1. Introduction

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The continuing worldwide trend to eliminate trade barriers and expand global trade presents small and medium-sized enterprises (SMEs) in developed countries with an opportunity and a challenge. The opportunity is to enhance revenue by selling more products to end-users or intermediaries in more foreign markets. SMEs can do this with their own sales force or through contracted distributors or representatives. The challenge is at least twofold. First, SMEs often lack the human and financial resources to take advantage of this selling opportunity. They need help from domestic or foreign partners or from public sector organizations to leverage or supplement their modest resources. Second, SMEs find it increasingly difficult to compete on price at home and abroad against competitors that have lower resource costs than they do. Consequently SMEs in developed countries are turning increasingly to innovation as a source of competitive advantage in order to protect their home market and participate in expanding foreign markets. Innovation can lead to development of products and services that competitors cannot imitate and for which customers will pay a premium price.

This book addresses the resource supplement/leverage and innovation challenges that increased global trade represents by exploring how SMEs can become more competitive at home and in foreign markets as stand-alone firms or as members of supplier and customer networks. The book contains 17 chapters, 16 of which are organized into six parts. Each part focuses on dimensions and issues that relate to the above challenges. These dimensions and issues are presented below with a follow-up summary of the chapters within each part.

Part I of the book focuses on innovation as a competitive strategy and the source and location of ideas for enhancing innovation capability. Does distance matter in the ability of firms to learn from each other? If it does matter, how can collaborating firms compensate for distance, especially when the information they exchange is tacit or context-sensitive? Can firms learn on their own as readily as they can from their customers and suppliers? Also how much innovative capability must a firm develop internally in order to absorb knowledge effectively from others? What are the essential elements of an innovation strategy? What types of firms and industrial sectors are most likely to adapt an innovation strategy and pursue it successfully?

Part II focuses on network dynamics. Networks vary considerably in their degree of coherence and structure and even in the extent to which members are conscious of network membership. Networks can aspire to function as virtual organizations, in which case one or more firms exercise leadership and control over others. How often can SMEs exercise leadership and control in such networks if much larger firms are also members? Networks can also be a looser arrangement in which participants only share information and ideas, but undertake no coordinated action. Finally, networks can be links between

clusters of firms that share limited information indirectly, but are unaware of firms in other clusters. Can learning how to form networks and alliances (with the right partners and governance) become a strategic asset for SMEs?

Part III focuses on the way SMEs can leverage technology for competitive advantage. The Internet, for example, permits SMEs to search for information and ideas and to reach suppliers and customers as readily as large firms can, and to act in concert in ‘virtual’ organizations with other firms with complementary resources. Computer-aided design (CAD) and associated knowledge codification may be a prerequisite for collaboration with customers and suppliers worldwide, for example, with exchange of data files. Collaboration on operational issues can build trust, which, in turn, can stimulate further and more comprehensive collaboration on strategic and value-based issues.

Part IV focuses on internationalization, a process that can stimulate innovation as well as be stimulated by it. Firms that compete on innovation may sell products with shorter lives, thereby encouraging firms to pursue scale economies through international sales before the onset of commoditization or obsolescence. Innovative products may also be sold in smaller, niche markets, thus prompting firms to seek international sales before quickly exhausting domestic sales. Innovative firms may also expand their search for ideas and partners worldwide. Whether or not a firm’s products are innovative, internationalization is an entrepreneurial act that only some SME managers are willing to undertake. The chapters in this section explore why some SMEs internationalize, their pace of internationalization, their choice of markets to enter and their entry mode.

Part V focuses on the role of the public sector in helping SMEs to overcome resource deficiencies that limit their ability to innovate and internationalize. SMEs can benefit substantially from partnering with universities that receive federal research grants, thereby supplementing their often modest R&D resources. Federal and state agencies can help SMEs to internationalize by financing or guaranteeing loans for foreign ventures or by introducing SMEs to reliable customers or suppliers in foreign countries. As SMEs vary considerably in their interest and capability to internationalize, no single policy or set of activities is suitable for all firms.

Part VI of the book includes summaries of presentations by senior executives of seven companies that earned recognition and awards from government agencies or industry associations for their outstanding exporting performance. Also included are summaries of presentations by two distinguished executives from the private and public sector, respectively, who were invited to discuss the economic and political context in which SMEs operate, and to highlight some government initiatives that have been designed to help SMEs to compete effectively in international markets.

PART I INNOVATION AND COMPETITIVE ADVANTAGE

Mark Freel explored the issue of geographical scope and innovation. He hypothesized that firms that cooperate with customers, suppliers and competitors outside their region tend to produce more radical innovations than firms that interact primarily within their region. The latter tend to produce incremental innovations. Broadening a firm’s geographical scope expands the diversity of its idea pool. If radical innovations required exchange of tacit knowledge, firms would be challenged to maintain face-to-face exchanges as geo-

graphical scope expanded. Freel suggests, however, that innovation relies at least as much on exchange of codified knowledge (science-based) as on tacit knowledge, and that technological, organizational and cultural 'proximity' between firms can substitute for spatial proximity. Also increased R&D expenditure and technical personnel enhance a firm's ability to recognize and interpret non-local knowledge. Physical proximity is necessary for building trust among cooperating competitors, but this is not the case among cooperating customers and suppliers.

Love and Roper explored the role of knowledge source (internal R&D, supply chain or non-supply chain) on innovation success (percentage of sales from new products introduced or updated in the last three years) and business performance (productivity and sales and employment growth). Process innovation was also measured. Data from Irish manufacturing plants show that innovation success is related to R&D (percentage of R&D employees/total employees) and number of supply-chain and non-supply-chain sources. These three sources tend to be complementary, but there is some degree of substitution between them. Innovation success is affected positively by organizational context (large batch, multi-plant member), skill level and capital investment. Innovation success in turn positively influences sales and employment growth, but negatively influences productivity, at least temporarily. Process innovation unambiguously improves both productivity and growth.

Youtie and Shapira explored the competitive strategies of SMEs in Georgia in the southeastern US with special interest in firms that compete on innovation. A small percentage of firms competed in this way and tended to be in science-based or electronics/electrical/transportation sectors. Innovation in these firms was general and evident in product, process, organization and marketing innovations. Firms that competed on innovation gave some priority to adapting to customer needs and offering value-added services, but gave least priority to low price. Innovation and low price were virtual polarities. Firms that compete on innovation seem to have a core competency that can manifest itself in multiple ways. They may develop this competency because they cannot compete on price or may consciously reject price as a strategic option in preference to innovation.

PART II NETWORK DYNAMICS

Petrick and Maitland view SMEs as potential members of networks that compete like virtual companies against similarly organized networks. Economies of speed may be more essential in such competition than economies of scale and scope. Original equipment manufacturers (OEMs) usually lead these networks with varying degrees of influence over the design, production, distribution and sale of components and end-products. Their influence is greater in industry sectors where low cost dominates differentiation, and is shared with SMEs in sectors where the latter enhance differentiation through their intellectual property. Other factors related to the comparative size and value of exchanges between buyer and seller also determine influence. The critical challenges for network management are to synergize the complementary assets of network members, take coordinated action when and where appropriate, and increase and distribute rewards that are sufficient to maintain member loyalty. The authors suggest that networks can address

these challenges by building social capital through the continuous exchange of knowledge, thereby enhancing the situational awareness that is essential to formulate and implement complementary member and network strategies.

Pennings and Cattani followed the chemical to digital transition in the imaging sector from 1975 to 2005. The authors tracked the patent count and forward citations for three large firms (Kodak, Fuji and Sony) and three smaller firms (Adobe, Indigo and Interactive). Patent count measures a firm's research productivity; forward citations measure the impact of a firm's patents on other sector firms (that cite its patents). Brokers are firms that link otherwise unconnected clusters of firms that often cite each other's patents, and have higher growth rates and profits than non-brokers. Pennings and Cattani show that the above six firms were brokers in chemical or digital technologies at different times, and that Kodak's broker role was related to patent counts and forward citations¹ in digital technology, but less so in chemical technology (patent count only). Adobe, Indigo and Interactive emerged early as brokers in digital technology but the latter lost this status quickly (to Indigo via acquisition).

PART III TECHNOLOGY AND ENHANCED CAPABILITIES

Etemad emphasizes the role of Internet-based technologies (IBTs) in SME growth and development, or more specifically, internationalization. He shows how fast-growing Canadian SMEs exploit IBTs very effectively as complementary resources. They use IBTs to leverage their initial resource base (for example, financial, entrepreneurial, knowledge) to make potential customers aware of their products or services or to reach out to potential customers. IBTs do not create competitive advantage by themselves, but, if appropriately configured and aligned with a creative business model, they can allow SMEs to compensate for their small size and inexperience. The richer the initial resource base, the more there is for IBTs to leverage. The environment that SMEs seek to enter also varies in richness (number and quality of customers, suppliers, competitors and so on, and their degree of connectedness). Again the richer this initial environment, the more there is for IBTs to leverage. For example, IBTs can help SMEs build on the initial connectedness in their environment to form extraregional networks or join existing ones, thereby creating in cyberspace many of the advantages that regional clusters enjoy. IBTs can facilitate a virtuous circle in which the resources of the firm (push) and those of the environment (pull) grow and reinforce each other.

Grandinetti, Furlan and Camuffo show that Italian district subcontractors vary considerably in their design and marketing capability. This variability results from the desire of some subcontractors to reduce their dependence on local customers and suppliers. They attracted non-local customers by shortening development time and lowering design cost via CAD. Their design capability was enhanced further by applying what they learned from these customers (for example, quality, safety and legal standards) to the design of other customers' products. A similar bidirectional dynamic exists for supplier management. More broadly knowledge codification enables such capability development by standardizing internal routines (software, blueprints, procedures and so on), and thereby facilitating communication with customers and suppliers. A major strategic shift (such as managerial succession, or financial crisis) or an important customer's

mandate for ISO certification or compatible CAD system may initiate the codification process.

Wood and Kaufman offer insight on the ability of suppliers to collaborate with their customers and on the content of their collaboration. Suppliers' ability to collaborate depends on their technology sophistication and sensitivity to the value of forming knowledge and learning networks with their customers, suppliers and so on. This collaborative ability is related to the type of products and services that suppliers offer their customers (for example, commodity or proprietary product). Collaboration builds trust, which, in turn, can lead to greater sharing of operational risk (manufacturing, product development, marketing) and asset risk (equipment and personnel) and to addressing corporate social responsibility (CSR) issues. SMEs address CSR issues by recognizing strategic stakeholders, aligning CSR activities with strategy, and using an explicit system of accountability. They tend to communicate about operational issues with suppliers and customers, but communicate about CSR issues only with suppliers with whom trust is crucial and furthest advanced (collaboration on proprietary products). SMEs may face more pressure to address CSR issues from European suppliers and customers than from those in the US and Asia.

PART IV INTERNATIONALIZATION

Maslach and McNaughton tested the 'small domestic market' hypothesis with comparative data on US and Canadian SMEs. It is widely assumed that SMEs in countries with small domestic markets will internationalize sooner than those in countries with larger domestic markets. While this is generally true, especially for SMEs that produce high technology products, there may be exceptions. The authors' data show few differences between US and Canadian firms on number of countries entered, number of countries with subsidiaries, diversity of the countries entered and overall foreign to domestic sales. Although Canadian firms derive sales from more countries and are more reliant on foreign sales overall, US firms internationalize more quickly (corrected for years of operation). Some special factors may explain the US-Canadian comparison, including exchange rates (which help Canadian exports, but hinder foreign direct investment (FDI)) and pool of venture capitalists (fewer in Canada than in the US).

Lu and Wu explore the differential impact of product diversification and international diversification strategies on innovation in SMEs. They show that product diversification has little impact on innovation (R&D/sales), which is contrary to the negative impact shown for large firms. International diversification has a positive impact on innovation when measured by export intensity (exports/total sales), but not when measured by number of countries in which firms had FDI. Product diversification interacts positively with international diversification (both measures) to enhance innovation. Lu and Wu speculate that international diversification facilitates innovation by exposing firms to more countries and ideas, and that innovation completes a virtuous cycle by encouraging innovating firms to diversify internationally in order to achieve an adequate return on R&D that is invested in products with relatively short product lives.

Jones contends that stage theories of internationalization ignore the many internal and external conditions that SMEs face during their development and imply thereby that

internationalization follows a fixed sequence of stages rather than a set of options from which SMEs can choose. A comprehensive review of the literature suggests, however, that internationalization is a more fluid and malleable process than stage theories imply. SMEs may not progress steadily to more advanced market entry modes (such as from exporting to FDI) and to more psychically distant countries. Instead their choices of market entry mode and country to enter depend on the firms' initial resources and capabilities, business model, technology, degree of market development, and proactive or reactive stance toward innovation. SMEs may internationalize early or late after inception, by importing or exporting, and involve their research, production or marketing functions. Their choices and the sequence in which they are made depend on the opportunities they confront. Internationalization may not be their primary objective, but is a derivative of the globalization of their suppliers, customers and alliance partners.

Crick and Spence conducted a qualitative, comparative study of the internationalization strategies of 24 UK and Canadian SMEs that sell high technology products (for example, software, electronics). Such firms (HTSMEs) often internationalize faster than those that sell low technology products because they have smaller domestic markets, shorter product lives and so on. The qualitative analysis of interviews led to the identification of four main themes. Canadian firms are generally more comfortable with differences in language and culture than UK firms. Senior executive international experience, social networks and company websites are critical resources that facilitate recognition and exploitation of opportunities. Choice of countries to enter is influenced by ease of entry, low transaction costs, non-price competition, customers' ability to pay and potential to build reputation that enhances access to other countries. Finally lifestyle preferences and family dynamics of senior managers influence their attitude toward risk and play a significant role in their strategic choices.

Susman and Stites review three major theories of internationalization that offer explanations of SME behaviour regarding pace, initial and subsequent market and entry mode choice. The three theories are stage, network and rationalist theory. Eight hypotheses were generated from these theories. They were tested with survey data that were collected from 19 firms that won federal or state awards for exemplary exporting performance. These 19 firms were part of an original sample of 21 firms that participated in a study in 2003–04. The results suggest that SMEs initially export to countries that are psychically close, use the same entry mode in foreign and domestic markets and use their initial entry mode in successive market entries. The authors used rationalist theory to test whether product, sales and service complexity and high intellectual property (IP) content and protection influence entry mode choice. The results suggest that firms use a direct sales force when customers require extensive training in use of the product, and use a contracted sales force when IP content is high. The latter seems more likely in countries with strong IP protection laws.

PART V ROLE OF THE PUBLIC SECTOR

Guay cautions that national statistics on trade and investment obscure regional and state differences in internationalization. The 'Sunbelt' states had the largest percentage increase in exports from 2001 to 2005; the Midwest and Northeast states had the highest export value because of their longer exporting experience. New York and New Jersey have the

most SMEs per capita and the highest percentage of exporting SMEs. The Northeast and Mid-Atlantic states attracted the highest percentage of FDI from 1999 to 2003, but employment by non-bank foreign affiliates declined during this period. Most states offer firm-specific advice or training on exporting (such as paperwork, market research, finding foreign distributors). Few states offer state-sponsored financing programmes, but many help firms find public or private financing. Some states lead trade missions or have opened foreign offices (mostly in the EU and Asia). Finally states compete to attract FDI by offering tax or other incentives, but these tend to offset each other. A less focused, more general, but essential factor in attracting FDI to states is investment in education, worker training, infrastructure and R&D.

Swamidass and Vulasa believe that US competitiveness will depend increasingly on innovation, and that universities and small businesses can contribute significantly to innovation enhancement. The Bayh–Dole Act of 1980 played a major role in stimulating innovation by granting to universities and small businesses the patent rights from federally sponsored research. This encouraged the development of university-based innovation parks where research was commercialized. One respected study found that university research accounts for 10 per cent of new products and processes commercialized in seven industries. SMEs commercialize 60 per cent of university-based research and are likely to be within 100 miles of the university where the research was conducted. Few SMEs can conduct their own in-house research because of lack of resources and training. Universities can provide the training and complementary skills that SMEs need to commercialize research, and partner with them via Small Business Innovation Research (SBIR) grants to facilitate commercialization.

Westhead, Wright and Ucbasaran advise that government agencies that promote internationalization should tailor their programmes and policies to the needs of different types of SMEs. The SME population is quite diverse. It includes recent start-ups and mature businesses, ‘micros’ (one to nine employees) and ‘macros’ (ten to 49 employees) and firms that sell or use traditional and knowledge-based technologies. SMEs vary in their interest in internationalizing, responsiveness to entrepreneurial opportunity, proactive or reactive reasons for internationalizing, resource availability, attitudinal or resource barriers and preferred modes of entry. Also the link between internationalization and performance appears to vary by the sector in which firms are engaged and by the performance measure used. Consequently government agencies need to devote sufficient time to identifying differences between firms so that they can then provide appropriate resources when and where they will be most effective.

PART VI EXECUTIVE SUMMARIES

The summaries by senior executives from seven award-winning companies indicated that they started to internationalize at different stages in their history and for different reasons. Diamond V Mills, Markel, X-Rite and Revere Copper Products were in business for decades before starting to export. Lake Shore Cryotronics, Brock Solutions and DALSA started to export almost from inception. Their high-technology niche products or services and small domestic markets probably played a role in their becoming exporters so early.

Diamond V, Markel and Revere faced stagnant US markets and hoped to expand sales by exporting. Diamond V made its earliest export sales in response to unsolicited orders,

but it soon developed a ten-year plan to increase international sales from 20 per cent to 50 per cent of its total sales. Revere and Markel followed current customers abroad, and Revere currently watches its current domestic customers for signs of moving offshore. X-Rite saw an opportunity to grow through international sales and seized it. Diamond V and X-Rite relied on Gold Key Service of the US Commercial Service² for market studies and help in identifying prospective distributors and customers.

The companies vary considerably in their initial mode of entry into a foreign market, and in the mode they used in subsequent market entries. Markel used an export agent to start selling internationally, but it switched to manufacturing representatives after 15 years so that it could communicate directly with its customers. Lake Shore generally enters new foreign markets with a direct sales force and then switches to distributors after a year. A direct sales force can only be used effectively in small markets because complexity increases quickly as markets grow. Distributors are easier to manage than a direct sale force because they know their territories well, and their career development and compensation are easier to manage. This assumes careful initial selection of distributors, monitoring their performance and assigning a territory that is appropriate in size and complexity. In contrast, X-Rite starts with distributors but switches to a direct sales force if the business supports it. The company's direct presence is needed because customers need pre-sale and after-sale support. X-Rite may buy a local distributor or develop a new sales and service team with temporary help from an ex-patriot from US headquarters.

Entry modes also vary by country. Diamond V gives exclusive rights to distributors in the EU, but has wholly owned subsidiaries in China and Mexico that do everything but manufacture products. Markel uses independent local manufacturing reps who sell and service a few large customers per country (mainly in the EU). Revere searches for distributors who sell non-competing products to the same customers that are targets of Revere. Diamond V and Markel have warehouses in the EU because their customers require frequent, small batch deliveries. Brock Solutions sells services rather than products, which it integrates by using multinational virtual teams that can deliver solutions easily across international borders.

The five US companies sell most of their products in US dollars, and those with distributors leave currency transactions to them. The EU is often an exception. For example, Markel sells its products (mostly to the EU) in euros. Its sales have increased considerably since 2003 because of the weak US dollar. Markel also hedges its currency risk by negotiating three-year price contracts that are matched with equivalent length contracts with its suppliers. Markel also assumes duty and regulatory risk by selling its product at delivered duty-paid prices.

Regulatory issues are a common challenge for these exporters. Diamond V faces uncertainty as to whether a country will classify its product as a food additive or a pharmaceutical. The latter classification requires payment of a higher duty. Diamond V hired a full-time person to deal with these issues. Lake Shore's distributors help it to deal with different electrical codes, plugs and standards. Brock Solutions says its customers take care of its regulatory issues. Most manufacturing companies must deal with Waste Electrical and Electronic Equipment (WEEE) and Reduction of Hazardous Substances (RoHS) directives from the EU that eliminated lead solder and other materials from their exported products after July 2006.

Companies face integration issues as their export sales grow, especially with increases in the number of countries served. These issues include how to gain economies across diverse platforms, integrate domestic and foreign operations, create a common brand identity worldwide, and conduct business in multiple currencies. X-Rite integrated order fulfilment, financial reporting and customer management onto a single platform. It now coordinates simultaneous new product development launches that include digital displays and user manuals in ten languages. Lake Shore introduced an enterprise resource planning (ERP) system that tracks warranty issues, customer needs and complaints. It relies on its dealers in each country or region to translate user manuals. Markel uses its ERP system to process orders and invoices in local currencies.

Exporting success depends heavily on selecting the right people as distributors, manufacturing representatives or direct sales employees, and motivating and training them to sell the company's products in foreign markets. Lake Shore looks for entrepreneurial personalities who run SME distributor businesses in their home countries. Diamond V seeks people who speak at least two languages. Even if they do not speak these languages fluently, this experience tends to make them more culturally sensitive. Distributors need as much attention as regular employees through constant communication, e-mails and training to make sure that everyone has the same knowledge and achieves the same technical level. The culture of each country is different, so the approach may need to vary. X-Rite brings all foreign-based employees together once a year for common budget meetings. Each business unit also has an Intranet-based 'chat room' that employees can visit to post questions, read answers and see updates. X-Rite uses a culture survey to assess its success in creating a common culture.

Employee and customer diversity increases as internationalization proceeds. Lake Shore and Dalsa have a high number of foreign-born employees in their home offices. Diamond V hosts international days to celebrate diversity. Lake Shore and Diamond V prominently display the flags of their customers in their offices and plants.

Manuel Rosales, Associate Administrator for International Trade in the US Small Business Administration, discussed the key challenges that small businesses face when considering international trade and what the SBA can do to help SMEs to meet them. These challenges include fear of foreign laws, regulations and language, complacency in light of a large domestic market, requisite knowledge of logistics, packaging, standards, prices, limited time to acquire knowledge, lack of foreign contacts and limited financial resources. The SBA has many excellent people and programmes to address each of these challenges. These include consultation, training, making foreign contacts and loan guarantees.

Markos Tambakeras, Executive Chairman to the Board of Directors of Kennametal Inc., emphasized that manufacturing still contributes significantly to GDP, employment and exports, but it faces domestic structural disadvantages that are unrelated to labour costs and exporting obstacles. These obstacles can be surmounted by allowing US firms fair access to foreign capital markets and requiring trading partners to adhere to transparent operating rules and common ethics and standards. US manufacturing output has increased considerably since the North American Free Trade Agreement (NAFTA) was implemented, and the recently enacted Central American-Dominican Republic Free Trade Agreement (CAFTA-DR) promises to continue this trend. China's membership in the World Trade Organization (WTO) puts the US in a much better position to hold

China accountable to WTO standards and to influence its trading behaviour. SMEs can contribute significantly to US export growth as they account for 97 per cent of all exporting firms, and two-thirds of them export to only one foreign market.

NOTES

1. Forward citations are citations that a particular patent receives from subsequent patents. Subsequent patents list the earlier patent as 'prior art'.
2. The US Commercial Service is the trade promotion arm of the International Trade Administration and helps US small and medium-sized businesses to grow international sales. The Gold Key Service provides SMEs with one-on-one appointments with pre-screened potential agents, distributors, sales representatives, association and government contacts, licensing or joint venture partners, and other strategic business partners in targeted export markets.