic decisions (Forbes 2003); entrepreneurial alertness (Gaglio and Katz 2001); entrepreneurial scripts (Mitchell and Chesteen 1995); goal setting; opportunity recognition (Krueger 2000; Krueger and Dickson 1994); prospect theory (Baron 2004); perceptions of risk versus opportunity; puzzle and problem solving; regulatory focus theory (Brockner, Higgins, and Low 2004); self confidence; self-efficacy; self-monitoring; specific functional entrepreneurial knowledge, skills, and abilities; social competence (Baron and Markman 2003); successful intelligence (Sternberg 2003); and the various positive and negative cognitive bias and error theories including optimistic thinking, illusion of control (Simon and Houghton 2002), the planning fallacy, and small and large number bias thinking. All of these entrepreneurial concepts involve perceptions about data and information storage, retrieval, processing, transformation, decision making, and entrepreneurial actions to start and grow new ventures.

We suggest that once researchers possess better empirical measurement instruments to conduct cognitive perspective research studies, we can move forward to study nascent and potential entrepreneurs systematically. Specifically, how they process data and information as they proceed through the new venture process, and learn more about patterns of venture success and nonsuccess. In addition, the more we learn about nascent and potential entrepreneurs in the field, the more information we will have to design improved education curriculum for university students enrolled in entrepreneurship courses. For example, if we can measure our student’s cognitive styles and entrepreneurial self-efficacy at the beginning of an entrepreneurship course, and at the conclusion, we will begin to understand the effectiveness of our curriculum and teaching. More students are enrolling in entrepreneurship courses every year. We can contribute to their education by presenting research studies using the most reliable and valid measures possible for measuring cognitive processes of successful nascent entrepreneurs.

References


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Professor D’Intino received his AB degree from the University of California, Santa Cruz, MBA from the University of North Carolina at Chapel Hill, and his Ph.D. from Virginia Tech in 1999. He has received the AOM 2002 Management History Division Best Paper Award and the USASBE Coleman Foundation 2004 Best Empirical Paper Award.
Entrepreneurial veterans in New England have generally fed their new-business-venturing appetites over the years by exploiting those major business opportunities available locally. Termed “paradigm shifts” by academics who know such things, these industry upheavals emerged in New England in the 1960s and 1970s in concentrated subregions such as the Boston area’s Route 128 (“America’s Technology Highway”) and later Route 495. Defense contractors (Raytheon, AVCO) and universities (Harvard, MIT, BU) were the source of spin-offs in a variety of technologies needing commercialization; markets were emerging for computers, medical devices, biotech and information technology; and there was sufficient capital to feed the resultant entrepreneurial hunger.

By the 1980s, the entrepreneurial infrastructure in the New England region was fully in place. To illustrate the intensity and localization of entrepreneurial activity, at one time I was simultaneously involved in five early-stage ventures that were all within 5 miles of my office. With such geographical concentration, it was not too difficult to become self-deceived into believing that Boston (and environs) was the “Hub of the Universe.” When the London capital markets became highly attractive in 1984–1985, for example, I became involved in taking Boston companies public “across the pond.” Those exhilarating experiences caused me to acknowledge that there were arguably some smart people and high-quality entrepreneurial deal-making activities outside of our own little neighborhood. The lesson learned: We shouldn’t always breathe our own vapors!

The Internet has served to make the world smaller and more accessible. International trade statistics reach new record levels every quarter. Entrepreneurs are reacting to these trends in a typically aggressive manner. What’s an increasing stimulus to entrepreneurial taste buds? China! Chinese trade issues pervade our daily consciousness. China is a nation with a GDP nearly equal to America’s, with four times the population! Its literacy rate is 83 percent, compared to India, for example, with its 52 percent literacy rate (Thomas 2003). What does China mean to the New England entrepreneur? While I don’t pretend to be a “China expert,” I have been bombarded by a continuous stream of facts, figures, and case studies on China—providing entrepreneurial food for thought. Let us examine the following business concerns about China in the same (metaphorical) way that we might check out a Chinese restaurant:

- How appetizing does China rate in terms of trade activity, vendor quality, and business climate? (“Zagat overview”)
- What is the range of available markets, industries, companies, and products? (“Menu options”)
- Who from “our little world” has partaken of the Chinese experience? (“Local patrons”)
- What negatives lurk behind the scenes? (“Problems in the kitchen”)
- What unexpected positive trends in the China story remain unpublicized? (“Chef’s surprises”)
- How does one buy into the Chinese business opportunity? (“Franchising opportunities”)
- What lessons can be learned? (“Doggy bag thoughts”)

The Zagat Overview: What’s the Big Attraction to an Entrepreneur Investigating China?

All discussions about China start with the obligatory reference to its 1.3 billion population. The Chinese economic landscape is really much more than that. Unless you’ve been cloistered in a monastery since the Reagan administration, you have increasingly been bumping into a myriad of sophisticated products from China. China is no longer a poor foreign country with mostly uneducated peasants. As Zakaria reports (2005), in the last 25 years China has been able to transition some 300 million people out of poverty and has
quadrupled the average person’s income. While latent xenophobia might make some people envision Chinese huddled in little cottages still eating with chopsticks, we should also acknowledge that their booming professional class is building a high-tech infrastructure and is creating an information society tailor-made for American entrepreneurs. Old perceptions must now give way to new realities. Most of the DVD players, microwave ovens, shoes, and toys manufactured in the world today are made in China. In 2002, China joined the World Trade Organization. Now it seems as if the entire world economy is gravitating toward this highly populous, low-cost country.

The surge in China trade has been nothing short of astonishing. Zakaria reports that China’s exports to the United States have grown by 1,600 percent over the past 15 years and U.S. exports to China have grown by 415 percent. Fifteen years ago, Pudong, in east Shanghai, was undeveloped countryside. This area is now Shanghai’s (and China’s) financial district—eight times the size of London’s new financial district. Shanghai has 4,000 high-rise buildings, nearly twice that of New York City.

The economic implications of China are significant. Consider just one U.S. retailer—Walmart. In 2004 (Zakaria 2005), Walmart imported $18 billion worth of goods from China. Of Wal-Mart’s 6,000 suppliers, more than 80 percent (5,000) are from China. For the American entrepreneur, a small subset of this type of Chinese trade activity can be quite alluring and may merit consideration.

**What Are the Statistical and Regional Dimensions of this Chinese Economic Buffet?**

The Chinese trade option has become increasingly popular and statistically significant (Fang 2005):

- China’s gross domestic product (GDP) increased from $1.1 trillion in 2000 to $1.6 trillion in 2005 (6th largest in the world).
- Its Foreign Direct Investment (FDI) increased from $38 billion in 2000 to $55 billion in 2004.
- Communications between China and the rest of the world are improving. Chinese Internet users have grown from 22.5 million in 2000 to 94 million in 2005.

Throughout China, a variety of its major cities and 31 provinces underscore the diversity of its consumers, products, and workers. The country is certainly not monolithic. As reported by Caufield and Shi (2005), these are several hot spots for the entrepreneur to consider, as follows (traveling north to south along China’s east coast):

- **Liaoning** is attracting high-tech to a province once known for heavy industry
  - Population = 42.4 million
  - Per capita GDP = $1,570
- **Shandong** is a booming province with growth in consumer appliances and oil
  - Population = 90.8 million
  - Per capita GDP = $1,406
  - Foreign investment = $6.5 billion
  - Investors: Daewoo, LG, Lucent, Samsung, Toyota
- **Jiangsu** produces one quarter of the world’s laptops and major parts for the digital camera and auto parts markets
  - Population = 74.4 million
  - Per capita GDP = $1,739
  - Foreign investment = $10.8 billion
  - Investors: BASF, Fujitsu, Motorola, Sony
- **Chongqing** is China’s automotive center, as well as a source of chemicals and pharmaceuticals
  - Population = 30.9 million
  - Per capita GDP = $767
  - Foreign investment = $450 million
  - Investors: BP, Ericsson, Ford, Honda, Philips, Suzuki
- **Shanghai** is China’s commercial and financial center and a hub for steel, semiconductors, and autos
  - Population = 16.7 million
  - Per capita GDP = $4,913
  - Foreign investment = $5 billion
  - Investors: Alcatel, Ericsson, Exxon, Mobil, GE, GM, Intel, Siemens, Volkswagen
- **Zhejiang** is the chief silk-producing province and hosts light industries like textiles and electronics manufacturing
  - Population = 46.8 million
  - Per capita GDP = $2,001
  - Foreign investment = $4.7 billion
  - Investors: Hankook Tire, Motorola, Nokia
- **Guangdong** produces shoes, toys, appliances, and electronics for export
  - Foreign investment = $4.3 billion
  - Investors: Accenture, Canon, Ford, GE, GM, Mitsubishi, Omon, Toshiba
- **Beijing** as the capital it is also China’s largest software production center
  - Population = 13.8 million
  - Per capita GDP = $3,551
  - Foreign investment = $5.1 billion
  - Investors: AT&T, Bayer, Hitachi, IBM, Microsoft, NEC, Oracle, Xerox
- **Tianjin** is China’s cell-phone-manufacturing hub and fastest-growing regional economy
  - Population = 10 million
  - Per capita GDP = $2,665
  - Foreign investment = $3.8 billion
  - Investors: Honeywell, Hyundai, LG, Motorola. Samsung, Yamaha

**Table:**

<table>
<thead>
<tr>
<th>Province</th>
<th>Population</th>
<th>GDP Per Capita</th>
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<td>42.4 million</td>
<td>$1,570</td>
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<tr>
<td>Shandong</td>
<td>90.8 million</td>
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<td>10 million</td>
<td>$3,551</td>
<td>$4.3 billion</td>
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What's the Nature of Conducting Business in China?

China's business environment is eccentric, if not chaotic. Entrepreneurs who have experienced the China business climate, when asked to describe the best plan of attack for other aspiring New England deal-makers, smile knowingly much as if to enjoy a private joke. There's no simple answer to the Chinese puzzle. Ahmad (2004) suggests that when it comes to doing business in China, the first rule is to throw away the rulebook, along with all the B-School cases and texts and basically all Western MBA theory. To quote Chairman Mao, “There is great disorder under heaven. The situation is excellent.” This aphorism underscores the lesson all foreign businesspeople should understand. The Chinese smell profit in chaos!

Many of the challenges an American entrepreneur might encounter in China emanate from the irrational nature of the Chinese business environment. Three factors are at play:

1. **Bureaucratic.** When the Communists took over the imperial civil service, they overlaid the complexities of party organization on existing governmental inefficiency.

2. **Legal.** China abides by the “rule of man” instead of the “rule of law.” Rather than statute-based boundaries, in China certain rights to act and conduct business derive from political influence and the power of the individual. Conflict of interest, rather than being an ethical dilemma, is viewed as a competitive edge. Personal connections (“guanxi”) are critical in pursuing commerce in China.

3. **Cultural.** The China business landscape presents many speed bumps: a difficult and imprecise range of languages and dialects; choking pollution; inadequate transportation, lodging and other accommodations; vast geography to navigate; and often gruesome working conditions. The major cultural challenge, however, is interpreting the sometimes-puzzling attitude of Chinese businesspeople. Notions of profits and “cracking the best deal” seem to take a back seat to psychological “game-playing” where game points are seemingly scored in a series of face-saving maneuvers and negotiating ploys. Deception is part of the process. For example, in an important decision-making meeting that an entrepreneur-friend of mine attended, the unnamed (and un introduced) note-taker in a golf shirt sitting in the back of the room actually turned out to be the Chinese company’s CEO! Emotions and deceit can often overshadow typical (Western) business logic in deal making.

What's the Role of State-Owned Enterprises?

While the mostly inefficient, state-owned enterprises (SOEs) are still a substantial part of the Chinese economy, SOEs tend to be large basic-industry entities. In China’s northeastern “rust belt,” for example, SOEs still represent 70 percent of the region’s GDP, as reported by Ahmad (2004, p. 105). In March 1998, the then-new Chinese prime minister Zhu Rongji enunciated the doctrine of zhuda fangxiao (“grasp the big, let go the small”) to restructure state-owned enterprises. Simply put, the government wanted to control the biggest and most significant companies and let the smaller ones go it alone. As a result, the ensuing period witnessed turbulent restructuring. Many of China’s SOEs have been incorporated and listed on stock markets. Mergers, restructuring, and shutdowns have reduced the number of SOEs from 262,000 in 1997 to 174,000 in 2001.

A majority of China’s SOEs were losing money in 2001. Moreover, for a typical SOE, average current assets had risen to 319 days of annual sales, suggesting that working capital was most likely plagued by uncollectible trades receivable and unsaleable inventory. Government control of these SOEs has obviously been more important than profitability. It is more an issue of power and prestige: promote the good SOEs; ignore the rest. Specifically, the government now hopes that the elite SOEs can be championed on the world economic stage to help China become an industrial superpower. Among the so-called SOE “stars” are

- PetroChina—oil/gas
- China Mobile—mobile telecoms
- Sinopec—oil/gas
- CNOOC—oil/gas
- Baosteel—steel
- China Aluminum—aluminum
- Shanghai Auto (SAIC)—cars
- Legend—PCs
- TCL—TVs/electronics
- Qingdao Haier—White/brown goods

The Menu Options

Where Does the Entrepreneur Start in Making Choices Concerning China?

Where to go? What to order? The range of business possibilities in China, like the counterpart menu in a Chinese restaurant, has limitless options. And like a Chinese menu, it is more than a little overwhelming just to get started. The entrepreneur must develop a plan of attack and determine functional areas of interest. An entrepreneurial American company

- Population = 86.4 million
- Per capita GDP = $1,815
- Foreign investment = $13.1 billion
- Investors: BP, Coca-Cola, Honda, Nestle, Procter & Gamble, Shell, Wal-Mart

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investigating China trade might consider manufacturing, engineering, or selling opportunities.

- **Manufacturing.** Basing a plant in China involves careful consideration of local area development plans. Each major city and province has identified the industries it wants to emphasize and nurture. (The U.S.-China Business Council summarizes much of this at www.uschina.org.) Since communications and transportation support are less than reliable, operations should be sited close to vendors (and clients, if they are located in China). Business-friendly coastal regions (see “hot spots” above) are the best places for the entrepreneur to consider to site a plant. An alternative to siting a plant is outsourcing, in which the entrepreneur uses local Chinese contractors to make products (or parts), perhaps cheaper and quicker than is possible by building a plant. In any case, it is important to work closely with local officials, who typically earn “bonus points” for dealing with foreign investors.

- **Engineering.** For high-tech entrepreneurs, it is important to acknowledge the undeniable surge in talented engineering students being educated in China’s universities. Recent graduates are trained in a wide range of hardware disciplines, from semiconductor engineering to product design. Software design capability is still constrained by language issues, but increasingly Chinese students are learning English and thereby improving their software design value.

- **Selling.** For a small American company to establish a market presence, China is simply too big, too patchy in infrastructure and too bureaucratic to be tackled on a national basis. Only a focused strategy to garner bite-size pieces of domestic Chinese sales can succeed. For every American entrepreneur with a clever business plan to sell consumer products in China, there might well be 1,000 Chinese entrepreneurs ready to knock-off a duplicate product at lower prices and margins. Attention to branding, partnering, and niche marketing can forestall and nullify such competitive threats. American industrial products—such as specialized capital equipment to help support the growth of Chinese manufacturing and high-tech process capacity—should have a better chance of success than “me too” products.

What Is the Status of China’s Major Markets and Industries?

What menu options might be appetizing to the American entrepreneur? Major markets of economic activity in China include energy, textiles, automotive, high-tech, and countless “other” segments. My various readings on Chinese markets and my discussions with successful American entrepreneurs already established in China only serve to emphasize how complex these entrepreneurial challenges are. To whet one’s venturing appetite, however, I offer the following thumbnail sketches as illustrations of what might be on the menu:

- **Energy.** The United States faces increasingly stiff competition from China in the pursuit of energy resources. Fang (2005) reports that China’s energy mix comprises coal (66%), oil (23%), hydroelectric (8%), and natural gas (3%). Our national media have chronicled the China National Offshore Oil Corporation (CNOOC) and its off-and-on quest for American oil company Unocal. This kind of Chinese M&A activity is somewhat off-script. Rather than the more typical Chinese bid for American technology or brand names—as has been the case with Lenovo’s takeover of IBM’s laptop computer line or Haier’s bid for Maytag—the CNOOC-Unocal pursuit has been steeped in geopolitical and national security policy considerations. From the entrepreneur’s vantage point, however, “smaller is better.” Energy as a basic natural resource is predominantly Big Company business. For smaller entrepreneurial firms, however, excellent targets of opportunity include: alternate energy (photovoltaics, wind, fuel cells); the infrastructure that supports energy distribution; and electric utility grids. For example, a Boston company that I know outsources to a Chinese manufacturing partner $2 million of annual work for component parts to supply the U.S. electrical utility sector. Three people in Massachusetts manage the Chinese partner’s 57 people (including 3 electrical engineers) in Guangdong province. A net annual savings of $800,000 is being achieved.

- **Textiles.** In 2005, the WTO brought to an end a 40-year-old global textile-quota system regulating China’s textile and clothing exports. All the antecedent conditions are present for China to lead the world in textiles. Chinese labor rates are 90 percent lower than those in the United States and Italy, and the Chinese workers can process piecework faster. China imported (Fong 2005) $3.5 billion of textile-related capital equipment in 2004, a 275 percent increase over the 1998 total. Despite on-going debates on tariff and import quota issues, the sheer scale of Chinese factories make it quite possibly “very attractive” to the American entrepreneur engaged in high-volume garment sales. Even “High Fashion” is exploiting the Chinese cost advantage. Many high-end European fashion labels are outsourcing to China: Celine’s Macadam collection of handbags, Francesco Blasia’s line of handbags, and Hugo Boss’s $500 suits.

- **Autos.** McKinsey (2005) predicts that China—already the fourth largest car market with domestic sales of 2.3 million cars in 2004—will overtake Germany in 2005 and Japan by 2010. America with 17 million cars per
year, it is also suggested, could also be caught soon after! The Shanghai Auto Show in April 2005 unveiled problems for foreign car firms looking to penetrate the Chinese market. VW has seen its 40 percent Chinese market share in 2001 fall to 20 percent in 2004. GM saw its sales drop 35 percent and profits drop 80 percent in 2005 (first quarter). The shifting competitive dynamic stems from new realities: previously, Roberts (2005a) reports VW and GM sold mostly to SOEs, where price was not a paramount issue. More recently, buyers in China have been individuals seeking value. Further, a rumor persists that Beijing is contemplating a big-engine car tax. The real areas in which foreign firms have been underperforming are: (1) implementing much-needed cost cutting and (2) establishing market distribution networks. For the American entrepreneur, most of this Big Company auto agony is good theater, but irrelevant. Auto parts are much more of interest. China’s ongoing auto part supply activity can feed all types of American companies. For example, low-cost subassembly auto parts examples ranges from Delphi parking-brake components to Johnson Controls seat covers. Given the October 2005 Chapter 11 filing by Delphi, the auto parts market in China has become that much more interesting. A small Massachusetts firm that I know is considering a major play in the hybrid electric vehicle (HEV) component market. As appropriate, subassemblies of the components will be fabricated in China.

- **High-Tech.** How many of us had an IBM PC as a first home computer? The fact that Legend (of China) subsidiary—Lenovo Group—purchased IBM’s PC division, with the help of McKinsey consultants and Goldman Sachs investment bankers, speaks volumes about our changing international economy. American entrepreneurs might consider the menu of other China high-tech activities.

- **Laptops.** Dean and Tam (2005) report that China assembled 68 percent of laptops worldwide in 2005, including providing parts like hard disk drives, power supplies, magnesium casings, and liquid crystal displays.

- **Internet.** Chinese firms are active in web-related ventures (Einhorn 2005). In 2004 Shanda Interactive Entertainment, a Shanghai gaming innovator, raised $100 million in an IPO (whose post-IPO share price rose 2.5 times); Ctrip.com (on-line travel reservations) placed a $40 million IPO in 2003 (its shares then doubled in price); and Tencent (Instant-messaging service) completed a June 2005 IPO for $200 million. Responding to this in-country entrepreneurial activity, American firms like MSN, Google, Yahoo, Expedia, and eBay have been joint-venturing with their Chinese counterparts to stake out a piece of the market growth.

- **Mobile Phones.** Shi (2005) reports on a clever entrepreneurial pursuit by Chaliyuan, a three-year-old Beijing-based manufacturer of cell phone recharge kiosks. Chaliyuan has installed 75 percent of China’s 65,000 kiosks which recharge cell phones for 12 cents in 10 minutes, and last 8 hours. The current installed base of cell phones in China is 340 million, nearly twice that of the United States. The venture economics appear attractive. The “juice bars” cost around $1,700 to install and generate an average return of $2,000 annually.

- **Contract Manufacturing.** Dean and Tan (2005) report that large segments of the American high-tech world are outsourcing portions of production to China. Hundreds of thousands of Chinese workers support these contract manufacturing activities. In 2004, 8 of China’s 10 biggest exporters (by value) were foreign ventures making PCs or other high-tech devices.

- **Other Segments.** What else is interesting on the Chinese menu? Here’s a small, eclectic sampling of how American and Chinese markets are interacting.

- **Diamond Polishing.** China has carved out a growing role in diamond polishing, as reported by Bradsher (2005a) With a skilled, organized labor force and automated process steps, China has advanced to third place in world ranking (after India and Israel) in diamond polishing. China imports $800 million of diamonds, and the process of polishing adds value to $1.1 billion.

- **Shrimp Exports.** China ranks behind only Thailand as a shrimp exporter to the United States, as reported by Kerber (2005) This market is complicated by U.S. agricultural biotech firms which want FDA guidelines to govern their use of protein-based feed additives.

- **Theme Parks.** The September 2005 opening of Hong Kong Disneyland represents, according to Fowler and Marr (2005), a $3.2 billion investment to address China’s 290 million consumers under the age of 14. Disney’s decision to charge adults a $45 entry fee will, of course, limit access for many. With regard to the park’s food menu, the controversial plan to serve shark’s fin soup—a Chinese favorite for two centuries—has outraged environmentalists, who believe the world’s shark population will be decimated. This clamor yet again underscores the clash between Western sensitivities and Chinese tradition.

- **Advertising.** Since the 1979 lifting of government bans on advertising, the ad industry in China has grown to $16 billion in 2004, as reported by Balfour (2005). Still, cultural peculiarities abound. For example, KFC’s
Colonel Sanders does not resonate as a meaningful image with the Chinese, and Nike’s slogan “Just Do It” conflicts with the Confucian admonition against youthful individualism. These cultural differences must be considered in establishing brand image in China. The top brands (in $ millions of advertising) are listed in Table 1.

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<td><strong>Brand</strong></td>
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<td>Huangjindadang</td>
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<td>Colgate</td>
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**Experiences of Local Patrons**

Much of the meaningful due diligence we conduct in life tends to be more anecdotal than analytical. To check out a new restaurant (metaphorically), we may look at the Zagat’s review, but we also ask our friends and neighbors what their experiences may have been with the new establishment. Similarly, to assess the China trade opportunity, we can, of course, delve into tomes of trade statistics. To relate more personally to this “foreign opportunity,” we can also examine the “hands-on” experiences of companies we either know first-hand or “know of” because they are in our backyard. A sampling of companies (local to my office) shows China activity in a variety of categories, as follows:

- **Manufacturing**
  - *Morgan Construction* (Worcester, MA) makes equipment (Stein 2005) used to produce steel and has a plant in China where Morgan has reduced its average labor rate from $20 to $2.
  - *SatCon* (Boston, MA), a $40 million a year technology company, outsources hundreds of motors per month to a manufacturing partner in China, substantially improving product margins.
  - *Midnight Pass* (Marshfield, MA) is a $2 million a year, eight-year-old gift and recreational product retailer. Midnight Pass has outsourced to a Chinese contract manufacturer to avoid investing in capital equipment. The company has experienced recent problems maintaining the contract manufacturer’s attention, which is being diverted to a larger client.
  - *Circor* (Burlington, MA), a valve and fluid-control maker, recently acquired the 40 percent share of its former Chinese joint venture partner for $6.75 million to gain control over management policy, financial controls, and investment decisions (Qualters 2005).
  - *Watts* (North Andover, MA), a water valve maker, made a similar move to Circor’s, needing to gain control of its joint venture to permit additional investment to fuel growth.

- **Consulting and Software**
  - *Eleven Technology* (Cambridge, MA) develops software for hand-held devices to assist sales reps and distributors manage sales and inventory. The company has expanded to China (Suzhou region) to save 75 percent on development costs and to open up the China market (Heires 2005).
  - *EastBridge Partners* (Boston, MA) has offices in Suzhou and advises smaller companies on how to navigate entry to China. It sees the American outsourcing to China for manufacturing and electronic components as expanding to encompass all markets;
  - *LEK Consulting* (Boston, MA) has a China practice, with an emphasis on medical devices.
  - *Bain* (Boston, MA) views China as its most important growth market. In mid-2005, the company held a meeting for 200 Bain partners in Shanghai. It plans to double the size of its China presence in 2005 (Ellis 2005).

- **Medical Devices**
  - *AgaMatrix* (Cambridge, MA) makes glucose-monitoring devices. It has its product prototyping done in China, reducing the time to market by 60 percent, with a cost savings of 75 percent (Heires 2005).
  - *Dialectrics* (Chicopee, MA) produces plastic components for other medical devices firms’ products and just set up a plant in China with a joint venture partner from Taiwan.
  - *Nypro* (Clinton, MA) also makes plastic products for medical devices, but has been in China for 30 years where it employs more than 7,000 in 14 plants.
  - *Smith & Nephew Endoscopy* (Andover, MA) is growing its China market, but has refrained from any manufacturing in China.

- **Electronics and High-Tech**
  - *Implant Sciences* (Wakefield, MA) has sold 101 explosive detection devices to the Chinese Railway Administration through its Beijing distributor (Light 2005).
  - *3Com* (Marlborough, MA) made a $160 million investment (Soule 2005) in a Chinese joint venture with a
Entrepreneurs are concerned for background facts is particularly key when approaching a very large potential partner. Entrepreneurs are often required, for example, to approach mega-corporations to initiate potential strategic contracts, technology licensing, marketing agreements, equity investments, or joint ventures. Always surprising to me is the entrepreneur who simply barges into the Big vs. Small fray without doing appropriate homework on the current climate and touch and feel of the larger company (an entrepreneur-friend of mine calls this the case of the mouse crawling up the leg of the elephant with intent to rape!). My personal experience with such endeavors constantly reaffirms the efficacy of knowing what's going on behind the published earnings reports of the Big Company.

Possible Problems “In the Kitchen”

Due diligence is the lifeblood of any good entrepreneur. This concern for background facts is particularly key when approaching a very large potential partner. Entrepreneurs are often required, for example, to approach mega-corporations to initiate potential strategic contracts, technology licensing, marketing agreements, equity investments, or joint ventures. Always surprising to me is the entrepreneur who simply barges into the Big vs. Small fray without doing appropriate homework on the current climate and touch and feel of the larger company (an entrepreneur-friend of mine calls this the case of the mouse crawling up the leg of the elephant with intent to rape!). My personal experience with such endeavors constantly reaffirms the efficacy of knowing what’s going on behind the published earnings reports of the Big Company.

- What are the Wall Street analysts saying about the Big Company and what are their expectations for the Big Company regarding new products and new markets?
- Who are the key first-level and second-level managers? Who is the heir-apparent to the CEO, and what new (entrepreneurial?) projects might be appealing to the inside “go-getters?”
- What Big Company soap-opera developments might actually be germane for the entrepreneur to know about—say, imminent reorganizations, plant openings/closings, or key-person distractions (illness, divorce, family feuding, etc.)?

These background issues—or “Problems in the Kitchen”—suggest an analogous due diligence construct that the entrepreneur might employ before approaching a Giant Dragon like China. Before an entrepreneur decides to have a widget made in China, he or she should consider the governmental, social, geopolitical, and economic context of doing business in China. Some cynics contend that the Chinese miracle is not “real” until adequate social and political reforms are implemented. Before bullying in to China, the entrepreneur should investigate the sociopolitical climate. As the fortune cookie suggests, “A peek is worth a thousand finesses.”

Does the Chinese Government Still Have Considerable Control over Non-SOE Business Activities?

Of course. Unlike countries such as Germany, Great Britain or Australia, where there is an obvious separation of government and business, China presents to the American entrepreneur a continuing black cloud of “Big Brother” in the background, pushing many of the key buttons and levers that regulate business. Consider, for example, the media industry, as reported by Fabrikant (2005). Big companies like Viacom reach 10 million Chinese homes with its MTV network; and Nickelodeon programming on the government CCTV network is available to 120 million homes. Nevertheless China’s Propaganda Department, the Ministry of Culture, and a host of other agencies present obstacles to small independent foreign film makers and animation companies. Some of this bureaucracy is political, and some is blatant economic protectionism to help nurture Chinese companies. Examples like this abound for most other industries as well. Ironically, the flip side of the regulatory-intervention coin is governmental inaction, as China turns a blind eye to the continuing violation of intellectual property rights and refuses to constrain widespread pirating and counterfeiting—practices that cost American industry more than $200 billion a year, according to Becker (2005).

What Social Issues Represent the “Hot Buttons” to Which the Entrepreneur Should be Sensitized?

Entrepreneurs would be well-advised to be sensitized to the current cultural climate in China. The short list of key social issues in China includes:

- Energy and the Environment. As reported by Bremmer (2005a), China spends three times the world average on energy to produce $1 of GDP because of its reliance on coal for 70 percent of its energy needs. Outdated coal-burning technology produces only 40 percent efficiency. China lacks natural gas, with only a 3 percent contribution to its energy mix. Regulatory codes and emission standards are largely ignored. Reports abound concerning industrial waste from...
chemical factories polluting air and water. Lynch (2005a) reports that the environmental/geo-social cycle becomes self-defeating: people relocate from affected regions and crowd into already crowded urban areas; a lack of clean water shuts down factories, costing what the World Bank estimates to be $14 billion in lost output; and environmental injury costs China 8 to 15 percent of its annual GDP. The government would like to reverse this migration, away from the urban coastal regions and back into the countryside. Regional economic agency incentives reinforce this objective. American ventures in the area of energy and environment must certainly confront these social dynamics. Any American venture wishing to locate in China must be aware of existing natural and financial resources, and environmental concerns.

- **Population and Sexual Concerns.** China’s transition into the 21st century has been accompanied with its full share of social problems. As one amusing example, university regulations against one-night stands in the dorms with escort girls or gigolos have backfired into a growing incidence of public sex which has become a raging fad in some urban areas. Krovatin (2005) reports that surveys show that the Chinese are the most likely to agree to unprotected sex with a new partner; 30 percent of Chinese who contract HIV do so through unsafe sex according to UNAIDS. According to French (2005a), some of the estimated 48 million Chinese gays and lesbians are coming out of the closet. Until recently, homosexuals were treated as dissidents who were either criminals or mentally ill. Still, the ruling Communist government remains “in the bedroom” with its one child population control policy and its intolerance of those activists who campaign against the state’s forced sterilization and abortion programs. The American entrepreneur would be well advised to avoid any casual reference to sexual or population issues.

- **Lingering Religious Intolerance.** The Communist Party does not abide by the ancient proverb: Man’s schemes are inferior to those made by heaven. As reported by Clayton (2005), the broadcast of the funeral of Pope John Paul II over CNN went blank for 35 seconds when the anchor started to discuss the status of Roman Catholics in China. (As a personal note, I find this particularly noteworthy, since an Irish cousin of my mother’s, Bishop Edward Galvin, founder of the missionary Columban Fathers, was evicted from China in 1952 by the Communists after 40 years of heroic missionary service there, including enduring several years of incarceration “as a criminal of the state.”) In any case, the American entrepreneur in China should focus on deal-making, not missionary work.

- **Linguistic Confusion.** China has 55 ethnic minorities, as reported by French (2005b). China’s Han, the ethnic group that comprises 90 percent of the population, speak as many as 1,500 dialects. While the national language is Mandarin, only half the population can speak it. The linguistic differences among Chinese dialects are much higher, for example, than the differences among European languages. In the Fujian Province, south of Shanghai, the constant migration of ethnic groups over the years has resulted in the expression, “If you drive 5 miles, the culture changes, and if you drive 10 miles, the language changes.” American entrepreneurs visiting China generally need a friendly, “connected” escort to help in linguistic “pot hole” avoidance.

- **A Workforce in Flux.** According to Hutzler (2005a), the number of worker protests in China has been growing at 17 percent per year, reaching an estimated 60,000 in 2003. These labor disputes have been in response to state factories being privatized and the loss of job security and benefits. Pensions are limited; only 20 percent of Chinese workers are covered, as reported by Roberts (2005b). The national pension system had a shortfall of $6.2 billion in 2005, which could reach $53.3 billion by 2033. As a result, China is likely to extend the current retirement age from 55 for women and 60 for men, to 65 by 2030. The worker skill mix is also of concern. In particular, the management talent pool is undersized. The number of world-class executives to meet industry growth must increase from an estimated 3,000 to 5,000 in 2005 to 75,000 over the next 10 to 15 years, according to Lynch (2005b). This shortage of capable management can be expensive to entrepreneurs looking to hire top-notch bicultural talent. The compensation package for Western-educated Chinese nationals is now in the same stratosphere as New York City investment bankers!

- **Growing Social Inequities.** For many Chinese, Communism has been the only governing force in their life. The state has been their “security blanket.” Sweeping market reforms have started to alter that security, broadening the gap between rich and poor. Unbalanced economic growth has generated extensive dissatisfaction among farmers and laid-off workers who resent the rise of the “private sector.” As reported by Lynch (2005c), during 2004, 3.8 million Chinese participated in 74,000 demonstrations over issues such as unpaid pensions, official corruption, and environmental concerns.


Does China’s Growing Presence in the Geopolitical Arena Represent Potentially Ominous Overtones for the American Entrepreneur?

Many cynical China observers suggest that China wants “to eat America’s lunch, if not its dinner!” The China “military threat” frequently referenced these days by political experts is possibly the precursor of a new U.S.–China Cold War based on mistrust, misinformation, and misjudgments. Washington’s hot and cold relationship with Beijing warmed with Nixon’s visit to China in the 1970s, and suffered through the shock of the post-Tiananmen Square period. Now there are growing economic and political tensions. Chinese warships display their might in the East China Sea near the gas fields in dispute between Japan and China. Recent Pentagon reports (King 2005) suggest that the Chinese military harbors ambitions beyond defending its historic claim to Taiwan, and that China’s military planners are guided, if not inspired, by China’s “Warring States Period,” an era of preunification strife about 2,300 years ago. China’s tradition is to amass its strength while attracting a minimum of attention.

In terms of present-day reality, China’s military spending was up 12.6 percent in 2005 (Cohen 2005)—undoubtedly one third to one half the true figure, since R&D and overseas purchases are not included in the total. The issue of North Korea is doubly confounding. It should go without saying that New England entrepreneurs engaged in military R&D for the U.S. government, holding a top-secret clearance classification, should tread carefully when entering China.

Importantly, all visitors to China should be wary of terrorism, particularly in the predominantly Muslim northwestern Xinjiang region. As 2008 Olympic venues are completed, foreign entrepreneurs contemplating business dealings in China should tread carefully when entering China.

Behind China’s Robust Economic Growth Trends, What Are the Lurking Problems?

China–U.S. trade statistics are startling. The American trade deficit with China for 2004 was $162 billion! Dominance in trade is a growing issue. At a time of rising protectionism in the U.S. Congress, China appears to be a flag-bearer for free trade. In late 2005, China was pursuing free-trade pacts with 25 countries, up from zero in 2003.

Several negative conditions with the fire-breathing Chinese (economic) dragon may be worrisome to American entrepreneurs contemplating business dealings in China.

• Currency Revaluation. In July 2005, the People’s Bank of China, as reported by Bradsher (2005b) raised the value of the yuan by 2.1 percent, to a yuan/dollar rate of 8.11. The U.S. trade/currency issue with China is fascinating. The U.S. trade deficit has approached $700 billion. In effect, the U.S. is exporting electronic dollars, and China (and other countries) is sending the U.S. widgets. Then China takes those dollars and buys our debt, helping to keep our interest rates low. Currency issues may not, however, be the overriding cause of the U.S. trade deficit, since eventually, with continued upward revaluation of the yuan, the U.S. demand for goods would just be shifted from China to other countries. The local concern is that the upward revaluation of China’s currency can hurt New England small businesses outsourcing to China by increasing costs and lowering margins. On the flip side of the currency issue, of course, are New England firms manufacturing states-side and competing against cheaper Chinese imports; they want upward currency revaluation.

• Counterfeit Products. In a sense, the trade deficit could be construed as an indirect measure of how well American companies—including New England entrepreneurs—are doing in importing Chinese goods, exploiting China’s low-cost manufacturing. The trade deficit is, however, exacerbated by Chinese pirating of American intellectual property, depriving U.S. companies of income.

• In the software area, Fishman (2005) reports that the Chinese use nine bootleg software packages for every legitimate one, resulting in a loss to the global software industry of $3.8 billion.

• China’s counterfeit trade is worth upwards of $80 billion (U.S. Commerce Department).

• Based on 2002 data, 91 percent of DVDs and video discs in Chinese homes are pirated.

• With new peer-to-peer (P2P) streaming TV technology, China is leading the world in pirated on-line pay TV, according to Fowler and McBride (2005). This case of technology outpacing international law enforcement is clearly a threat to the U.S. cable TV industry ($57.6 billion in 2004) and the satellite TV services market ($18.5 billion in 2004).

• Corrupt Banks. As reported by Bremmer (2005b), China’s banking system has been plagued with scandals of loan fraud and embezzlement. Consider the negative impact of corruption on the Big Four state-owned banks.

• Industrial and Commercial Bank of China required a $30 billion government bailout in 2004, with its 20 percent rate of bad loans.

• China Construction Bank needed $22.5 billion of government capital in 2003; has been pursuing a possible $8 billion IPO, comanaged by Morgan Stanley. (More on its potential privatization in the “Franchising” section.)

• Bank of China also needed a $22.5 billion 2003 bailout; has an alliance with Royal Bank of Scotland, which has a $3 billion stake in the bank with a provi-
In addition to competing with the West for fossil fuels, China appears to be taking the longer energy view toward renewables. Chen (2005) reports that the Solar Energy Institute at Shanghai Jiaotong University has built a prototype house with photovoltaic cell arrays, wind turbines, heat pumps and solar water heating panels. Given the solar insolation \(^1\) in Shanghai, the goal is for the sun (and wind) to provide 70 percent of the needed energy. In the transportation sector, the research group for clean-energy automobiles at the College of Automotive Engineering at Shanghai Tongji University is developing a line of research cars that have independent electric drives for each wheel. These “Chunhui” (or “Spring Sunlight”) cars are powered by lithium batteries and hydrogen fuel cells, with only water vapor as an emission. New England’s robust alternate energy industry should take notice of China’s initiatives (both offensively and defensively).

**Chef’s Surprises**

Every so often we may experience the joy of the unexpected—like the time my company staff dragged me over to the old Joyce Chen’s restaurant in Cambridge and, off-menu, we were served an elaborate Peking duck banquet feast that I can still savor in my mind. We all love pleasant surprises (e.g., beating sales and profit forecasts is always smile-inducing!). It appears that China has a few “chef surprises” of its own in the following areas of significance to the entrepreneur:

- **Medicine**
- **Alternate energy**
- **Consumer protection**
- **Individual freedoms**
- **Advanced computing**

**What Medical Advances Are being Pioneered by China?**

Since Chinese scientists benefit from regulatory standards less restrictive than in the United States, labs in China can fast-track their investigations. As reported by Morrison (2005), the UK’s Department of Trade and Industry determined that China is at the world’s leading edge in stem cell research, and engages in “significant recruitment” of U.S. and other Western scientists, luring them with incentive packages that involve greater scientific freedom and well-funded research centers. Another Chinese medical research community is addressing severe acute respiratory syndrome (SARS). Chen (2005) reports that in December 2004, the Chinese Academy of Medical Sciences and Chinese biotech company Sinovac completed successfully a first-stage clinical trial on a SARS vaccine. The academy’s research group has developed a protein chip to detect antibodies against the SARS virus, and has established analytical techniques for diagnosis, involving SARS serum mass-spectrum fingerprinting, and enzyme-linked immunosorbent assay (ELISA) test kits. New England’s biopharma community needs to monitor these developments.

**What Is China Doing to Improve Its Terrible Record on Energy Efficiency?**

In addition to competing with the West for fossil fuels, China...
uncomfortable with an open and free press. In its efforts to promote technology, the Chinese government may, ironically, be a victim of the omnipresent video cameras and laptops it has been promoting. The rate of information flow with the West has been growing exponentially. The nouveau “Urban Elite” class of Chinese wants the same freedoms that they observe in the rest of the world. Some media have become emboldened. Newspapers like The Epoch Times, which debuted its Chinese-language version in 2000, claims that its series of editorials has caused 1.9 million people to leave the “lies, tyranny and terror” of the Chinese Communist Party, according to Jurkowitz (2005). The newspaper has been accused of being a backer of Falun Gong—a spiritual and health-related movement begun in China in the 1990s. Traditionally, the Chinese government cracks down on any group that has the capacity to organize people outside of the state’s purview.

This government fear of organization relates directly to religious freedoms. There is some official level of religious freedom in China. The government recognizes five religions—Catholicism, Protestantism, Buddhism, Daoism, and Islam. According to Hutzler (2005b), there are roughly 35 million Protestants and 12 million Catholics in China. The state is actually building churches for these groups, undoubtedly so it can supervise the congregations.

With the prospect of Pope Benedict XVI soon visiting China, and thus ending 50 years of estrangement between Beijing and the Vatican, and the scheduled hosting of the 2008 Olympic Games, individual freedoms should continue to loosen up. These relaxations should improve the general social climate for the visiting American entrepreneur.

What About Leadership in the High-Tech Arena?

China has an acknowledged reputation for providing low-cost production for the electronics industry. But China is moving beyond the spec sheets of fabrication and assembly to the basic scientific equations of the high-tech big leagues. As Chen (2005) reports, the Chinese Academy of Sciences in 2004 unveiled the Dawning 4000A, a supercomputer that performs more than 10 trillion operations per second, ranking it in the world’s top 10 for speed. China is also developing its own “Godson” series of home-grown computer chips, giving its information industry its own royalty-free source of processors. U.S. entrepreneurs can view China’s advanced electronics initiatives in both an offensive and defensive context.

Franchising Opportunities

How Receptive Is China to Foreign Investment?

If only the entrepreneur’s investment decision to “doing Chinese” was as straightforward as investing in our metaphor-ical Chinese restaurant! Experience shows that a well-run restaurant has predictable cash flow, good capacity loading of its facilities, precisely-crafted margins, and specific and lever-aged uses of proceeds in the capital raise-up. A chi chi theme-restaurant (e.g., Planet Hollywood), in contrast, generally displays more glitter than substance, and more concern about franchising “the theme” over and over again, before management ever gets the first location “right.” Investors’ capital often falls into a black hole.

The metaphor translates well to “the China strategy.” The notion of “getting it right first” before launching an American company’s trade initiative in China is vitally important. The entrepreneur should have a product or service that is operationally and economically sound, has enjoyed success in the states, and will only benefit additionally from a China hook-up.

The ancient proverb says: If you have money, you can make ghosts and devils turn your grindstone. The obvious big bucks come from the mega-firms. The large U.S. multinationals have already introduced a Western flavor to China’s integration into the world economy. Rosenthal (1998) wrote an entertaining article in the New York Times entitled, “Funny, I moved to Beijing and Wound Up in Pleasantville.” The author describes typical weekend activities in Beijing, driving her kids to soccer games in a SUV made by Beijing Jeep (a joint venture with DaimlerChrysler), buying household supplies at Price Smart, swinging through for a Big Mac at one of Beijing’s 40 McDonald’s, and then over to Dairy Queen for a sundae. Or she could have tried a KFC outlet; number 1,500 in China opened in October 2005.

As detailed by Huang (2003), foreign direct investment (FDI) in China is pervasive. In the 1980s and 1990s, China absorbed $346 billion in FDI. Between 1992 and 1998, on average, FDI flows into China accounted for 13 percent of the gross capital formation of all firms annually. Chinese officials, foreign business practitioners, and the World Bank have credited FDI as the major driving force behind celebrated China’s economic success. Huang makes a counterargument that the inefficiencies of the SOEs increase their capital needs, and the political pecking order regarding capital allocation favors SOEs, and thereby deprives nonstate firms—especially entrepreneurial ventures—of growth capital. In any case, FDI capital is flowing into China, and there are opportunities for China-U.S. capital transactions. It should also be noted that the Chinese, overflowing with trade surpluses, are aggressively pursuing brand-name Western companies (e.g., Maytag).

Are American Venture Capitalists and Investment Bankers Responding to the China Opportunity?

For American venture capitalists (VCs) funding American start-ups, the frequent question is: “What’s the China strate-
gic element in your business plan? China is a presumed part of the entrepreneur's thinking. Ignoring China is viewed as ignoring opportunity.

Increasingly, there is American interest in funding Chinese entrepreneurs. As reported by Ante (2005), one of the pioneers in establishing an in-country fund is Boston’s Patrick J. McGovern, the magazine entrepreneur who founded International Data Group (IDG). Despite many unfavorable factors—the dominance of the Communist government in directing the economy, the virtual absence of any seasoned entrepreneurs, and the lack of an exit position for a venture investment via a national stock market—the IDG Technology Venture Investment Inc. venture fund was established in 1992, and has earned a 42 percent IRR on its $170 million China investment.

On the face of it, this investment climate is intriguing and perhaps seductive. IDG’s success belies the difficulty for VCs in finding deals, qualifying entrepreneurs, and establishing exit positions. Most deals are transacted through offshore entities so that VCs can take their portfolio firms public on overseas exchanges. Since assets are effectively moved out of the country, Buckman (2005) reports that the Chinese government responded in June 2005 by enacting new rules and regulations requiring disclosures and approvals for Chinese citizens to move company assets overseas.

Despite these difficulties, capital continues to flow into China. Mane y (2005) reports that in 2004, American VCs invested $1.3 billion into China, a 29 percent increase over 2003. A key to VC success appears to involve having a U.S. presence on-site in China. Chinese entrepreneurs want more than capital. They want access to American business savvy, international contacts, and personal mentoring.

**What About Later-Stage Investment?**

Private equity firms such as Bain Capital (the sister organization of consulting firm Bain & Co.) and Thomas H. Lee (THL) Partners L.P. are setting up high-profile funding shops in China. As reported by Galante (2005), Bain, with $25 billion under management, is entering China by itself, while THL Partners, with $12 billion under management, is teaming up with H&Q Asia, a transpacific private equity firm with offices in China, Japan, South Korea, Singapore, Taiwan, and the United States. Other American investors entering China include Blackstone Group, Kohlberg Kravis Roberts & Co., and Carlyle Group.

**How Can China’s Entrepreneurial Climate Fully Blossom without the Underpinnings of a Modern Commercial Banking System?**

The underpinnings are being improved with a little banking help from the West. The inefficiency of the SOE banks has been a significant deterrent to commercialization of early-stage companies. Like everything else in China, change is in the offing. In June 2005, Bank of America (BOA) acquired a 9 percent equity interest in China Construction Bank (CCB) for $3 billion, as reported by Barboza (2005c). The CCB has more employees—310,000—than any bank outside China. With 14,000 branches, CCB will need all the help it can get from BOA to reform its outmoded banking practices. It is anticipated that this BOA investment is the first step in CCB’s path to privatization via an IPO. CCB would lead the way as the first of China’s four mega state-owned banks to break away from the governmental cocoon. Since 1998, the Chinese government has poured more than $250 billion into the four banks to restructure their balance sheets and to clean up nonperforming loans. Corruption has been prevalent. CCB has had two chairmen resign in three years as a result of bribery accusations. With reduced government interference expected—because of foreign investors—these behemoths may have a chance to change their ways and help entrepreneurs commercialize. Otherwise, they will be ill-prepared for 2007 when China’s banking sector opens to global competition.

**Departing “Doggy Bag” Thoughts**

**What Are the Primary Concerns for the American Entrepreneur in Approaching China?**

Although entrepreneurs are often depicted as risk-takers, they are more typically managers of risk. To manage the risk associated with a trade relationship with a Chinese partner, the entrepreneur must become educated on China. The biggest fear can often be the fear of the unknown. If American entrepreneurs based their views of China on xenophobic “impressions”—say the Tiananmen Square incident in 1989 or the movie Red Corner (1997) where Richard Gere plays a visiting American executive jailed and framed for murder—then China deals would never get transacted!

Negotiating with the Chinese is a counterintuitive experience for most entrepreneurs. Experts in the field, like Blackman (1997), have delineated elaborate guidelines to help explain the interplay of Chinese “collectivism” with Western “individualism.” American entrepreneurs typically solve a business negotiation challenge step-by-step, in a series of well-controlled meetings. The collectivist Chinese will typically introduce into a business process a formal banquet dinner in a restaurant to entertain the visiting American. The entire office staff attends, from the managing director to the clerk, to bond the group together. Blackman has developed a four-page negotiating matrix that relates Chinese characteristics to cultural background and suggests how Westerners might effectively respond. Key considerations in the East vs. West negotiating dialogue include the following Chinese gambits vs. American responses:
established relationships by attending trade shows and cultivating the entrepreneur’s personal network. As noted by Emmons (2005), the entrepreneur must understand that the Chinese can “hide” behind various rules. In China, the rules may be fairly rigid, but the individual people can be flexible. Accordingly, the entrepreneur must, with chosen advisers, gain access to powerful personal networks—or guanxi. Appropriately sensitive dealings with business partners and government contacts will assure the entrepreneur’s guanxi.

What Is the Best Way to Cultivate and Sustain Guanxi?

Caufield and Ting (2004) emphasize that small gestures are important. To avoid looking like a *sba lao wai* (i.e., “silly foreigner”), the entrepreneur should take certain precautions, for example:

- Always present business cards with both hands in giving them to a Chinese host.
- Offer product samples and literature about the business.
- Give modest gifts like a carton of cigarettes or a bottle of liquor.
- Avoid “Made in China” gifts (viewed as mocking), expensive gifts (viewed as bribery), and white gift wrapping (viewed as the symbol of death).

Advice to the American entrepreneur: In the end, be patient, be polite, do not take anything that is said or done in negotiation as personal, and do not lose perspective on the overall goal of getting a business relationship established.

What Is Needed for the Entrepreneur to “Do Chinese?”

The short answer is for the entrepreneur to do all the “right” things he or she would do back home in New England to establish a strategic alliance. Be very, very wary about anything not well-understood; and employ qualified, trustworthy advisers. Adapt to China. Emmons (2005) reports on a Harvard MBA (’03) graduate, Andy Klump, who works in Beijing and notes, “Establishing strong relationships with your colleagues is critical, as they will be in a position to support you or sink you, sometimes without you even knowing it…you need to have a wide range of interests and experiences in order to relate to many types of people; be able to learn quickly and read people and situations through body language and context; and, finally, be willing to take risks and drive for results amidst ambiguity.”

Once the entrepreneur grasps the essence of China’s cultural issues, the American team can proceed by first planning the initiative; preparing a detailed plan evaluating opportunities in specific regions and provinces of China; developing a feasibility study; and creating a localized procurement plan, detailing suppliers and outsourcing relationships. Specifically:

For *distribution arrangements*, a few straightforward steps are suggested:

- Select the Chinese partner *proactively*, based on due diligence. Don’t *react* to random meetings, say at a trade show.
- Identify partners who can develop markets across an industry, not just provide “first contact” door openers with individual customers.
- Treat Chinese distributors as long-term partners, not *order-takers*.
- Commit adequate resources to assure a chance at success.
- Maintain on-going control over strategy and translate the strategy into market and performance measures.
- Recruit a bicultural member to the entrepreneurial team.

For *outsourcing arrangements*, there are many pitfalls to avoid:

- Understand that while there are anecdotal China success stories from New England entrepreneurs, there are many companies that have tried and failed in the China connection. MIT lecturer David Meeker, as reported by Malone (2004), suggests his research shows that outsourcing savings is a myth since it adds an average of 24 percent to unit cost.
- Don’t partner with an unknown “rookie” organization that hasn’t dealt with the West before and may not have adequate government connections.
- Have a trusted member of the team on-site to represent the company’s interest. As the Chinese proverb says, “You can’t fight a fire with water from far away.”
- Make sure there is an exit strategy with monthly or quarterly contract terms at the beginning, tied to performance objectives.
- For any company processes being located offshore, assure that results, quality, and worker performance can be measured with precision. Know the product/component design and cost detail.
- Remember that outsourcing is based on certain assumptions about cost-savings goals and protection of intellec-
tual property. Constantly assure that those assumptions are valid. Always assume that anything you share with the Chinese will be copied. Keep the family jewels (customer lists, product drawings and software code) away from the Chinese partner personnel. The goal is not to spawn China’s entrepreneurs.

- Pay the bills in an intelligent way. Start the accounts receivable clock ticking when the components arrive at the dock, *not* when the goods are put on the ship. This can save six to eight weeks of working capital availability, or avoided borrowing against a line of credit.
- Make haste, but go slowly. Try one production piece for outsourcing; then a subassembly; and then the whole component. As the Chinese proverb says, “If you’re in a hurry, you will never get there.”

**What Are the Sources of Information for the Entrepreneur Interested in China Business Opportunities?**

There are many resources available to the entrepreneur. Rather than plow through the thousands of Google hits one might get to a particular question on China trade, try the following:

- China Business Information Center (www.export.gov/china) provides access to leads on trade and tips on export, market research, and regulatory guidelines
- U.S. Export Assistance Centers

**Endnote**

1. Insolation is a scientific term used in renewable energy circles to explain, in short, how much sunshine is available (e.g., photons per square inch per hour). Tel Aviv has high solar insolation, London has far less!

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Mr. Levangie has served on the Boards of Directors of dozens of private and public companies, and has been a guest reviewer at Business Plan contests at MIT and Harvard Business School. He is an active alumnus of both institutions. He currently is vice chairman of Ardour Capital Investments, a New York City investment banking firm.