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ENABLING TECHNOLOGIES AND TRADE

in business and professional services

Credits

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ENABLING TECHNOLOGIES AND TRADE

In business and professional services

Background

This report focuses on the impact of enabling technologies on seven of Canada's leading business and professional service industries: architectural services, commercial education and training, computer and information technology (IT) services, consulting engineering, geomatics and geographic information services (GIS), legal services, and management consulting. The analysis of global trends is based on a review of the international business literature regarding new technologies and the use of enabling technologies by business and professional service firms, plus Statistics Canada's recent publication, *Innovation in Dynamic Service Industries* (December 1998). The following international policy-related documents were also reviewed:

- American Enterprise Institute, *The Borderless Economy: Global Trade Rules and the Internet* (1998).
- Australian Coalition of Service Industries, *australia.com: Australia's Future Online* (1997).
- OECD, *Economic and Social Impact of Electronic Commerce* (1998).
- UNCTAD, *Telecommunications, Business Facilitation, and Trade Efficiency* (1997).
- WTO, *Electronic Commerce and the Role of the WTO* (1998).

Interviews were also conducted with 53 Canadian and U.S. key informants representing the seven sectors being targeted:

- architectural services (4),
- commercial education and training (6),
- computer/IT services (9),
- consulting engineering (13),
- geomatics/GIS (6),
- legal services (5),
- management consulting (10).

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The Role of Technology in Services Trade

International trade in services has increased exponentially due to developments in information technologies in the past ten years. Services believed to be "untradable" are now traded routinely in one form or another. The informatics infrastructure (i.e., information technology + telecommunications) facilitates services trade in much the same way as transportation infrastructure supports goods trade.

Statistically speaking, between 1990 and 1997 the fastest growing area of international trade was "other services," of which a major component is business and professional services (see Table 1). For Canada, "other services" exports grew at 1.5 times the rate for goods exports. The growth in business and professional services can be linked directly to enabling technologies that facilitate cross-border marketing, co-production of services with distant partners, and/or distance delivery of services. The Canadian business services portion of "other services" exports for 1998 exceeded $20.8 billion.

While individual industries may have technologies specific to their expertise, there is a core set of information and communication technologies applicable to a range of service industries. These "enabling" technologies can be divided into three groups:

- Telephony-based: videoconferencing, wireless communications, interactive voice response
- Computer-based: groupware, shareware, electronic forms, optical character recognition, electronic funds transfer, computer-aided design
- Web-based: e-commerce, e-mail, websites, chat rooms, intranets, extranets

Table 1
Average Annual Growth in Exports: 1990-97

Country	Other Services*	Goods
Canada	11.7	7.8
Australia	11.7	7.3
U.S.A.	10.2	8.3
U.K.	9.1	6.3
France	-2.1	4.5
Global average	11.5%	9.9%

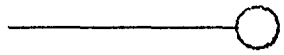
Source: Calculated from IMF, Balance of Payments Statistics
*"Other services" include all services except transportation and tourism. * i.e., services like business and professional services, telecommunications, finance, construction, cultural services

Increasingly, these technologies are being thought of as forming the architecture for "electronic commerce." They are being used for a range of business functions including the following:

- Increasing internal operational efficiency
- Promoting services
- Conducting market research
- Generating and facilitating sales

- Designing new services
- Delivering services
- Supporting service delivery

Electronic commerce itself is presently a US$26 billion business domestically and internationally With the growth of telephony over the Internet, the commercial distinctions between domestic and international transactions are becoming blurred While the popular media have focused on business-to-consumer innovations, the substantive growth has been in business-to-business transactions The World Trade Organization estimated in 1998 that, by 2005, the volume of electronic commerce may be as high as US$1 trillion At least 80 percent of the volume of electronic commerce worldwide is predicted to be in business-to-business transactions



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Changes in the International Services Trade Environment

In the international trade arena, several recent events are signalling the importance of these enabling technologies First, member countries of the World Trade Organization have concluded negotiations on an annex to the General Agreement on Trade in Services (GATS) specifying that market access must include access to national telecommunications networks The earlier telecommunications agreement had addressed only value-added telecommunications services The agreement on basic telecommunications is a milestone in recognizing that telecommunications, and by association information technologies like the Internet, are the critical infrastructure for international services trade

Second, in September 1998 the WTO General Council adopted a work program on electronic commerce to identify and address trade issues, which included the first international definition of electronic commerce as including

a) The provision of Internet access services themselves -- meaning the provision of access to the net for businesses and consumers

b) The electronic delivery of services -- meaning transactions in which services are delivered to the client in the form of digitized information flow

c) The use of the Internet as a channel for distribution services by which goods and services are purchased over the net but delivered to the consumer subsequently in non-electronic form

An interim review of progress is scheduled for the end of March 1999, with reports due by the end of July 1999 For service firms, this means that issues related to electronic commerce will be an integral part of the new round of trade liberalization negotiations to start by January 2000

As part of the GATS, which came into effect in January 1995, trade in services was defined as covering four modes of supply (a) cross border delivery, (b) attracting potential customers to the host country, (c) commercial presence abroad, and (d) staff travelling abroad At that time, negotiators felt that the gains in market access for *commercial presence abroad* were the most critical The argument put forward was that in most instances services need to be delivered face-to-face with substantial growth being contingent on a physical presence in the foreign market

Overall the impact of increasing sophistication in enabling technologies has been to shift the trade focus from *commercial presence abroad* to *cross-border delivery*, particularly electronic commerce While personal contact remains important, its primary role is shifting to the initial phase of export market development Increasingly, customers are becoming comfortable with "virtual" rather than in-person interactions once initial credibility and rapport have been established In fact, some services are being delivered solely over the Internet, with the principals never meeting face-to-face

Theoretically, all types of services can be traded using enabling technologies For example, specialized surgery is being performed under the direction of surgeons in different locations conferring by means of videoconference In actuality, though, unless the service provider is already known to the client, there are limits to the types of services that are traded The most commonly traded services have standardized features that allow for comparison shopping, relatively little downside risk if performance is substandard, and are capable of rapid response to client needs

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Usage of Enabling Tech es by Canadian Service Providers

Across all service sectors reviewed, the wide-spread use of enabling technologies underscores how vital the informatics infrastructure is for exporting services. The daily use of phone, fax, and computers (including local area networks based on client-server architecture) are a given for virtually all firms in the seven service industries being reviewed (see Table 2). The *common technologies* in use by the vast majority of firms in the seven service industries are now defined as e-mail and the Internet, including corporate websites. To these are being added the *newer technologies* like specific telephony applications, web-based client feedback, electronic funds transfer, and computer-aided design. *Differentiation* in experience and positioning is linked to the use of videoconferencing with staff and broader electronic commerce applications, with innovations such as website log books where clients or potential clients can leave requests or client on-line review of accounts and project status becoming generally accepted practice. The truly *leading edge technologies* appear to be those based on successful virtual interactions with clients.

Table 2
Usage of Enabling Technologies
by Canadian Business and Professional Service Firms

Type of Technology	Technology Examples	% Usage*
Technology base	phone, fax, computers, LANs	99
Common technologies	e-mail, Internet, corporate website	88
Newer technologies	wireless communications, fax/phone-back options, web-based client feedback, electronic funds transfer, computer-aided design	45
Differentiating technologies	videoconferencing with staff, intranets, optical character recognition, electronic forms, on-line sales and delivery	36
Leading edge technologies	videoconferencing with clients, on-line chat rooms with clients, extranets, groupware and shareware, interactive voice response	16

*Estimated based on interviews and literature review

With regard to the use of enabling technologies, the Canadian business and professional service exporters interviewed reported that their primary concerns were increased speed and efficiency, increased convenience for their clients, and closer ties with strategic partners. Operational efficiency and strategic partnership strengthening occur primarily through e-mail, with websites being used to streamline promotional activities. Over three-quarters of the firms report using the Internet regularly for market research, primarily to locate strategic partners or clients abroad. Approximately half use the Internet for researching global industry trends, benchmarking, or identification of potential export markets.

There are three primary limiting factors for Canadian business and professional service firms to the adoption of technologies beyond those categorized as "common." The first is *expense*, with 61 percent of Canadian business service firms surveyed by Statistics Canada saying that they delay implementation of enabling technologies like those supporting electronic commerce because the technology is too expensive and there are few, if any, offsetting tax benefits available to them. The second factor is the matter of access *speed*. Relatively slow on-line access not only increases frustration for staff and clients but is also expensive in terms of the extra staff time required. There continues to be a significant price differential between commonly-available access speeds (up to 56 kbps) and speeds that are necessary for regular business use -- a differential that only larger firms are in a financial position to absorb. The third factor is whether or not *trading partners use* the technology, with 56 percent of surveyed business service firms1

giving this as a reason for delay in adoption. Presumably, "trading partners" would include clients.

On the other hand, 72 percent of surveyed business service firms[1] reported that using enabling technologies (especially electronic commerce technologies) created *closer ties with business partners* -- a real benefit to service firms that depend on local partners for successful exporting. In addition, 67 percent of surveyed business service firms[1] were satisfied that enabling technologies had lowered their operating costs.

Different service industries focus on different benefits (see Table 3). The use of enabling technologies and the benefits targeted depend on the particular client group. For example, consulting engineering firms working with high-tech clients are much more likely to find client receptiveness to, and demand for, enabling technologies than their counterparts working with resource-based firms who are less likely to use information technologies.

Table 3
Usage of Enabling Technologies
Primary Benefits Sought from Using Enabling Technologies

Benefit	Architecture	Education / Training	Computer Services	Consult. Engin.	Geomatics GIS	Legal Services	Mgmt. Consult.
Lower overhead			*				*
Less time required per billable task						*	
Self-paced delivery		*					
Distance delivery		*	*				
Distance interaction	*			*	*		
Client review of work-in-progress	*			*	*	*	*

NOTE: Only the top two benefits sought have been listed for each Canadian service industry.

A good deal depends, of course, on how the enabling technologies are deployed. For example, interactive voice response (based on expert systems software) can handle the bulk of routine enquiries to customer service lines; however, at least 46 percent of users are reported to press "0" for a human operator because they do not get a useful initial response. While customers may prefer phone-based support due to familiarity, phone lines are often busy or are only answered during limited hours or are inadequately staffed, with customers finding it expensive to be left on hold. By contrast, a well-designed web-based customer service can empower customers by providing continuous access, immediate information on new services and the most frequently asked questions, and the ability to check one's own records on-line. Satisfaction of users will be linked to creative indexing of information so that answers are accessible within three query "layers" and discussion groups between clients and providers are kept current

1. From the data collected for Statistics Canada's Innovation in Dynamic Service Industries, December 1998

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Best Practices in Using Information and Telecommunications Technologies

Architectural services. Competitive Canadian architectural firms have been using the electronic production and transfer of drawings for some time, allowing for faster modification of specifications, duplication of sketches, and rescaling of plans. More recent uses include the development of intranets for ongoing consultations not only with clients but also with all members of a project team throughout the life of the project. Virtual reality modelling software is also being used to allow for virtual tours prior to finalizing plans.

Commercial education & training. In 1998, 25 percent of corporate training was delivered electronically. Predictions by Gartner Group Inc. are that at least half of training will be web-based by 2005. Delivery has been shifting from in-person presentations to self-paced, learner-centred multi-media training packages. Popular modalities for export include CD-ROMs (as portable multi-media tools) and web-based training, supported by videoconferencing. While U.S. firms are ahead of Canadian firms because of the sheer volume and range of courses offered, Canadian firms are very competitive in speciality training. One of the challenges in international delivery where Canadian firms should be competitive is managing multiple languages.

New trends in commercial education and training include web-based training, intelligent tutoring systems that are interactive and self-improving, object-based learning materials that support efficient mass customization, and voice recognition technology. The leading edge Canadian training applications provide not only training modules but also supporting on-line tools (such as prior learning assessments and learning plan management), on-line registration, and on-line conferencing.

Computer/IT services. By their very nature, computer service firms are extensive users of enabling technologies, some of which they create themselves. Canadian firms have been particularly competitive in cryptography development, providing key tools for international standards in electronic commerce. Competitiveness is presently linked to using non-proprietary platforms for applications to ensure interoperability. Innovative technologies used in support of export earnings focus particularly on enhanced uses of the Internet, including developing and managing extranets in rapid growth sectors like call centres. Firms are equipping Internet service providers with value-add features such as audio and video conferencing, the scheduling of virtual meeting rooms, and enhanced security features for their customers. New trends include "brokering" Internet searches for the best service deal (to certain specifications) worldwide.

Consulting engineering. Consulting engineers have tended to follow their clients' adoption of enabling technologies. Computer-aided design (CAD) has made possible international design partnerships as well as the electronic transmission of blueprints and designs. Through CAD, engineering firms are able to reduce drafting time, increase accuracy, and achieve greater design-phase flexibility . * resulting ultimately in faster project turnaround, higher quality and greater profitability. Newer technology uses include creating secure extranets for virtual client consultations and effective project management.

Geomatics/GIS. Canadian firms are world leaders in remote sensing and satellite technology, having a technologically sophisticated industry base. Many of the enabling technologies . * such as intranets, extranets, and CD-ROMs * are a part of daily business. Access to on-line spatial data, as well as the digital delivery of mapping and reports, are assumed. Competitive firms are able to manage distributed geographic information in response to remote on-line queries. Newer technologies include electronic journals, the use of graphic tools and space imaging technologies, the use of Advanced Network Technologies (ANT), and the use of the Internet to demonstrate capabilities using virtual reality.

Legal services. Law firms have been using on-line databases for legal research for some time now as well as intranets and e-mail. Leading edge technology includes the use of groupware for collaborative work with clients as well as encrypted client file transfer. Another fast growth area is in the use of videoconferencing for secure arraignments

distance expert testimony, testimony of abused victims without exposure to the courtroom, trial preparation by multiple sites, video dispositions, and professional development conferencing. Use of enabling technologies is reinforced to the extent that the firms use value-added digitalized support services that provide document imaging, preparation of trial exhibits and document management. While technology use internal to law firms is fairly similar between Canada and the U.S., the U.S. judicial system has been faster to embrace and validate the cost and time savings of distance technologies such as videoconferencing.

Management consulting. Management consulting firms tend to be on the cutting edge of enabling technologies use to the extent that they both advise clients on technology use and need to model its use themselves. Even consulting firms without a technology-related practice are finding electronic accessibility to clients a must and corporate websites an important tool for enhancing credibility. Management consulting firms are also likely to use a wide range of software tools, including presentation, database, document management, and project management software. Leading edge technology uses focus in two areas: research, and overhead reduction. To remain competitive, management consulting firms rely on data mining to identify trends and on websites that incorporate client interaction. Smaller management consulting firms, in particular, are using a range of on-line technologies to create a virtual presence, thereby lowering overhead.

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The Impact of Enabling Technologies on Exporting Services

The falling costs of enabling technologies, coupled with the dramatic increase in transmission speed, have changed the export environment for services dramatically, with over 200 economies having active Internet connections Estimates indicate that there are 263 million e-mail addresses worldwide and that 30 million people use e-mail each day On-line demographics are also changing, with one-third of the users having only a secondary school education and women business owners more equitably represented Canadian service exporters can have a reasonable degree of confidence that they can link electronically with both strategic partners and clients in virtually any market they target

The Organisation for Economic Co-operation and Development (OECD) has pointed out that rapid growth of Internet usage (as one of the core enabling technologies) will be linked not only to the cost and convenience advantages but also to the trend of large companies demanding that suppliers be linked to them electronically as a condition of doing business There is a fundamental shift occurring in the way in which businesses interact, both with their own staff and with each other

There have been at least six main competitive changes as a result of these enabling technologies *First*, cost-based competition has intensified These technologies have significantly reduced per-unit transaction costs by offering local-charge Internet telephony and faxing for global communication, web-based access to customer service functions in place of more expensive long distance calls, and increased options for self-service in place of more expensive professional time Dramatic declines in delivery costs are being documented (see Table 4) But, while delivery costs have fallen these savings are offset by significantly higher sunk costs for service providers (such as continual software and equipment upgrades and ongoing training of staff to use the technologies) that are increasingly difficult to recover as part of professional fees

Second, clients' expectations of both "normal" service and "community" are being influenced by the 24-hour 7-days-a-week environment of the Internet Clients are expecting to be able to access routine information on-line at will In addition, clients expect to be able to find global discussion groups around topics of interest to them or that touch on the service for which they are looking The OECD has flagged the impact of changes in the relative importance of time on production cycles, the range of collaborators included on projects, and breadth of contacts included as part of one's reference group Meeting such client expectations can be expensive and will place demands on employees to be available over extended time periods

Table 4
Delivery Costs Using Different Technologies

Transmission Mode	Cost (US$)	Cost (US$)
*Document transmission (New York to Tokyo)**		
Air mail	7.40	5 days
Courier	26.25	24 hours
Fax	28.83	31 minutes
Internet e-mail	0.10	2 minutes
Software distribution#		
Traditional mail-out	15.00	
Phone order	5.00	
Internet download	0.20-0.50	

*ITU, Challenges to the Network (1997)
#OECD, The Economic and Social Impact of Electronic Commerce (1998)

Third, new factors are influencing clients' selection of professional service providers At a minimum, clients now have access to considerably more comparative data on service firms than they had in the past The web-based technologies, in particular, are making it possible for clients to comparison shop for professional services worldwide As well, new intermediaries are emerging to rate or rank various service providers and influence the decision-making process Given a medium that pushes for price-based comparisons, it is becoming more challenging for smaller specialty firms to demonstrate the value added they provide in order to shift the selection criteria to quality considerations

Fourth, the distribution of enabling technologies' usage is forcing professional service providers to maintain at least two modes of delivery technology neutral, and technology enabled There remain groups of clients who prefer to deal face-to-face without a technology interface, who may use fax but not necessarily e-mail, and who seldom if ever "surf the net " At the other extreme, there are clients who have little interest in meeting face-to-face, who are very comfortable in on-line chat rooms, and who expect the service to be delivered electronically Interestingly, the distinction is more along generational lines than it is along socio-economic ones

Fifth, size is becoming less of a factor Larger firms may have the budgets for faster implementation of new technologies, but smaller firms often adapt to technology changes more quickly It is now possible to be productive with fewer employees Firm size is also not apparent to potential clients when transactions are all virtual, thus removing size as a credibility variable so that very small firms can appear well-established As well, small newcomers have the advantage of not having to deal with legacy technology

Sixth, enabling technologies are influencing the structure and design of service delivery both within firms and in interaction with clients Newer technologies like groupware underscore a shift in the power structure due to the ready availability of strategic information at all levels of the organization The technologies allow for independence of time and location, removing the traditional constraint of simultaneous production and consumption As well, many services are becoming in essence "assisted" self-service

Looking ahead, one can see the advent of yet another paradigm shift as computer, telecommunications, and entertainment technologies converge to further lower transaction costs Digital cameras already allow easy insertion of graphics into business materials In November 1998, TV stations aired the first digital broadcast Satellite response is being used to speed media-rich web content to Internet users, and intelligent disc drives are just around the corner Already there is work underway on a general information infrastructure that would integrate wired, wireless, packet switching, satellite, cable, and related technologies to provide the user with optimum access choice Some are already referring to the "hollowing out of the computer" as the centre of focus shifts from the individual desktop to the network For business and professional service firms, the key competitiveness issues will be speed, cost, and security as pressure on shared networks mounts

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Canada's Competitive Position in the Use of Trade-Enabling Technologies

Assessing the export competitiveness of Canadian service firms in their use of enablir ,j technologies is challenging as comparative data collection lags significantly behind the present 6 to 12 month technology innovation cycle Three factors may be helpful in that assessment

(a) the availability of the necessary inputs
(b) the actual use of enabling technologies, whether for domestic or export purposes
(c) the growth in service exports since 1990 when basic enabling technologies began to be widespread

Availability of inputs Canadian service firms have a strong base of educated workers from whom to recruit who, in turn, should be comfortable with using enabling technologies given their integration into Canada's tertiary institutions (see Table 5) As well, Canada enjoys an extensive telephone infrastructure, maintained in part due to the vast geographic distances to be bridged The provinces differ currently in the responsiveness of their telecommunications providers to the needs of the business community, however, any service lacks or excessive charges should get resolved as competition for phone service increases Canada does lag behind the U S and Australia on the use of information technologies, but it is still ahead of the U K and France

Table 5
Availability of Competetive Inputs
(per 1,000 persons)

Country	Human Resources	Technology Resources		
	Tertiary Students: 1995*	Main Phone Lines: 1996*	Personal Computers: 1996#	Internet Hosts: 1997#
Canada	38 65	602	199	22 8
Australia	54 01	519	311	38 2
U S A	53 98	640	362	44 2
U K	33 80	528	193	14 9
France	37 86	564	151	5 0
OECD	36 45	540	224	20 3

*United Nations Development Programme, Human Development Report 1998
#World Bank, World Development Report 1998

Use of enabling technologies Canada ranks ahead of the U S A both in telephonic links with the rest of the world and in Internet users (see Table 6) While these data do not indicate specific usage by industry, they are indicative of a predisposition to use these technologies February 1999 survey data from ComQuest Research show that 55 percent of Canadians now have on-line access and 26 percent use the Internet on at least a weekly basis These data compare very favourably to ComQuest's internationally comparable data of 27 percent on-line access in the U S and 18 percent in the U K Demonstrating a willingness to use the technologies is particularly important in light of reports that Canadian firms are more risk aversive than their U S counterparts and have less access to venture capital A positive consequence may be slower initial growth among Canadian start-up firms, accompanied by fewer business failures

Table 6
Use of Enabling Technologies: 1995

Country	International Phone Calls (minutes per person)	Internet Users (per 1,000 persons)
Canada	99 9	41 2
Australia	52 6	55 4
U S A	59 5	38 0
U K	69 5	25 6
France	48 3	8 6
OECD	41 6	17 9

Source United Nations Development Programme, Human Development Report 1998

Service export growth Disaggregated data on service export activity are still difficult to obtain, however, Statistics Canada does track and report export volumes for most of the service industries of interest in this report (see Table 7) Unfortunately, data for commercial education and training, while collected, are not reported in a disaggregated fashion but rather are part of "miscellaneous business services " The other six industries, for which disaggregated data are available, have average annual export growth rates above both the Canadian and international averages Given that international competition has been increasing, firms in these six Canadian service industries are clearly already competing successfully abroad

Table 7
Average Annual Export Growth for
Selected Canadian Business Services: 1990-97

Canadian Business Service	Average Annual Growth: 1990-97
Architectural services and consulting engineering	29 1
Legal services	20 8
Computer/IT services	17 8
Geomatics/GIS ("other technical services")	15 5
Management consulting	15 4
Average for total Canadian business services	14 3%
Global average	11 5%

Source Calculated from Statistics Canada publication 67-203

The one area of interest where internationally comparable data are published is for "design firms" (the combined arena of architecture and engineering) Table 8 shows that Canadian firms ranked #4 again in 1997 with regard to international billings While they lagged behind U S firms in number of firms in the Top 200 and percent of total billings, they averaged higher per firm revenues than did the U S firms Fourteen Canadian "design" firms were represented in the Top 200, led by SNC-Lavalin as #6

Canadian firms tend to mirror international usage of enabling technologies They are generally viewed as being as competitive as U S firms or even slightly ahead in highly specialized services such as geomatics/GIS and some areas of computer services In general, Canadian geomatics/GIS and commercial education and training firms are in the competitive forefront worldwide for adopting and adapting enabling technologies Management consulting firms and computer/IT service firms tend to use the enabling technologies most extensively Consulting engineering, architectural services, and legal services still rely less on enabling technologies than do other professional service industries

Table 8
International Billings of Design Firms by Country of Origin 1997

Rank	Country	Percent of Billings	Average Billings per Firm (US$)
1	U.S.A.	43.7	79.7
2	U.K.	13.0	130.5

3	Netherlands	11 1	223 2
4	Canada	7 6	87 3

Source Engineering News Record Sourcebook December 1998

Barriers to technology use by Canadian service exporters appear to be primarily external to the firm rather than related to a willingness to adopt new technologies The specific barriers mentioned most frequently are as follows

a) *Lack of cost-efficient access to high speed networks*
While some parts of Canada enjoy very competitive rates and maximum speed, others (particularly in the north) face high charges, very limited network availability, and antiquated technologies The single factor most likely to increase use of enabling technologies was reported by those interviewed to be *inexpensive access to high speed (ISDN) transmission infrastructure*

b) *Lack of tax incentives to invest in new technologies*
At present in Canada there is a disparity between the 12-18 month technology life cycle and the 36+ month depreciation schedules allowed for information technologies Competitors in the U S continue to enjoy opportunities to write off initial information and communication technology purchases under investment tax credits, but business and professional service firms in Canada do not have similar tax relief

c) *Lack of clear, enforced regulations regarding "cyber" privacy*
The Internet itself is evolving a mechanism to alert users to the potential for privacy violations Websites are being encouraged to post privacy policies, and "seal of approval" agencies such as Business Bureau Online, HonorWeb, and TRUSTe have become established In addition, two protocols have evolved to ensure security of transmissions Secure Electronic Transactions (SET) and Secure Socket Layer (SSL) Guarantees of such security should be reflected in a website address beginning with "https" (instead of "http") but few are yet visible There is still a need to reinforce voluntary compliance with regulations to protect users from privacy violations

d) *Lack of international encryption standards*
Canada is a world leader both in encryption technology itself and in policy development to support digital signature recognition To facilitate secure export-related transmissions, international protocols are needed in order to provide both protection and designated access While the issue is complex, involving changes in federal legislation, Industry Canada is working with OECD to develop an acceptable legal framework for the use of encryption in a network environment and the recognition of digital signatures

e) *Limited automatic document translation*
One of the hallmarks of the network environment is easy access to information Language can still create a barrier, however Canadian service exporters may be constrained in promoting their services where local automatic on-line document translation is not available

Continued competitive use of enabling technologies will depend not only on exporter initiative but also on three areas of government action (a) ensuring cost-efficient high speed transmission infrastructure throughout the country, (b) providing more appropriate tax incentives to offset the cost of ongoing technology adoption, and (c) facilitating the international development and adoption of open, non-proprietary standards for a network environment Regarding the issue of international standards, such standards need to ensure interoperability between platforms and the use of non-proprietary object-oriented databases Without such standards, Canadian service providers will face challenges in communicating with a range of clients in different countries due to having to use different and non-compatible protocols

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ENABLING TECHNOLOGIES AND TRADE

In business and professional services

Summary of Findings

The use of telephony-based, computer-based, and web-based enabling technologies will continue to revolutionize the trade of business and professional services, supporting a shift from "commercial presence" to "virtual presence." As potential clients gain worldwide access to business and professional services, competition has become increasingly cost-based and expectations for immediate, 24-hour, 365 days a year service have soared

Internationally competitive Canadian service firms have already met the challenge by reducing operational costs through adopting the common technologies (e-mail, websites, and Internet research) as well as newer computer-aided design and web-based client feedback. Firms are now differentiating themselves in the international marketplace through the use of videoconferencing and, most recently, virtual reality interaction with clients on-line.

The main limitations on technology-based growth for Canadian service firms are not from a reluctance to use enabling technologies but rather from external factors The primary issue for the seven service industries surveyed was cost-efficient access to high speed networks, followed by the lack of tax relief for the continued investment needed for ongoing upgrading of technology supports. Other limitations relate to the regulatory environment in which international services trade takes place, particularly the lack of international conventions on recognition of digital signatures and protection against privacy invasion

Exports by Canadian business and professional service firms are already increasing at above the international average The growing importance of enabling technologies is good news for Canada Their adoption creates a level international playing field between Canadian service exporters and their larger U S competitors and makes location a non-issue Addressing infrastructure and regulatory barriers in a timely manner should lead to a further increase in services export revenues with related benefits to the domestic economy.

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