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# The competitive characteristics of small- and medium-sized manufacturing firms in the US and Canada: empirical evidence from a crossborder region.

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## Abstract

This paper examines the competitive characteristics of small and medium-sized manufacturing firms (SMFs) in a Canada-US crossborder region (the Niagara Frontier). Particular attention is given to the innovation and business performance of comparably-sized firms on both sides of the border. The results of two firm-level surveys are presented. A comparative analysis of the two groups suggests that Canadian SMFs exhibit significantly stronger export and innovation performance than their US counterparts. The results also suggest that US firms face tougher competitive difficulties arising from specific national and regional circumstances, including shortages of skilled labor, higher corporate tax rates, rising import competition, and a more complex regulatory environment. The implications of the empirical results are discussed in the context of policy options for regional economic development in crossborder zones such as the Niagara Frontier.

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## Introduction

There is growing agreement that small and medium-sized manufacturing firms (SMFs) can play an important role in technological change (Freeman, 1991; Malecki, 1994, 1997), export development (Berman, 1994; Dichtl et al., 1984, 1990; Samiee and Walters, 1990), and employment growth (Birch, 1979, 1987; Lyons, 1995). Innovative SMFs have attracted mounting policy attention across many of the advanced market economies (Shapira et al, 1995), not least because of their ability to retain industrial jobs at a time when large companies have been undergoing significant downsizing (Ceh, 1996; Shearmur and Coffey, 1997). In recent years, moreover, certain types of SMFs have been identified as important sources of innovation (new product development), as witnessed by recent studies from the US (Acs et al., 1994), Canada (Ceh, 1996), Britain (Rothwell, 1991; Rothwell and Whitson, 1992) and several European nations (Maillat, 1990). In the US, for example, SMFs have been shown to outperform their larger counterparts across a variety of innovation measures, including patent counts (Jaffe, 1986; Jaffe et al, 1994), rates of new product launch (Feldman and Florida, 1994), and R&D productivity (Koeller, 1995). At the same time, the US evidence continues to reveal an important role for SMFs as far as industrial job growth is concerned (Lyons, 1995). In short, there is evidence that industrial SMFs can make a significant contribution to regional economic development (Gertler, 1991). It would appear, moreover, that part of this development contribution can be traced to export activity based upon continuous product innovation (Britton, 1985, 1996).

On a more cautious note, the importance of SMFs to job creation and/or technological change should not be overstated. On the Canadian side of the debate, for example, several authors have revealed an element of exaggeration regarding the employment role of small firms (e.g. Baldwin, 1996; Picot et al., 1994; Picot and Dupuy, 1996), and the same has been argued on the US side (e.g. Davis et al., 1996; Harrison, 1994). While the debate over the economic contribution of SMFs is likely to continue for some time, especially in light of well-publicized reservations regarding the accuracy of earlier studies (e.g. Birch, 1979, 1987), regions that depend upon small firms have an obvious interest in assessing the extent to which SMFs can promote economic development.

This said, the competitive performance of similar types of SMFs is known to vary across regions (Acs et al., 1994; O'Farrell and Hitchens, 1994). In other words, differences in local competitiveness can influence the performance of SMFs, in that few regions exhibit identical sets of conditions for industrial development. Even in the face of similar economic circumstances across regions, SMFs will often exhibit different performance characteristics because production systems are a function of a complex combination of skills and information. Furthermore, strategic (e.g., policy scenario, geographic location) as well as technological, economic and/or social factors affect local competitiveness. According to Porter (1990, 1991), for instance, variations in regional/local competitiveness can be traced to differences in factor endowments (e.g., the supply of skilled labor), demand conditions (e.g. the existence or absence of technologically advanced customers), government policy (e.g. antitrust legislation, R&D subsidies), the relative presence of related or supporting industries, and/or the degree of rivalry between similar types of firms within any given region. Such lists of critical factors conducive toward entrepreneurial growth are numerous (Amin and Thrift, 1993, 1994; Bearse, 1981; Bruno and Tyebjee, 1982; Cooke and Morgan, 1994a and 1994b; Shapero, 1984; OTA, 1984; Dubini, 1989; Sweeney, 1987; Smilor and Feeser, 1991; also, see Malecki for a discussion of these critical factors pp. 164-170). Recent researchers emphasize the importance of public and private institutions, inter-institutional and inter-firm networking, as well as the innovation receptiveness of SMFs as a factor in local/regional competitiveness (Braczyk et al. 1998). All agree that one of the most critical factors is urban size. Therefore, the ideal setting would be "where firms take

advantage of agglomeration and proximity to utilize nearby sources of information, skilled labor, technology and capital. Standing in sharp contrast, the predominant empirical finding about small firms in peripheral areas is their relatively low level of innovativeness " (Malecki, 1997, p. 170).

Set against this backdrop, our purpose in this paper is to explore similarities and differences in the innovation performance, growth characteristics, techno-market goals, and competitive problems of US and Canadian SMFs in the crossborder region of the Niagara Frontier (which includes Southern Ontario and Western New York). This binational region contains a substantial stock of industrial SMFs operating in similar sectors (McConnell, 1996). SMFs in this region have long relied heavily upon bilateral trade (Freshwater, 1993). The study region also contains a wide array of policy agencies and/or private institutions that actively emphasize and support export-oriented growth (McLean, 1997). An interesting feature of the Niagara Frontier is that policy agencies on both sides of the border often treat the region as a unified territory as far as long-range planning is concerned. For example, transportation planning is bilaterally coordinated (Peace Bridge Authority, 1997); the region advertises itself as a single unit for the promotion of inward investment (Canada-United States Trade Center, 1998); regulatory policies for international commerce have been harmonized under the FTA and NAFTA (Rugman et al., 1997); the regions' universities are linked through numerous educational alliances (McConnell, 1997); private companies have increasingly fostered crossborder joint ventures for marketing purposes (McLean, 1997); and most of the trade that takes place between the US and Canada across the Niagara River is organized on an intrafirm basis (Hartung, 1995). It is no surprise, then, that economic development agencies frequently ignore the national boundary when it comes to strategic planning.

While the perception of 'one region/two nations' is quite widespread within the Niagara Frontier, the growing permeability of the border has not, in itself, created a unified territory as far as business conditions are concerned. Macroeconomic circumstances and national policy structures differ appreciably (and sometimes unpredictably). For instance, Canadian exporters currently operate with a weak dollar and state-subsidized health care for workers, whereas US exporters 'enjoy' the opposite. In a similar vein, US firms enjoy lower minimum wage legislation than their Canadian counterparts, as well as more powerful trade remedy laws (Rugman et al., 1997). In short, the concept of 'one region/two nations' cannot be stretched too far. It should be recognized that the Canadian side of the Niagara Frontier is part of Canada's economic/industrial heartland, whereas the US side exhibits all of the familiar attributes one normally associates with a declining region. To an extent, then, these environmental contrasts may play a role in some of the regional differences in SMF behavior discussed later in the paper.

Keeping this backdrop in mind, four principal questions are addressed in the empirical analysis which follows. First, are there significant variations in the competitive characteristics of US and Canadian SMFs in the study region? Second, do these SMFs exhibit different types of competitive problems? Third, are there significant variations in the technological and/or market-related goals of these firms? And, fourth, are there significant differences in the types of external technical services that these firms exploit for innovation and/or export-related purposes? Partial answers to these questions come from two firm-level surveys that were conducted by the authors over the period 1994-1996. Before we discuss the survey results, however, it is important to establish a regional context for the inquiry. Why is the Niagara Frontier worth studying as a case example? And, why would we expect to find organizational and/or performance variations among firms within this particular study area?

## Regional Context

From a regional perspective, the Niagara Frontier represents a crossborder economy that has become increasingly integrated over the last few years (Cole, 1990; MacPherson and McConnell, 1992). The study region includes 12 municipalities between Lake Erie and Ontario on the Canadian side (Fort Erie, Grimsby, Lincoln, Niagara Falls, Niagara-on-the-Lake, Pelham, Port Colborne, St. Catharines, Thorold, Wainfleet, Welland, and West Lincoln) and nine counties on the US side (Allegany, Cattaraugus, Chatauqua, Erie, Genesee, Monroe, Niagara, Orleans, and Wyoming). The 1989 Canada-United States Free Trade Agreement (FTA) has played an important role in this integration thrust, notably in terms of increased bilateral trade (Hartung, 1995), foreign direct investment (MacPherson, 1996), and crossborder shopping (Canadian Consulate, 1996). The Canadian side of the Niagara Frontier consists of a series of small urban centers that are strongly oriented toward export activity (Niagara Canada Business Directory 1993/1994), while the US side (centered around Buffalo and Niagara Falls) also exhibits strong export orientation (Chandra, 1992). In addition, the two regions exhibit remarkably similar industrial structures in terms of manufacturing activity (McConnell, 1996), giving rise to substantial amounts of intraindustry trade (Hartung, 1995).

Despite these similarities, several important contrasts can be identified that would lead one to suspect different modes of competitive behavior among similar types of firms on either side of the border. For instance, the Canadian domestic market is at least 10 times smaller than its US counterpart, suggesting a more urgent need for export involvement among Canadian firms (Britton, 1996; Seringhaus and Botschen, 1991). Second, the rising importance of non-price competition across a growing range of international markets suggests that export-dependent firms are more likely to emphasize product innovation than firms that export on an occasional or passive basis. This would suggest a stronger innovation focus among Canadian firms, as opposed to a stronger price-oriented focus among US firms (MacPherson, 1995). Third, a good deal of the Canadian market for US merchandise is served by US subsidiaries operating inside Canada, rather than by direct exports (Britton, 1996). On balance, then, one might expect Canadian firms within the Niagara Frontier to be more export-oriented than their US counterparts.

In terms of local and regional business conditions, there is also reason to suspect that similar types of firms on different sides of the border might experience contrasting sets of competitive problems and/or opportunities. For instance, Western New York is a declining manufacturing region with a long history of industrial plant closure, outmigration, slow income growth, and high corporate and personal taxes (MacPherson and McConnell, 1992). This particular constellation of problems has had a profound impact upon the quality and depth of the regional labor market (anecdotes abound regarding the inability of local firms to find technically proficient workers). While the Canadian side of the Niagara Frontier exhibits similar problems (Freshwater, 1993), few scholars would deny that the severity of these difficulties is stronger on the US side (Cole, 1990; McLean, 1997). If these perceptions are correct, then one might expect to find significantly different assessments of local business conditions among Canadian and US firms within the study region.

Variations may also exist in terms of the types of external support networks that can assist the competitive efforts of firms within the cross-border area. Although firms in Western New York enjoy quick access to a local industrial agglomeration of modest size (Buffalo/Niagara Falls/Rochester), the more nonmetropolitan firms on the Canadian side of the border enjoy faster access to Toronto (Canada's premier center for high-technology activity and advanced producer services). The Toronto metropolitan area also contains Canada's densest concentration of post-secondary educational facilities and public/private research units (Britton, 1996), and can be

accessed by car within 60-90 minutes by any firm on the Canadian side of the Niagara Frontier (compared to 120-180 minutes by firms on the US side). Given that there is now a substantial literature that connects the performance of industrial firms with the availability of advanced producer services and other technological resources (Bryson et al 1993; Feldman and Florida, 1994; Rothwell, 1989; Sinkula, 1990; Smallbone et al. 1993), one might expect southern Ontario firms to enjoy easier access to these external opportunities than their counterparts in Western New York. This expectation is driven by the fact that the Buffalo/Niagara Falls area is known to be sparsely endowed with advanced producer services (Harrington and Lombard, 1989), especially those of an industrial and/or technological nature (MacPherson, 1997; McConnell, 1997).

Taken together, these factors suggest that US and Canadian SMFs might exhibit different characteristics in terms of export intensity, innovation, external service utilization, competitive problems and/or strategic goals. For example, high levels of export orientation are often associated with above average innovation intensity, if only because successful international marketing typically requires superior product performance (Cooper and Kleinschmidt, 1985; Denis and Depleateau, 1985; Kleinschmidt and Cooper, 1990; Kotabe, 1990). In a similar vein, export-intensive SMFs are more likely to exhibit a strategic interest in non-price competition than domestically focused firms (Harrison and Hart, 1987; MacPherson, 1995). The logic here is that price competition is becoming steadily less important across a growing range of international markets, reflecting an ongoing shift from cost-based to quality-oriented purchasing (Britton, 1989a, 1993). Is this the case?

## Research Method and Empirical Results

In order to explore the ideas mentioned above, the empirical sections which follow focus upon the results of two separate surveys that employed the same questionnaire and a similar sampling method. The first survey (1994/1995) was designed to assess the role of external technical inputs in the competitive performance of New York State SMFs (MacPherson, 1997), while the second survey (1996) adopted a parallel approach toward SMFs on the Canadian side of the Niagara Frontier (Bagchi-Sen, 1997). Both surveys were structured with a view to collecting basic information on the following dimensions of company behavior: (1) recent growth performance for total sales and foreign exports; (2) strategic business goals and technical objectives; (3) current competitive problems; (4) innovation performance (new product development activity); (5) use of external business services; and (6) in-house R&D activity.

Aside from trivial differences in questionnaire design (reflecting issues specific to the two study regions), firms on both sides of the border were presented with the same survey instrument, including cover letters printed on the same institutional letterhead. Both surveys targeted a similar mix of industrial sectors (primarily metal fabricating, electrical products and machinery), as well as a comparable size-range of firms (Commerce Register Inc, 1994/1995; Niagara Canada Business Directory 1993/1994). The returned surveys showed no significant differences in terms of sectoral affiliation, employment size, or sales volume. Neither of the two surveys was afflicted by significant nonresponse bias (similar sensitivity tests were applied in both cases), though a somewhat higher response rate was achieved for the Western New York portion of the earlier survey than was the case for the Canadian survey (34.8% for Western New York [158 firms] and 24% for the Niagara Region [56 firms]). Tests for non-response bias included a comparison of late versus early respondents for key variables (e.g. export-intensity, firm size, and innovation-intensity), following the logic outlined by Babbie (1973). Similar tests were conducted on the basis of published employment data gathered from the two sampling frames. Significant differences between early versus late respondents did not emerge (t-tests), and the same holds true

for respondents versus nonrespondents.

Some of the main similarities and differences between the two samples can be seen in Tables 1 and 2. Table 1 compares growth rates for total sales, exports, value-added, and R&D outlays. Interestingly, Canadian SMFs experienced better growth rates compared to their US counterparts for most of these variables. Over one-third of all Canadian firms noted greater than 15 percent growth in total sales and exports (38% and 36.6%, respectively), while one-fifth of all Canadian firms noted greater than 15 percent growth in value-added. In comparison, a much smaller percentage of US firms noted growth rates greater than 15 percent in sales, exports, and value-added (12.7%, 7%, and 7%, respectively). Only 6 percent of all Canadian respondents noted less than 1 percent growth in sales, compared to one-third (33.1%) of all US respondents. In a similar fashion, 17.1 percent of Canadian firms noted less than 1 percent growth in exports, compared to 59.2 percent of all US respondents. Furthermore, over one-fifth (22%) of all Canadian respondents noted less than 1 percent growth in value-added, compared to 52.9 percent of all US firms. A large percentage of both US and Canadian firms (59.9% and 44.2%, respectively) noted less than 1 percent growth in R&D expenditure. However, close to one-fifth (18.6%) of all Canadian respondents noted over 10 percent growth in R&D expenditure, whereas only 5 percent of all US respondents noted over 10 percent growth in R&D expenditure.

**Table 1. Percentage Distribution of Firms Across Growth Categories of Four Performance Measures: U.S.-Canada Comparisons.**

| | Growth Categories | | | | |
|---|---|---|---|---|---|
| Performance Measures[a] | ≤1% | 1-5% | 5.1-10% | 10.1-15% | ≥15% |
| **Sales Growth** | | | | | |
| Canada | 6.0 | 16.0 | 24.0 | 16.0 | 38.0 |
| U.S. | 33.1 | 22.9 | 17.2 | 14.0 | 12.7 |
| **Export Growth** | | | | | |
| Canada | 17.1 | 19.5 | 17.1 | 9.8 | 36.6 |
| U.S. | 59.2 | 17.2 | 7.0 | 9.6 | 7.0 |
| **Growth in Value-Added** | | | | | |
| Canada | 22.0 | 19.5 | 24.4 | 14.6 | 19.5 |
| U.S. | 52.9 | 14.6 | 19.1 | 6.4 | 7.0 |
| **R&D Expenditure** | | | | | |
| Canada | 44.2 | 27.9 | 9.3 | 7.0 | 11.6 |
| U.S. | 59.9 | 21.0 | 14.0 | 2.5 | 2.5 |

*a each row adds to 100%*

On this note, Table 2 presents a categorical snapshot of the main differences and/or similarities between the two samples for a set of key variables, including total sales, sales growth, export-intensity, in-house R&D spending, growth in value-added, product innovation, sales from innovation, and process innovation (the incidence of new technology adoption). To keep the discussion as simple as possible, we show dichotomies (high versus low) based on median divisions for all variables (it should be noted that ANOVA and/or t-tests uncovered precisely the same pattern of significant/nonsignificant differences as those that are reported in Table 2). Although the data indicate that US and Canadian firms are not significantly different in terms of sales volume, R&D-intensity, and process innovation, it would appear that Canadian firms are more likely to exhibit high export-orientation than their US counterparts. For example, fully 75 percent (n = 42) of the 56 Canadian firms belong to the export-intensive category, compared to only 36 percent (n = 57) on the US side of the border (chi-square = 24.84; p = 0.001).

A second feature of Table 2 is that firms on the Canadian side of the border have recently been growing faster than their US counterparts. In terms of sales growth, for instance, 58 percent (n = 33) of the Canadian firms achieved expansion rates of 10 percent or more over the last few years, compared to 27 percent (n = 42) of the US firms. Much of this contrast can be linked to the superior export performance of the Canadian firms, in that firms with above average sales growth typically belong to the export-intensive category noted above (see Bagchi-Sen, 1997).

It is also worth noting that Canadian firms appear to be more innovative than their US counterparts. Two measures of innovation were employed in this regard. Column 5 of Table 2 presents a dichotomous measure of successful new product development (frequency counts), whereas column 6 gives an estimate of the proportion of current output represented by products that were developed over the last 5 years. Significantly, Canadian firms outperformed their US counterparts across both of these measures. For example, 77 percent (n = 43) of the Canadian firms belong to the innovation-intensive category described in column 5, compared to 22 percent (n = 35) on the US side of the border. Similar proportions can be discerned for the output-based measure of innovation, suggesting stronger levels of product development activity among Canadian firms.

Overall, then, it would appear that companies on the Canadian side of the border exhibit stronger export-orientation, faster sales growth, higher levels of growth in value-added, and better innovation performance than comparably-sized firms on the US side of the Niagara Frontier. Although we shall return to these contrasts later in the paper, especially with regard to possible reasons for such differences, it is pertinent to ask whether the two samples differ with respect to competitive conditions, technology strategy, and/or operating characteristics. In short, are we looking at radically different firms in terms of environmental conditions and/or management attributes?

Partial answers to this question can be gleaned from Tables 3 and 4, which collate the two samples on the basis of a variety of factors pertaining to sources of competitive advantage or disadvantage. Table 3 presents Canadian versus US assessments of specific problems encountered within the political and economic contexts of the two regions. Each factor was presented to respondents on a 5-point Likert scale, with possible scores ranging from 1 (not an important factor at all) to 5 (a critically important factor). Significantly, poor access to appropriately skilled labor and investment capital poses a serious threat to the competitive capabilities of SMFs in the cross-border region. The lack of proficient labor, both as a direct input to the firm and in the form of specialist service providers, would appear to be an especially critical issue for US manufacturers. Part of the problem can be traced to high rates of outmigration of qualified people from the Western New York area (Miller, 1995), as well as the lack of interest of newcomers to select

# Table 2. A Comparison of Innovation and Business Performance of U.S. and Canadian SMFs

| Count ( )<br>%Row<br>%Column<br>%Total | (1) Sales | | (2) Growth in Sales | | (3) Export Intensity | | (4) R&D Intensity | | (5) Growth in Value-Added | | (6) Product Innovation | | (7) Sales from Innovation | | (8) Process Innovation | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Low | High | Low | High | Low | High | Low | High | Low | High | Low | High | Low | High | N | Y |
| **UNITED STATES** | | | | | | | | | | | | | | | | |
| n=157 | (101) | (56) | (115) | (42) | (100) | (57) | (81) | (76) | (106) | (51) | (122) | (35) | (115) | (42) | (65) | (92) |
| | 64.3 | 35.7 | 73.2 | 26.8 | 63.7 | 36.3 | 51.6 | 48.4 | 67.5 | 32.5 | 77.7 | 22.3 | 73.2 | 26.8 | 41.4 | 58.6 |
| | 73.2 | 74.7 | 83.3 | 56.0 | 87.7 | 59.6 | 71.7 | 76.0 | 86.2 | 56.7 | 90.4 | 44.9 | 94.3 | 46.2 | 74.7 | 73.0 |
| | 47.4 | 26.3 | 54.0 | 19.7 | 46.9 | 26.8 | 38.0 | 35.7 | 49.8 | 23.9 | 57.3 | 16.4 | 54.0 | 19.7 | 30.5 | 43.2 |
| **CANADA** | | | | | | | | | | | | | | | | |
| n=56 | (37) | (19) | (23) | (33) | (14) | (42) | (32) | (24) | (17) | (39) | (13) | (43) | (7) | (49) | (22) | (34) |
| | 66.1 | 33.9 | 41.1 | 58.9 | 25.0 | 75.0 | 57.1 | 42.9 | 30.4 | 69.6 | 23.2 | 76.8 | 12.5 | 87.5 | 39.3 | 60.7 |
| | 26.8 | 25.3 | 16.7 | 44.0 | 12.3 | 42.4 | 28.3 | 24.0 | 13.8 | 43.3 | 9.6 | 55.1 | 5.7 | 53.8 | 25.3 | 27.0 |
| | 17.4 | 8.9 | 10.8 | 15.5 | 6.6 | 19.7 | 15.0 | 11.3 | 8.0 | 18.3 | 6.1 | 20.2 | 3.3 | 23.0 | 10.3 | 16.0 |
| **TOTAL** | | | | | | | | | | | | | | | | |
| COUNT | (138) | (75) | (138) | (75) | (114) | (99) | (113) | (100) | (123) | (90) | (135) | (78) | (122) | (91) | (87) | (126) |
| %OF TOTAL | 64.8 | 35.2 | 64.8 | 35.2 | 53.5 | 46.5 | 53.1 | 46.9 | 57.7 | 42.3 | 63.4 | 36.6 | 57.3 | 42.7 | 40.8 | 59.2 |
| CHI-SQUARE ($X^2$)<br>(probability) | n.s. | | 18.73<br>(p=.000) | | 24.84<br>(p=.000) | | n.s. | | 23.36<br>(p=.000) | | 52.81<br>(p=.000) | | 62.25<br>(p=.000) | | n.s. | |

*(1) Sales: Low ≤ $5 million, High > $5 million*
*(2) Growth in Sales: Low ≤ 10%, High > 10%*
*(3) Export Intensity: Low ≤ 3% of sales from exports, High > 3% of sales from exports*
*(4) R&D: Low ≤ 2% of sales on R&D, High > 2% of sales on R&D*
*(5) Growth in Value-Added: Low ≤ 5%, High > 5%*
*(6) Product Innovation: Low ≤ 3 new or redesigned products, High > 3 new or redesigned products*
*(7) Sales from Innovation: Low ≤ 15% of total sales, High > 15% of total sales*
*(8) Process Innovation: Y=Yes, N=No*

precision manufacturing as a career option (MacPherson, 1994). Although aggregate statistics reflect a lack of jobs for technical and precision workers, individual organizations indicate that the supply of such labor is problematic (skill-mismatch or the lack of suitable labor at the right time).

## Table 3. Comparison of Competitive Problems Faced by U.S. and Canadian SMFs.

| | Frequency (percentage) Distribution[1] | | | | | |
|---|---|---|---|---|---|---|
| | No/minor Importance | | Moderate Importance | | Critical Importance | |
| Competitive Problems | CAN | US | CAN | US | CAN | US |
| **Factor Inputs** | | | | | | |
| finding skilled labor | 50.0 | 21.0 | 28.0 | 42.7 | 22.0 | 36.3 |
| finding investment capital | 67.3 | 47.1 | 7.7 | 28.7 | 25.0 | 24.2 |
| finding specialist services | 89.6 | 65.4 | 8.3 | 23.1 | 2.1 | 11.6 |
| **Competitors** | | | | | | |
| domestic competition | 63.5 | 30.6 | 21.2 | 28.7 | 15.3 | 40.8 |
| competition from foreign imports | 66.6 | 46.5 | 15.7 | 21.0 | 17.6 | 32.5 |
| **Fiscal** | | | | | | |
| municipal/local taxes | 35.3 | 19.8 | 19.6 | 26.8 | 45.1 | 53.5 |
| provincial/state taxes | 32.1 | 12.1 | 26.4 | 20.4 | 41.5 | 67.5 |
| federal taxes | 30.2 | 21.0 | 28.3 | 28.0 | 41.5 | 51.0 |
| **Regulatory** | | | | | | |
| trade barriers | 74.0 | 57.4 | 24.0 | 22.3 | 2.0 | 20.4 |
| government regulations | 70.0 | 41.4 | 18.0 | 23.6 | 12.0 | 35.1 |

[1] *Row-values for Canada will add to 100% (example: 50 + 28 + 22 = 100)*
*Row-values for U.S. will add to 100% (example: 47.1 + 28.7 + 24.2 = 100)*

Firm-level responses regarding access to business/specialist services also suggest a competitive disadvantage for US producers. At the same time, however, most Canadian and US firms in the region ranked (table not shown) the importance of such services as peripheral to production. Such findings are contrary to our expectations based on the literature on service-to- manufacturing linkages in improving business performance. The results from the Niagara region may imply a lack of awareness on the part of local SMFs regarding the production enhancing capabilities of external service providers. Alternatively, the results may simply reflect the fact that advanced technical and/or professional services are not readily available within the two study regions.

**Table 4. Competitive Problems Faced by U.S. and Canadian SMFs.**

| Problems | Mean Values[1] U.S. | Canada | t (prob) |
|---|---|---|---|
| **Factor Inputs** | | | |
| Finding good labor | 3.17 | 2.54 | 3.16(.002) |
| Finding investment capital | 2.64 | 2.19 | 2.26 (.02) |
| Finding specialist services | 2.15 | 1.39 | 5.58(.000) |
| **Competitors** | | | |
| Competition from foreign imports | 2.85 | 2.17 | 3.15(.002) |
| Domestic competition | 3.15 | 2.23 | 5.03(.000) |
| **Fiscal** | | | |
| Municipal/local taxes | 3.62 | 3.00 | 2.98(.004) |
| Provincial/state taxes | 3.95 | 3.00 | 5.31(.000) |
| Federal Taxes | 3.50 | 3.13 | 1.89(.061) |
| **Regulatory** | | | |
| Government regulations | 2.90 | 2.02 | 4.47(.000) |
| Trade Barriers | 2.54 | 1.84 | 4.53(.000) |

*[1]Mean Values on a 1-5 Likert Scale where 1=not a problem and 5=severe problem.*

On a different note, it is perhaps not surprising that both domestic and foreign competition was identified as a particularly serious problem for US manufacturers in the Western New York area. In this region, manufacturers have limited scope to cut costs -- for example, relocation and process innovation are both expensive. Furthermore, revenue generation through market search and expansion requires venture capital. These problems are compounded by rigid fiscal and regulatory structures which may hinder US manufacturers in this region from pushing forward with rapid changes in their production environment (see Chandra, 1992). Interestingly, 9 of the 10 competitive factors listed in Table 3 differentiate the two samples at $p = 0.05$ or better (see Table 4). The results suggest a number of important differences that warrant brief mention. First, it would appear that US firms in Western New York encounter greater difficulty finding suitably skilled labor than their counterparts in southern Ontario. Despite the fact that the US side of border contains two metropolitan centers of modest size (implying a deeper labor pool), this potential advantage does not reflect itself in the data. Second, companies from the US sample consistently ranked tax-related problems as being of greater significance than Canadian firms. This is not terribly surprising, in that New York State consistently ranks second or third in the US as far as local and state taxes are concerned. A third point is that domestic and international competitive conditions appear to be more problematic for US companies (i.e. import competition, barriers to foreign exports, and competition from rivals within the US domestic market). On balance, Canadian firms ranked these problems as being of relatively minor importance. Finally, it would appear that Canadian firms experience weaker problems as far as access to capital is concerned,

and the same holds true for access to local business services. Again, this is somewhat surprising, especially in view of the more nonmetropolitan nature of the Canadian sample.

**Table 5. Techno-market Goals of U.S. and Canadian SMFs.**

| Goals | Mean Values[1] U.S. | Canada | t (prob) |
|---|---|---|---|
| Constantly improve existing products | 3.30 | 3.72 | -2.11 (.03) |
| Develop new products on a continual basis | 3.11 | 3.07 | - |
| Broaden product line significantly | 3.02 | 3.05 | - |
| Expand R&D efforts | 2.78 | 2.47 | 1.62 (.10) |
| Constantly improve existing manufacturing methods | 3.56 | 3.67 | - |
| Introduce new production technologies on a continual basis | 3.07 | 3.25 | - |
| Price-based | 2.98 | 2.52 | 2.12 (.03) |
| Non-price based | 3.26 | 3.17 | - |
| Find new home markets | 3.22 | 3.23 | - |
| Find new markets elsewhere | 3.11 | 3.13 | - |
| Enter new markets before competitors | 2.87 | 3.23 | -1.73 (.08) |
| Find import competition by exporting more | 2.40 | 2.41 | - |
| Seek protection against foreign imports | 2.78 | 2.49 | - |
| Try to become leaders within the market segment | 3.36 | 3.84 | -2.57 (.01) |

*[1]Mean Values on a 1-5 Likert Scale where 1=not important and 5=critically important.*

Further contrasts between the two samples are shown in Table 5, which compares US and Canadian firms in terms of the key technological and/or commercial priorities of company managers (strategic goals). The top 5 techno-market priorities for the US sample included (in rank order): (1) the improvement of existing manufacturing procedures; (2) the achievement of commercial leadership within existing market segments; (3) the improvement of existing products; (4) greater emphasis upon nonprice competition (e.g. enhanced product quality/performance), and (5) finding new customers or market niches within the US itself. In contrast, the Canadian firms ranked market leadership first (US ranking = 2), product improvement second (US ranking = 3), the improvement of existing manufacturing procedures third (US ranking = 1), and (tied for fourth) acquiring new domestic customers (US ranking = 5) or becoming leaders in seeking out entirely new markets (US ranking = tied at 6). On the basis of these differences, it would appear that US and Canadian firms exhibit contrasting priority rankings as far as future company development is concerned. With regard to individual priority factors, moreover, it would seem that Canadian firms are more likely to emphasize market leadership ($p = 0.01$), product improvement ($p = 0.03$), and the development of new markets ($p = 0.08$), whereas US firms are more likely to emphasize price competition ($p = 0.03$). A tabulation of frequencies (not shown here) revealed some major differences between the two samples. For example, one-fourth of all US respondents ranked price-based competitive strategies as extremely important, compared to

only 7 percent of all Canadian respondents. However, over 25 percent of all Canadian SMFs considered all 4 categories of innovation strategies as critically important elements of competitive strategies (US range: 14-17 percent rated innovation strategies as critically important).

**Table 6. The Importance of External Service Inputs in Improving Business Performance in SMFs: A Comparison of U.S. and Canadian SMFs.**

| Service Categories | Mean Values[1] U.S. | Canada | t (prob) |
|---|---|---|---|
| **Private Services** | | | |
| Industrial Design | 2.11 | 1.97 | - |
| R&D | 1.78 | 1.66 | - |
| Management Consultants | 1.93 | - | |
| Market Research | 1.84 | 1.68 | - |
| Advertising | 2.16 | 1.81 | 1.95 (.05) |
| Testing Labs | 2.29 | 2.18 | - |
| Engineering Services | 2.36 | 2.30 | - |
| Industrial Equipment Repair | 2.59 | 2.65 | - |
| Export Advisory | 1.95 | 1.72 | - |
| Data Processing | 2.15 | 1.60 | 3.31 (.00) |
| Software | 2.35 | 2.24 | - |
| **Public Services** | | | |
| University Research | 1.94 | 1.41 | - |
| Government Services | 1.90 | 1.89 | - |
| Technical Colleges | 2.00 | 1.83 | - |
| **Informal/Semi-Private** | | | |
| Other Manufacturers | 2.44 | 2.58 | - |
| Local Networks of Business Services | 2.56 | 2.17 | 2.05 (.04) |
| Customers | 3.34 | 3.52 | - |
| Distributors | 2.83 | 2.76 | - |
| Suppliers | 2.95 | 3.36 | -1.99 (.04) |

*[1]Mean Values on a 1-5 Likert Scale where 1=zero and 5=critical.*

A final set of contrasts between the two samples is shown in Table 6. Here, Canadian and US firms are compared in terms of the importance they attach to external sources of business service support (again using a 5-point Likert scale). Aggregated for all firms within each sample (i.e. both users and non-users), the results suggest that US companies perceive advertising and

dataprocessing services to be more important to their business performance than Canadian firms, whereas the latter regard industrial suppliers as being more important than their US counterparts. The only other significant difference is that US firms rank the importance of university contacts more strongly than Canadian firms, albeit few companies on either side of the border rank the academic sector very highly in the first place. In sum, both groups of SMFs regard users/customers, suppliers, and distributors as the most important external links for improving innovation and production capabilities.

Despite the seemingly "low" importance rankings that accompany the various service support classes listed in Table 6, it should be kept in mind that the data pertain to all respondents within the two regional samples. These 'impact' scores rise appreciably when service users are separated from non-users. For now, however, we are not concerned with the impact scores themselves. The important point is that there are significant differences between the two samples as far as service-specific impact assessments are concerned. At the same time, it is worth noting that the two samples do not differ significantly in terms of recent expenditures on external support. For both samples, average total expenditures per annum on private business services were found to lie between US$30-50 thousand for most firms, compared to US$4-10 thousand for public/government services (the actual spending distributions are too skewed across both samples to conduct a reliable significance test). Average total spending on semi-private/informal services was found to be much lower on both sides of the border (US$1-3 thousand), though several notable outliers were found on the Canadian side (e.g., supplier linkages).

To put these figures into perspective, it should be noted that previous surveys involving similar types of firms in Toronto (MacPherson, 1988) and New York City (MacPherson, 1997) uncovered significantly higher spending estimates, as well as higher impact scores. These surveys also revealed more diverse sets of service-to- manufacturing linkages than those that were found in the crossborder study area (i.e. Toronto and New York City firms typically exploit a wider mix of external services). In short, US and Canadian SMFs located in the Niagara region exhibit weaker links to the external service environment than their counterparts in large metropolitan centers like Toronto and New York City.

## Discussion

Some of the empirical results summarized above suggest research issues that warrant further discussion. To begin with, Canadian SMFs have recently been outperforming their US counterparts across a variety of dimensions, including export orientation, product innovation, and sales growth. Why is this the case? Second, Canadian SMFs appear to exhibit superior R&D productivity. Although the two samples do not differ significantly in terms of R&D-intensity, rates of new product development are noticeably higher among Canadian firms. Third, there are significant differences in the strategic priorities of SMFs from the two samples, and the same holds true for competitive problems. Finally, it would appear that Canadian SMFs have been accessing external business services with no greater difficulty (or ease) than their US counterparts. Despite the more nonmetropolitan nature of the Canadian sample, levels of producer service utilization are broadly similar on both sides of the border. Each of these points is discussed in more detail below.

With regard to the first point, the superior export performance of Canadian SMFs may partly reflect the fact that such firms are faced with a relatively small domestic market. Exports represent an important means by which such firms can lower their unit costs (as well as increase their sales). The imperative to export is arguably less potent on the US side of the border. In this sense, then,

the higher level of export orientation among Canadian SMFs is not too surprising. This said, Canadian SMFs have also been growing faster than their US counterparts in terms of total sales. Significantly, exports account for a substantial chunk of this growth (Bagchi-Sen, 1997). Part of the export superiority demonstrated by Canadian SMFs may also reflect the fact that these firms have been more successful in generating new products than their US cousins. Recall that Canadian SMFs regard market leadership as a much stronger strategic priority than their US counterparts. Clearly, then, part of the performance differential between the two samples can ultimately be traced to differences in management goals.

To an extent, of course, some of the performance differences between the two samples may also reflect differences in the timing of the two surveys. For example, the Canadian survey (1997) provides performance data for the 1991-1996 period, and thus captures a larger slice of the post-1990 recession recovery for North America as a whole. In contrast, the US survey (1995) covers the 1989-1994 period, and thus includes two full years of slack and/or declining demand, as well as a three year recovery phase. In short, Canadian firms were surveyed during a period of relative prosperity, whereas their US counterparts were surveyed across years that included a longer period of recession. A second factor that should be kept in mind is that the Canadian dollar underwent a steady depreciation against the US dollar over the 1989-1997 period (ranging from a high of $US0.84 in 1989 to a low of US$0.69 in 1997), rendering Canadian export prices more attractive than US export prices over the study period. It should be acknowledged, then, that part of the performance gulf between the two samples may be the result of macroeconomic conditions rather than regional or firm-specific characteristics. Interestingly, however, a majority of the Canadian SMFs achieved sustained export growth to the US at a time when many Canadian commentators had predicted major competitive problems for indigenous SMFs under the FTA (see Drache and Gerter, 1991). It would appear that few Canadian SMFs in the Niagara region have been damaged by a flood of cheap imports from the United States. While the weakness of the Canadian dollar must surely be an important factor in this regard, it should be mentioned that most of the Canadian SMFs in the sample emphasize non-price competition as a key feature of business strategy. At the same time, it should be noted that annual rates of sales growth for the Western New York sample did not vary appreciably over the 1989-1994 period (despite the existence of distinct recession/recovery phases over this period).

In this regard, it should be mentioned that US firms invested just as much R&D in 1989-1990 as their Canadian counterparts invested in 1991-1992 (and the same holds true for the remaining overlapping years). The superior R&D productivity of Canadian firms would seem to be clear, irrespective of the timing of the two surveys. While the comparative data on export and sales performance may be tainted as a result of different macroeconomic conditions across the two time periods, the same problem cannot be ascribed to the R&D and innovation data. In short, we have no reason to believe (or evidence to suggest) that the timing of the two surveys plays a significant role in the general patterns that have been described thus far.

This brings us to the second point in our list. Recall that R&D outlays do not differ appreciably between the two samples. It follows that the stronger innovation performance of Canadian SMFs must flow from superior R&D productivity. In the absence of major inter-sample differences in sector membership, firm size (and age), external spending on technical/professional services, and new product development objectives, we are left with two possible sources of advantage that may be at work -- neither of which bode well for Western New York. First, Canadian firms may be operating with better human capital. Second, the fact that Canadian firms place a significantly higher priority upon incremental innovation (product improvement) than US firms suggests that a modest approach toward product change is commercially more effective than an approach which emphasizes the development of entirely new products (which is a stronger priority among US

firms). Taken together, these two factors would go some way toward explaining the superior performance of Canadian SMFs in terms of the innovation measures described earlier.

As far as the human capital argument is concerned, it should be remembered that SMFs from the US sample ranked labor recruitment (finding good workers) as being a significantly stronger obstacle to competitiveness than their Canadian counterparts. An implication here is that US companies within the crossborder region may be operating with inferior workers (this is a politically unpalatable but plausible scenario). The productivity implications of this possibility are not too difficult to envision. At the same time, of course, it should be recalled that SMFs within the US sample also ranked local and regional business conditions as being more problematic than did their Canadian counterparts, notably with regard to tax rates, domestic and foreign competition, government regulations, and access to capital. It would appear that a cluster of policy-driven and/or industrial-economic conditions conspire to render Western New York a less hospitable environment for business development than the Niagara region of Ontario.

Finally, it should be noted that SMFs on both sides of the border spent roughly the same on external technical and/or professional services over the study period. Few companies ranked these services as being particularly important in terms of business impact (though major outliers were found in both samples), and few companies indicated any serious problems regarding the local availability of such services. These findings contrast sharply with recent literature on the importance of external services to SMF innovation in large metropolitan centers (for a review, see MacPherson, 1997). In short, SMFs in the Niagara region appear to source locally, minimally, and infrequently. Although small clusters of outliers distort this picture on both sides of the border, the overall pattern is one of relatively weak service-to-manufacturing interaction.

## Conclusions

Canadian SMFs in the Niagara region outperform their US counterparts across a range of dimensions, including export growth, innovation-intensity, and sales performance. It would appear that US firms are oriented toward price-competition, whereas Canadian firms more typically emphasize qualitative factors (notably incremental innovation). Although US firms regard new product development as a strategic priority, innovation scores are higher among Canadian SMFs (despite similar R&D expenditures across the two samples). Some of these contrasts can be traced to explicit differences in management goals (e.g. Canadian SMFs are more interested in product improvement than new product development), whereas other differences may reflect macroeconomic variations between the two nations (e.g. the unusually weak Canadian dollar). At the same time, the survey responses highlight different sets of issues as far as local business conditions are concerned, especially with regard to corporate taxes, access to investment capital, and the availability of skilled labor. It would appear that we are dealing with an economically and geographically integrated cross-border region as far as certain attributes are concerned (e.g. intraindustry trade and coordinated public policy at the local level). With regard to other attributes, however, we are dealing with regions that are separated by different macroeconomic and/or national policy conditions, as well as contrasting factor markets (e.g. Western New York has a serious shortage of skilled workers).

These findings suggest a need for multiple crossborder studies of a similar or related nature. For instance, would different findings emerge from comparable surveys of other crossborder regions such as Windsor/Detroit or Seattle/Vancouver? We think not, if only because the Niagara Frontier possibly represents the only Canada/US crossborder region in which an old/declining urban area (Buffalo) sits beside a more dynamic Canadian environment (Toronto's fringe). In this regard,

Porter's (1990) generic prescription implies that a worthwhile option for the less dynamic region would be to access the competitive diamond of the more prosperous territory. On this note, options for future research might include empirical assessments of the potential for crossborder network formation (inter-firm partnerships), institutional collaboration (information exchange), enhanced service-to-industry interaction (crossborder trade in producer services), and bilaterally unified policy efforts to promote innovation, crossborder commerce, and/or extra-regional export growth.

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