Small and Medium-Sized Enterprises, Technology, and Globalization: Introduction to a Special Issue on Small and Medium-Sized Enterprises in the Global Economy

Zoltan J. Acs
Lee Preston

Abstract. This paper is an introduction to the special issue on Small and Medium-Sized Enterprises in the Global Economy. The paper gives a broad outline of globalization, the role of technology, and examines the role that small and medium-sized enterprises play in the global economy. We focus on foreign direct investment of small technology based firms and how their innovations diffuse into the global economy.

There is little question that economic activity of all types is moving in the direction of globalization. As we approach the 21st century, a worldwide system of production and distribution is evolving, in much the same way as national markets evolved from local and regional networks during the 19th century (Chandler, 1990). In nearly every economically active country of the world, the importance of international trade and foreign direct investment (FDI) have risen significantly over the last decade. The growth of FDI has been particularly dramatic, increasing more rapidly than either world production or world trade. As a result, both inbound and outbound FDI stocks have increased relative to total investment and gross domestic product in nearly every country (Dunning, 1995).

Globalization refers to the web of linkages and interconnections between states, societies, and organizations that make up the present world economic system. Globalization creates new structures and new relationships, with the result that business decisions and actions in one part of the world have significant consequences in other places. Underlying and reinforcing these globalization trends is the rapidly changing technological environment, particularly in biotechnology, information processing, and telecommunications. Changes in telecommunications and data processing capabilities make it possible to coordinate research, marketing and production operation around the world. Almost instantaneous communications makes it possible to trade financial instruments twenty-four hours a day: and thus more return-sensitive are location of resources within firms, industries and countries.

The growth of global markets stimulates competition and forces governments to adopt market-oriented policies, both domestically and internationally. Modern technologies have greatly reduced the cost of information and the capabilities to participate in the global economy (Dunning, 1993). Countries must join the club. Policies that aim to exclude global participation via trade and investment barriers can be easily circumvented, and they keep no hostages but deprive the countries of global prosperity.

Along with the globalization trend, contemporary technical advances are demanding a much

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Zoltan J. Acs
U.S. Small Business Administration and
Merrick School of Business
University of Baltimore
Baltimore, MD 21201-5779

and

Lee Preston
College of Business and Management
University of Maryland
College Park, MD 20742

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closer synthesis and more integrative learning between innovative and production activities. The pressures of global competition force producers to continually innovate, and to upgrade the quality of existing products. Yet, at the same time, many firms can no longer acquire or afford all the technological and human resources that they need. Increasingly, they form interdependent and flexible relationships with other firms – including suppliers and competing firms – to fully capitalize on their core competencies (Gomes-Casseres, 1996). Interdependence calls for a capacity on the part of firms, individuals, and governments to interact with speed, flexibility and creativity to the actions of other agents (de la Mothe and Paquet, 1996).

In this new environment knowledge and intellectual labor are being mobilized on a more collaborative basis. Firms must develop human resource strategies based on synthesis with educational institutions. They must locate design and production facilities in metropolitan areas that allow partnerships with suppliers and educational institutions, and in places served by governments committed to business-friendly policies. The main form of economic organization in intermediary product markets is increasingly a network of interfirm cooperative arrangements, rather than the large hierarchical firm (Reich, 1992).

Advancement in technologies and management skills have blurred firm boundaries. Before 1980 most FDI was of the "stand alone" variety. Each Multinational Enterprise (MNE) would exploit its own home-based competitive advantages and coordinate related intra-firm activities across national boundaries through internal mechanisms. More recently, however, MNEs are expanding their territorial and functional horizons by acquiring, or gaining access to, new resources and capabilities. The critical feature of strategic asset-seeking FDI, as opposed to market-seeking FDI, is that participating firms recognize that their stand-alone resources and capabilities are *insufficient* to sustain their international competitiveness, and that they need to draw upon resources and capabilities of others to achieve this goal. While there are may reasons why firms form alliances with other firms, the great majority of those concluded over the past decade have been to gain access to new product or process, technologies and organizational competencies, especially those perceived necessary to advance their core competencies.

Globalization challenges management and students of business economics. According to conventional wisdom, most transnational business activities, particularly those involving FDI or cross-border alliances, are traditionally carried out by large firms. In addition, some people have believed that technological change requires increasingly large scale total operations, along with increasing size of research and development resources. These views would lead one to expect that small enterprises would decline in importance as they become overwhelmed by global firms exploiting economies of scale.

As the readers of this *Journal* well know, there is considerable evidence that these commonly held views are no longer correct. Depending upon the measure of business size examined, the long-term trend toward increasing firm size either decelerated, ceased, or reversed itself sometime between the late 1960s and the late 1970s (Acs, 1996). This leads to an interesting question: "Is the apparent resurgence of smaller firms due to the emergence of a dynamic, vital innovative entrepreneurial sector, or is it due to the inability of large incumbent MNEs to prevail in a technologically dynamic global environment?"

Harrison (1994) has argued that the role of SMEs has been overestimated, and that MNEs have been able to prosper in the new global environment by combining four basic building blocks: returning to their core competencies; using new information technologies; forming strategic alliances; and eliciting more active collaboration from their workers. However, this view overlooks the synergy between large and small firms, the strong attachment of small firms to their local economies, the role of small firms in technological change, and the role they play in the growth and evolution of industries (Acs, 1995). In fact, there is ample evidence that small and medium sized enterprise (SMEs) have not only flourished in domestic economies, but that their international presence has grown as well (UNCTAD, 1993; Masataka, 1995a and 1995b; Admiraal, 1996; and Buckley et al., in press). However, very little is known about the processes by which SMEs participate in the global economy.

For this reason, the Center for International Business Education and Research (CIBER) at the University of Maryland organized a conference of experts on "Small and Medium Sized Enterprises and the Global Economy", held on October 20, 1995.

The conference was organized by Zoltan J. Acs, then Associate Director of CIBER. The primary focus of the conference was on the role that technology and network organizations play in the global activities of SMEs. Participants in this conference examined the role of SMEs in the identification of technological opportunity, technological diversity and geographical localization, technology transfer, R&D spillovers, strategic alliances, and the international diffusion of innovations. The papers appearing in this special issue of *Small Business Economics* are revised versions of those presented on that occasion.

An overview of SME participation in the global economy reveals at least three lines of activity: trade, technology, and investment. The most commonly discussed topic in SMEs international literature is their role as exporters from their domestic jurisdictions to foreign customers. The opportunities and challenges facing SMEs in this role are well known. The conference papers do not address these topics in any detail. Instead, they see that export activity as linked to the other activities that are given greater emphasis here.

The second most prominent issue in the literature is SMEs and technology, and particularly SME supplier connections with larger MNEs in local markets. In their simplest form, these connections involve "intra-national exports," that is, domestic sales to foreign firms, who happen to be operating within the home country of the supplier. The importance of these connections is stressed by Porter (1993), in his discussion of the role of "related and supporting industries", and Dunning (1993) under the heading of "linkages and spillover effects" of MNEs. These connections came up for explicit attention at the conference primarily in connection with technological opportunity, technologic diversity, technology transfer, and R&D spillovers. The emphasis was mostly on transfer of technology from MNEs to their SME suppliers and costumers, although it was also acknowledged the MNEs might also acquire the appropriate technology from local SMEs, and possibly eventually acquire the SME firms themselves as well.

The final issue is the SME role in investment, the connection between SMEs and FDI. SMEs may evolve as multinationals either through their own investments or as a result of the formation of alliances. The questions of why SMEs go abroad, how they do it, and what are the consequences of this activity are examined carefully in the papers in this volume.

We start by examining the technological basis of SMEs. Though in aggregate SMEs spend less on R&D than large firms, they produce almost twice as many innovations on a per employee basis (Acs and Audretsch, 1990). In 1993 U.S., SMEs receive 3.8 percent of federal R&D dollars and performed 14.5 percent of company funded industrial R&D (U.S. National Science Foundation, 1996). In 1991 SMEs received 40 percent of all domestic utility patents granted in the United States (U.S Patent and Trademark Office, 1996).

Recently Cohen and Klepper (1996) have suggested that while small firms may be superior in the *generation* of new knowledge, larger firms are superior in their ability to *appropriate returns* from these innovations, either by buying property rights, acquiring the firms or benefiting through spillovers. This raised two important questions: (1) Why are SMEs superior innovators in the first place? and (2) How do we explain the superior innovative performance of SMEs if they spend less on R&D than large firms?

Why SMEs are superior innovators is examined in the first paper by Acs, Morck, Shaver and Yeung. The critical role of property rights in capitalist economies is becoming increasingly evident. Societies must protect innovators' property rights to the gains from their innovations. An additional angle in the paper is that it also emphasizes an innovator's property rights within an organization. An innovator in a large company only has very limited property rights protection. The new product, process, etc. generally belongs to the firm, not the employee who invented it. This reduces creative employees' incentives to innovate for the company. The lack of clear property rights in large corporations creates perverse incentives for both employees and managers. Both can benefit from "free riding" on other people's innovative efforts and results.

In contrast to innovative employees in large firms, independent innovators can hold clear property rights, can have every incentive to undertake radical innovations, and can be largely free of red tape. Thus they argue that SMEs are better at creating radical innovations because they better protect the innovator's property rights.

Acs et al. further argue that the international diffusion of SMEs innovations is important for global economic welfare. However, SMEs have only limited operations abroad. One reason for this is barriers to entry. Barriers to entry that limit international expansion are systematically higher for SMEs than for larger firms. The other reason is that SMEs have less resources to protect their property rights. The Authors suggest that these difficulties faced by SMEs in international markets can frequently be circumvented by using existing MNEs as international conduits for SMEs innovations. MNEs can thus be catalysts and facilitator of smaller firms' international expansion.

While direct expansion by SMEs is the subject of much discussion, the *intermediated* possibility had not been given much attention. However, such intermediated modes of expansion are adversely affected by transaction difficulties and intermediator's rent extraction, which are topics explored in greater details in Gomes-Casseres, Kohn, and Eden's papers. Acs et.al. raise several conceptual considerations important in comparing the two modes of international expansion, and identify the conditions for private market arrangements to be efficient. They do not believe direct subsidies to SMEs going abroad are advisable.

How do we explain the superior innovative performance of SMEs? In a recent study Jaffe et al. (1993) analyzed patent citation data pertaining to domestic university and corporate patents to test the extent of localization of knowledge spillovers. Almeida and Kogut (1995) found that localization of patentable knowledge varies across regions. Semiconductor knowledge in the Silicon Valley and New York triangle tends to be localized. This suggests that complementarities are important. (Feldman, 1996). Recent literature has suggested that SMEs benefit from R&D spillovers from university research and private research at large firms (Acs, Audretsch and Feldman, 1994; and Anselin, Varga and Acs, 1996).

But why should this phenomenon of regional networking benefit smaller firms rather than larger ones? One reason, perhaps, is that larger firms, because of their property rights and incentive structure, are more self reliant and do not emphasize building relationships with other institutions in the region. By definition of a start up, the personnel in a new company will have a shorter tenure in the company, and recent experience in other firms.

To study the influence of geographic localization and technological diversity on innovation Almeida and Kogut in the second paper examine the origins of citations to 170 major patents in the semiconductor industry. Field research, consisting of interviews with semiconductor engineers and other informed individuals, served to complemented the patent analysis. They argue (1) that start ups gain their comparative innovative advantage by exploring new technological spaces that may be overlooked by larger firms, and (2) that this process is facilitated by regional networking which permits small firms to obtain and use knowledge more efficiently than large firms. They find that start-ups produce innovations in less crowded technological space than larger firms. That is, small firms are more likely to explore technologically diverse territories. Their empirical results pinpoint how smaller firms make radical innovations and compliment the theoretical conjecture in Acs et al.

While knowledge is localized for both start-ups and other firms, start-ups are more closely tied into regional networks since they depend on networks for critical knowledge inputs. Knowledge was more localized for start-ups than other firms with groups of entrepreneurs playing a crucial role. If knowledge flows are localized, then firms located in distant regions are excluded from knowledge networks. It is this local character of the networks that is their potential link with globalization (Acs, de la Mothe and Pacquet, 1996). Therefore, small technology-based firms are attractive acquisition targets for MNEs interested in entering new technological networks. About 10 percent of the 38,000 new high tech establishments listed in the Corp Tech data base had foreign ownership in 1994 (Science and Engineering Indicators, 1996, pp. 6–29).

The next two papers offer examples of the intermediated form of international expansion by

SMEs. If small firms face higher barriers to entry in international operations than large firms, and have a more difficult time protecting their property rights, how can small firms become international players? When SMEs invest abroad they generally seek help. In the third paper, Gomes-Casseres examines the use of strategic alliances by SMEs. He asks three questions: (1) When do small firms use alliances to do business abroad? (2) How do small businesses use alliances? and (3) What effect do alliances have on firms competitive performance? The paper defines a new unit of competition called a "constellation". A constellation is a set of firms linked together by alliances. The paper finds that small firms can follow one of two different approaches to alliances, depending on their relative size. Firms that are small relative to competitors and to the requirements of the market tend to use alliances to reach scale and scope economies. Firms that are large relative to the same benchmark, rely on internal capabilities to expand.

In any event, the evidence shows that SMEs, against the expectations of many traditional scholars, are active players in the international arena. In the fourth paper, Kohn examines *how* SMEs play the international game when they choose not to team up with larger partners. He finds that most small multinational firms follow a "deep niche strategy". That is, their positions were characterized by market dominance and technological leadership, and by a focus on producer goods. Also, small firms tend to invest in younger industries rather than more mature ones. In fact, Gomes-Casseres and Kohn (forthcoming) found that SMEs had fewer, not more, alliances than one might have expected.

Do SMEs face higher transaction costs than MNEs in international expansion? The fifth paper in this issue examines the role of transaction costs in international expansion. Eden, Levitas and Martinez survey a large literature dealing with international business, entrepreneurship, and technical change; they provide a link between the technological literature on SMEs and the technological literature on MNEs.

The paper examines three aspects of technology: (1) technology as a firm-specific advantage, (2) the costs of technology transfer, and (3) technology spillovers. In each case they outline current views and debates in the field about the role played by the large multinationals which, according to the statistical evidence, are the world's principal technology producers. Finally, they compare the ability of large and small firms to profit from technology. They suggest that SMEs are less likely to be able to properly manage the technology transfer process when problems occur.

In terms of the costs of technology transfer, they suggest that SMEs may face higher transaction costs that large MNEs. Although SMEs, due to their relative size, benefit from reduced bureaucratic costs, they also have fewer resources to devote to search, negotiation, monitoring and enforcement efforts. They may also be more subject to opportunistic behavior on the part of suppliers and buyers due to their smaller size and corresponding inability to retaliate. Finally, SMEs may be less likely to have a tight appropriability regime protecting their knowledge-base, and therefore may face higher risks of dissipation and its attendant costs. This view is consistent with Cohen and Klepper (1996)

If small technology-based firms have in fact become international players, then how large a role are they playing in the global economy? The fifth article by Buckley examines the role of SMEs in technology transfer. It relies for its empirical evidence on the United Nations Conference on Trade and Development (UNCTAD) report on small and medium sized multinational corporations (UNCTAD, 1993). The UNCTAD study on technology transfer found that SMEs, like MNEs, transferred technology internationally from the parent firm. The most common vehicle for international transfer is via a joint venture with a host country company. This however is much less formalized than in large MNEs. Three types of technologies are picked up by SMEs: small scale technologies, labor intensive technologies, and specialized high technology know-how. The latter included biotechnology and microelectronics. These firms frequently utilize joint ventures, and non-equity licensing deals and alliances.

Finally, Reynolds revisit's an old question: "Do larger markets favor larger firms?" A number of recent analyses and events suggest that the types of large markets currently in development not only provide substantial opportunities for SMEs, but that a dynamic new and small firm sector is critical for economic growth in these markets. This

brings us full circle to the issues initially raised by Acs et al. and Almeida and Kogut. Rather than weak and vulnerable entities that may require subsidies, new and small firms may not only thrive in new global markets, but maybe a necessary component for enhanced economic well-being (Lucas, 1988).

The international diffusion of new innovations is crucial for continuing improvement of global economic welfare. In the diffusion process SMEs face two serious challenges: property rights protection and barriers to entry. If the rate of creative destruction is indeed too low, public policies should aim to increase the creation and international diffusion of innovations by SMEs. The analysis in the papers that follow suggests that policies should aim to reduce the costs in international expansion for SMEs. That is, policies should aim to reduce private market costs incurred for the protection of property rights, to reduce entry barriers, and to reduce transaction costs. We should note, however, the suggestions rely on the premises that we have to little creative destruction. The broader question whether we have to much or too little creative destruction is not yet addressed. This basic question deserves our research attention.

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