Zoltan J. Acs' and David B. Audretsch's Prize Lecture: The Emergence of the Entrepreneurial Society

*2001 Award Winners**

Introduction

The role of entrepreneurship in society and has changed drastically over the last half century. During the post-war period the importance of entrepreneurship and business seemed to be fading away. While alarm was expressed that small business needed to be preserved and protected for the good of society, few made the case on the grounds of economic development.

This position was drastically reversed in recent years. Entrepreneurship has become the engine of economic and social development throughout the world. The purpose of this paper is to explain how and why the role of entrepreneurship has changed so much between the traditional and new economies. In the second section of the paper we explain what the role of entrepreneurship was in the traditional economy. The third section describes how a series of research projects and studies undertaken by Zoltan J. Acs and David B. Audretsch revealed a radically different role for entrepreneurship than had been commonly perceived and understood by the conventional wisdom. The emerging role of entrepreneurship and entrepreneurship policy is explained in the fourth section. Finally, a summary and conclusions are provided in the final section.

Entrepreneurship in the Traditional Economy

The widespread fear vis-à-vis the Soviet Union pervasive throughout the west at the end of the 1950s and early 1960s was not just that the Soviets might bury the West because they were the first into space with the launching of the *Sputnik*, but that the superior organization of industry facilitated by centralized planning was generating greater rates of growth in the Soviet Union. After all, the nations of Eastern Europe, and the Soviet Union in particular, had a "luxury" inherent in their systems of centralized planning – a concentration of economic assets on a scale beyond anything imaginable in the West, where the commitment to democracy seemingly imposed a concomitant commitment to economic decentralization.

Although there may have been considerable debate about what to do about the perceived Soviet threat some three decades ago, there was little doubt at that time that firm size mattered. And even more striking, when one reviews the literature of the day, there seemed to be near unanimity about the way in which industrial organization mattered. It is no doubt an irony of history that a remarkably similar version of the giantism embedded in Soviet doctrine, fueled by the writings of Marx and ultimately implemented by the iron fist of Stalin, was also prevalent throughout the West. This was the era of mass production when economies of scale seemed to be the decisive factor in dictating efficiency. This was the world the world so colorfully described by John Kenneth Galbraith (1956) in his theory of counterveiling power, in which the power of big business was held in check by big labor and by big government. This was the era of the man in the gray flannel suit and the organization man,[1] when veritually every major social and economic institution acted to reinforce the stability and preditability needed for mass production (Piore and Sabel 1984; Chandler 1977).

It became the task of a generation of scholars spanning a broad spectrum of academic fields and disciplines to sort out the issues involving this perceived trade-off between economic efficiency on the one hand and political and economic decentralization on the other. Scholars responded by producing a massive literature focusing on essentially three issues: (i) What are the gains to size and

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It was not until 2003 that the Award Winners were formally requested to give a Prize Lecture. Therefore, in cases where the lectures were missing the Award Winners were invited in 2008 to deliver a belated Prize Lecture in the form of a manuscript. This essay by Professor Zoltan J. Acs and Professor David B. Audretsch is from August 2008.

[1] For a description of these, see Whye (1960) and Riesman (1950).

large-scale production? (ii) What are the economic welfare implications of having an oligopolistic market structure, i.e. is economic performance promoted or reduced in an industry with just a handful of large-scale firms? and (iii) Given the overwhelming evidence that large-scale production resulting in economic concentration is associated with increased efficiency, what are the public policy implications?

Not only was the large corporation thought to have superior productive efficiency, but it was also believed to be the engine of technological change and innovative activity. Schumpeter wrote in 1942 (p. 106), "What we have got to accept is that the large-scale enterprise has come to be the most powerful engine of progress."

A fundamental characteristic of this literature was not only that it was obsessed with the oligopoly question but that it was essentially static in nature. There was considerable concern about what to do about the existing firms and industrial structure, but little attention was paid to where they came from and where they were going. Oliver Williamson's classic 1968 article "Economies as an Antitrust Defense: The Welfare Tradeoffs," became something of a final statement demonstrating what appeared to be an inevitable trade-off between the gains in productive efficiency that could be obtained through increased concentration and gains in terms of competition, and implicitly democracy, that could be achieved through decentralizing policies. But it did not seem possible to have both, certainly not in Williamson's completely static model.

The fundamental issue confronting western societies at that time was how to live with this apparent trade-off between concentration and efficiency on the one hand, and decentralization and democracy on the other. The public policy question of the day was: *How can society reap the benefits of the large corporation in an oligopolistic setting while avoiding or at least minimizing the costs imposed by a concentration of economic power?* The policy response was to constrain the freedom of firms to contract. Such policy restraints typically took the form of public ownership, regulation and competition policy or antitrust. At the time, considerable attention was devoted to what seemed like glaring differences in policy approaches to this apparent trade-off by different countries. France and Sweden resorted to government ownership of private business. Other countries, such as the Netherlands and Germany, tended to emphasize regulation. Still other countries, such as the Untied States, had a greater emphasis on antitrust. In fact, most countries relied upon elements of all three policy instruments. While the particular instrument may have varied across countries, they were, in fact, manifestations of a singular policy approach – how to restrict and restrain the power of the large corporation. What may have been perceived as a disparate set of policies at the time appears in retrospect to comprise a remarkably singular policy approach – a managed economy (Audretsch and Thurik 1999).

Thus, in the traditional, managed economies of the post-war era, small firms and entrepreneurship were viewed as a luxury, perhaps needed by the west to ensure a decentralization of decision making, but in any case obtained only at a cost to efficiency.

The Impact of Entrepreneurship in Markets

With the publication of *The Changing Structure of the U.S. Economy: Lessons from the Steel Industry*, Zoltan Acs (1984) shattered the prevalent conventional wisdom. While the industrial organization literature portrayed small firms as less efficient clones of the large corporations, Acs introduced a radically different view of the small firm. By arguing that entrepreneurs started new firms not to simply duplicate the incumbent firms but rather to deviate in an innovative manner, Acs challenged the conventional wisdom in industrial organization by proposing a second view of small firms – as *agents of change.* Under this alternative view, the dynamic contributions made by small firms far offsets any static efficiency losses.

Coase (1937) was awarded a Nobel Prize for explaining why a firm should exist. But why should more than one firm exist in an industry? One answer is provided by the traditional economics literature. An excess level of profitability induces entry into the industry. And this is why the entry of new firms is interesting and important – because the new firms provide an equilibrating function in the market, in that the levels of price and profit are restored to the competitive levels. The new firms are about business as usual – they simply equilibrate the market by providing more of it.

An alternative explanation for the entry of new firms was provided for by Acs (1984), in his seminal work on the emergence of the mini-mills in the United States steel industry. Acs showed how the traditional model of entry was unable to explain the startup of the minimills in an industry where the incumbent firms were experiencing negative profits and a loss in market share to foreign companies. Rather, Acs argued that the new firms entered the industry not simply to increase output by being smaller replica of the large incumbent enterprises but by serving as *agents of change.* The minimills produced a different product using different inputs and different production processes. This suggested that small firms, at least in some situations, were not about being smaller clones of the larger incumbents but rather about serving as agents of change through innovative activity.

The troublesome aspect of Acs' work was the implication that small entrepreneurial firms might actually have had the innovative advantage in the U.S. steel industry in the late 1970s and early 1980s. In fact, the prevalent view of the innovative process was that large corporations had a virtual monopoly on the innovative process. To reconcile the findings from the American steel industry, Acs teamed up with David Audretsch to investigate the determinants of innovative activity.

Knowledge regarding both the determinants and the impact of innovative has been largely shaped by measurement. Measures of technological change have typically involved one of the three major aspects of the innovative process: (1) a measure of inputs into the process, such as R&D expenditures, or the share of the labor force accounted for by employees involved in R&D activities; (2) an intermediate output, such as the number of inventions that have been patented; or (3) a direct measure of innovative output.

The earliest sources of data, R&D measured, indicated that virtually all of the innovative activity was undertaken by large corporations. As patent measures became available, the general qualitative conclusions did not change, although it became clear that small firms were more involved with patent activity than with R&D. The development of direct measures of innovative activity, such as data bases measuring new product and process introductions in the mar-

[1] Marshall himself, highly praising *Lancashire Cotton Industry* by S. Chapman, defined it: "both a realistic-impressionist study of human life, and an economic treatise" (Whitaker 1996, Vol. III, p. 93).

ket, indicated something quite different. In a series of studies, Acs and Audretsch (1987, 1988, 1990) found that while large firms in manufacturing introduced a slightly greater number of significant new innovations than entrepreneurial small firms, small-firm employment was only about half as great as large-firm employment, yielding an average small-firm innovation rate in manufacturing of 0.309, compared to a large-firm innovation rate of 0.202. The relative innovative advantage of small and large firms was found to vary considerably across industries. In some industries, such as computers and process control instruments, entrepreneurial small firms provide the engine of innovative activity. In other industries, such as pharmaceutical products and aircraft, large firms generate most of the innovative activity. Knowledge regarding both the determinants and the impact of technological change has been largely shaped by measurement.

Acs and Audretsch (1988, 1990) concluded that some industries are more conducive to small-firm entrepreneurial innovation while others foster the innovative activity of large corporations corresponds to the notion of distinct technological regimes – the routinized and entrepreneurial technological regimes.

The starting most for most theories of innovation had been the firm. In such theories the firms are exogenous and their performance in generating technological change is endogenous. For example, in the most prevalent model found in the literature of technological change, the model of the *knowledge production function,* formalized by Zvi Griliches (1979), firms exist exogenously and then engage in the pursuit of new economic knowledge as an input into the process of generating innovative activity.

The knowledge production function has been found to hold most strongly at broader levels of aggregation. Where the relationship becomes less compelling is at the disaggregated microeconomic level of the enterprise, establishment, or even line of business. For example, While Acs and Audretsch (1990) found that the simple correlation between R&D inputs and innovative output was 0.84 for four-digit standard industrial classification (SIC) manufacturing industries in the United States, it was only about half, 0.40 among the largest U.S. corporations.

The model of the knowledge production function becomes even less compelling in view of the evidence by Acs and Audretsch that entrepreneurial small firms are the engine of innovative activity in some industries, which raises the question, "Where do new and small firms get the innovation producing inputs, that is the knowledge?"

One answer, proposed by Audretsch (1995),[3] is that, although the model of the knowledge production function may still be valid, the implicitly assumed unit of observation – at the level of the firm – may be less valid. The reason why the knowledge production function holds more closely for more aggregated degrees of observation may be that investment in R&D and other sources of new knowledge spills over for economic exploitation by third-party firms.

A large literature has emerged focusing on what has become known as the *appropriabilitfy problem*.[2] The underlying issue revolves around how firms which invest in the creation of new economic knowledge can best appropriate the economic returns from that knowledge (Arrow 1962). Audretsch (1995) proposed shifting the unit of observation away from exogenously assumed firms to individuals -- agents with endowments of new economic knowledge. But when the lens is shifted away from focusing upon the firm as the relevant unit of observation to individuals, the relevant question becomes: *How can economic agents with a given endowment of new knowledge best appropriate the returns from that knowledge?*

The appropriability problem confronting the individual may converge with that confronting the firm. Economic agents can and do work for firms, and even if they do not, they can potentially be employed by an incumbent firm. In fact, in a model of perfect information with no agency costs, any positive economies of scale or scope will ensure that the appropriability problems of the firm and individual converge. If an agent has an idea for doing something different than is currently being practiced by the incumbent enterprises – both in terms of a new product or process and in terms of organization – the idea, which can be termed as an innovation, will be presented to the incumbent enterprise. Because of the assumption of perfect knowledge, both the firm and the agent would agree upon the expected value of the innovation. But to the degree that any economies of scale or scope exist, the expected value of implementing the innovation within the incumbent enterprise will exceed that of taking the innovation outside of the incumbent firm to start a new enterprise. Thus, the incumbent firm and the inventor of the idea would be expected to reach a bargain splitting the value added to the firm contributed by the innovation. The payment to the inventor – either in terms of a higher wage or some other means of remuneration – would be bounded between the expected value of the innovation if it implemented by the incumbent enterprise on the upper end, and by the return that the agent could expect to earn if he used it to launch a new enterprise on the lower end

The model proposed by Audretsch (1995) refocused the unit of observation away from firms deciding whether to increase their output from a level of zero to some positive amount in a new industry, to individual agents in possession of new knowledge that, due to uncertainty, may or may not have some positive economic value. It is the uncertainty inherent in new economic knowledge, combined with asymmetries between the agent possessing that knowledge and the decision making vertical hierarchy of the incumbent organization with respect to its expected value that potentially leads to a gap between the valuation of that knowledge.

Audretsch (1995) suggested that divergences in the expected value regarding new knowledge will, under certain conditions, lead an agent to exercise what Albert O. Hirschman (1970) has termed as *exit* rather than *voice*, and depart from an incumbent enterprise to launch a new firm. But who is right, the departing agents or those agents remaining in the organizational decision making hierarchy who, by assigning the new idea a relatively low value, have effectively driven the agent with the potential innovation away? *Ex post* the answer may not be too difficult. But given the uncertainty inherent in new knowledge, the answer is anything but trivial *a priori.*

This initial condition of not just uncertainty, but greater degree of uncertainty vis-à-vis incumbent enterprises in the industry is captured in the theory of firm selection and industry evolution proposed by Boyan Jovanovic (1982). The theory of firm selection is particularly appealing in view of the rather startling size of most new firms. For example, the mean size of more than 11,000 new-firm startups in the manufacturing sector in the United States was found to be fewer than eight workers per firm (Audretsch 1995). While the minimum efficient scale (MES) varies substantially across industri-

[2] See Cohen and Levin (1989) and Baldwin and Scott (1987).

es, and even to some degree across various product classes within any given industry, the observed size of most new firms is sufficiently small to ensure that the bulk of new firms will be operating at a suboptimal scale of output. Why would an entrepreneur start a new firm that would immediately be confronted by scale disadvantages?

An implication of the theory of firm selection is that new firms may begin at a small, even suboptimal, scale of output, and then if merited by subsequent performance expand. Those new firms that are successful will grow, whereas those that are not successful will remain small and may ultimately be forced to exit from the industry if they are operating at a suboptimal scale of output.

An important finding of Audretsch (1991, 1995) and Audretsch and Mahmood (1995) is that although entry may still occur in industries characterized by a high degree of scale economies, the likelihood of survival is considerably less. People will start new firms in an attempt to appropriate the expected value of their new ideas, or potential innovations, particularly under the entrepreneurial regime. As entrepreneurs gain experience in the market they learn in at least two ways. First, they discover whether they possess *the right stuff,* in terms of producing goods and offering services for which sufficient demand exists, as well as whether they can product that good more efficiently than their rivals. Second, they learn whether they can adapt to market conditions as well as to strategies engaged in by rival firms. In terms of the first type of learning, entrepreneurs who discover that they have a viable firm will tend to expand and ultimately survive. But what about those entrepreneurs who discover that they are either not efficient or not offering a product for which there is a viable demand? The answer is: *It depends – on the extent of scale economies as well as on conditions of demand*. The consequences of not being able to grow will depend, to a large degree, on the extent of scale economies. Thus, in markets with only negligible scale economies, firms have a considerably greater likelihood of survival. However, where scale economies play an important role the consequences of not growing are substantially more severe, as evidenced by a lower likelihood of survival.

What emerges from the new evolutionary theories and empirical evidence on the role of entrepneurial small firms is that markets are in motion, with a lot of new firms entering the industry and a lot of firms exiting out of the industry (Davis, Haltiwanger and Schuh 1996). The evolutionary view of the process of industry evolution is that new firms typically start at a very small scale of output. They are motivated by the desire to appropriate the expected value of new economic knowledge. But, depending upon the extent of scale economies in the industry, the firm may not be able to remain viable indefinitely at its startup size. Rather, if scale economies are anything other than negligible, the new firm is likely to have to grow to survival. The temporary survival of new firms is presumably supported through the deployment of a strategy of compensating factor differentials that enables the firm to discover whether or not it has a viable product.

The empirical evidence (Audretsch 1991; Audretsch and Mahmood 1995; Agarwal and Audretsch 2001) supports such an evolutionary view of the role of new firms in manufacturing, because the post-entry growth of firms that survive tends to be spurred by the extent to which there is a gap between the MES level of output and the size of the firm. However, the likelihood of any particular new firm surviving tends to decrease as this gap increases. Such new suboptimal scale firms are apparently engaged in the selection process. Only those firms offering a viable product that can be produced efficiently will grow and ultimately approach or attain the MES level of output. The remainder will stagnate, and depending upon the severity of the other selection mechanism – the extent of scale economies – may ultimately be forced to exit out of the industry. Thus, the persistence of an asymmetric firm-size distribution biased towards small-scale enterprise reflects the continuing process of the entry of new firms into industries and not necessarily the permanence of such small and sub-optimal enterprises over the long run. Although the skewed size distribution of firms persists with remarkable stability over long periods of time, a constant set of small and suboptimal scale firms does not appear to be responsible for this skewed distribution. Rather, by serving as agents of change, entrepreneurial firms provide an essential source of new ideas and experimentation that otherwise would remain untapped in the economy.

Entrepreneurship in The New Economy

When the Berlin Wall fell in 1989 many people expected even greater levels of economic well-being resulting from the dramatic reduction of the economic burden in the West that had been imposed by four decades of Cold War. Thus, the substantial unemployment and general economic stagnation during the subsequent eight years has come as a shock. Unemployment and stagnant growth are the twin economic problems confronting Europe and much of the OECD. The traditional comparative advantage in mature, technologically moderate industries such as metalworking, machine tools and automobile production had provided an engine for growth, high employment and economic stability throughout Western Europe for most of the Post-War economic period. This traditional comparative advantage has been lost in the high-cost countries of Europe and North America in the last decade for two reasons. The first has to do with globalisation, or the advent of competition from not just the emerging economies in Southeast Asia but also from the transforming economies of Central and Eastern Europe. The second factor has been the computer and telecommunications revolution. The new communications technologies have triggered a virtual spatial revolution in terms of the geography of production

Globalization has triggered a virtual spatial revolution in terms of the geography of production. The (marginal) cost of transforming information across geographic space has been rendered to virtually nothing. Confronted with lower cost competition in foreign locations, producers in the high-cost countries have three options apart from doing nothing and losing global market share: (1) reduce wages and other production costs sufficiently to compete with the low-cost foreign producers, (2) substitute equipment and technology for labor to increase productivity, and (3) shift production out of the high-cost location and into the low-cost location.

Many of the European and American firms that have successfully restructured resorted to the last two alternatives. Substituting capital and technology for labor, along with shifting production to lower-cost locations has resulted in waves of Corporate Downsizing throughout Europe and North America (Baily, Bartelsman and Hal-

[3] A similar start-up size for new manufacturing firms has been found by Dunne, Roberts and Samuelson (1989) for the U.S., Mata (1994) and Mata and Portugal (1994) for Portugal and Wagner (1994) for Germany.

tiwanger 1996). At the same time, it has generally preserved the viability of many of the large corporations. As record levels of both European and American stock indexes indicate, the companies have not generally suffered. For example, between 1979 and 1995 more than 43 million jobs were lost in the United States as a result of corporate downsizing. This includes 24.8 million blue-collar jobs and 18.7 million white-collar jobs. Similarly, the 500 largest U.S. manufacturing corporations cut 4.7 million jobs between 1980 and 1993, or one quarter of their work force. Perhaps most disconcerting, the rate of corporate downsizing has apparently increased over time in the United States, even as the unemployment rate has fallen. During most of the 1980s, about one in 25 workers lost a job. In the 1990s this has risen to one in 20 workers.

Globalisation has rendered the comparative advantage in traditional moderate technology industries incompatible with high wage levels. At the same time, the emerging comparative advantage that is compatible with high wage levels is based on innovative activity. For example, employment has increased by 15 percent in Silicon Valley between 1992 and 1996, even though the mean income is 50 percent greater than in the rest of the country.

The global demand for innovative products in knowledge-based industries is high and growing rapidly; yet the number of workers who can contribute to producing and commercializing new knowledge is limited to just a few areas in the world. Economic activity based on new knowledge generates higher wages and greater employment opportunities reflecting the exploding demand for new and improved products and services. There are many indicators reflecting the shift in the comparative advantage of the high-wage countries towards an increased importance of innovative activity.

There are two fundamental characteristics of knowledge that differentiate from the traditional factors of production in the traditional economy. The first is that knowledge has increased the importance of geographic proximity. The second, is that the greater degree of uncertainty, asymmetries and transactions cost lead to an increased role of entrepreneurial activity. Systematic empirical evidence point to a marked shift across OECD countries towards a greater role played by small entrepreneurial firms (Acs and Audretsch 1993; Loveman and Sengenberger 1991; Davis and Henrekson 1999; Henrekson and Johansson 1999).

As illustrated by the title page of *The Economist* proclaiming *The Death of Distance,*[4] the claim that geographic location is important to the process linking knowledge spillovers to innovative activity in a world of E-mail, fax machines and cyberspace may seem surprising and even paradoxical. The resolution to the paradox posed by the localisation of knowledge spillovers in an era where the telecommunications revolution has drastically reduced the cost of communication lies in a distinction between knowledge and information. *Information*, such as the price of gold on the New York Stock Exchange, or the value of the Yen in London, can be easily codified and has a singular meaning and interpretation. By contrast, *knowledge* is vague, difficult to codify and often only serendipitously recognised. While the marginal cost of transmitting information across geographic space has been rendered invariant by the telecommunications revolution, the marginal cost of transmitting knowledge, and especially tacit knowledge, rises with distance. Geographic proximity matters in transmitting knowledge, because as Kenneth Arrow (1962) pointed out some four decades ago, such tacit knowledge is inherently non-rival in nature, and knowledge developed for any particular application can easily spill over and have economic value in very different applications.

The consistent empirical evidence that supports the notion knowledge spills over for third-party use from university research laboratories as well as industry R&D laboratories. This empirical evidence suggests that location and proximity clearly matter in exploiting knowledge spillovers. Acs, Audretsch and Feldman (1992, 1994), Anselin, Acs and Varga (2000), Feldman and Audretsch (1998) and Audretsch and Feldman (1996) found that the propensity of innovative activity to cluster geographically tends to be greater in industries where new economic knowledge plays a more important role. This finding is supported by Audretsch and Stephan (1996) who examine the geographic relationships of scientists working with biotechnology firms. The importance of geographic proximity is clearly shaped by the role played by the scientist. The scientist is more likely to be located in the same region as the firm when the relationship involves the transfer of new economic knowledge. However, when the scientist is providing a service to the company that does not involve knowledge transfer, local proximity becomes much less important.

Globalization is shifting the comparative advantage in the OECD countries away from being based on traditional inputs of production, such as land, labor and capital, towards knowledge. As the comparative advantage has become increasingly based on new knowledge, public policy has responded in two fundamental ways. The first has been to shift the policy focus away from the traditional triad of policy instruments essentially constraining the freedom of firms to contract – regulation, competition policy or antitrust in the U.S., and public ownership of business. The policy approach of constraint was sensible as long as the major issue was how to restrain large corporations in possession of considerable market power. That this policy is less relevant in a global economy is reflected by the waves of deregulation and privatisation throughout the OECD. Instead, a new policy approach is emerging which focuses on enabling the creation and commercialisation of knowledge. Examples of such policies include encouraging R&D, venture capital and new-firm startups.

Probably the greatest and most salient shift in SME policy over the last fifteen years has been a shift from trying to preserve SMEs that are confronted with a cost disadvantage due to size inherent scale disadvantages, towards promoting the startup and viability of small entrepreneurial firms involved in the commercialization of knowledge, or knowledge-based SMEs.

For example, the United States Congress enacted the Small Business Innovation Research (SBIR) program in the early 1980s as a response to the loss of American competitiveness in global markets. Congress mandated each federal agency with allocating around four percent of its annual budget to funding innovative small firms as a mechanism for restoring American international competitiveness. The SBIR provides a mandate to the major R&D agencies in the United States to allocate a share of the research budget to innovative small firms. Last year the SBIR program amounted to around $1.2 billion. The SBIR represents about 60 percent of all public SME finance programs. Taken together, the public SME finance is about two-thirds as large as private venture capital. In 1995, the sum of equity financing provided through and guaranteed by public pro-

[4] "The Death of Distance," *The Economist*, 30 September, 1995.

grams financing SMEs was $2.4 billion, which amounted to more than 60 percent of the total funding disbursed by traditional venture funds in that year. Equally as important, the emphasis on SBIR and most public funds is on early stage finance, which is generally ignored by private venture capital. Some of the most innovative American companies received early stage finance from SBIR, including Apple Computer, Chiron, Compaq and Intel.

The second fundamental shift involves the locus of such enabling policies, which are increasingly at the state, regional or even local level. The downsizing of federal agencies charged with the regulation of business in many of the OECD countries has been interpreted by many scholars as the eclipse of government intervention. But to interpret deregulation, privatisation and the increased irrelevance of competition policies as the end of government intervention in business ignores an important shift in the locus and target of public policy. The last decade has seen the emergence of a broad spectrum of enabling policy initiatives that fall outside of the jurisdiction of the traditional regulatory agencies. The success of a number of different high-technology clusters spanning a number of developed countries is the direct result of enabling policies, such as the provision of venture capital or research support. For example, the Advanced Research Program in Texas has provided support for basic research and the strengthening of the infrastructure of the University of Texas, which has played a central role in developing a high-technology cluster around Austin. The Thomas Edison Centers in Ohio, the Advanced Technology Centers in New Jersey, and the Centers for Advanced Technology at Case Western Reserve University, Rutgers University and the University of Rochester have supported generic, precompetitive research. This support has generally provided diversified technology development involving a mix of activities encompassing a broad spectrum of industrial collaborators.

One of the most interesting examples of entrepreneurial policy involves the establishment of five EXIST regions in Germany, where startups from universities and government research laboratories are encouraged (BMBF 2000). The program has the explicit goals of (1) creating an entrepreneurial culture, (2) the commercialization of scientific knowledge, and (3) increasing the number of innovative start-ups and SMEs. Five regions were selected among many applicants for START funding. These are the (1) Rhein-Ruhr region (bizeps program), (2) Dresden (Dresden exists), (3) Thueringen (GET UP), (4) Karlsruhe (KEIM), and (5) Stuttgart (PUSH!).

Such enabling policies that are typically implemented at the local or regional level are part of a silent policy revolution currently underway. The increased importance of innovative regional clusters as an engine of economic growth has led policy makers to abandon the policy cry frequently heard two decades ago, "Should we break up, regulate, or simply take over General Motors, IBM and U.S. Steel?" for a very different contemporary version, "How can we grow the next Silicon Valley?"

Conclusions

The role of entrepreneurship and small business has evolved considerably since World War II. What was once considered to be a perhaps necessary drain on western economies has become a central strategic instrument for competitiveness in global markets. Just as it has been important to understand how to manage entrepreneurial firms, it has now become at least as important to understand how to achieve an entrepreneurial society. While this emphasis on small entrepreneurial firms as engines of dynamic efficiency may seem startling after decades at looking to the corporate giants as engines of growth and development may not be so new. Before the country was even half a century old, Alexis de Tocqueville, in 1835, reported, "What astonishes me in the United States is not so much the marvellous grandeur of some undertakings as the innumerable multitude of small ones."

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