UNIVERSITY EDUCATION FOR ENTREPRENEURS IN THE UNITED STATES:

A CRITICAL AND RETROSPECTIVE ANALYSIS OF TRENDS IN THE 1990s

April 1999

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I. Introduction

Entrepreneurship is defined as the process of creating something new with value by devoting the necessary time and effort, assuming the accompanying financial, psychic, and social risks, and receiving the resulting rewards of monetary and personal satisfaction and independence. This definition of entrepreneurship has generated increasing admiration from the public as small firms have gained in popularity in the last twenty years. They are now under the spotlights of the new global technology-based economy.

Business education, producing roughly 275,000 graduates per year, is at the top of the national political agenda. It is often portrayed as critical to the health of the economy and has sustained repeated criticisms for its lack of initiative and its focus on bureaucratic rather than entrepreneurial careers.

Entrepreneurship education is at the crossroads of two worlds and two sets of forces: How can universities, inherently hierarchical knowledge systems, produce real entrepreneurs, susceptible of pulling up the American economy with their innovation, their dynamism and their flexibility?

This report is a review of the major trends and changes in entrepreneurship education in the United States, with a focus on high technology entrepreneurs. The report focuses on the following areas:

- The effort at understanding the special role of entrepreneurship and entrepreneurship education in the American economy–wealth and jobs creation, innovation, economic growth
- The advent of a small-business driven culture in the second half of the twentieth century which shapes the U.S. macro-economic environment
- The controversial debate on the validity of entrepreneurship education
- The analysis of the pedagogical issues governing the implementation of educational programs for professional and business students focusing on entrepreneurship
- A review of the major entrepreneurship programs in leading business schools and those presenting innovative features
- A critical analysis of the patterns, evolution, and new directions of the field of university-based entrepreneurship education

The research supporting this report was conducted with extensive documentation, gathered from different sources such as:

- Academic textbooks
- Case studies developed specially for this subject
- Articles from national and international business publications based on extensive data base searches
- Articles from publications specialized on small-business and/or business education
- Interviews with leading personalities, academics and professionals in the field of entrepreneurship
- Governmental publications from the U.S. Small Business Administration and the U.S. Department of Commerce and related agencies

I. The Role of Small Businesses in the US Economy

0 History of Entrepreneurship

With a few notable exceptions, economists did not spend much time studying small firms until the end of the 1970s. Since the onset of the industrial revolution, they had in fact considered that large firms were the cornerstones of modern economies. The concept of economies of scale was proposed by Adam Smith, among others, with the famous case example of the pin factory. The classical economics approach to industrial competition was dominated by an environment in which technology was constantly increasing the minimum average plant size in a static context. It reached its zenith in the late nineteenth century with the dominance of the monolithic trusts in steel, oil, and automobiles. The subsequent passage of the Sherman Anti-Trust Act of 1890 was intended to stem the growth of monopoly power.

In this view, which has prevailed for the greater part of the twentieth century, small firms were not seen to play an important role in the economy, except as suppliers to large firms. For decades the small-firm sector was ignored and poorly understood, even though many people worked for small firms. However, it began to change as powerful computers and large data sets enabled researchers to grasp in greater depth the economic role of small firms. In the first authoritative book on small businesses[1], Brock and Evans examined the change in the small business sector over time. If their conclusions were that the overall importance of small businesses in the U.S. declined between World War II and the 1980s as firms were generally getting bigger, this book revealed as well that the traditional structures of manufacturing industries were beginning to crack. In the U.S. steel sector, industrial giants were being outperformed by "mini-mills," small firms competing with lesser costs, owing to the efficient use of technology. Other examples can be found in industries characterized by rapid product innovation, such as electronics and software. This development, enabled by technology and other factors (see below, II.C.2, Small Business' Impact on the U.S. Economy), triggered an unexpected reappraisal of the role and importance of small manufacturing firms, resulting in a divergence of opinion on the importance of firm size.

The twin oil shocks of the early 1970s are landmarks in entrepreneurship history, as they symbolize the discovery of small firms as major economic agents. However, all forms of entrepreneurship cannot pretend to play the same role in the U.S. economy. There is obviously a

large gap between the economic behavior of small steel producers or high tech start-ups and "mom and pop restaurants". A clear definition of small business is therefore mandatory to better understand the phenomenon of entrepreneurship.

1 Different Kinds of Entrepreneurships

The term "entrepreneurship" refers to multiple business models, from the simple family-owned business to the high tech start up close to an IPO. The most salient characteristic of these companies is their size. The U.S. Small Business Administration (SBA) establishes size standards for firms to be considered entrepreneurial and potentially eligible for SBA loans. These standards, which were revised in 1987, are stated in terms of number of employees or in terms of sales volume, depending on their industry sector. Figure I below presents some of the SBA standards.

Figure I: SBA Standards for the Classification of Small Businesses

Industry	**Yardstick**	
	Number of Employees	Annual Revenues
Manufacturers:		
-Petroleum refining	1,500	
-Electronic computers	1,000	
-Macaroni and spaghetti	500	
-Metal can	1,000	
Wholesalers:		
-Sporting goods	500	
-Furniture	500	

[1] Brock, Evans, Small Business Economics, 1989

Retailers:		
-Automobile dealership		
-Groceries		$11.5 million
		$13.5 million
Services:		
-Computer		
-Accounting		$12.5 million
-Television repair		$4 million
-Advertising agencies		$3.5 million
-Insurance agents &		$3.5 million
brokers		$3.5 million

Source: "U.S. Small Business Administration: Small Business Size Standards." Federal Register, Vol.49, No 28, revised in 1987

Among the yardsticks commonly used to define entrepreneurial activity, we can also find financial measures such as total assets (resources a business holds, like cash, inventory, machinery, etc.) or owner's equity (total investments made by investors). Characterizing a firm as entrepreneurial based on its owner's equity can lead to the elimination of several high tech start ups because they frequently attract venture capitalists or stock market investors and have then a very strong shareholder's equity, though they may not employ many workers nor generate much revenue.

Beside size characteristics, entrepreneurship definitions cover businesses created in different ways. A family business will be simply transmitted from one generation to the other. Immigrant entrepreneurs will typically set up small companies from the ground up, based on particular motivations usually linked to their situation as foreigners newly arrived in the United States. "Intrapreneurs" will come up with a business idea while working for a big company, develop it within their company as a new department, and then spin it off to become independent entities.

Conditions of development of new firms are beyond the scope of this study. However, there is a positive correlation between any form of change (political, regulatory, and economic) and the creation of new enterprises. Market liberalization is a highly effective trigger for small business creation, as demonstrated in Eastern European economies. Benefiting from new economic conditions with the advent of market capitalism, small businesses there were set up to address untapped

commercial markets and deliver products and services that were not available in the old economic system.

Entrepreneurship defines a large range of business models, from newborn high tech firms to old family restaurants. It represents a broad economic force defined by its opposition to established corporations. In order to evaluate the real weight of this phenomenon, we have to understand its economic implications.

2 Entrepreneurship Economics

0 In Search of a Theory

There are many paths leading to an understanding of entrepreneurship as an economic phenomenon. Research in entrepreneurship finds its intellectual roots in economics. The earliest interest in entrepreneurship was expressed by Richard Cantillon and Jean-Baptiste Say in the eighteenth and nineteenth centuries and during the twentieth century by Joseph Schumpeter. For economists, the main question is what happens when entrepreneurs act, i.e., the net effects of the actions of the entrepreneur upon the general economic system. Later, societal concern changed from trying to explain the role of entrepreneurship in economic development to building entrepreneurship itself. Individuals' entrepreneurial attributes and motivations then appeared to be critical factors. Research aimed at understanding who the entrepreneur is and why he/she acts, i.e. the individual actor was put in focus. As a result, research was taken over by psychologists and sociologists with seminal works by Charles McClelland, among others.

The establishment of new firms, however, requires a different approach since entrepreneurship concerns the enactment of new ideas in the market. The "how" question of entrepreneurship has so far not been adopted frequently, possibly because it invites fascinating but troublesome integration of planning and execution, of theory and practice. Recent contributions, for example, are concerned with entrepreneurial behavior as an outcome of both rational reasoning and intuitive choice, thus underlining that entrepreneurship is about both creation and reflection, both reaction to environmental change and intentional action. This image of the field calls for an action-oriented approach. The entrepreneur distinguishes himself/herself by his/her ability to make decisions in interaction with others as well as steps to allocate resources according to opportunity. This further leads to the notion that to educate more individuals to become entrepreneurs leads to the creation of

more employment in society at large. Developing opportunity-driven individual rationality is often in stark contrast to the type of decision rationality much fostered at business schools and technological universities.

Two disparate views have been developed to analyze the economic role of small firms: First, static theory suggests that large firms are efficient because they focus on the status quo. Second, dynamic theory suggests that small firms are efficient because it focuses on change.

One of the most striking findings emerging in the static view of industrial organization is that small firms generally operate at a level of output that is too small to sufficiently exhaust scale economies, even when the standard definition of small firms employing up to 500 employees is applied. This statement is backed up by the importance of economies of scale in traditional manufacturing industries and therefore classifies most small firms as sub-optimal. Static theory argues for reducing the share of sub-optimal firms to increase efficiency. For example, static theory applied to the electric utility industry would lead to double the size of a coal-fired utility plant, the output of electricity being doubled while cost only increase by 70 percent.

Static theory is concerned neither by the time required for change to occur, nor by organizational and managerial structures needed for the change. Seen through the static lens provided by traditional industrial organization and labor economics, the economic welfare implication of the recent shift in economic activity away from large firms and toward small enterprises is unequivocal: it represents a decrease in productivity for the whole economy.

Dynamic theory, on the other hand, emphasizes the role of small firms as balancing forces and agents of change. In any industry, an excess level of profitability induces entry of new firms. These new firms provide an equilibrating function in the market in that prices and profits are restored to competitive levels. But why do firms start up in industries when incumbent firms are experiencing negative profits and market share loss to foreign companies? Traditional static theory would support either entry or exit, but not both at the same time. An alternative explanation provided by dynamic theory is that new firms are entering the industry not simply to increase output by being smaller replicas of large incumbent companies, but to serve as agents of change[2].

Dynamic theory favors small firms because they shine a bright light on change. In today's information economy, continued innovation and change is the rule. More than half of the sales of high technology firms come from products that are less than 18 months old. Evolutionary theory recognizes that the market is in motion, with many firms entering and exiting the industry simultaneously. A changing set of new small firms provides an essential source of new ideas and experimentation that otherwise would remain untapped in the economy. As Kirchhoff points out[3], the implication for public policy is to implement measures that encourage the entry of new firms, support their survival, and promote their growth.

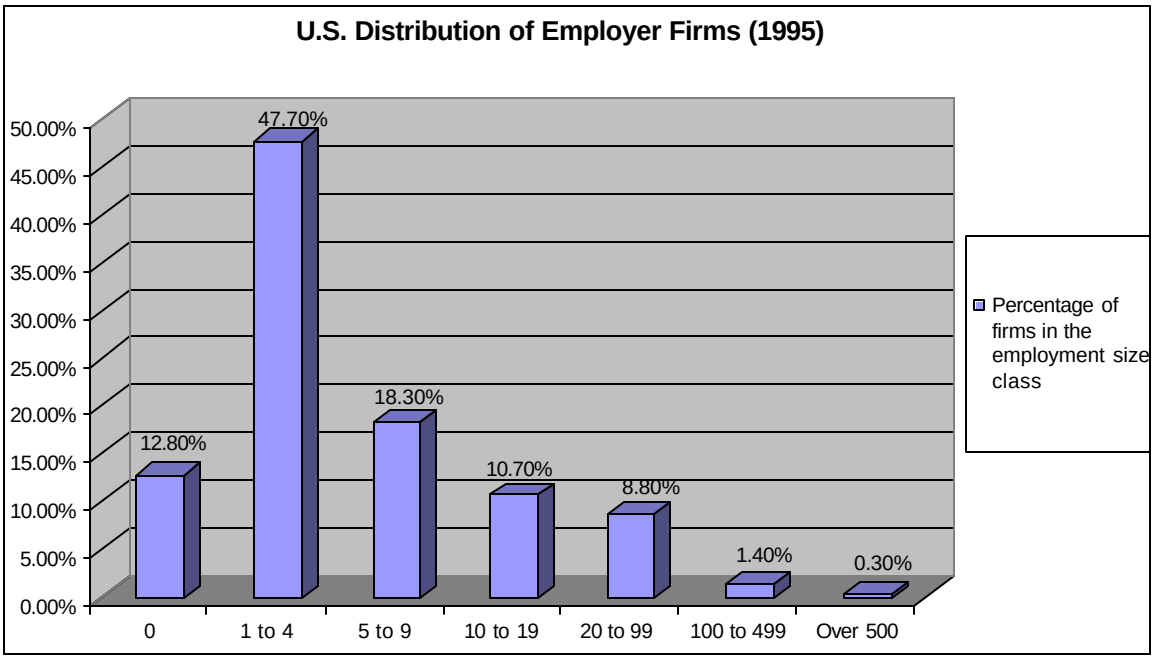
1 Small Businesses' Impact on the U.S. Economy

As suggested by dynamic theory, small firms play a major role in the U.S. economy. They represent the large majority of American firms and are the main source of economic growth and job creation. Widely divergent statements about the number of business in the U.S. can be found, from 4 millions in the U.S Small Business Administration database to more than 20 millions for the Internal Revenue Service (Number of tax returns filed in 1990, given the fact that most of them report individually, usually part-time or seasonal activities). As we noticed earlier, almost 99 percent of these roughly 4 million businesses have fewer than 100 employees. Small businesses are to be found mostly in retail, services, and construction, where the employ between 50 and 88 percent of the industry's employees.

[2] Acs, Zoltan J., The Changing Structure of the U.S. Economy, Praeger, 1984

[3] Kirchhoff, Bruce, Entrepreneurship and Dynamic Capitalism, London,: Praeger, 1994

Figure II: U.S. Distribution of Employer Firms



Note: Employment is measured in March, leading to firms with zero employment and some annual payroll

Source: Office of Advocacy, U.S. Small Business Administration, 1997

The success of America's economy over the recent past, in comparison with Europe or Japan, is due, among other factors, to differences in competition, entrepreneurship, and new start-up firms. The U.S. has experienced extremely strong performance by new these firms. Between 1960 and 1983, the number of corporations and partnerships in the United States has more than doubled (from 2 million to 4.5 million) while the number of corporations in Europe stagnated. Between 1990 and 1996, the trend has continued in the U.S. The American economy has literally reinvented itself by fostering and promoting entrepreneurial activity. Today, almost 80 percent of American firms have less than 10 employees (Figure II).

The dynamism of small firms is further demonstrated by their job creation capacity. In 1979, David Birch created a furor in the economics establishment by publishing the results of a study based on a data file of all U.S. firms and their employment from 1969 through 1976. His research, formalized in 1987 in a book entitled Job Creation in America, concluded that small firms, those with fewer than 100 employees, created 81 percent of the net new jobs in the United States. Since net new job creation is a widely accepted measure of economic growth, Birch's findings meant that small firms created most of the economic growth.

Further evidence that small firms dominate economic growth has been provided by the U.S. Small Business Administration. The SBA calculates the respective share of jobs created by small and large firms on a biannual basis and publishes these statistics in an annual report The State of Small Business. These statistics show that small firms do not necessarily produce the majority of net new jobs in every reported period, but emphasize their dynamism during economic recessions, and immediately after these recessions. In 1981-1982, a period of economic stagnation, small firms accounted for 92 percent of net new job creation, while it was only 33 percent in 1987-1988, a period of overall economic growth. The small-firm sector in the U.S. demonstrates a stable, regular net new job creation, regardless of the condition of the overall economy.

When trying to explain the more rapid growth of smaller firms compared to large companies, economists point to several factors that have modified the business landscape in the last thirty years. Among those factors, the most repeatedly cited are:

- New technologies, such as numerically controlled machine tools, that may permit efficient production on a smaller scale than before
- A greater flexibility required as a result of increased global competition (see II.D. International Potential of Entrepreneurial Activity in the U.S.), a requirement that favors small firms
- The ability of small firms to create employment for working mothers, a growing portion of the labor force
- The switch in customers' taste from mass-produced goods to more personalized products which opens market doors for smaller businesses

Since the 1979 findings on entrepreneurial job creation, entrepreneurs have gradually turned into heroes in the social landscape. Entrepreneurship is now recognized as an important contribution to American society. This change in the perception of small firms has had a very positive impact on their environment, particularly in terms of support from governmental authorities which have responded to the social transformation potential created by small firms.

2 Governmental Support

Government support to small firms comes primarily under the responsibility of the U.S. Small Business Administration. Established in 1953, it provides financial, technical, and management assistance to help Americans start, run, and grow their businesses.

With a portfolio of business loans, loan guarantees, and disaster loans worth more than $45 billion, SBA is the nation's largest single financial backer of small businesses. In addition to several financing programs, SBA proposes its assistance in such fields as R&D, business counseling, export, and technical or management training. Last year, the SBA offered its assistance to more than one million small business owners. The SBA also plays a major role in the government's disaster relief efforts by making low-interest recovery loans to both homeowners and businesses.

SBA's assistance to small businesses is delivered through Small Business Development Centers (SBDC). SBDCs work closely with universities in the United States to provide management assistance to current and prospective business owners. While they do not provide academic credentials in business management and entrepreneurship studies leading to certificates or diplomas, they fulfill an essential training function. SBDCs reach all corners of the United States and their location in the world of U.S. universities insures a fairly high quality of services based on the latest entrepreneurial research and knowledge base. They are often a laboratory for entrepreneurship research by nearby university-based scholars and provide "hands on" experience for students of entrepreneurship programs. Figure III, below, presents SBDCs' mission statement, as well as the list of universities in which they are located.

Figure III: Small Business Developments Centers Mission and Overview

SBDC MISSION AND OVERVIEW

The U.S Small Business Administration (SBA) administers the Small Business Development Center program to provide management assistance to current and prospective small business owners. SBDCs offer one-stop assistance to small businesses by providing a wide variety of information and guidance in central and easily accessible branch locations. The program is a cooperative effort of the private sector, the educational community and federal, state and local governments. It enhances economic development by providing small businesses with management and technical assistance.

There are now 57 small business development centers -- one in every state (Texas has four), the District of Columbia, Guam, Puerto Rico and the U.S. Virgin Islands – with a network of nearly 1,000 service locations. In each state there is a lead organization which sponsors the SBDC and manages the program. The lead organization coordinates program services offered to small businesses through a network of sub-centers and satellite locations in each state. Sub-centers are located at colleges, universities, community colleges, vocational schools, chambers of commerce and economic development corporations. SBDC assistance is tailored to the local community and the needs of individual clients. Each center develops services in cooperation with local SBA district offices to ensure statewide coordination with other available resources.

Each center has a director, staff members, volunteers and part-time personnel. Qualified individuals recruited from professional and trade associations, the legal and banking community, academia, chambers of commerce and SCORE (the Service Corps of Retired Executives) are among those who donate their services. SBDCs also use paid consultants, consulting engineers and testing laboratories from the private sector to help clients who need specialized expertise.

Funding

The SBA provides 50 percent or less of the operating funds for each state SBDC; one or more sponsors provide the rest. These matching fund contributions are provided by state legislatures, private sector foundations and grants, state and local chambers of commerce, state-chartered economic development corporations, public and private universities, vocational and technical schools, community colleges, etc. Increasingly, sponsors contributions exceed the minimum 50 percent matching share.

What the Program Does

The SBDC Program is designed to deliver up-to-date counseling, training and technical assistance in all aspects of small business management. SBDC services include, but are not limited to, assisting small businesses with financial, marketing, production, organization, engineering and technical problems and feasibility studies. Special SBDC programs and economic development activities include international trade assistance, technical assistance, procurement assistance, venture capital formation and rural development. The SBDCs also make special efforts to reach minority members of socially and economically disadvantaged groups, veterans, women and the disabled. Assistance is provided to both current or potential small business owners. They also provide assistance to small businesses applying for Small Business Innovation and Research (SBIR) grants from federal agencies, a program reviewed later in this report.

Eligibility

Assistance from an SBDC is available to anyone interested in beginning a small business for the first time or improving or expanding an existing small business, which cannot afford the services of a private consultant.

Additional Information

In addition to the SBDC Program, the SBA has a variety of other programs and services available. They include training and educational programs, advisory services, publications, financial programs and contract assistance. The agency also offers specialized programs for women business owners, minorities, veterans, international trade and rural development.

The SBA has offices located throughout the country. Interested parties can easily call the Small Business Answer Desk at 1-800-8-ASK-SBA or (202) 205-7064 (fax).

University-Based Small Business Development Centers List - With Phone Contact Information

University of Alabama, Birmingham, AL (205) 934-7260

University of Alaska/Anchorage, Anchorage, AK (907) 274-7232

Maricopa County Community College, Tempe, AZ (602) 731-8202

University of Arkansas, Little Rock, AR (501) 324-9043

California Trade and Commerce Agency, Sacramento, CA (916) 324-5068

Office of Business Development, Denver, CO (303) 892-3809

University of Connecticut, Storrs, CT (203) 486-4135

University of Delaware, Newark, DE (302) 831-2747

Howard University, Washington, DC (202) 806-1550

University of West Florida, Pensacola, FL (904) 444-2060

University of Georgia, Athens, GA (706) 542-6762

University of Hawaii at Hilo, Hilo, HI (808) 933-3515

Boise State University, Boise, ID (208) 385-1640

Dept. of Commerce & Community Affairs, Springfield, IL (207) 524-5856

Economic Dev. Council, Indianapolis, IN (317) 264-6871

Iowa State University, Ames, IA (515) 292-6351

Fort Hays State University, Hays, KS (785) 296-6514

University of Kentucky, Lexington, KY (606) 257-7668

Northeast Louisiana University, Monroe, LA (318) 342-5506

University of Southern Maine, Portland, ME (207) 780-4420

University of Maryland, College Park, MD (301) 405-2147

University of Massachusetts, Amherst, MA (413) 545-6301

Wayne State University, Detroit, MI (313) 577-4848

Dept. of Trade and Economic Development St. Paul, MN (612) 297-5770

University of Mississippi, University, MS (601) 232-5001

University of Missouri, Columbia, MO (314) 882-0344

Department of Commerce, Helena, MT (406) 444-4780

University of Nebraska at Omaha, Omaha, NE (402) 554-2521

University of Nevada in Reno, Reno, NV (702) 784-1717

University of New Hampshire, Durham, NH (603) 862-2200

Rutgers University, Newark, NJ (201) 648-5950

Santa Fe Community College, Santa Fe, NM (505) 438-1362

State University of New York, Albany, NY (518) 443-5398

University of North Carolina, Raleigh, NC (919) 571-4154

University of North Dakota, Grand Forks, ND (701) 77-3700

Dept. of Development, Columbus, OH (614) 466-2711

S.E. Oklahoma State University, Durant, OK (405) 924-0277
Lane Community College, Eugene, OR (503) 726-2250
University of Pennsylvania, Philadelphia, PA (215) 898-1219
Inter American University, Hato Rey, PR (787) 763-5108
Bryant College, Smithfield, RI (401) 232-6111
University of South Carolina, Columbia, SC (803) 777-4907
University of South Dakota, Vermillion, SD (605) 677-5498
University of Memphis, Memphis, TN (901) 678-2500
Dallas Community College, Dallas, TX (214) 565-5833
University of Houston, Houston, TX (713) 752-8444
Texas Tech University, Lubbock, TX (806) 745-3973
University of Texas at San Antonio, San Antonio, TX (210) 558-2450
Salt Lake City Community College, Salt Lake City, UT (801) 957-3481
Vermont Technical College, Randolph Center, VT (802) 728-9101
University of the Virgin Islands, St. Thomas, US VI (809) 776-3206
Dept. of Economic Development, Richmond, VA (804) 371-8258
Washington State University, Pullman, WA (509) 335-1576
Governor's Office of Community and Industrial Development,
Charleston, WV (304) 558-2960
University of Wisconsin, Madison, WI (608) 263-7794
University of Wyoming, Laramie, WY (307) 766-3505

SBDC's programs are a clear demonstration that SBA is conscious of the role small firms play in society in terms of integration and equal opportunities. The location of these programs primarily in host universities underlines the close connection between the world of academe and small business development.

3 The Role of Small Firms in the Social Integration Process

Small firms have always been an essential mechanism through which millions have entered the economic and social mainstream of American society. They are a manifestation of the American Dream. Women, minorities, and immigrants, among other groups, will naturally lean towards entrepreneurship to gain social recognition.

Less than fifty years ago, women accounted for less than twenty six percent of the entire United States workforce. As regulations and habits changed, more women successfully created, managed, and grew companies, getting recognition for their achievement from media and society. From five percent at the turn of the 1970s, the share of small women-owned business increased to thirty eight percent. One of the reasons the U.S. economy has created so many businesses in the past decades is precisely that many women have chosen self-employment over wage-employment. According to many authors, one of the key variables that facilitated women starting businesses has been the change in technology. As the economy continues to shift towards an information base, innovation in telecommunications and computers have made it far easier to start home-based businesses, allowing women entrepreneurs to fulfill a large number of social and economic roles such as raising children or participating in community life.

Minority-owned businesses have followed the same progression, representing approximately 12.5 percent of all small firms today. Based on static views of the economy, considered earlier, most of these firms could be viewed as sub-optimal. However, the dynamic approach offers a different analysis, suggesting that these businesses are building a community and developing networks in order to share information. Their social impact is momentous, guaranteeing the cohesion of an entire segment of American society. The continued creation of new start-ups is a crucial barometer of economic and social well-being.

3 International Potential of Entrepreneurial Activity in the U.S.

The current trend towards economic globalization represents an opportunity for all companies, even small firms which may have doubts as to their ability to reach overseas markets because of their size. How do small firms go international? The traditional view of internationalization is a stage-based model. Small companies take an incremental approach ranging from first being passive (or indirect) exporters, filling international orders but not actively seeking international sales. Later, an export department may be added or an international division with a more concerted approach to international sales. Then, joint ventures and other forms of direct investment with production abroad may follow. In fact, small size does not in and of itself preclude a business from developing the type of globally integrated network that characterizes transnational corporations.

Most small businesses, however, do not have the managerial and financial resources required for immediate globalization. The stage approach tends to be favored because it minimizes risks and

develop international expertise very gradually. A special challenge of entrepreneurship educational and training programs is to prepare tomorrow's entrepreneurs for a global market requiring penetration of several national markets simultaneously. This challenge is all the more acute in high technology product areas where the product life cycle is short and requires rapid action to seize the advantage of overseas market opportunities.

Small firms face numerous barriers in deploying an international strategy. The issue of size is paramount: it often implies limited personnel and financial resources as well as insufficient economies of scale. Moreover, smaller firms may not have the necessary "on board" expertise and experience which may produce attitudes towards the pursuit of international opportunities which are risk-averse, if not negative, and reinforce a strong domestic orientation. Yet smaller firms overcome these barriers regularly and successfully enter international markets. In particular, the impediment of size is felt only in the initial stages of internationalization. Once a firm does pursue an international strategy, there is a consensus the international sales intensity (amount of international sales divided by total sales) is not affected by the firm's size.

Smaller firms may in fact have an advantage over larger and more rigid firms. They are better able to adapt products and operations to changing technologies. This speed of action is often described as the small-business advantage. Barriers to small-business internationalization are being reduced by liberalizing trade agreements such as NAFTA or the operation of the single market in the European Union. The spread of targeted information through the World Wide Web provides ready information to entrepreneurs.

Certain factors are key in determining when a small business should choose the international option. The wise entrepreneur will raise a number of questions to derive the proper answer and international strategy:

- Are the managerial and financial resources sufficient to internationalize?
- Is management ready to overcome the risks inherent in internationalization?
- Is the product of a global standard of quality?
- Are there sufficient profit margins overseas?
- Which countries should first be targeted?
- Is the product's intellectual property easily protected or copied?

- Are there location advantages to be achieved in the value chain?
- Can the company afford not to be present internationally?

An increasing number of entrepreneurial companies have products and services with short life cycles. This leaves them scant choice in going international immediately and to move rapidly through the stages of internationalization. Entrepreneurial companies that begin with an international strategy are often described as "global start-ups." Patricia McDougall of Georgia Tech and Indiana University and Ben Oviatt of Georgia State University have considered the unique conditions that favor the emergence of global start-ups[4]. Six key elements often make for successful global startups:

- Dispersed key skills in different locations in the world
- A multiplicity of international sources of venture capital;
- An increasing global demand based on global consumption patterns;
- An insufficient domestic market to support adequate sales and R&D investment;
- Avoiding later resistance to globalization by starting the process immediately;
- Preventing imitators by anticipating competitive imitations.

Small firms in the United States have now become an important component of international trade and investment. Entrepreneurs and small firm executives must be ready to anticipate and respond to the international challenges of global markets.

I. Technological Innovation: The Source of Entrepreneurial Dynamism

New products that originate in the research laboratories of large firms make a valuable contribution to a high standard of living. There is a question, however, as to the relative importance of large firms in achieving significant product innovations. The record shows that many scientific breakthroughs originate with independent inventors and small organizations. The number of innovation per employee is actually higher in small than in large firms (36.2 per 1 million employees vs. 30.1 for large firms[5]). The following is a list of some twentieth-century examples of new products created by small firms:

- Photocopiers

[4] Hisrich, Robert D., McDougall, Patricia P., Oviatt, Benjamin M., Cases in International Entrepreneurship, Irwin, 1997

- Insulin
- Vacuum tube
- Penicillin
- Zipper
- Automatic transmission
- Jet engine
- Helicopter
- Power steering
- Color film
- Ball-point pen

The amount of innovation produced by small firms is surprising, considering that they are often resource-poor and have small research and development (R&D) budgets and limited manpower. It is interesting to note that research departments of large firms tend to emphasize the improvement of existing products. In fact, it is likely that some product or process ideas generated by research personnel in larger firms are sidetracked because they are not related to existing product lines or because their unusual nature does not fit in the long term strategic plan of the established company. Start-ups, on the other hand, produce innovations in less crowded technological fields. Recent research suggests as well that innovative activity tends to decrease as the level of concentration in an industry rises, thereby confirming the importance of small firms in the innovation process.

Small enterprises usually overcome their limited resources by turning to community networks. They often rely on regional knowledge networks for important inputs into the innovation process. One of the major elements of these knowledge networks are business incubators. They are public, private, or university-sponsored business assistance organizations whose purpose is to support the development and growth of new enterprises through the provision of range of business services. Because they enhance relationships between start-ups, business incubators are a place where information is shared, networks are built, and ideas are developed.

[5] Edwards, Gordon, Characterization of Innovations Introduced on the U.S. Market in 1982, 1982

Small firms are evolving in an environment that provides various incentives to innovation. In several cases, innovation is simply a matter of survival for start-ups. New entrants have no choice but to come up with an innovative product or services in order to gain market shares against established companies. This situation is a further motivation for entrepreneurial structures to explore new ways of doing business and to develop innovative processes.

From the federal government's perspective, the Federal Small Business Innovation Development Act of 1982 and the Small Business Research and Development Enhancement Act of 1992, passed by the United States Congress, are clear recognition of the close relationship between technological innovation and entrepreneurship. The U.S. Small Business Administration's Office of Technology is tasked with implementation of many of the provisions of these two landmark legislative instruments.

This Office's mission is to strengthen and expand the competitiveness of U.S. small high technology research and development businesses in the federal marketplace. It also provides assistance in achieving commercialization of the results of both the federal research and development programs mandated by these two statutes. The mission of this Small Business Administration Office is carried out through legislated programs including:

- The Small Business Innovation Research Program
- The Small Business Technology Transfer Pilot Program
- The R & D Goading Program
- Advocacy of Federal technology assistance

The Office of Technology, formerly the Office of Innovation, Research and Technology, is organized into two components: the Research Acquisition Policy Division and the Innovation and Technology Division. The Office of Technology promotes federal small business high technology programs to boost the competitive capabilities of small research and development businesses with particular emphasis on emerging and under-served small firms. It encourages state-of-the-market technology training, technology information exchange and outreach on federal technology programs. It also encourages private and public resource support for the commercialization of federal R & D efforts. It further promotes outreach activities to introduce women and minority-owned small business concerns to the advantages of competing for federal R & D projects. These new R&D-oriented federal programs and the federal funding they deploy have proven to be an important engine

of growth for small firms in the United States. Tied to "state of the art" higher education programs in entrepreneurship management they guarantee a dynamic environment for entrepreneurial growth in the United States.

As encouraged as it can be by external conditions, innovation is above all a "state of mind". Entrepreneurs are often born innovative and develop their ideas at the right moment, in the right place. What makes for entrepreneurial success is closely linked to the cultural environment of the host economy.

I. Culture and Entrepreneurship: Is America Different?

4 The Role of National Culture

American culture has been shaped by explorers, pilgrims, and immigrants, many of whom have come in the pursuit of wealth. As pointed out by Hammond and Morrison[6], much of the settlement that originally took place in America was backed up by venture capitalists who expected to see a profit. The entrepreneurial spirit has, from the very beginning, been a major component of the American way of life.

From its enterprising beginning, American culture has developed several features that make it hospitable to entrepreneurship. Seven cultural forces can be identified:

- Insistence on choice
- Pursuit of impossible dreams
- Obsession with "big and more"
- Impatience with time
- Acceptance of mistakes
- Urge to improvise
- Fixation with what is new

Hammond and Morrison consider these cultural patterns the underlying motivation of many entrepreneurial stories: "Our freedom of choice allows us to tackle an impossible dream that is bigger than anything we have done before; we want to achieve it now, but fail in our initial attempts; we try

[6] Hammond, Morrison, The Stuff Americans are Made of: The Seven Cultural Forces that Define American –A New Framework for Quality, Productivity, and Profitability, 1996

again and through some sort of improvisation succeed, only to wonder what is new so that we can start all over and make another choice."

One characteristic differentiating American culture from most other Western or Eastern cultures is the perception of failure as a step to success. Americans accept the fact that entrepreneurship, or any other activity with uncertain outcomes, carries the real possibility of failure. For them, initial setbacks make the final victory sweeter. Americans value mistakes as learning experience, while most Western societies condemn them as unsuccessful attempts to deviate from the traditional path. Hammond and Morrison have developed a somewhat flippant theory about Americans' understanding and acceptance of mistakes: "This 'mistake business' may all have been started by Columbus. He 'discovered' America by mistake, and a German mapmaker working in France gave America its name by mistake, having concluded that Amerigo Vespucci discovered the New World."

With a culture defined by pioneers and immigrants, America has always considered professional achievement a way of gaining recognition and respect. Freewill and choice are two pillars of American culture that encourage entrepreneurship initiatives and reward them, whatever their outcome. However, despite this supporting cultural environment, there are not 260 million entrepreneurs in the U.S. It takes personality and motivation, among other characteristics, to be able to create and run a business.

5 Characteristics of Entrepreneurs

An extensive literature has analyzed successful entrepreneurs with the goal of identifying common traits in order to draw a portrait of the typical entrepreneur. There is no such "magic recipe", but research has proven that self-made men and women are coming from similar origins or share common traits and motivations. Scientific proof of the importance of these qualities is still lacking, and there are always exceptions to the rule, but the number of entrepreneurs sharing these traits precludes us from seeing them as casual coincidence.

Geographical origin of entrepreneurs differs slightly from the origin of typical corporate America CEOs. According to a Business Week survey[7], seventeen percent of them were born

[7] Business Week, "Enterprise: How Entrepreneurs are Reshaping the Economy and What Big Companies can learn," Special 1993 Bonus Issue

outside of the U.S. compared to seven percent in big companies. For Patrizio Vinciarelli, Vicor Corp's Italian-born CEO, it is not a surprise because "the first act of moving is an entrepreneurial act in itself." In terms of occupation of the entrepreneurs' parents, there is strong evidence that entrepreneurs tend to have self-employed or entrepreneurial fathers. The independent nature and flexibility of self-employment exemplified by the father is ingrained at an early age. Whether they themselves are entrepreneurs or not, parents can nurture achievement, independence, and responsibility.

A large majority of small business CEOs were employed before founding or joining their small company, thirty-two percent of them in marketing departments, twenty percent in engineering, and fourteen percent in finance. The impact of their educational background will be discussed in IV.C, Role of Education in Entrepreneurs' Success.

In an attempt to describe a typical entrepreneurial personality, William D. Bygrave, Director of the Center for Entrepreneurial Studies at Babson College, has isolated ten personal characteristics commonly found among American entrepreneurs (see Figure IV below).

Figure IV: The 10 D's

Dream	Entrepreneurs have a vision of what the future could be like for them and their businesses, and have the ability to implement their dreams
Decisiveness	They don't procrastinate. They make decisions swiftly. Their swiftness is a key factor in their success
Doers	Once they decide on a course of action, they implement it as quickly as possible
Determination	They implement their ventures with total commitment. They seldom give up, even when confronted with obstacles that seem insurmountable.
Dedication	They are totally dedicated to their business, sometimes at considerable cost to their relationships with their friends and families. They work tirelessly. Twelve-hour days and seven-day workweeks are not uncommon when an entrepreneur is striving to get a business of the ground
Devotion	Entrepreneurs love what they do. It is that love that sustains them when the going gets tough. And it is love of their product or service that makes them so effective at selling it
Details	It is said that the devil resides in the details. That is never more true than in starting and growing a business. The entrepreneur must be on top of the critical details
Destiny	They want to be in charge of their own destiny rather than dependent on an employer
Dollars	Getting rich is not the prime motivation of entrepreneurs. Money is more a measure of their success. They assume that if they are successful they will be rewarded
Distribute	Entrepreneurs distribute the ownership of their business with key employee that are critical to its success

Source: Bygrave, William D., The Portable MBA in Entrepreneurship, 1997.

This characterization of entrepreneurial personalities does not take into account their goal-seeking motivation. Such personalities are driven by an objective, a goal that is pursued with determination until it is reached. The number one motivation generally mentioned is autonomy. Entrepreneurs are very concerned to have the ability to do as they want, free of hierarchical constraints, and to be masters of their destiny. Then, in second position, come such motivations as the

challenge represented by the management of a small business, the respect gained in entrepreneurship, or the financial opportunity.

Entrepreneurs are achievers. For the most part, they could have been very successful corporate executives, but they had an idea at the right time and had the courage to develop it. Since ideas can hardly be taught, education is not perceived as a major factor to develop entrepreneurship behaviors. However, it is interesting to analyze entrepreneurs' educational background in order to understand the reservoir of knowledge they utilize when confronted with the business challenges.

6 Role of Education in Entrepreneurs' Success

Some fascinating entrepreneurial success stories feature individuals who dropped out of school to start a new venture. This should not lead to the conclusion that education is unimportant. Research projects show that the formal education of new business owners is superior to that of the general adult public. This suggests that one should not expect success based on substandard education.

When entrepreneurs themselves are questioned about what they perceive to be the most important contributors to entrepreneurial success, they mention entrepreneurial values, managerial skills, or interpersonal skills. These qualities are often considered as "soft factors", by opposition to hard, technical factors such as calculus or methods. It leads us to the question of the usefulness of entrepreneurship studies with some scholars arguing that entrepreneurs are born and not made, as will be discussed in Part V.

A research project conducted in 1994 and sponsored by the Center for Entrepreneurial Leadership of the Kauffman Foundation surveyed a panel of 170 firms making between $5 and $20 million in sales. The purpose of the research was to understand the learning requirements of practicing entrepreneurs at each stage of their venture life cycle. This study emphasized, beside the stereotypes about "born" or "made" entrepreneurs, what kind of practical knowledge was really useful to run a business. Entrepreneurs were asked to rank, on a scale from one (least) to seven (most), the importance of different criteria aggregated in four groups: Finance, marketing, human resources and growth management. Figure V below presents the results of this study.

Figure V: Learning Needs of Entrepreneurs

	Finance			
	Using Cash Flow to Make Business Decisions	Financing Growth	Increasing the value of your business	Harvesting the value of your business
Average need	5.5	5.413	5.387	4.473
				5.193

	Marketing			
	Successful Selling via Helping Customers Buy	Hiring, training and motivating a sales force	Value added advertising tactics	Sales/Marketing Strategies for Growth
Average need	5.054	5.14	4.114	5.122
				4.857

	Human Resources			
	Creative HR Management	Hiring, training and motivating for growth	Compensation for yourself and your associates	Equity-based compensation techniques
Average need	4.647	5.26	4.907	4.691
				4.876

	Growth management			
	Building an entrepreneurial culture	Probles and pitfalls for growth	Management succession	Succeding in a rapidly changing world
Average need	4.959	4.919	4.224	4.851
				4.739

Source: Sexton, Donald L., Upton, Nancy B., Wacholtz, Larry E., McDougall, Patricia P., "Learning Needs of Growth-Oriented Entrepreneurs", Journal of Business Venturing, 1997, pp.1-8.

It is interesting to notice that, while experts argue about the relevance of entrepreneurial studies, actual entrepreneurs express strong needs in academic business fields such as understanding

a cash flow statement (5.5 on a scale of 1 to 7), motivating a sales force (5.14), or hiring, training, and motivating personnel (5.26).

It is impossible to ignore the impact of education on entrepreneurial success. However, opinions diverge on the way to organize entrepreneurship studies, and which educational components to emphasize when putting together an academic entrepreneurship program.

I. Entrepreneurship Education: An Ongoing Debate

7 Definition of Entrepreneurial Education

The Kauffman Center for Entrepreneurship Leadership (see Section V.B) has evolved an excellent operational definition of entrepreneurship education. It defines it as the process of providing individuals with the concepts and skills to recognize opportunities that others have overlooked, and to have the insight and self-esteem to act where others have hesitated. It includes instruction in opportunity recognition, marshaling resources in the face of risk, and initiating a business venture. It also includes instruction in business management processes such as business planning, capital development, marketing, and cash flow analysis.

Entrepreneurship scholars have differing views on what the proper scope of studies should be in entrepreneurship education. An initial focus on entrepreneurship for "a person who organizes and manages a business undertaking, assuming the risk for the sake of profit" can clearly expand into other topic areas. Starting a business is closely related to managing growth; starting a business has family and estate implications; creating a new business could also be connected to the issue business entry. Two trends are prevailing among entrepreneurship scholars, one advocating small business management and the other focusing on entrepreneurship. Academic scholars, such as Salomon, Weaver and Fernald[8], or Zeithaml and Rice[9], have debated on the similarities and differences between these two programs' orientations.

The focus of both small business management and entrepreneurship education programs is to provide a breadth of creative managerial skills and knowledge. This is probably the closest approach

[8] Solomon, George T., Weaver, K. Mark, Fernald, Llyod W., "A Historical Examination of Small Business Management and Entrepreneurship Pedagogy," Simulation & Gaming, September 1994

[9] Zeithaml, Rice, "Entrepreneurship/Small Business Education in American Universities," Journal of Small Business Management, 1987

to the original concept of professional management education offered at colleges and universities. Courses in both areas often focus on the total firm. They provide coverage of the problems involved in planning, implementing, and operating a small business for managers and owners. They frequently provide some feasibility analysis model, as well as considerations regarding selling or retiring from the business.

Differences between the two types of educational approach lie in their ultimate goal: Small business management courses will aim at providing students with solid foundations in management and operation of existing companies, while entrepreneurship courses will focus on the activities involved in originating and developing new growth ventures. The former make extensive coverage of how to successfully manage the business to expect normal sales, profits, and growth, stressing planning and organization, selection of employees, marketing of goods and services, and financial planning and control. The latter emphasize information in which the principal objective of the entrepreneur is profitability and growth. This type of courses is directed toward speculative entrepreneurs, who seek rapid growth, high profits, and a possible quick sellout with a large capital gain.

8 A Unique Resource in Entrepreneurship Education: A Case Study of the Kauffman Foundation

The case study presented below highlights the unique contribution made by the Kauffman Foundation to the development of entrepreneurship education in the United States. This institution continues to play a special role through its educational and research funding initiatives.

Case Study #1: The Kauffman Center for Entrepreneurship Leadership of Kansas City, Missouri, a Unique Resource in Entrepreneurship Education

The Kaufman Center was established in the early 1990's in Kansas City, Missouri and provides a unique resource for entrepreneurship education. Two features of this private Center deserve special mention in this report: its National Center for Entrepreneurship Research and its Clearinghouse on Entrepreneurship Education.

First, the National Center for Entrepreneurship Research (NCER) was formed in 1995 to oversee the applied research program at the Kauffman Center for Entrepreneurial Leadership. From those

roots, NCER is pursuing three compelling opportunities: To identify and promote the innovative and breakthrough practices of highly successful entrepreneurs; to provide an effective forum in which issues that challenge the entrepreneur, public policy makers and educators can be incorporated into a single research program; to disseminate the knowledge gained through the proposed research program.

The overall research program is driven by the needs of three distinct audiences:

a. The needs of entrepreneurs for information concerning how to achieve and sustain superior financial and competitive performance in the start-up and growth of business ventures in a global marketplace;
b. The needs of public policy makers for greater understanding of the role of entrepreneurship in social and economic development and the influence of public policy on the entrepreneurial process;
c. The needs of entrepreneurship educators for information on cutting-edge curricula and program designs. NCER works in partnership with leading scholars, successful entrepreneurs and effective educators. The result is an integrated research initiative focused on outcomes and audiences.

Second, an affiliated clearinghouse created in January 1996 as a joint project of the University of California, Los Angeles and the Kauffman Center for Entrepreneurial Leadership (CEL), Ewing Marion Kauffman Foundation. The CEL Clearinghouse on Entrepreneurship Education (CELCEE) identifies sources of information on aspects of entrepreneurship education at every level -K-12, post-secondary, nonprofit organizations and societies, commercial organizations, and small business development centers. CELCEE collects, indexes, abstracts, and disseminates this information in an attempt to make more accessible the rich array of materials related to entrepreneurship education - curriculum guides, training support, reports on programs and projects, analyses and evaluations- that now are scattered throughout a diversity of educational entities, both public and private and at all levels of education.

Additionally, substantive documents on entrepreneurship education are made available to all educators and managers through the federally funded Education Resources Information Center (ERIC) system and its processes for database maintenance and distribution of educational materials, which have functioned so effectively for the past thirty years.

The Kauffman foundation is one of the numerous resources available to potential entrepreneurs. Its research and other activities are at the heart of the debate on entrepreneurship education,. This debate addresses the issue of the feasibility of educating students to be entrepreneurial and innovative-–two personal rather than academic characteristics.

9 Debate Concerning the Feasibility of Teaching Entrepreneurship

"We can teach skills to people with basic entrepreneurial tendencies. But there is a fire in the belly that cannot be taught." This quote from Robert D. Hisrich, Chair for Entrepreneurship Studies at Case Western Reserve University, summarizes the entire debate around entrepreneurship studies: Successful venture creation is a question of idea, motivation, and hard work -–not traditional business subjects.

Despite these contradictions, entrepreneurship programs have flourished in American Business Schools. Plaschka and Welsch[10] found a parallel between the rapid growth of entrepreneurship programs and the rapid growth of small businesses in the U.S. The University of Arizona reports that half its marketing graduates have launched companies in the past nine years. These facts make a strong argument for the advocates of entrepreneurship studies.

Entrepreneurship studies, however effective they may be, now form a respectable part of every business school's curriculum. These programs have been first developed in the 1960s, and have followed a growing trend since then.

I. History of Entrepreneurship Education: The Roots of the Movement and Reform

Until 1970, very few universities offered entrepreneurship courses. The Harvard Business School introduced an entrepreneurship course in 1945, apparently to help industry rebound after the collapse of the armament industries and to offer an alternative to returning World War II soldiers. The course took hold and grew in popularity, although the tenure-track faculty member who began it apparently saw insufficient academic future in it and shifted his attention to the study of boards of directors in major corporations. Entrepreneurship did not become more popular in the 1950s and early 1960s, a period where large corporations grew bigger while small businesses declined in number.

By the late 1960s, the number of corporations per capita (a widespread measure of entrepreneurial dynamism) stopped falling and began to rise again, followed by the number of

[10] Plaschka, Welsch, "Emerging Structures in Entrepreneurship Education: Curricular Design and Strategies," Entrepreneurship Theory and Practice, 1990

Schedule C's (Income from Business or Profession) filed with the U.S. Internal Revenue Service. Higher education institutions adapted themselves to this new trend and by the year 1970 entrepreneurship programs were offered in sixteen universities. New magazines such as *Inc.*, *Venture*, *In-Business* and *Entrepreneur* were created, celebrating the rebirth of entrepreneurship. Connotations of the term "entrepreneur" began to shift from notions of greed, exploitation, selfishness, and disloyalty to creativity, job creation, profitability, and innovation. This movement was encourage by a growing venture-capital industry, that eventually established itself in the 1980s as a highly visible professional activity encouraging innovation and wealth creation.

In the late 1970s, the work of David Birch proving the impact of small business on job creation (see Part II.C.2) gave another boost to entrepreneurship in the U.S., and business schools increased again their offering in small business-oriented programs. The advent of microcomputers in the 1980s accelerated this trend, helping entrepreneurs by making possible the operation of businesses with greatly reduced economies of scale, while at the same time creating opportunities for new software firms that were low in capital intensity and high in margin, therefore riding a wave of high demand. Computers created new opportunities for entrepreneurial studies by enabling business simulations in which students could be confronted to complex situations based on case studies. From a base of 16 in 1970, the number of schools offering entrepreneurship courses had grown to over 400 by 1995.

During this 25-year period, pedagogical methods applied to transmit entrepreneurial skills and knowledge underwent major changes. In line with business administration teaching methodology and under the influence of the Harvard Business School, entrepreneurship education has traditionally focused on case studies. Ronstadt[11] characterizes what is now called "the old school method" toward small business education in the following terms: "[It] took an extreme, action-oriented approach to the subject. The motto of the old school was decidedly "go out and do it now." The business plan served as the academic heart of these courses. The rest of the curriculum was provided by experienced visitors who presented interesting case stories, practical advice, and inspirational motivation." Now that entrepreneurship education has matured, that a large number of universities are offering this type of programs, that the faculty resource pool is large enough to allow productive exchange of information and benchmarking, entrepreneurial education has evolved from the initial, "hands-on,"

[11] Ronstadt, "The educated entrepreneur: An new area of entrepreneurial education is beginning," American Journal of Small Business, 1985

practical method to more sophisticated pedagogy. In this regard, a review of today programs' structure and philosophy is presented in Part VIII.

Following the development of small firms in the U.S. economy, entrepreneurship education has been built up from the ground up and turned into a major field of study in today's business schools. This educational interest for small business is not only the result of the economic shift considered earlier, but also the consequence of the demand placed on this field of study by American universities and their student population.

II. The Special Role of Universities in Entrepreneurial Education

10 American Education System

The strengths the American higher education system –expanding sources of funding, increasing student bodies with fairly open admission policies, close university-industry relations, a generous tradition of philanthropy buttressed by federal fiscal policy, and openness to the creation of new sub-disciplines- have propelled the study of entrepreneurship, as for many other fields of study. These characteristics have allowed the field of entrepreneurship to develop quickly and independently when compared to other educational systems in Europe or Asia.

The funding of university education by private individuals or companies is an American specificity that bears noting. Research centers have always been funded by generous donations from private organizations that have an interest in the development of a particular field of study. Because of their size and extended geographical reach, large, multi-location, multi-product corporations are not in a good position to fund centers or create chairs in a particular university, neglecting others. Therefore, the bulk of private donations to colleges and universities, for this purpose, come from fast growing small- and medium-sized companies. Successful entrepreneurs are usually more keen to thank their own university by donating large amounts of money to see centers or chairs created and named after them. This generous financial support by entrepreneurs has led to the creation of multiple entrepreneurship centers and chairs, ultimately buttressing small business-oriented studies.

Parallel to this financial trend in entrepreneurship education, colleges have sometimes accompanied the creation of entrepreneurship centers with the development of an entire department dedicated to this field of study. Being elevated to the official rank of department, entrepreneurship

was finally considered a serious matter and given the necessary resources to launch research projects, attract faculties, and develop programs that eventually were turned into majors for students willing to concentrate in small business management or new venture creation.

The way American universities are organized has played a major role in the recognition of entrepreneurship education as a respected field of study. But even more important has been the tight relationship between university research and commercial applications. It has allowed entrepreneurial theories to be applied directly during the educational process and turned into real world applications, as students have launched start-ups while still at school.

11 Professors or Entrepreneurs?

Case Study #2: The Commercialization of University-based Research by Stanford Professor

Hollywood is already salivating at the prospect of using Professor Marc Levoy's technology for special effects. Levoy, computer science professor at the famous Silicon Valley's Ground Zero—Stanford University's computer-science and electrical engineering departments- has invented a technology to scan items with a laser and fax the resulting three-dimensional model to a remote stereo lithography machine, which fashions an exact copy out of plastic. This innovation could revolutionize the art reproduction industry—a $1 billion market--or make obsolete the current technology used in special effects.

Stanford is full of potential entrepreneurs like Marc Levoy. In fact, the entire campus is famous for its infectious entrepreneurial spirit. It is no coincidence that Levoy talks about the potential market for his technology as comfortably as he does about computer graphic art, his engineering specialty. "People in our department do not often spin off into theory-land and irrelevance," says Edward A. Feigenbaum, a legendary artificial intelligence researcher currently on leave from Stanford's Knowledge System Laboratory. Stanford attracts researchers for whom developing products—and making a few millions--is as alluring as publishing: In 1984, John Hennessy—Dean of the School of Engineering--took a sabbatical and started MIPS Technologies Inc. based on his pioneering work in RISC chip architecture at the University. MIPS Technologies Inc. is now a unit of Silicon Graphics.

At Stanford, the gap between research and production, theory and praxis, has considerably

narrowed. The Stanford approach remains a model for many universities seeking to commercialize their research products. Universities are now keen on developing legal instruments to cash in on some of the income flow accruing scholar-entrepreneurs.

12 Linking University Research and Commercial Application: The Impact of Business Incubators on Small, High-Tech Firms

The close collaboration between university and industry is one of the major forces and distinguishing features of the U.S. higher education system. For new small businesses, the concrete manifestation of this collaboration is business incubators. Incubators are organizations which rent office space and provide additional services such as administrative assistance and management advice to new businesses or to individuals wishing to launch business ventures. They are generally co-sponsored by universities or governmental organizations and private companies. After a rapid growth in the 1980s, the number of business incubators in the U.S. is now stable at around 550 nationwide.

The value added of such structures lies in the fact that they bring together academic research and university resources (faculties, students, libraries, etc.) and private capital. Public organizations will typically be satisfied by the economic development role of incubators, while existing businesses can outsource new products development or fundamental research in order to limit the risks, or encourage new venture creation with an acquisition perspective. Incubators are designed to facilitate the start-up process, and businesses are expected to relocate soon after they take off. Moreover, the dynamism of incubators provokes a snowball effect: As new businesses are created and research on a particular subject is developed in and around the incubator, established business will locate near the incubator in an attempt to benefit from the build-up and spill-over of economic activities.

Such a phenomenon can be observed in the Research Triangle Park in North Carolina. Companies like IBM and Northern Telecom located research facilities in the area in the late 1960s, in order to concentrate on telecommunications with the help of local universities. Several research projects were conducted, some successfully ending with the creation of new products and companies. These successes attracted other telecommunication industry players that capitalized on the experience of the area to launch other projects. The entire place soon turned into one of the most successful and dynamic locations in the U.S. for new technological venture creation.

Several other successful universities-companies collaboration examples, which eventually lead to the creation of new high tech companies, can be found in the Silicon Valley or in Boston's Road 128. Presented in Appendix 2 is a case study on the collaboration between the General Electric Company and the Rensselear Polytechnic Institute that focuses on new venture creation through technology transfer programs.

Below is a case study presenting one of the earliest university-based business incubators, Georgia's Advanced Technology Development Center (ATDC). We have chosen to highlight in case study # 3 this unique Georgia case of technology incubation as it illustrates remarkably well the private-public sector dynamic in taking technology from idea form to commercial product stage.

Case Study #3: Georgia's Advanced Technology Development Center (ATDC), an example of University-Based Technology Entrepreneurial Incubation

Most states in the United States have undertaken sophisticated initiatives to foster indigenous start-up companies and technology-based industries and services. As part of this extended approach to economic development, technology business incubators have been established in numerous locations in the United States, with about 100 facilities in operation by the mid-1990s. These technology incubators have similarities with general business incubator facilities (of which there are several hundreds) in their focus on creating new start up businesses and jobs, providing shared facilities, and offering management support. But there are important differences, with technology business incubators focusing on companies with more advanced (and often untried) technologies that can be commercialized into marketable products and services. These emerging firms may have needs for research facilities and equipment as well as specialized expertise in management, licensing, marketing, and venture financing. In the United States, technology incubators are often associated with universities, where research and technical facilities are available. Indeed, universities may establish technology incubators as ways of commercializing faculty research as we have seen in the case of Stanford University.

One of the leading technology incubators in the United States – the Advanced Technology Development Center (ATDC)- was established by Georgia Institute of Technology in 1980. The

concept for a technology business development center in Georgia began to take shape in the late 1970s. It was during this decade that the still-emerging stories of successful high-technology based regional growth in "Silicon Valley" in Northern California and "Route 128" in Massachusetts began to be more widely known in other parts of the United States. In 1980, with legislative and financial support from the Governor and General Assembly, the Advanced Technology Development Center (ATDC) was established at Georgia Tech. Four professional staff members were employed to focus on four major programs: entrepreneurial development, industrial recruitment, education, and venture capital. Space in a former high school on the campus was renovated and, in 1981, the ATDC admitted its first incubator company. In 1984, a new 83,000 sq.-ft (7,710 sq.-m) incubator facility was opened at Georgia Tech.

In addition to this Atlanta-based facility, efforts were also made to extend technology incubation services to other parts of the state. With additional state support, the ATDC opened technology business incubators in the eastern city of Augusta, Georgia, in 1987, and Warner Robbins, in the middle part of the state, in 1989. The Augusta center aimed to promote new startups in health-science technologies, drawing on the nearby Medical College of Georgia. However, the clinical nature of research at this college led to few opportunities for start-up companies with marketable health-science products or services. The Augusta facility was subsequently closed in the early 1990s. At Warner Robbins, the ATDC sought to promote aerospace and defense-related spin-offs. Located in a greenfield corporate technology park, progress has been slow, but there are several companies in the Warner Robbins ATDC or located in new adjacent facilities. In 1996, the ATDC opened a new branch facility, occupying a floor of the new Georgia Center for Advanced Telecommunications Technologies (GCATT) building. This building, close to the main Georgia Tech campus in Atlanta, was built with state and private funds to promote research, business, and exchange in emerging telecommunications fields. In the GCATT building, ATDC seeks to promote the start-up of new ventures in multi-media, software, and associated communications technologies. A further ATDC branch is scheduled to open in Fiscal Year 1997-1998 in Thomasville, in the southern part of the state, as part of a new wood product technology facility.

The ATDC operates three main programs: the Entrepreneurial Services Program; the Faculty Research Commercialization Program; and the Corporate R&D Support Program.

- The ATDC Entrepreneurial Services Program provides "commercialization assistance to move

technology toward the marketplace more rapidly" (ATDC 1994). The Entrepreneurial Services Program is the ATDC's primary mechanism for performing this function and the majority of funding and staff resources are allocated to it. Under this program, ATDC offers services to support the growth and development of "early-stage" technology companies. Entrepreneurs who are members of the ATDC incubator facilities have access to the following entrepreneurial, administrative and facilities services: assistance with business planning, sales and marketing strategies; development of financial sources; intellectual property guidance (for example, patents, copyrights, licenses); staffing guidance; market research; corporate communications assistance; identification of service providers; shared fax, copy, conference rooms, audio and visual equipment, word processing assistance; access to the Georgia Institute of Technology's research facilities and services; access to faculty and students as consultants, advisors, or employees; and attractive rates on office and laboratory space. Another service is the Corporate Partnering Program. It identifies potential corporate partners by matching the resources of large corporations with the needs of the ATDC member companies.

-The Faculty Research Commercialization Program, established in 1991, offers support to faculty members for the conversion of laboratory stage technology into commercially viable products. The program is available to faculty members from academic institutions that are members of the Georgia Research Alliance - a partnership between state government, six major research universities in Georgia, and private industry. The program provides financial support, in the form of an ATDC sponsored project. Basic research projects are not eligible for funding; only applied research projects that focus on products or technologies with a potential commercial market are considered. Project awards, which range from $30,000 to $100,000 per project, can be used for equipment, contract consulting, release time, materials and related expenses.

-The Corporate R&D Support Program supports early-stage technology companies. ATDC provides "landing party" assistance to corporate research and development divisions or special product, service or marketing units of established companies that seek access to the faculty and facilities of the Georgia Tech. A landing party usually occupies office and laboratory space in the ATDC incubator facility in Atlanta.

More than 100 companies have participated as formal ATDC members since 1986. Many other companies have sought information and assistance from ATDC staff without becoming members.

Currently, in 1997, there are 49 member companies, comprised of 30 companies at the main ATDC facility, four companies at GCATT, six companies at Warner Robbins, and nine companies who are members "without residence" -mainly firms ATDC is working with while awaiting incubator space. By 1997, twenty-nine firms had graduated from the ATDC program. Of these, twenty-two are still in business, one was acquired and is no longer tracked, two others are no longer tracked for other reasons, and two are no longer in business. Total revenues annual for all these 78 companies were $266 million, with identified employment exceeding 2,100 jobs. The average graduate firm had revenues of $8.7 million and 66 employee. As expected, the mean for members companies was much smaller -5 employees on average, with typical revenues of about $0.3 million. Employment and company revenues associated with ATDC have doubled since 1990, but in terms of revenues per company or revenues per employee, ATDC graduates have reported rather constant (as opposed to growing) figures since 1990 (i.e. the growth has come from more graduate companies rather than increased average revenues per firm over time).

Some ATDC graduates have been highly successful, for example Mindspring Enterprises, Inc., which has emerged as one a major internet service provider in the U.S. South. This firm now has over 170 employees. Indeed, Mindspring is one of four ATDC graduate companies that have completed initial public offerings, with more than $46 million raised in subscribed funds (in three cases, ATDC companies are now traded on NASDAQ). Overall, the ATDC has established a track record of promoting new high technology startup companies, some of which have graduated with significant success. ATDC is recognized as one of the most well-established university-based state-wide technology incubators, and has won national awards. The cost, over nearly two decades has been relatively modest. In a state which has experienced relatively fast employment and population growth, but which has lacked the reputation as a high technology location, many deem the benefits of ATDC, including "perceptual" benefits, to be worth the cost.

In addition to technology incubation, universities can prepare graduate-level engineers to assume entrepreneurial functions while they complete advanced engineering training and research projects. Appendix 5 presents such an initiative designed to encourage the creation of new ventures based on technological achievement at university: The Certificate in Biomedical Engineering Management at the Georgia Institute of Technology.

This programmatic initiative further reflects the centrality of biomedical engineering as a source of future entrepreneurial creativity. California alone has more than 1,000 biotechnology firms of small size. Most of the breakthroughs in this field have come not from the laboratories of big companies but from universities, and from a plethora of small entrepreneurial ventures. This entrepreneurial culture has fostered innovation allied to irreverence for established wisdom often found paradoxically in universities themselves. In fact, it can be argued that marrying entrepreneurship to bioengineering at the graduate level is the precise way to break what in Japan has been called "sempai-kohai," an unquestioning reverence for the elderly by young scientist-entrepreneurs.

13 Linking University Research and Entrepreneurship : The Special Role of Governmental Goal Setting for Research

The U.S. Small Business Administration, a governmental institution focused on encouraging entrepreneurial activity (see Part II.C.3), encourages public-private initiatives that could lead to new business development. The SBA has recently launched several research projects, to be addressed by faculties and doctoral students, in order to gain a deeper understanding of small firms' behavior on a range of issues. These subjects are in fact previewing the coming fields of interest in entrepreneurship research, and potentially the contents of future entrepreneurship programs. They also reflect the central concerns of government policy makers addressing new ventures and entrepreneurial development. Figure VI details the sixteen topics that are covered by the SBA's annual research competition for fiscal year 1999 and 2000.

Figure VI: List of Request For Proposals and Corresponding Web Sites

- Evaluation of Regulatory Flexibility Analysis by Federal Agencies

http://cbdnet.access.gpo.gov/cgi-bin/Xcbdsubmit.cgi?fileName=AA001317.301

- Small Business Closure Model

http://cbdnet.access.gpo.gov/cgi-bin/Xcbdsubmit.cgi?fileName=AA001317.354

- Discrimination in Bank Lending

http://cbdnet.access.gpo.gov/cgi-bin/Xcbdsubmit.cgi?fileName=AA001317.356

- Small Business Use of Credit Cards

http://cbdnet.access.gpo.gov/cgi-bin/Xcbdsubmit.cgi?fileName=AA001317.358

- Value of Worker Training Programs to Small Firms

http://cbdnet.access.gpo.gov/cgi-bin/Xcbdsubmit.cgi?fileName=AA001317.362

- Literature Survey: Impact of Credit Crunches on Small Firms

http://cbdnet.access.gpo.gov/cgi-bin/Xcbdsubmit.cgi?fileName=AA001317.363

- Hiring and Keeping Small Firm Employees in a Tight Labor Market

http://cbdnet.access.gpo.gov/cgi-bin/Xcbdsubmit.cgi?fileName=AA001317.367

- Small Firm Share of high tech Commerce and E-Commerce

http://cbdnet.access.gpo.gov/cgi-bin/Xcbdsubmit.cgi?fileName=AA001317.370

- Credit Card Procurement from Small Firms

http://cbdnet.access.gpo.gov/cgi-bin/Xcbdsubmit.cgi?fileName=AA001317.432

- Contract Streamlining

http://cbdnet.access.gpo.gov/cgi-bin/Xcbdsubmit.cgi?fileName=AA001317.436

- Procurement Teams

http://cbdnet.access.gpo.gov/cgi-bin/Xcbdsubmit.cgi?fileName=AA001317.442

- Tax Incentives for Investing in Small Businesses

http://cbdnet.access.gpo.gov/cgi-bin/Xcbdsubmit.cgi?fileName=AA001317.447

- Making Benefits Available to Employees in Small Businesses

http://cbdnet.access.gpo.gov/cgi-bin/Xcbdsubmit.cgi?fileName=AA001317.458

- Ph.D. Dissertation Competition

http://cbdnet.access.gpo.gov/cgi-bin/Xcbdsubmit.cgi?fileName=AA001317.464

- Access to Capital by Women-Owned and Minority-Owned Firms

http://cbdnet.access.gpo.gov/cgi-bin/Xcbdsubmit.cgi?fileName=AA001317.466

- Small Business Share of Economic Growth: Projections to 2005

http://cbdnet.access.gpo.gov/cgi-bin/Xcbdsubmit.cgi?fileName=AA001317.471

I. Entrepreneurship Programs

14 Pedagogy & Structure of Entrepreneurship Programs

In an attempt to break with traditional teaching methods presented in Part VI, new pedagogical approaches have emerged in entrepreneurship education. These new methods arise from an enhanced understanding of entrepreneurs and entrepreneurship students, as this field of study has finally matured and been able to rely on large data sets to identify entrepreneurs' needs and student appraisal of entrepreneurship programs.

Sexton and Upton have proposed structuring courses around the psychological needs of students: "Entrepreneurship students are depicted as independent individuals who dislike restraint, restriction, and routine. They are capable of original thought, especially under conditions of ambiguity and uncertainty. Many of them need to develop better communication skills and to become more aware of how others perceive their behavior."[12] These conclusions led them to propose that courses should be relatively unstructured, while encouraging independent thinking by posing original problems under circumstances of ambiguity and risks. From a methodology standpoint, the greatest evolution in entrepreneurship education over the last years has been the massive introduction of computer-based business simulations. Simulation programs are becoming increasingly complex, integrating as many aspects of a real firm's environment as possible. The advent of the Internet has played a significant role in distance learning for these computer-based training programs. Students are now able to participate in a distance learning simulations, receive feedback and advice with a dial-up connection, wherever they are located.

[12]Sexton, Donald L., Upton, Nancy B., "Evaluation of an Innovative Approach of Teaching Entrepreneurship," Journal of Small Business Management, 1987

The structure of entrepreneurship programs has always been a source of debate among faculties. Some of them like Gary L. Benson[13] have addressed whether it is preferable to structure entrepreneurship studies as majors or simply as areas of emphasis within more "traditional" majors such as Management of Information System or Finance. He recommends the second solution, especially in institutions where the program is new, because students who "major" in entrepreneurship may encounter difficulty in finding traditional employment if they are unable to develop an entrepreneurial venture. This cautious approach can be bypassed when sufficient infrastructure and reputation virtually ensure that any graduate, willing to create or take over a business, can do so.

The time dimension of entrepreneurship studies is another crucial issue. Optimal entrepreneurship education requires that students have substantial "hands on" exposure to the world of entrepreneurs simultaneously with their other college/university courses. Ideally, students should be able to take time off from school to develop their businesses, experience venture capitalism, and apply classroom theories in the real world. An adequate time structure for undergraduate entrepreneurship programs would then be five or six years instead of the current traditional four years, in order to provide students with the necessary curriculum flexibility.

Finally, universities willing to develop entrepreneurship education must come up with adequate course assessment methodologies which addresses the characteristics of this type of studies. Beyond the traditional use of test and written case studies in grading students, innovative course assessment methods have been developed in different universities: Grades can depend on school-based business creation, live case studies, case competitions among different groups of students, or amount of capital raised by group presenting their projects to venture capitalists. These examples have been implemented in universities around the country, and provide entrepreneurship students with a challenging course structure that better match their expectations and tend to be more outcome-driven.

There has been much innovation in the structure of entrepreneurship programs in the last fifteen years. Thanks to a better understanding of students' needs and expectations, these programs are now far more popular, even if there is room for improvement in terms of content (Part IX

[13] Benson, Gary L., "Thoughts of and Entrepreneurship Chairholder: Model Entrepreneurship Curriculum," Journal of Applied Business Research, Winter 1992-1993

discusses the quality of entrepreneurship programs' content). Original initiatives have been developed to encourage the adoption of entrepreneurship curricula by universities, among which one of the most aggressive consists in organizing generic business studies around an entrepreneurial focus.

15 An Evolution of Entrepreneurship Programs: The Infusion of Entrepreneurship into the Core Curriculum

Case Study #4: The Development of Entrepreneurship within the Lally School of Management & Technology at the Rensselear Polytechnic Institute (RPI)

Ten years ago, the Rensselear business school's entrepreneurship program was made of a few "stand-alone" courses offered as electives in the fringe of the core curriculum. Under the direction of Professor Mark P. Rice and with the support of the Center for Entrepreneurial Leadership at the Kauffman Foundation and of the National Consortium of Entrepreneurship Centers, the Lally School of Management launched an effort to infuse entrepreneurship into the core curriculum and into the mainstream experience of students.

Because of its well-established commitment to technology entrepreneurship, the Rensselear Institute of Technology was ideal to develop this initiative. The research focus on entrepreneurship and the final reorganization of the entire curriculum took the following steps:

1. *Determine entrepreneurial learning objectives*

In collaboration with other universities, Mark Price prepared a draft report defining the education experience Rensselear Polytechnic Institute would like to deliver to students interested in entrepreneurship. The document listed different methods and concepts that needed to be transferred. These concepts were divided into strategy, organization, innovation management, finance and marketing. They would constitute the learning objectives to be addressed by the entrepreneurship program.

1. Prospect for entrepreneurial content in existing courses

The next step of the project was to analyze existing courses' contents, in order to determine what was important for future entrepreneurship students. Such content was isolated in courses such as "Staffing High Performance Organizations" and "Technology and Competitive Advantage." Project members exchanged with faculties teaching those courses to see if they were open to an

increase in the small-business focus of their courses.

2. Develop a comprehensive set of entrepreneurship courses

After thorough examination of the future program's objective and of the material already available, Rensselear's core entrepreneurship faculties came up with a detailed set of courses representing the core of the future entrepreneurship program. They proposed 19 courses, some required and some electives, spread over the entire spectrum of business studies.

3. Develop new courses

Additional course material was developed to satisfy the requirements of the entrepreneurship program's objectives. It required creativity and consensus from the part of entrepreneurship faculties, as they had to make choices in organizing the different fields of study the program would have to cover.

This project led to the creation of the current entrepreneurship program at the Lally School of Business at RPI. It multiplied the number of entrepreneurship courses offered by more than four, and provided entrepreneurship students with a carefully planned and highly integrated curriculum. In addition to that, all MBA students, regardless of their concentration, took seven core MBA courses with significant content related to the teaching of entrepreneurship.

In an effort to share its experience, the project's team set up a strategy for fostering the process of gradually infusing entrepreneurship into the core curriculum. This strategy focuses on four key success factors to take into account when trying to develop entrepreneurship education:

- Promote collaboration among entrepreneurship and non-entrepreneurship faculty
- Recruit an entrepreneurship program director as well as entrepreneurship faculty and program staff who are effective champions –both internally and externally
- Build and leverage a network of entrepreneurs and other supporters of the entrepreneurship center
- Enlist the Dean and other key administrative leaders as champions in the business school

This experience at Rensselear Polytechnic Institute has proven successful. Enrollment and satisfaction in the entrepreneurship program have increased, as a direct result. The diffusion of an

entrepreneurial spirit over the entire business school's curriculum represents in this case an aggressive evolution. This innovative way to focus students' attention on small business creation and management may be the next step in the development of entrepreneurship education.

I. Evaluating the Quality of Entrepreneurship Programs

16 Determining Quality in Entrepreneurial Education: In Search of Assessment Criteria

Because many entrepreneurship education programs are still in their infancy, there is a lot of discrepancy in the way entrepreneurship is taught from one school to the other. It is therefore difficult to make comparisons and produce a ranking of the different institutions offering this type of education.

In late 1994, a mail survey, conducted by Vesper and Gartner, was addressed to 941 U.S. and 312 international business schools, asking them to rank university-level entrepreneurship programs (See IX.B). Respondents were also asked to mention the criteria that they considered important to evaluate the quality of such programs. Below, in Figure VII, is a ranking of the different criteria academics used to evaluate entrepreneurship programs.

Figure VII: Ranking of Program Criteria by Academics

Criterion	Overall Rank	U.S. Rank	Non-U.S. Rank
Course offered	1	1	1
Faculty publications	2	2	2
Impact on community	3	3	3
Exploits of alumni	4	4	4
Innovations	5	5	5
Alumni start-ups	6	6	6
Outreach to scholars	7	7	7
Competition and awards won	8	8	13
Years of activity	9	9	12
Size of MBA program	10	10	11

Source: Vesper, Karl H., Gartner, William B., "Measuring Progress in Entrepreneurship Education," Journal of Business Venturing, 1997.

The first observation we can make about this ranking is that the perception of what is important in an entrepreneurship program is not very different inside and outside the United States. Foreign universities considered criteria such as incoming student body's quality or "halo" of the

school to be more important than their American counterparts, and placed them into the top ten criteria. However, a large majority of respondents were agreed on the most important factors determining the quality of programs, at the top of which list is the program's content.

Course offering appeared to be by far the "number one" criteria to measure the quality of an entrepreneurship program. This factor is enigmatic and could relate to the quantity of courses offered in the program, to the size of the classes, to the number of credits or class sessions, or to the methodology. But it strongly states the importance of content as opposed to environment or related activities like creation of student start-ups. The importance of the following criteria was significantly lower than "courses offered": Faculty publications, impact on community, and alumni relates to the outreach capacity of the program, and its ability to diffuse the entrepreneurial spirit in its immediate environment.

One of the surprising conclusions of this survey was the perceived low importance of the program's location, a criterion that appeared only in eighteenth position. It has long been observed that exceptionally high-performance entrepreneurship tends to cluster geographically –Silicon Valley and Road 128 became famous because of this concentration. A dynamic entrepreneurial environment provides many resources for entrepreneurship classes, such as guest speakers, mentors, or live case studies.

In addition to this empirical criteria list, worth considering when trying to evaluate the quality of an entrepreneurship program, there are trends in business performance evaluation that can provide models to be applied to the field of entrepreneurship education. One such evaluation scheme, the Malcolm Baldridge National Quality Award (MNBQA), offers a comprehensive and detailed format for identifying critical factors in educational programs. It was established in 1987 to promote quality improvement, recognize organizations that have made substantial improvements in quality, and foster the sharing of "best-practices" information. The MNBQA is a diagnosis system that provides a framework to assess organizations across 28 requirements that are embodied in 7 categories. The following description presents these seven categories ranked in increasing order of importance (the weight of each category is mentioned in parenthesis).

Information and Analysis (7.5%): This first category is concerned by the time and consideration devoted to such activities as benchmarking, feedback collection and analysis, and

outcome evaluation. Without such information on inputs, processes, and outcomes, it is difficult to adequately evaluate the performance of any program. Therefore it is critical for an entrepreneurship education program to collect this information, in order to maintain an updated knowledge base supporting the overall mission of the program.

Strategic and Operational Planning (7.5%): The primary emphasis of this category is on aligning the strategic planning process with student needs and expectations, external factors, requirements and opportunities, internal capabilities, and resources. A good program is one that can rely on a strategic plan taking into account the needs of all the players, and use it as a road map to its success.

Leadership (9%): In the context of entrepreneurship education, this category entails describing the involvement and commitment of entrepreneurship program directors, business school deans, university administrators, advisory board members, and student representatives. Programs ranked high in this category might have "entrepreneurship" as a significant part of the school's mission statement, and often cited and described in university publications.

Human Resource Development and Management (15%): This category examines how faculty and staff are supported and developed so as to satisfy the strategic goals of the program. Measurements in this category include the amount of resources devoted to enabling entrepreneurship faculty to do research, helping faculty become better entrepreneurship teachers through training and workshops, and enabling staff to better serve students or work with entrepreneurial clients.

Educational and Business Process Management (15%): This category specifies key aspects of the design and delivery of the educational research and service components of the program, as well as an examination of the processes involved in improving these components. The notion of course offerings that we mentioned earlier would be addressed in this category. However, rather than evaluating course offerings based on the quantity or methodology of entrepreneurship courses, the MNBQA requires that programs be measured on the logic, coherence, and efficiency of the educational experience that entrepreneurship students undertake.

School Performance Results (23%): This category concentrates on the program's outcomes, being defined as students' performance improvement. The evaluation of students'

progress requires the definition of key indicators of performance, which might include student demonstrations of key skills and knowledge, Grade Points Averages, student satisfaction, and economic impact on the community. Programs who demonstrate the progression of these indicators offer evidence of their quality.

Student Focus, and Student and Stakeholder Satisfaction (23%): This category analyzes the process used for determining students and stakeholders' needs and expectations. In many respects, the MNBQA process begins with this category, since the concept of quality is closely tied to a thorough understanding of students and stakeholders needs. This suggests that the quality of a program is driven by external rather than internal contribution, as the program's alignment with its environment is its number one determinant.

17 Leading Entrepreneurship Programs in the U.S.

The Vesper-Gartner survey allowed for a computation of national rankings among entrepreneurship programs. The schools were listed alphabetically when the survey was mailed to universities around the world, and respondent were asked to choose the top ten programs beside their own. To combine the different types of responses consistently, a weighting scheme was used under which a school ranked #1 by a respondent was assigned 30 points, #2 was assigned 29 points, etc. Schools are ranked on the basis of these academic points. Figure VII below presents the top 20 schools.

Figure VIII: Top-rated U.S. Entrepreneurship programs

Rank	School	Academic Points
1	Babson College	1063
2	Harvard Business School	904
3	Wharton School	810
4	University of Southern California	499
5	University of Texas, Austin	421
6	U.C.L.A	408
7	Wichita State	362
8	University of Georgia	298
9	Carnegie-Mellon	290
10	Northwestern	283
11	New York University	281
12	Rensselear	262
13	University of St Thomas	245
14	Baylor University	224
15	DePaul University	215
16	Stanford	176
17	Kennesaw State University	162
18	Ball State University	159
19	University of Arizona	147
20	Case-Western University	136

Source: Vesper, Karl H., Gartner, William B., "Measuring Progress in Entrepreneurship Education," Journal of Business Venturing, 1997.

Appendix 6, as a complement, provides a detailed description of the ten leading American entrepreneurship programs

I. Comparative Trends in Entrepreneurship Education: Does the US Stand Out?

The United States has always been recognized for the dynamism of its small businesses and its entrepreneurial spirit. There are more new ventures created here than anywhere else in the world

in a given year. The American approach to creating new business ventures has been infectious. One can look at all those firms in emerging markets, especially in East Asia, which are filling up with American-educated business persons, returning home to preach entrepeneurial ways and create new wealth. The ambition is unmistakable. The question is not whether but how it can be achieved. Given this situation, it is interesting to analyze the basic difference in entrepreneurship education between the U.S. and other developed or developing countries.

For comparison purposes, Figure IX presents a ranking of entrepreneurship program offered in foreign universities. This table is to be analyzed jointly with Figure VIII that presented a ranking of American entrepreneurship programs. It is worth noticing that, on the basis of the academic points computed from different surveys, the best foreign program would be ranked thirty-second among its American peers. A description of the five leading foreign entrepreneurship programs can be found in Appendix 7.

Figure IX: Top-rated Foreign Entrepreneurship Programs

Rank	School	Academic Points
1	University of Calgary (Canada)	55
2	Durham University (UK)	29
3	Swinburne (Australia)	28
4	University of Stirling (UK)	27
5	Vaxjo (Sweden)	17
6	INSEAD (France)	17
7	HEC Montreal (Canada)	16
8	Vincennes University (France)	16
9	Cranfield Institute (UK)	16
10	York University (Canada)	16
11	London Business School (UK)	14
12	University of Western Ontario (Canada)	8
13	Bocconi (Italy)	1

Source: Gartner, William B., Vesper, Karl H., "Measuring Progress in Entrepreneurship Education," Journal of Business Venturing, 1997.

We have seen earlier that the perception of which factors are important in building quality entrepreneurship education is almost the same inside as it is outside the United States. The structure and methodology used in entrepreneurship programs in other developed countries are very close to what was described in Section VIII, in part because the large number of student and faculty exchanged between American, Asian and Western European universities has allowed broad information sharing.

The major source of discrepancy between entrepreneurship educational programs in different parts of the world is the perception that populations have of small business. American entrepreneurs are now often perceived as "heroes," admired by the entire population, and rewarded by favorable tax breaks. In European economies such as Sweden or Germany, where the national government is very involved in business life and where tax pressure is high, or where making money is still viewed negatively, as in France, entrepreneurs do not benefit from the same aura as in the U.S. In such environments, students are less attracted by small business and entrepreneurship programs do not get the same attention.

In the small business world, regulations and accepted wisdom have always been perceived as barriers to creativity, innovation, and free enterprise development. Therefore, entrepreneurship is a very powerful way to foster economic development in transitioning countries from Eastern Europe, Southeast Asia, or Africa, where the economic environment has until recently precluded the development of a more formal, established business community. In these countries, educating entrepreneurs is a way to accelerate the opening of economy, to increase the people's living standard, and to address social concerns such as unemployment. In former socialist countries, entrepreneurship advocates must address the question of awareness since populations are not familiar with demands and opportunities in a market economy. But once this initial stage is completed, studies show that students have a good image of entrepreneurship[14].

Entrepreneurship in foreign economies is not the subject of this report. One can remark, however, that, besides cultural and environmental differences, there is no major difference in the way this field of study is tackled. Differences will likely emerge as innovative ways of teaching entrepreneurship are developed in different countries.

[14] Glas, Miroslav, "Creating Entrepreneurial Awareness of Students of Business and Economics," Educating Entrepreneurs in Modernizing Economies, 1994

I. Innovation in Program Offering: The Shape of the Future

Entrepreneurship education is still a relatively young field of study. It can only rely on a limited experience base, many teachers are experimenting with new pedagogical methods to transfer entrepreneurial knowledge to students. The unforeseen growth in the number of entrepreneurship programs, from being offered in a few schools in the late 1960s to more than five hundred in the U.S. today, has generated significant curricular innovation of various qualities. The place where entrepreneurship is taught, the content of the studies, and the methods used to transfer the knowledge to students, are all being revisited by academic leaders to prepare entrepreneurship education for the twenty-first century.

Findings on the location of university entrepreneurship studies provide an interesting insight on the philosophy of this field of education. Entrepreneurship programs were originally developed in business schools. Small firms were treated as an area of focus within the field of management for students manifesting independence and creativity, and for whom large corporate structures would represent too much of a constraint. These programs are now evolving toward offering an introduction to management targeted for engineering students, based on the fact that high technology, however defined, is a major source of new venture creation. The philosophy of this type of program is to initiate innovators to the management their firms and commercialization of their products rather than to teach managers how to be creative and generate commercializable ideas.

One of the most successful entrepreneurship programs tailored for engineering students is the Stanford Technology Venture Program (STVP) offered at Stanford University's School of Engineering. Created in 1997 as an entrepreneurship center, STVP consists of a series of coordinated courses, programs, conferences, seminars, and research activities designed to promote entrepreneurial education. Its mission is to establish Stanford as the leading institution in accelerating high-technology entrepreneurship for engineers and scientists worldwide. Courses offered to undergraduate and graduate students include Management of Technology Ventures, Strategy in Technology-Based Firms, and Technology Venture Formation, among others.

Alongside these entrepreneurship programs specifically tailored for engineers, new initiatives focus on the development of programs for both managers and engineers, taught simultaneously in

business and engineering schools, in order to apply entrepreneurial notions to a specific field of study and industrial activity (See Appendix 5, "A Case Study: The Certificate in Biomedical Engineering Management at Georgia Tech"). The ultimate purpose of such programs is to train, along the course of the study, heterogeneous groups of students who combine the necessary skills to successfully create and develop a business firm in the technical field in which they matriculate.

The trends for entrepreneurship programs' curricular content have been reviewed in Part IX.A. We noted the increased use of computer-based training programs, "live cases," and the orientation of business plans towards products rather than services. Offering innovative courses in an entrepreneurship program requires substantial preparation for the professor. Research has shown that instructor's assumptions regarding the knowledge and experience students bring to class are usually too high[15]. Instructors relaxing certain requirements for entrepreneurship courses (business core prerequisites such as financial statement analysis, basic statistics, and organizational behavior) are more likely to experience a failure when introducing new courses. A factor determining whether a new course will be a failure or success is an accurate perception of the incoming students' skills and abilities. This preparation will become increasingly important as entrepreneurship education is directed towards engineers rather than managers.

In terms of methods for teaching entrepreneurship, the trend is to bring the "real world" to the classroom. We mentioned earlier that course structure was less important than live experimentation and originality in teaching entrepreneurship to university students. Involving outsiders as mentors to student groups is usually successful. Mentors tend to bring an invaluable realistic touch to class learning and projects. Combining live case presentations by entrepreneurs in class and a dinner with the entrepreneur and selected students is another way to add a more depth to this academic experience. Because there is now an abundance of literature that covers such topics as venture capital, bank loans, new products development, and small business export, the function of guest speakers will probably move away from being content providers to one of acting more as counselors and advisors to students.

The amount and diversity of experiments in entrepreneurship education are testimonial to the field's dynamism. In almost thirty years of existence, it has become a major component of university-

[15] Gartner, William B., Vesper, Karl H., "Experiments in Entrepreneurship Education: Successes and Failures," Journal of Business Venturing, 1994

level education, and has produced tangible results benefiting local communities and economies. Today's challenge for entrepreneurship education is to adapt to the economic globalization and set up programs that will train entrepreneurs to compete on larger scale markets.

II. Conclusions: The State of Entrepreneurship Education in the United States –A Plea for Balance

This report offers an overview of the role of small business in the U.S. economy, of technological innovation as a source of entrepreneurial dynamism, and of the key environmental forces in which new entrepreneurs operate. It has sought to identify the essential relationship between culture and entrepreneurship and the particular impact of American culture in this regard. Delineating the key issues in the educational debate surrounding entrepreneurship's place in the university and the proper scope and pedagogical methods of this new field, it has set in context the recent history of the entrepreneurship movement, its present status, and future evolution. The report has reviewed in some detail the unique part played by American higher education institutions in fostering entrepreneurship and the creation of start-up companies. Key educational programs have been identified and an effort made to assess their performance. The role of governmental support – based on a unique tripartite partnership between federal and state government as well as university systems- has been highlighted in connection with technology-driven entrepreneurship.

The United States can arguably rely on the most dynamic and innovative entrepreneurial sector among developed economies. For twenty years, small American firms have been the leading source of job creation in the country. They contribute to the flexibility of the American economy by virtue of their flexibility in terms of employment, especially during and immediately after a recession. In addition, they are particularly innovative in developing new products and services which benefit all segments of society by opening new markets, responding to real and perceived needs, and creating new customer demand. Finally, small firms are one of the main determinants of the American society's cohesion, providing access to social and economic recognition to minorities, immigrants, and women, among others.

The quality of the small business sector is maintained by much public and private initiatives, especially from the U.S. Small Business Administration, which provides financial and managerial assistance to entrepreneurs. American culture is also a source of support to entrepreneurs, who are admired as modern economic heroes. Most of all, the dynamism of American entrepreneurship is the consequence of a rich and diverse system of higher education, organized around a multitude of university-level programs.

The take-off of university education for entrepreneurs dates back to the early 1970s. Despite the relative youth of this field of study, entrepreneurship programs have spread all over the country and are now offered in more than four hundred institutions. Their focus is on the transfer of applicable knowledge through original, motivating ways, and by providing as much reality-based experience as possible. Such programs generally cover topics ranging from what an entrepreneur needs to know in order to plan his or her business, create a start-up, and manage the growth of its activity. Students are encouraged to develop their companies while at school, in order to benefit from universities' resources such as business and technology incubators.

In today's technology-based economy, entrepreneurship programs are turning to engineering students and researchers, in an effort to encourage them to market their ideas and findings and to develop further the innovative capacity of the American economy. Programs benefit from new technologies as well, experimenting with new teaching methods, using computer-based simulations, and infusing realism and "hands on" experience in the curriculum, and relying increasingly on distance learning to reach a larger audience.

America's entrepreneurial dynamism is without doubt the result, in good measure, of university programs that effectively train entrepreneurs to exploit new market's opportunities. The challenge for these programs in the coming years is to understand the place of entrepreneurship in a globaliz economy where borders are less relevant and the needs of entrepreneurs of the “Internet generation.” Yet a cautionary note of balance should be introduced. Even in America, a relatively small number of start-ups ever reach the big time. Alfred Chandler, an eminent business historian, argued that it is in the end the big companies that matter. This line of thinking is nowadays considered somewhat static. Yet the revival of the semiconductor industry was very much the result of the much-maligned behemoth IBM investing heavily in research and training. Some economists are concerned that America's present emphasis on lean entrepreneurship has gone too far. Kent Bowen argues that corporations have perhaps gone too far in shifting from basic research to product development. William Sahlman of Harvard Business School argues for a model that “makes the whole organization more opportunistic without destroying some of the reasons why people are bound to large organizations in the first place.”

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