

Adoption of Internet Technologies and e-Business Solutions by Small and Medium-sized Enterprises (SMEs) in New Brunswick

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19 November, 2004

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Executive summary

The Survey

This report describes results of a survey of small and medium-sized enterprises (SMEs) in New Brunswick that was carried out in April and May, 2004. The study aims to identify and describe the current level of e-business enablement of SMEs in the Province, and contribute to the realization of New Brunswick's e-business agenda. The research investigates the socio-demographic characteristics, perceived facilitators of adoption and barriers to adoption, and the perceived outcomes of adoption of Internet technologies and e-business solutions among New Brunswick SMEs. The survey is part of the *e-Business Awareness Program* currently being funded by the Atlantic Canada Opportunities Agency and executed by the Electronic Commerce Centre of the University of New Brunswick - Saint John. In connection with the e-Business Awareness Program, this study aims to assess needs and demand for e-commerce or e-business support services. The study of New Brunswick SMEs' adoption of Internet technologies and e-business solutions also aims to help clarify several enterprise performance issues that policymakers, public and private service providers, and the SME business community address in their respective fora.

The Respondents

The survey contains usable responses from 280 New Brunswick SMEs. The responses were obtained in several tests and then through an invitation sent to 2,260 New Brunswick SMEs that were identified via mailing lists provided by Enterprise Networks and Business New Brunswick. The SMEs that participated in this survey account for an estimated 4924 employees and an estimated \$315M in sales. Firms from all regions of New Brunswick and 28 industries participated in the survey.

We distinguish among 5 size classes of firms: microenterprises, which have fewer than 5 employees (including owners), very small firms (with 5 to 19 employees), small firms (with 20 to 49 employees), medium firms (50 to 499 employees), and large firms (500 or more employees). No large firms were invited to participate in this survey. The population of firms in this survey roughly approximates the size distribution of SMEs in New Brunswick.

Around three-quarters of firms in New Brunswick are microenterprises. Microenterprises account for around 11% of all employees and 14% of all revenue of the population of survey respondents. The average age of respondent SMEs is nearly 14 years. These firms are not new companies with unproven business models, but firms that have overcome the threats to survival that eliminate the majority of new firms in the first few years of life.

The Lessons

Several lessons can be drawn from the results of the study. First, the simplest Internet technologies and e-business solutions (such as e-mail, PCs, and use of the Internet for information searches) are in practically universal use among New Brunswick's SMEs. Although dial-up connections remain widespread, faster and more flexible methods of connecting to the Internet are being taken up by the SME community. For instance, 60% - 70% of very small and small firms have adopted high speed connections, and around 10% of firms use wireless connections. In general, larger SMEs appear to adopt the more complex Internet technologies and e-business solutions faster than their smaller counterparts. However, microenterprises lead in adoption of business models relying on Internet-based sales, and small SMEs lead in matters of Internet-based exporting. Microenterprises have the highest ratio of Internet sales to total sales (27%) and medium enterprises the lowest (10%). This is a reflection of the ability of some microenterprises to find business models and specialty niches that lend themselves to Internet commerce. Two-thirds of SMEs report having plans for further investments in Internet technologies and e-business solutions; focus would be on website content development and design, conducting secure transactions with business, government, and customers, or on marketing on the Internet.

The second lesson from the survey is that, in general, SMEs report positive experiences with Internet technologies and e-business solutions. This result stands in contrast to other recent surveys from Canada and elsewhere that report only modest satisfaction with e-business solutions among SMEs. Most of the firms replying to this survey report having experienced a broad range of benefits from their engagement in e-business. It is notable that many of the impacts that firms have experienced are highly qualitative, having to do with image, relationships, speed, and agility. Highly rated impacts are: improved relationships with customers, improvement in brand and image, increased adaptability to customers' requirements, and increased speed of delivery.

The Internet has not led to significant internationalization of New Brunswick SMEs. New Brunswick SMEs earn most of their revenue within the province; around 62% of their revenue is in the local market. Microenterprises have the highest rate of Internet-based export sales (on average 26% of the firms Internet sales are to international customers). In terms of volume, about half of SMEs' Internet-based sales are conducted by very small firms (5-19 employees) and about one-quarter by medium-sized SMEs. We estimate the total volume of New Brunswick's SME sales over the Internet to be around \$16 million. Export sales account for about \$4 million, of which half is conducted by very small firms.

The third learning from our survey is that firms' needs for support and services vary among size classes of firms. The larger the firm, the more likely it is to have purchased externally supplied business services. Medium SMEs are major users of technical services, while very small and small SMEs purchase training, strategic management, and marketing support services. All in all, 100% of medium SMEs have purchased services, and a little more than half of all microenterprises have purchased services.

Ways to Increase e-Business Engagement among New Brunswick SMEs

Our survey suggests that SMEs engage in e-business largely as a consequence of solving business challenges and also for strategic reasons. We identified four groups of factors that facilitate SMEs' adoption of Internet technologies and e-business solutions: 1) management, leadership, organizational culture, and strategy; 2) entrepreneurship, risk-taking, and focus; 3) competition and opportunity; and 4) business process improvement and technology management. Private and public service providers that can help SMEs solve problems of purchasing, quality, market development, coordination, and productivity can also help these firms to improve their e-business capabilities, since information technology underpins most contemporary business solutions in these areas.

Public and private organizations and agencies, together with SMEs, have many opportunities to increase the uptake of e-business in New Brunswick by influencing the capability development aspirations and the internal and external factors that are known to facilitate adoption of e-business by SMEs. Educators, trainers, SME associations, policymakers, economic development agencies, and private service providers can contribute to improving the use of Internet technologies within the New Brunswick SME community by learning how to identify and service the e-business learning needs of these firms. Our research suggests that locally available services are perceived to be expensive and not always entirely reliable. Demand exists for a range of Internet related business and support services, but these services need to be priced and delivered to customers in suitable ways.

The Future

Most New Brunswick SMEs have plans for future adoption of Internet technologies and e-business solutions, and in the next phases of e-business enablement we expect to see deepening of capability to exploit Internet technologies and e-business solutions, enlargement of the population of firms that are actively adapting these new tools to their own purposes, increased use of secure online transactions, and increase in the amount of local and export economic activity that is conducted with the support of Internet technologies and e-business solutions.

Introduction

This report describes results of a benchmarking study that is part of the *e-Business Awareness Program* currently being funded by the Atlantic Canada Opportunities Agency and executed by the Electronic Commerce Centre of the University of New Brunswick - Saint John. The study reports the results of a survey of small and medium-sized enterprises (SMEs) in New Brunswick that was carried out in April and May 2004. The study aims to identify and describe the current level of e-business enablement of SMEs in the province and to contribute to the realization of New Brunswick's e-business agenda. The research investigates the socio-demographic characteristics, perceived facilitators of adoption and barriers to adoption, and the perceived outcomes of adoption of Internet technologies and e-business solutions among SMEs. With reference to the *e-Business Awareness Program*, the study aims to assess needs and demand for e-commerce or e-business support services. By identifying the "pain points" that SMEs in different sectors encounter, our research helps to determine which support services are of interest to SMEs. Our immediate concern was to identify characteristics of demand for e-business training services among SMEs. However, the results of the study also provide benchmark information against which the development of e-business capability among New Brunswick SMEs can be gauged in coming years. Furthermore, our analysis of New Brunswick SMEs' adoption of Internet technologies and e-business solutions helps to clarify several enterprise performance issues that policymakers, public and private service providers, and the SME business community address in their respective fora.

We have used a deliberately broad definition of e-business. It encompasses all Internet-based business-to-business and business-to-consumer transactions as well as non-transactional interactions throughout the customer transaction cycle. In this definition, a firm is engaged in e-business without conducting online transactions if some of the phases of the transaction cycle such as marketing or post-sale service delivery take place online. Furthermore, we consider the internal use of information and communication technologies also to be a feature of e-business, although here we focus on the business use of relatively advanced, complex, or emerging applications for purposes of internal process integration, coordination, or decision support, rather than on use of older information technologies.

Key learning points

Our survey of adoption of Internet technologies and e-business solutions by 280 SMEs in New Brunswick is the first of its kind in the province. It is not designed to show whether New Brunswick SMEs are more or less advanced than SMEs in other regions. Instead, it is designed to provide baselines against which the future development of e-business capability among New Brunswick SMEs can be gauged, to identify policy and management issues that can be addressed in various fora, and to ascertain the needs and interests of New Brunswick SMEs regarding e-business support services.

The seven key learnings from this survey are as follows:

1. Even among SMEs, size matters. Larger SMEs adopt Internet technologies and e-business solutions more extensively than smaller SMEs do. However, smaller firms adopt Internet-based business models more quickly than larger firms. Furthermore, the support and service requirements of SMEs differ significantly by size category.
2. SMEs in the major urban regions of New Brunswick are more extensively e-business enabled than are firms in rural regions.
3. Motivations for adopting e-business solutions and Internet technologies vary. Four facilitating factors are identified: 1) strategic management and leadership; 2) entrepreneurship and risk; 3) perception of competition and opportunity; and 4) process improvements and technology management capability. Perceived level of competition locally, regionally, and internationally is correlated with degree of e-business enablement, but the direct effect is relatively small.
4. SMEs report experiencing a broad range of benefits from adoption of Internet technologies and e-business solutions. Many of the benefits are qualitative, and most of the reported benefits are highly correlated with each other. In other words, firms that experienced some sorts of benefits from adoption of Internet technologies also experienced other sorts of benefits. The greater the use of Internet technologies and e-business solutions, the greater the reported benefits.
5. New Brunswick SMEs are mainly applying Internet technologies and e-business solutions to their activities in local and regional markets. The use of e-business for geographical market expansion, especially for exporting, is lower than anticipated.
6. Most NB SMEs have plans for future adoption of Internet technologies and e-business solutions. Of most current interest are security solutions and solutions that enable interactivity with customers and market development.

7. Educators, trainers, SME associations, policymakers, economic development agencies, and private service providers can contribute to improving the use of Internet technologies within the New Brunswick SME community by learning how to identify and service the e-business learning needs of these firms, and by facilitating the establishment of such community of business service providers in the Province.

Simple Internet and e-commerce technologies such as e-mail and PCs have diffused throughout practically the entire population of firms. However, adoption of more advanced or complex technologies and business practices is not as widespread. The technology frontier is continually advancing and the complex solutions of today will become the simple applications of tomorrow. SMEs can push the technology envelope and if they learn how to produce business value from Internet technologies and e-business solutions, they may gain a competitive edge.

Patterns of uptake of Internet technologies and e-business solutions among New Brunswick SMEs are described below.

Our survey results show that many New Brunswick SMEs have experienced a broad range of benefits from their engagement in e-business. Many of the reported benefits are qualitative - improvement in relationships, speed of response, agility, and so forth. The value of e-business appears to be broader than direct incremental improvements to the bottom line. At the same time, not all of the expectations that New Brunswick SMEs have with respect to Internet technologies and e-business solutions have been met. For example, impact of e-business use on market and product development is relatively low. However, as firms become more proficient users of e-business technologies and solutions, they may learn to create business value in these areas.

Our finding regarding benefits is in contrast to other recent surveys of SMEs and e-business suggesting disappointing experiences with e-business technologies and business models among SMEs. Our finding may be a reflection of the population of firms that participated in this survey. Since the questionnaire was administered online, only firms with online capability are included in the respondent population. It may be that mostly firms with positive experiences with e-commerce cared to participate in the survey. If this is so, then the survey results should be interpreted as a description of the subpopulation of New Brunswick SMEs that are among the more successful adopters of Internet technologies and e-business solutions.

Firms' needs for support and services vary according to size. Nearly three-quarters of firms are microenterprises - firms with fewer than five employees (including owners). This group of firms can benefit significantly from adoption of Internet technologies and e-business practices, but the needs and challenges of e-business enablement of microenterprises have not been well addressed in the e-business policy literature or in the management literature.

Furthermore, our survey results suggest that threshold effects exist in matters of adoption of Internet technologies and e-business solutions. For example, larger SMEs report higher levels of benefits. Further research needs to be undertaken to better understand the requirements of different size classes of SMEs with respect to Internet technologies and e-business solutions.

Characteristics of respondents

Our survey contains usable responses from 280 New Brunswick SMEs. Responses were obtained in several tests and then through an invitation sent to 2,260 New Brunswick SMEs that were identified via mailing lists obtained from Enterprise Network (formerly known as Community Economic Development Agencies - CEDAs) and Business New Brunswick. Total response rate was about eleven percent. The questionnaire was administered online in French and English versions. 20.1% of the respondents completed the survey in French and 79.9% completed it in English. A copy of the questionnaire is provided in Appendix 1.

We distinguish among 5 size classes of firms: microenterprises, which have fewer than 5 employees (including owners), very small firms (with 5 to 19 employees), small firms (with 20 to 49 employees), medium firms (50 to 499 employees), and large firms (500 or more employees). This classification of firm sizes mostly follows convention in Canada, except that we have split the category of "small firms" into two categories: very small firms and small firms.

Nearly three-quarters of firms in New Brunswick are microenterprises (this preponderance of microenterprises is typical in other provinces as well). Around 16 percent of firms are very small (5-19 employees), and around 4 percent are small (20-49 employees). Medium and large firms represent less than 7 percent of all firms in New Brunswick. As Table 1 shows, our surveyed population of firms roughly approximates the size distribution of firms in New Brunswick.

It is not possible to estimate the representativeness of the sample of firms in our survey from the standpoint of sectoral distribution, since no baseline data are available regarding sectoral distribution of firms in New Brunswick. However, firms from 28 industries participated in the survey.

The SMEs that participated in this survey account for an estimated 4924 employees and an estimated \$315M in sales. Table 2 provides information about characteristics of firms by size. Microenterprises represent nearly two-thirds of the firms in the survey, but only 11% of all employees and 14% of all revenue.

Table 2 shows that all sizes of firms report strong average annual growth over the past three years. These high reported growth rates are not typical of the SME population in general. Also, Table 2 shows that the smaller firms tend to be younger.

The average age of firms in the survey is greater than eleven years, rising to around 20 years in small and medium-sized firms. In this respect, SMEs in our survey are unlike average SMEs since the average age of SMEs in the population is likely to be younger. In other words, the firms in the survey are not recently established companies with unproven business models. They are firms that have overcome the threats to survival that eliminate the majority of new firms in the first few years of life.

No accurate data are available regarding the geographical distribution of firms in New Brunswick. If we assume that firms are geographically distributed as a function of population, then the geographical distribution of firms in the respondent population does not accurately reflect the geographical distribution of firms in the province. Firms from all regions of New Brunswick participated in the survey. However, response rates were much higher in some regions than in others. Therefore, in reporting results from our survey, we do not attempt to extend the analysis to the regional level in New Brunswick. We do, however, distinguish between urban and rural regions in New Brunswick. Counting the Enterprise Network regions of Saint John, Fredericton, and Moncton as urban regions, then less than 25% of SMEs are in an urban region (Table 3).

New Brunswick SMEs earn most of their revenue within the province. Figure 1 shows that NB SMEs earn around 62% of their revenue in the province. Larger firms tend to earn a greater proportion of revenue from regional, national, and international markets. The U.S. market is a particularly important source of growth for small (20-49) and medium-sized (50-499) firms. In general competition is considered to be less intense in the New Brunswick market than nationally or internationally, although perceived competitive pressures vary by size of firm (see Figure 2) and by sector (data not shown). As Figure 2 shows, small firms (20-49 employees) report greater intensity of competition than other sizes of SMEs.

What barriers prevent SMEs from growing? Figure 3 provides a rank ordered list of perceived barriers. Figure 3 shows that in general, New Brunswick SMEs believe that they would improve their business performance if they could develop specialized niches in the domestic market, formulate and communicate their marketing messages more effectively, improve the quality of their products or services, and deliver these products and services more effectively and efficiently to customers. Among medium-sized firms, staff recruitment, retention, and productivity are also considered to be barriers to growth.

Firms usually intend to develop capabilities in response to perceived barriers to growth. We asked New Brunswick SMEs which capabilities they would like to develop. The answers are shown in Figure 4. Marketing, interactivity with customers, and technology top the list of desired capabilities. However, once again the profile of small firms (20-49 employees) differs from the others. Small firms share the interests of other SMEs in development of capabilities but also express particular interest in capabilities in new product development, purchasing, supply

management, and change management. The profile of small firms' interests suggests that when firms reach the range of 20 employees, they face a new set of growth challenges that reflect the transition to a larger organization with more formal management, purchasing, and business development routines. Medium-sized firms do not express interest in developing these capabilities because to grow to the 50 employee range they have already developed them.

Patterns of adoption and use of Internet technologies and e-business solutions

We now turn to an analysis of the patterns of adoption and use of Internet technologies and e-business solutions among New Brunswick SMEs. Figure 5 shows the percent of firms using various methods of connecting to the Internet in New Brunswick. Firms use more than one method of connection. Medium-sized firms use the broadest range of connections: dial-up, cable modem, high speed, T1 lines, and wireless, favoring dial-up and high speed connections. Microenterprises principally use dial-up connections and secondarily use high speed connections. Between 60% and 70% of very small and small firms have adopted high speed connections. Around ten percent of firms use wireless connections. However, 61% of all firms still use dial-up connections. Overall, the persistence of dial-up connections shows that slow speed access to the Internet is still a fact of life for many firms.

Firms were asked to indicate which of sixteen Internet technologies or e-business solutions they currently use (Q36). Responses, summarized in Figure 6, indicate that practically every firm now uses e-mail, the Internet (mainly for finding information), and personal computers. More than two-thirds of all firms, and nearly all small and medium-sized enterprises, use functional (application) software. More than 80% of medium-sized firms also use external websites, wireless, and shared file folders. But half or fewer of the firms use the remaining technologies or solutions. The most extensive users of Internet technologies or e-business solutions tend to be the larger firms.

Around three-quarters of New Brunswick SMEs use the Internet to purchase goods or services (Figure 7). Once again, size appears to be a factor in the adoption and use of Internet technologies and e-business solutions. The larger the SME, the more likely it is to purchase goods and services over the Internet. Around 90% of medium-sized firms purchase over the Internet, while around 70% of microenterprises use the Internet for purposes of purchasing.

About two-thirds of New Brunswick SMEs have their own website. Only slightly more than one in two microenterprises has a website, while 80% or more of very small, small, and medium-sized enterprises have websites (Figure 8). However, only 44% of SMEs use the Internet for selling goods and services (Figure 9).

Among SMEs with websites, the functions of websites are predominantly to convey information. 58% of SMEs' websites are used to provide information about the company, and 56% provide information about products or services (Figure 10). Use of websites for bi-directional communication with customers is less frequent. Half of small SMEs and one-quarter of medium-sized SMEs use their websites for this purpose. Small SMEs are the leaders in offering secure websites, although fewer than half do. In general fewer than 20% of SMEs offer digital products or services, privacy policy statements, facilities for online payment, synchronous two-way communication, or wireless access through their websites.

Larger SMEs are not the leaders in use of Internet technology for online sales. 54% of very small firms and 42% of microenterprises sell goods or services on the Internet, compared to 31% of small firms and 25% of medium-sized firms. Of those SMEs selling goods or services over the Internet, the proportion of Internet sales to total sales is about 24% (Figure 11). Microenterprises have the highest ratio of Internet sales to total sales (27%) and medium enterprises the lowest (10%). This is a reflection of the ability of some microenterprises to find business models and specialty niches that lend themselves to Internet commerce.

The Internet has not led to major export activity by New Brunswick SMEs. Most Internet sales conducted by New Brunswick SMEs are to domestic (Canadian) customers. Less than 25% of sales are to international customers (Figure 11). Microenterprises have the highest rate of Internet-based export sales (on average 26% of the firms Internet sales are to international customers). In terms of volume, about half of New Brunswick SMEs' Internet-based sales are conducted by very small firms (5-19 employees) and about one-quarter by medium-sized SMEs (Figure 11). We estimate the total volume of SME sales over the Internet at about \$16 million. Export sales account for about \$4 million, of which half is conducted by very small firms.

To summarize the picture of adoption and use of Internet technologies and e-business solutions by SMEs in New Brunswick, we have created five indexes (see Table 4):

- The Connectivity Index measures the degree to which methods of connecting to the Internet are advanced (Q35). If a firm connects with dial-up, it scores one point. If it connects with cable modem, ISDN, or wireless, 2 points. If it connects with a T1 line, 3 points. Because firms can connect to the Internet with multiple methods, the highest possible score on the Connectivity Index is 12. In the benchmark survey, the highest score received was 10 and the average score was 2.1. Smaller firms generally have lower Connectivity Index scores (Table 4).

- The e-Business Use Index measures use of 16 Internet and e-Business technologies and solutions (Q36) and the ownership of a website (Q53). If the firm uses a technology or solution it scores 2 points; if it plans to use a technology or solution it scores 1 point; otherwise it scores zero. If it possesses a website it scores three points; otherwise zero. The maximum score possible for the e-Business Use Index is 41 points. In the survey, the maximum score received was 32 points. The average score on this Index is 18.1 points and smaller SMEs tend to have lower scores than larger SMEs (Table 4).
- The Transaction Index measures use of the Internet for buying and selling (Q52 and Q56), which are worth 3 points each. Maximum possible score is therefore 6 points. Among participants in the Benchmark Survey the average score on this Index is 3.6. Very small SMEs (5-19 employees) receive the highest score on the Transaction Index.
- The Index of Website Functionality measures the extent of functional features of a firm's website. Only firms with websites can score on this index. For each of nine features utilized a firm scores one point. The maximum possible score is therefore nine points. Only one firm in our survey scored nine on the Index of Website Functionality. The average score is 1.9, and small SMEs have the highest average score: 3.2 (See Table 4).
- A composite Index of e-Business Enablement combines the four indexes described above by adding them. The highest possible score is 68. In our survey, the highest score obtained by a firm is 52. The average score is 25.8, and larger SMEs tend to have higher scores on this composite Index.

Overall, the simplest Internet technologies and e-business solutions (such as e-mail, PCs, and use of the Internet for information searches) are in practically universal use among New Brunswick's SMEs. Although dial-up connections remain widespread, faster and more flexible methods of connecting to the Internet are being taken up by the SME community. In general, larger SMEs appear to adopt the more complex Internet technologies and e-business solutions faster than their smaller counterparts. However, microenterprises lead in adoption of business models relying on Internet-based sales, and small SMEs lead in matters of Internet-based exporting. Firms in rural areas report lower average score on the e-Business Enablement Index than firms in urban regions (Table 5).

Two-thirds of SMEs report having plans for further investments in Internet technologies and e-Business solutions. SMEs' next wave of investment in Internet and e-business technologies solutions will focus on website content development and design, conducting secure transactions with business, government, and customers, marketing on the Internet, payment services, and customer support (Q36 and Q74); see Figure 12.

Drivers and impacts of adoption of Internet technologies and e-business solutions

The decision to adopt Internet technologies and e-business solutions reflects considerations of business opportunity, timing, likelihood of achieving anticipated outcomes, and estimates of various kinds of risk. It is of interest to better understand the motivations of New Brunswick SMEs in deciding to adopt Internet and e-business technologies and solutions. Figure 13 provides a rank-ordered list of firms' assessment of factors that might facilitate adoption and use of the Internet and e-business. It shows that the most important factor is firms' perceptions of the possibility of accessing new markets. Entrepreneurship, capability to manage technological change, the nature of products and services bought or sold (such as digital products or electronically delivered services), demanding customers or suppliers, management effectiveness, and focus are other highly ranked factors that facilitate adoption and use of e-business and Internet technologies and solutions. The emphasis seems to be on management capability, market opportunity recognition, and relationships with customers or suppliers. It is interesting to note that very small and small SMEs seem to face a somewhat different set of drivers. Very small SMEs rate the entire range of factors more highly than other size classes of SMEs. Combinations of market access, demanding customers and suppliers, access to specialized suppliers and the skills set of employees appear to induce small SMEs to adopt Internet and e-business solutions and technologies.

Table 6 shows the four underlying factors in the responses regarding eighteen possible facilitators of Internet and e-business adoption. (These underlying factors were obtained through factor analysis). The four factors have to do with 1) management, leadership, organizational culture, and strategy; 2) entrepreneurship, risk-taking, and focus; 3) competition and opportunity; and 4) business process improvement and technology management. It is in these terms that we need to begin to think about why and how SMEs adopt and learn to use Internet technologies and e-business solutions.

What are the consequences of adoption and use of internet technologies and e-business solutions? Firms report a range of benefits; these are rank ordered in Figure 14, which shows the percentage of firms in each size category reporting high or very high impacts in each possible area of impact. The most important impacts are in improved relationships with customers, improvement in brand and image, ability to keep up with competition, increased adaptability to customers' requirements, increased customer service, and increased speed of delivery. Half or more of all firms in the survey reported that adoption and use of Internet technologies and e-business solutions had yielded high or very high impacts in these areas.

It is notable that many of the impacts that firms have experienced are highly qualitative, having to do with image, relationships, speed, and agility. Improvements in these areas have effects as much on the top line as on the bottom line of firms.

We factor analyzed the responses regarding impacts of adoption of the Internet and e-business and identified two underlying factors, which are shown in Table 7. Responses to Question 59 are highly correlated with each other, suggesting that impacts of adoption of e-business and Internet solutions are interlinked. Improvements in one domain are accompanied by improvements in other domains. The first underlying factor represent improvement of business performance in several areas, including speed, agility, efficiency, and quality. The second underlying factor concerns market growth and includes development of domestic and foreign market share, branding, development of niches and expertise, and improved profitability.

Models of drivers of e-business enablement, perceived value of e-business, demand for e-business solutions, and demand for e-business support services

What are the factors that drive the development of e-business capability among SMEs in New Brunswick? What are the determinants of perceived value of e-business use among adopters of Internet technologies and e-business solutions? Which factors drive demand for Internet Technologies and e-Business solutions among New Brunswick SMEs? What determines demand for e-business support services? Four models, summarized below, shed some light on these questions.¹

Drivers of e-business enablement. It is of interest to understand the factors that induce firms to acquire e-business capability. The model in Figure 20 shows that competitive pressures, the market orientation of the firm (i.e. orientation toward local, regional, or international markets), and sociodemographic factors such as size or location do not have direct effects on New Brunswick SMEs' degree of e-Business capability (but they may have indirect effects). In contrast, acquired e-business capability is best predicted by two factors: the presence of barriers to business success, and the presence of facilitators of e-business enablement. Barriers and facilitators can be internal to the firm or external, in the firm's business environment. This model suggests that firms acquire e-business capability as a response to solving problems that impede business success. At the same time, some characteristics of the firm (the quality of its management, its business strategy, etc.) and some features of the firm's business environment (for example, demanding customers or suppliers) facilitate the development of e-business capability. Without these internal and external pressures, the likelihood of adopting Internet technologies and e-business solutions is lower.

¹ Models were estimated using PLS Graph (a structural equation modeling software package) v. 3.0 build 1136.

Drivers of perceived value. What determines the business value of e-business capability? Figure 21 presents a model of drivers of e-business impacts. We found no significant direct effects between business impacts of Internet technologies/e-business solutions and the existence of barriers to business success, intensity of competition, the market orientation of the firm, or sociodemographic factors such as firm size or location. E-business value is best predicted by two factors: the firm's degree of e-business capability, and the presence of facilitators of e-business enablement. This means that in general, firms generate value from investments in Internet technologies and e-business solutions by learning to use these tools. Of particular importance are wireless, application software, intranets, remote help desks, hosted solutions, remote data storage, and conducting secure B2C and B2B transactions. The more the firm uses these capabilities, the greater the perceived value. At the same time, a variety of internal and external factors facilitate e-business enablement. These include quality of management and leadership, culture, demanding customers and suppliers, entrepreneurship, and attitude toward risk.

Drivers of current e-business adoption plans. What determines current plans to adopt Internet technologies and e-business solutions? Figure 22 presents a model of drivers of adoption in the near future. It measures plans to purchase technical consulting, content development, hosting, payment, marketing and promotion, and security services, and to adopt catalog management, shopping cart, delivery, customer support, and business process integration technologies. Perceived barriers to success are not a significant factor. Four factors best predict planned adoption of Internet technologies and e-business solutions: the firm's current level of e-business capability, the presence of internal and external e-business facilitators, the presence of certain sociodemographic factors (number of employees, gross sales, and location in relatively more densely populated areas of New Brunswick), and specific capabilities that firms wish to develop. This model suggests that the next wave of e-business enablement among SMEs in New Brunswick will be led by larger SMEs that plan to develop new capabilities for which Internet technologies and e-business solutions are germane. The most important desired capabilities are planning, entrepreneurship and leadership, interactivity with customers, and change management.

Drivers of demand for e-business support services. Figure 23 shows that the principal drivers of demand for e-business support services are current e-business enablement plans and desired capabilities. This makes sense: SMEs want support services that directly contribute to achievement of desired capabilities and current e-business enablement plans.

Ways to improve adoption and use of Internet technologies and e-business solutions among New Brunswick SMEs

Based on insights from our descriptive analysis and from the four models described above, we can make some suggestions about ways to improve the adoption and use of Internet technologies and e-business solutions by New Brunswick SMEs.

New Brunswick SMEs seem not to have adopted Internet technologies and e-business solutions primarily in direct response to intensified competitive pressures or, in many cases, in conquest of new markets. Instead, e-business enablement has occurred as firms solve business problems (including responding to pressure from demanding customers or suppliers) and improve business capabilities. Private and public service providers that can help SMEs solve problems of purchasing, quality, market development, coordination, and productivity will also be helping these firms to improve their e-business capabilities.

1. SMEs, their associations, and public and private organizations and agencies have many opportunities to increase the uptake of e-business in New Brunswick by influencing the capability development aspirations and the internal and external factors that are known to facilitate adoption of e-business by SMEs.

Respondent SMEs identified a range of internal and external factors that facilitate adoption of Internet technologies and e-business solutions. Some of these factors are not under the control of SME owners and managers, but many of them are. By improving themselves in such areas as internal business culture, management effectiveness, and skillfulness of employees, SMEs also indirectly improve their ability to adopt and exploit Internet technologies and e-business solutions. As we saw in Figure 22, desired capabilities are an important predictor of plans to adopt Internet technologies and e-business solutions.

2. Educators, trainers, SME associations, policymakers, economic development agencies, and private service providers can all contribute to improving the use of Internet technologies within the New Brunswick SME community by learning how to identify and service the e-business learning needs of these firms.

The principal determinants of the SME's ability to derive business value from Internet technologies and e-business solutions are the firm's degree of e-business capability and the internal facilitators of e-business adoption. This finding tells us that as firms become more experienced and extensive users of Internet technologies and e-business solutions, they find ways to produce more business value from them. As mentioned earlier, firms report value from top-line, qualitative improvement as well as from bottom-line, quantitative improvement. It is likely that the facilitating

factors that we mentioned earlier facilitate not just *adoption* of technologies but also “infusion” of these technologies within the firm, which we can interpret to mean learning how to successfully produce business value from Internet technologies and e-business solutions. E-business enablement implies that a variety of learning processes take place within the firm. SMEs that have a learning orientation are probably better suited to adopt and exploit Internet technologies and e-business solutions than other firms are.

3. The expansion of e-business capability among New Brunswick SMEs implies expansion of the community of business service providers in the Province.

The best predictors of demand for e-business support services are the degree to which the SME wishes to improve various business capabilities and the degree to which the SME seeks to adopt Internet technologies and e-business solutions. Support services need to be aligned with SMEs’ development objectives and e-business targets. Ultimately, even very small SMEs should have recourse to reliable and affordable business services that are provided through the market.

Assessment for service, support, and training needs

A major goal in undertaking this survey was to identify and assess the needs for business services among New Brunswick SMEs. In this section we report results of the survey that describe features of demand for a range of technical and business services among New Brunswick SMEs.

A majority (60%) of SMEs have purchased externally supplied business services within the past three years. The larger the firm, the more likely it is to have purchased externally supplied business services. A little more than half of microenterprises report having purchased services, while 100% of medium SMEs have purchased services (see Figure 15). Technical services are the most frequently purchased business services, followed by marketing services (Figure 17). Demand for services varies among size classes of firms. Medium-sized SMEs are major users of technical services, while very small and small SMEs purchase training, strategic management, and marketing support services. However, the most popular course of action among SMEs is to design, develop, and operate their e-business solutions internally (see Figure 16). Small SMEs are most likely to have designed and developed their own solution. As firms increase in size, hosted solutions and turnkey solutions become attractive. The low rate of affirmative responses by microenterprises may represent a belief that they do not use “e-business solutions” but only partial solutions.

New Brunswick SMEs appear to be demanding customers of suppliers of business services. The most desired quality of training, consulting, or other business service providers is affordability; the second and third most sought-after qualities are credibility/expertise and good reputation/referrals/image (Figure 18). Services that are flexible and locally supplied are also considered to be important. These requirements suggest that the market for locally supplied business services is not yet well developed, and that available services are perceived to be expensive and not entirely reliable.

What support tools or services related to Internet technologies or e-business solutions are New Brunswick SMEs most like to use? Figure 19 provides a rank ordered list of preferences. More than 40% of SMEs would be likely to use personalized, expert advice, examples (cases) of successful e-business use, and recommendations about e-commerce solutions. The profile of demand varies by size of firm. However, in the case of practically every kind of business service and size categories, at least 20% of the firms express interest. Demand therefore exists for a range of business and support services in the area of Internet technologies and e-business solutions, although this demand must be suitably aggregated and priced, and solutions delivered to customers in suitable ways.

Concluding remark

This survey has shown that at least several hundred New Brunswick SMEs have learned to use Internet technologies and e-business solutions well enough to derive significant business benefits from these new tools. Learning has taken place via business activities that are largely in the local and regional markets. In the next phases of e-business enablement among New Brunswick SMEs, we expect to see deepening of capability to exploit Internet technologies and e-business solutions, enlargement of the population of firms that are actively adapting these technologies to their own purposes, and increase in the amount of local and export economic activity that is conducted with the support of Internet technologies and e-business solutions.

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Table 1: Size distribution of firms

Size class	ECC survey	CFIB estimate
Micro (<5)	64.6%	72.6%
Very Small (5-19)	24.3%	16.2%
Small (20-49)	6.8%	4.3%
Medium (50-499)	4.3%	4.6%
Large (>500)	N/A	2.2%

Table 2: Characteristics of firms in survey

	micro (<5)	very small (5-19)	small (20-49)	medium (50-499)	Total
# of firms in survey	181	68	19	12	280
% of total	64.6%	24.3%	6.8%	4.3%	100.0%
# of employees	452.5	816	655.5	3000	4924
average # of employees	2.5	12.0	34.5	250.0	17.6
% of all employees	9.2%	16.6%	13.3%	60.9%	100.0%
Estimated average gross sales (\$000)	\$291.5	\$1,479.7	\$3,811.8	\$10,636.4	\$1,294.6
total sales (\$000)	\$45.5	\$87.3	\$64.8	\$117.0	\$314.6
% of all revenue	14.5%	27.8%	20.6%	37.2%	100.0%
Average annual rate of growth, past 3 years	19.9%	24.9%	17.9%	23.9%	21.1%
average age (years)	11.7	17.0	20.6	19.8	13.9

Table 3: Percentages of respondents from major urban centers

		count	percentage
size category	micro (<5)	41	22.70%
	very small (5 -19)	19	27.90%
	small (20-49)	5	26.30%
	medium (50-499)	4	33.30%

Major urban centers are: Fredericton, Saint John and Moncton.

Table 4: Indexes of Internet technology and e-business solution adoption and use among New Brunswick SMEs

	size category			
	micro (<5)	very small (5-19)	small (20-49)	medium (50-499)
	Mean	Mean	Mean	Mean
index of connectivity	1.79	2.51	2.63	3.67
index of e-business use	16.28	21.08	21.73	23.25
index of buying and selling on internet	3.36	4.19	3.63	3.50
index of website functional	1.48	2.69	3.21	2.17
index of e-business enablement	22.99	30.67	31.13	32.58

Table 5: Indexes of Internet technology and e-business solution adoption and use among New Brunswick SMEs in major urban centers

			size category			
			micro (<5)	very small (5-19)	small (20-49)	medium (50-499)
			Mean	Mean	Mean	Mean
urban location?	yes	index of connectivity	2.05	2.89	2.80	4.25
		index of e-business use	17.64	22.53	22.40	26.75
		index of buying and selling on internet	3.73	4.74	4.20	3.75
		index of website functionality	2.07	3.37	4.00	3.00
		index of e-business enablement	25.51	33.24	33.40	37.75

Major urban centers are: Fredericton, Saint John and Moncton.

Table 6: Underlying factors that facilitate adoption and use of Internet technologies and e-business solutions

Factor 1: strategic management and leadership

- Management commitment
- Management effectiveness
- Leadership quality
- Skillful and resourceful employees
- Strategic objectives
- Internal business culture

Factor 2: risk, entrepreneurship, focus

- Attitude toward risk
- Entrepreneurship
- Focus
- Favorable regulatory environment
- Access to financial resources

Factor 3: competition and opportunity

- Nature of goods or services you buy and sell
- Possibility to access new markets
- Competitive threats
- Demanding customers or suppliers

Factor 4: process improvement and technology management

- Business processes that facilitate learning
- Capability to manage technological change
- Access to specialized suppliers

Table 7: Underlying factors of impacts of adoption and use of Internet and e-business technologies and solutions

Factor 1: general business improvement

- Increased speed of delivery
- Increased adaptability
- Improved quality of goods or services
- Improved coordination with partners or suppliers
- Increased productivity
- Increased customer service
- Improved rate of new product development
- Decreased cost of production
- improved relationships with existing customers

Factor 2: market development

- Increased international market share
- Increased domestic market share
- Improved brand and image
- Developed unique expertise or market
- Increased profitability

Figure 1: geographic sources of revenue of NB SMEs (Q9)

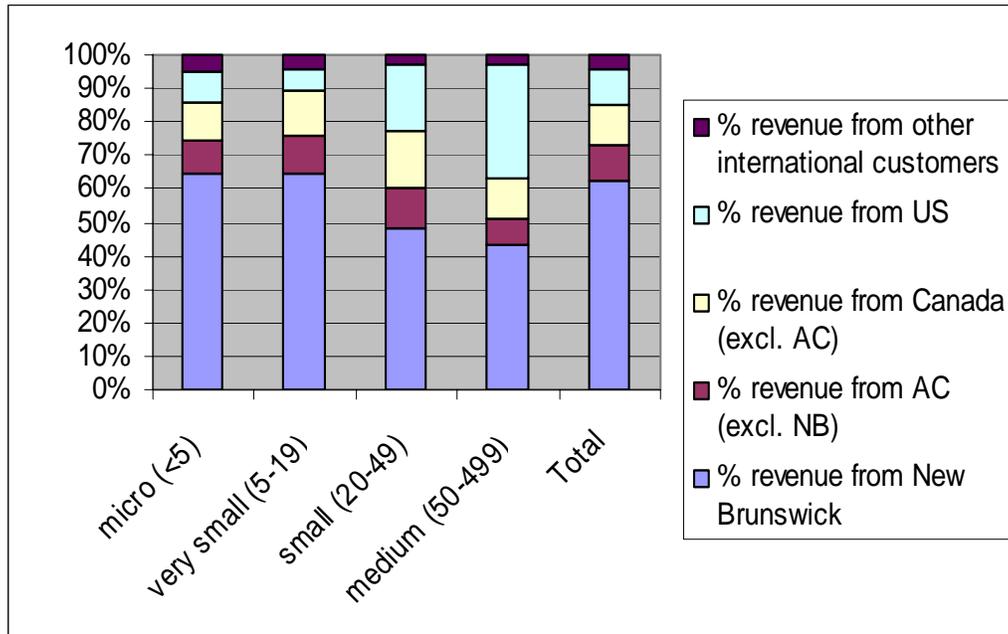
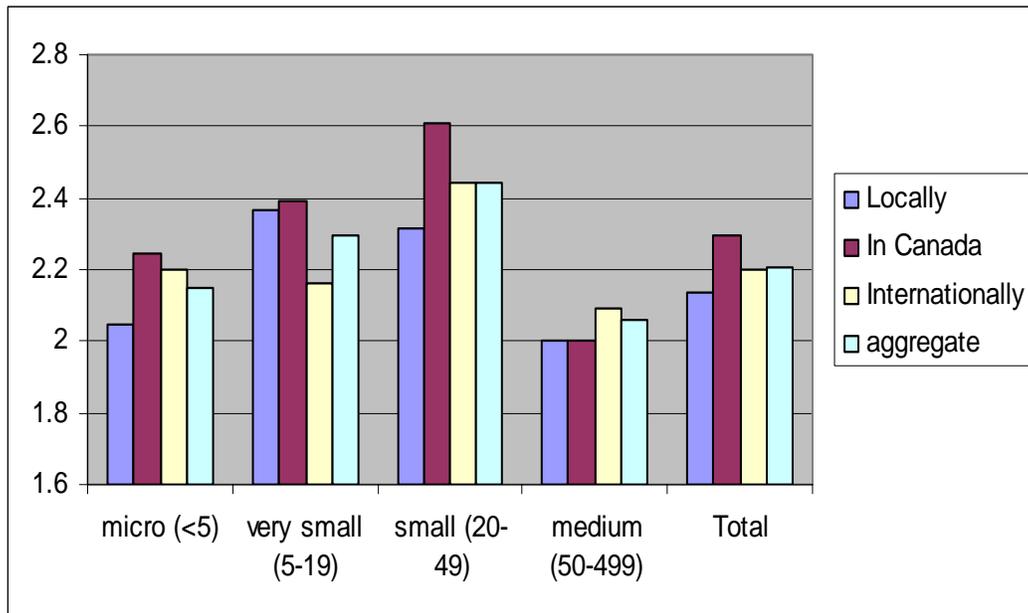
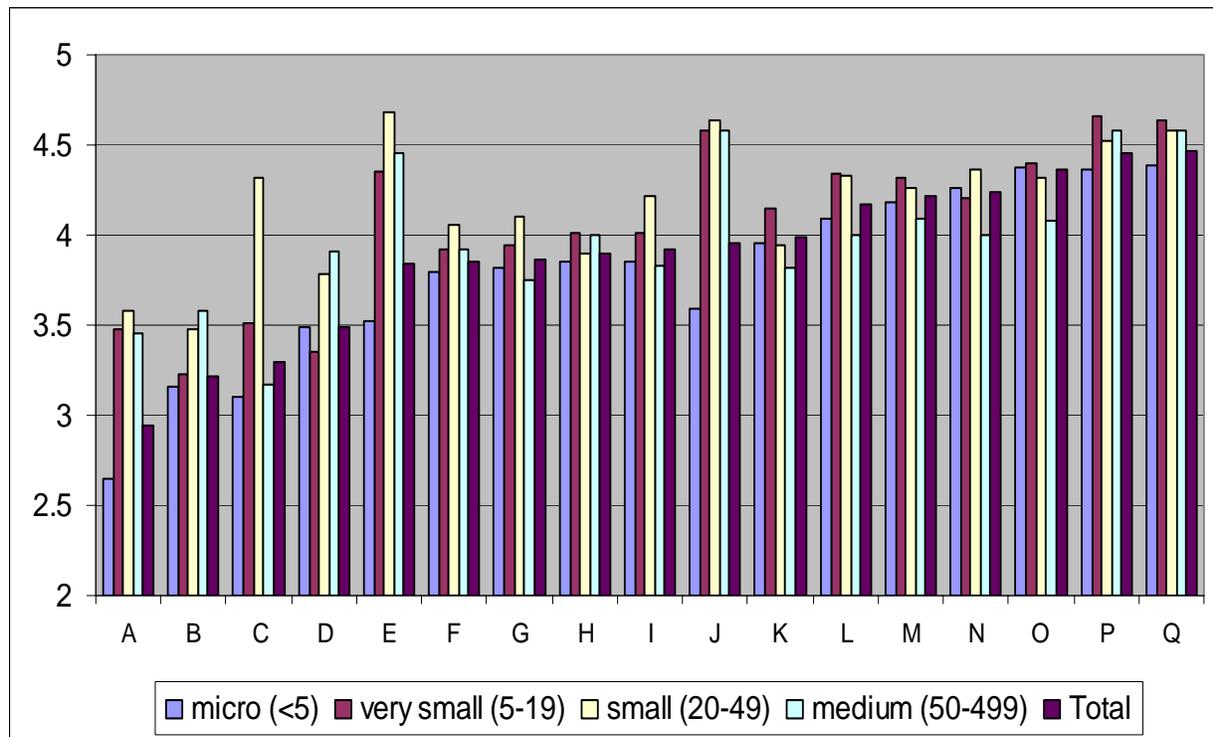


Figure 2: perceived intensity of competition (Q14)



Scale: 1 = low, 2 = medium, 3 = high

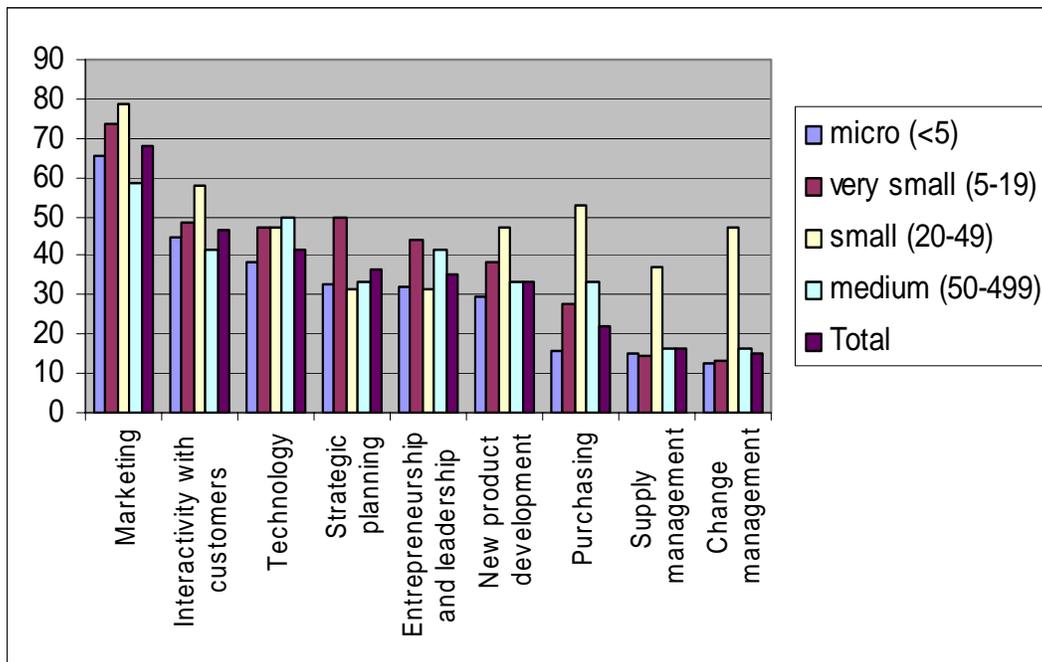
Figure 3: perceived barriers to success among NB SMEs (Q17)



Scale: 5 = Very Important, 4 = Important, 3: = Neutral, 2 = Little importance, 1 = No Importance

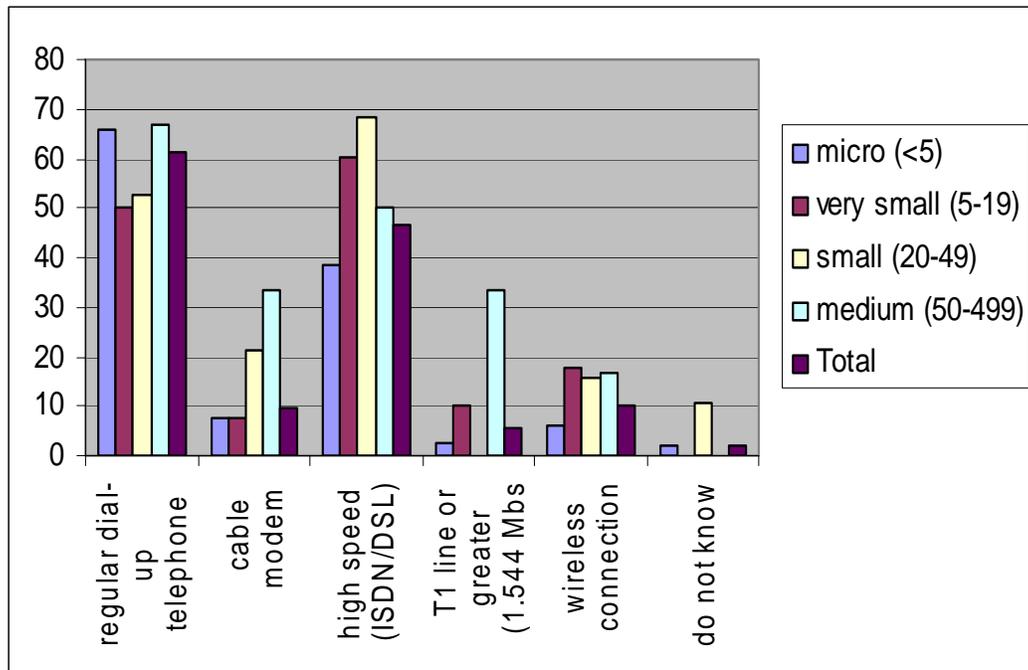
Legend: A: Managing and communicating with mobile staff. B: Finding customers abroad. C: Purchasing supplies and raw materials. D: Geographical distance form clients and suppliers. E: Increase staff productivity. F: Managing office information technology. G: Managing and reporting financial and tax information. H: Implementing new information and communication technologies. I: Equipment costs. J: Attracting and retaining key staff. K: Managing customer information. L: Keeping overhead costs down. M: Getting marketing message out. N: Developing niche, specialized markets. O: Attracting new domestic customers. P: Improving the quality of products and services. Q: Delivery of products and services to customers.

Figure 4: desired capabilities to develop (Q111)



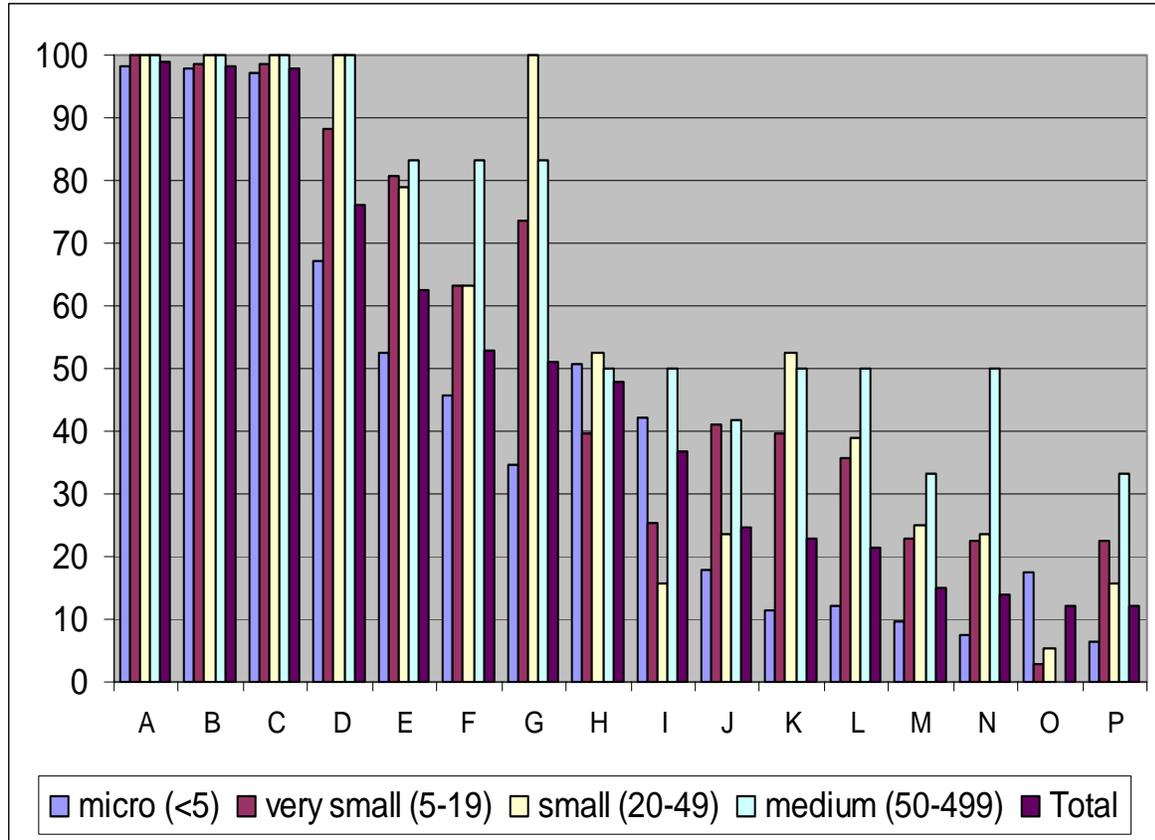
Scale: percent of firms expressing interest in developing a capability

Figure 5: methods of connecting to the Internet used by New Brunswick SMEs (Q35)



Scale: percent of firms using method of connection.

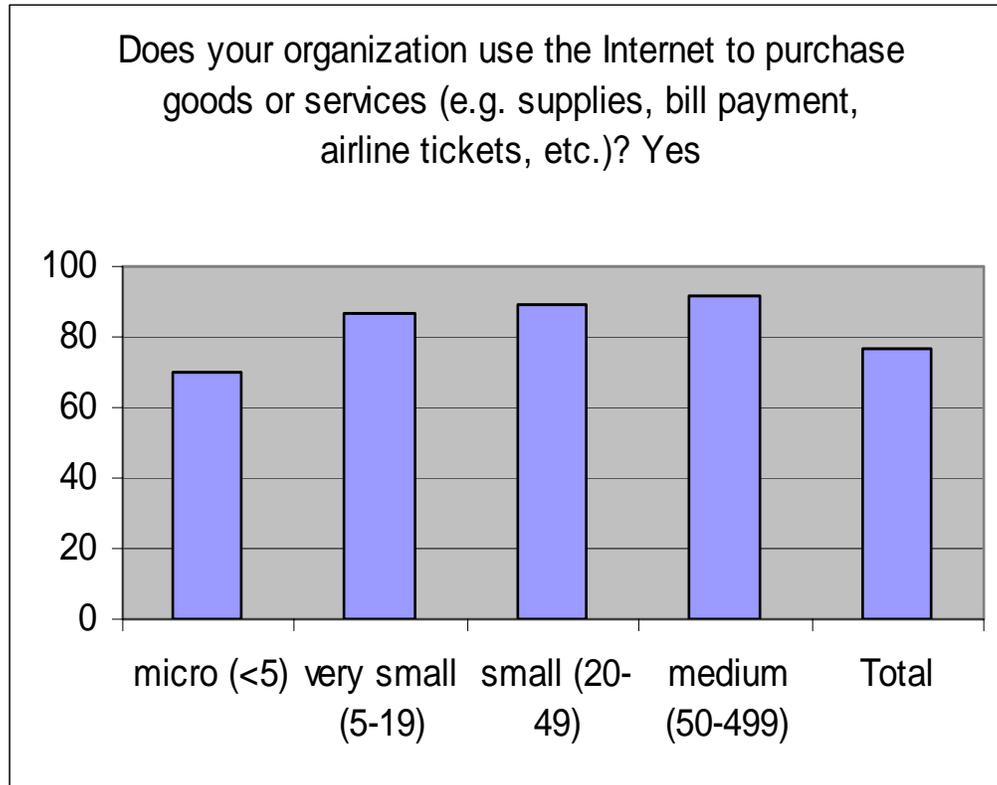
Figure 6: use of Internet technologies and e-business solutions by NB SMEs (Q36)



Scale: percent of firms using technology or solution.

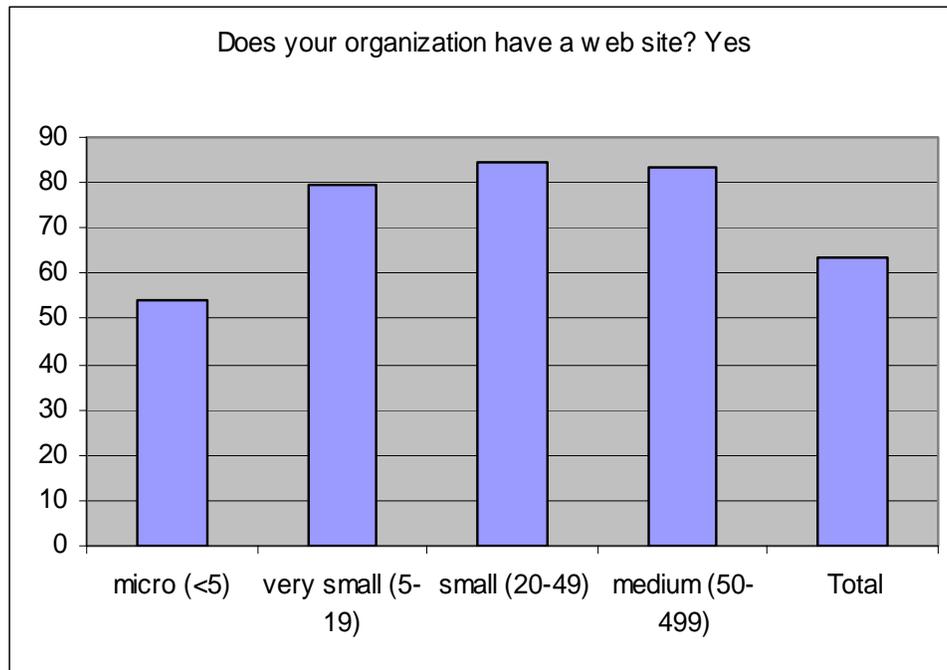
Legend: A: e-Mail. B: Internet. C: Personal computer. D: Functional (application) software. E: External website. F: Wireless. G: Shared file folders. H: Secure transactions with consumers. I: Secure transactions with business or government. J: Remote data storage. K: Intranet. L: Hosted solutions. M: Extranet. N: Remote help desk. O: Networking/information security technology (firewall, anti-virus software, access control). P: Net meetings.

Figure 7: use of Internet for purchasing (Q52)



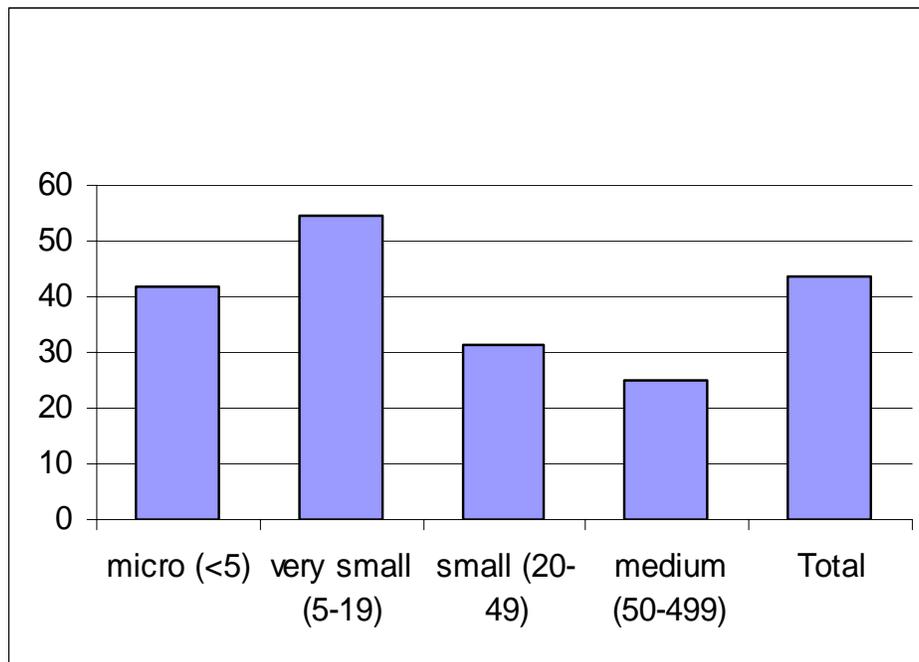
Scale: percent of SMEs that use the Internet to purchase goods or services.

Figure 8: SMEs with own website (Q53)



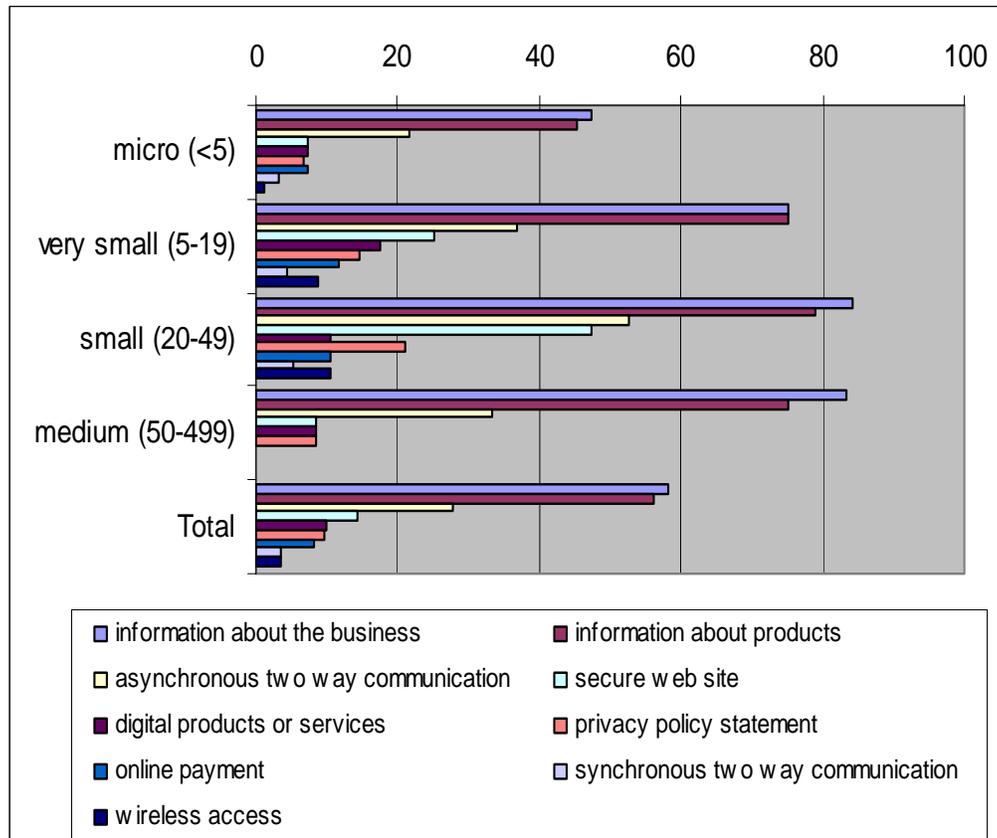
Scale: percent of SMEs that have a website.

Figure 9: use of the Internet to sell goods or services (Q56)



Scale: percent of SMEs that use the Internet to sell goods or services.

Figure 10: website functionality (Q54)



Scale: percent of SMEs' websites with indicated functionality.

Figure 11: NB SMEs' proportion of sales conducted over the Internet (Q57), and proportion of Internet-based sales to international customers (Q58)

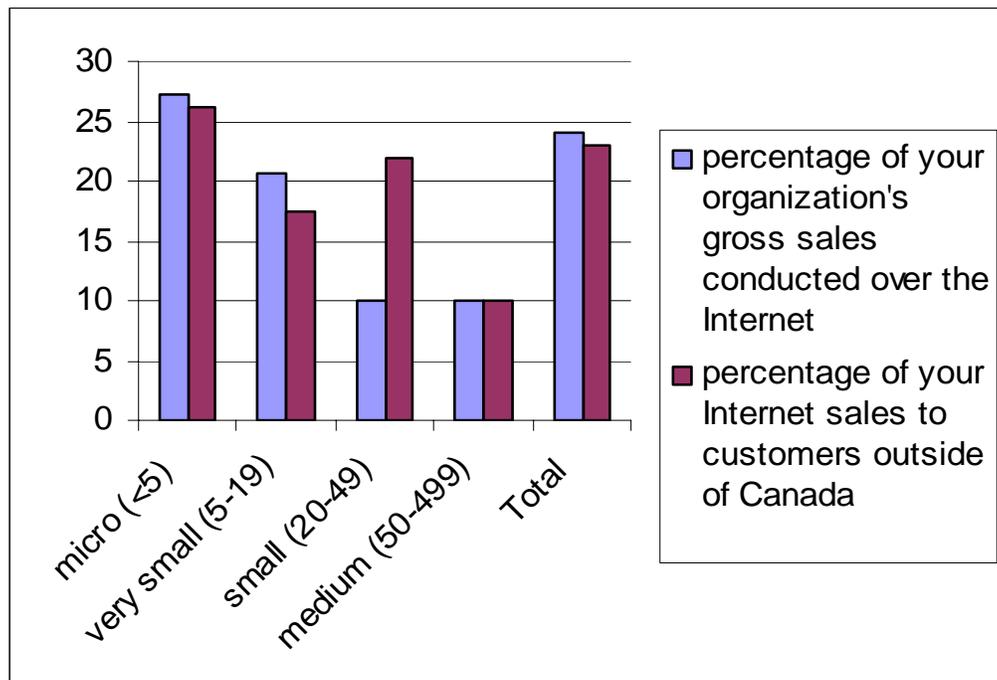
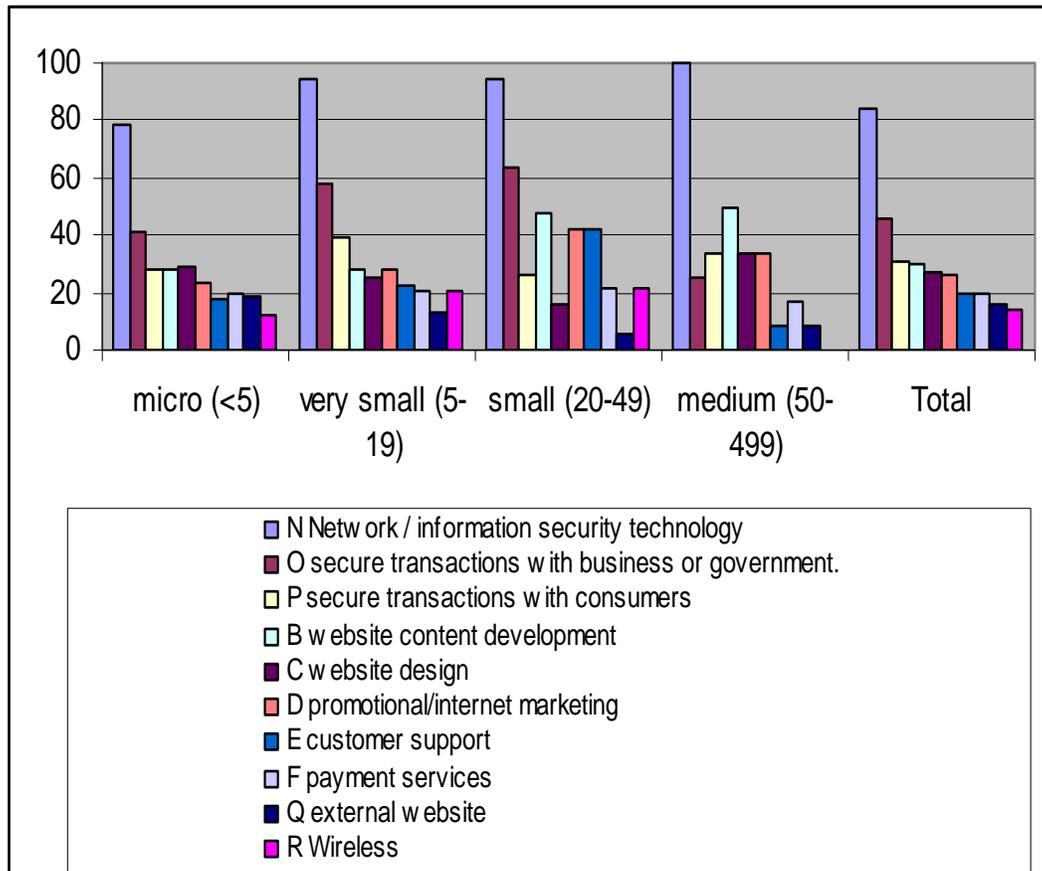
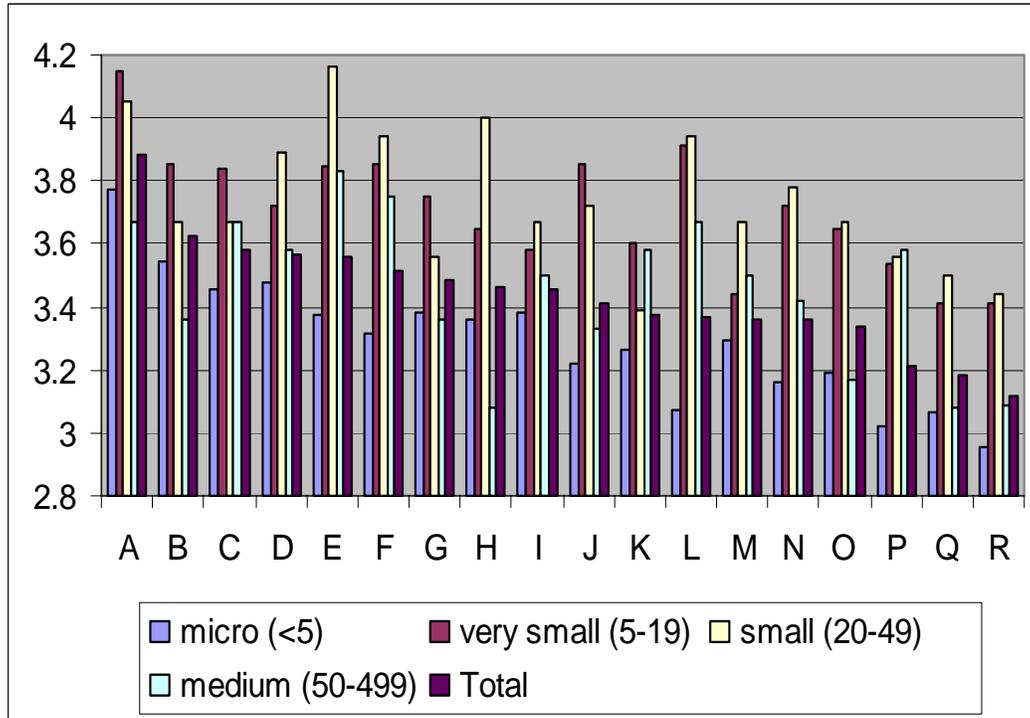


Figure 12: planned adoption of Internet technologies and e-business solutions - top ten technologies and solutions (Q36 & Q74)



Scale: percent of firms in each size category planning to adopt specific Internet or e-business technologies or solutions.

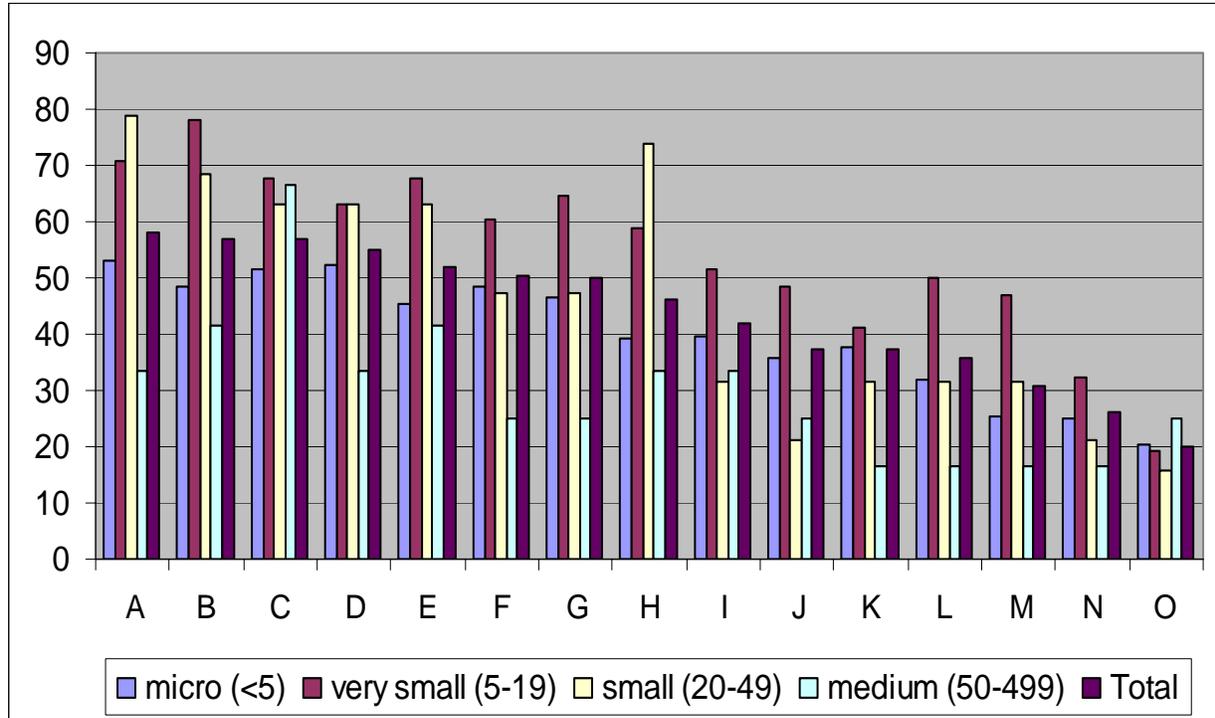
Figure 13: factors that might facilitate adoption and use of Internet technologies or e-business solutions (Q75)



Scale: 5 = Very Important, 4 = Important, 3: = Neutral, 2 = Little importance, 1 = No Importance

Legend: A: Possibility to access new markets. B: Entrepreneurship. C: Capability to manage technological change. D: Nature of the goods or services that the firm buys or sells. E: Demanding customers or suppliers. F: Management effectiveness. G: Focus. H: Access to specialized suppliers. I: Strategic objectives. J: Competitive threats. K: Business processes in place that facilitate learning. L: Skillful and resourceful employees. M: Access to financial resources. N: Management commitment. O: Leadership quality. P: Internal business culture. Q: Attitude towards risk. R: Favourable regulatory environment.

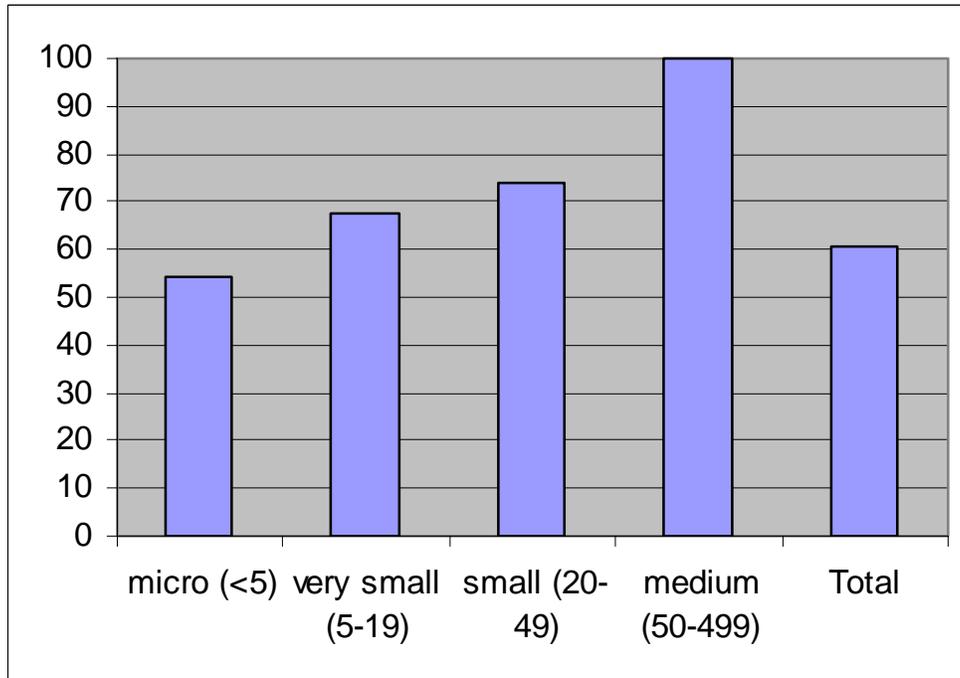
Figure 14: perceived impacts of adoption and use of Internet technologies and e-business solutions (Q59)



Scale: percent of firms in each size category reporting high or very high impact

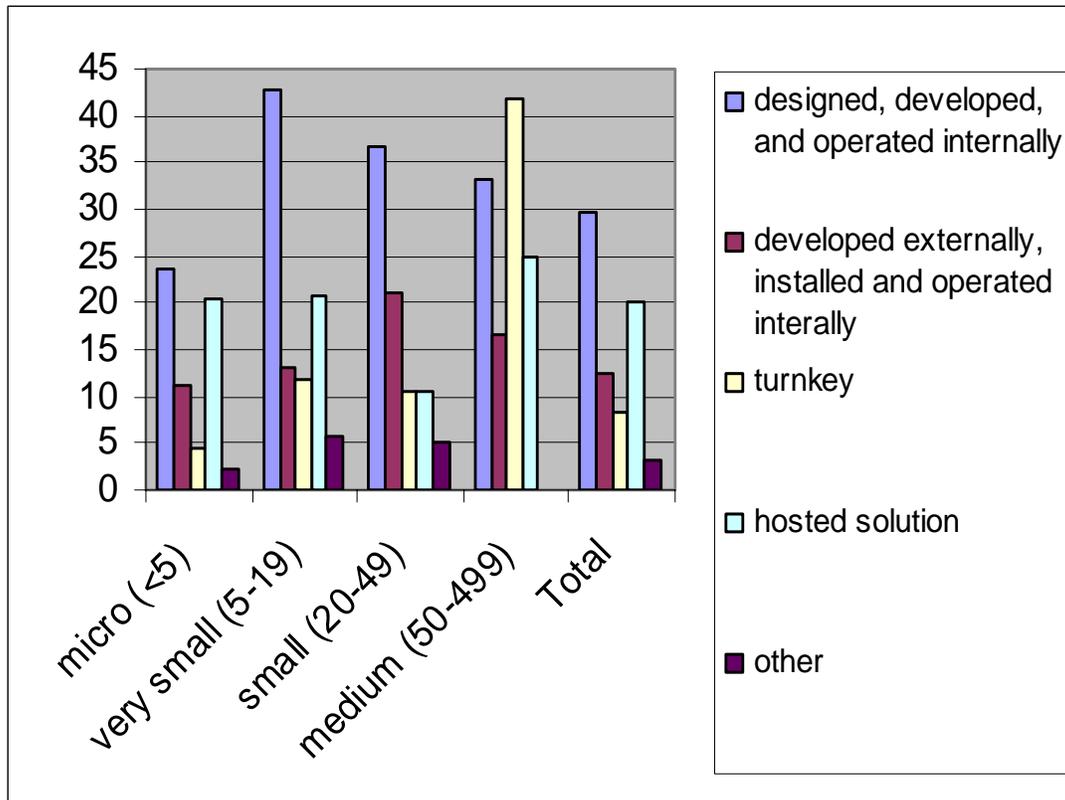
Legend: A: improved relationships with customers. B: kept up with competitors. C: improved brand and image. D: increased adaptability to customers' requirements. E: Increased customer service. F: increased speed of delivery. G: increased productivity. H: improved coordination with partners or suppliers. I: improved quality of goods or services. J: improved profitability. K: development of a unique expertise or market. L: improved rate of new product development. M: increased domestic market share. N: decreased cost of production. O: increased international market share.

Figure 15: SMEs that have used training and/or consulting services in the past three years (Q93)



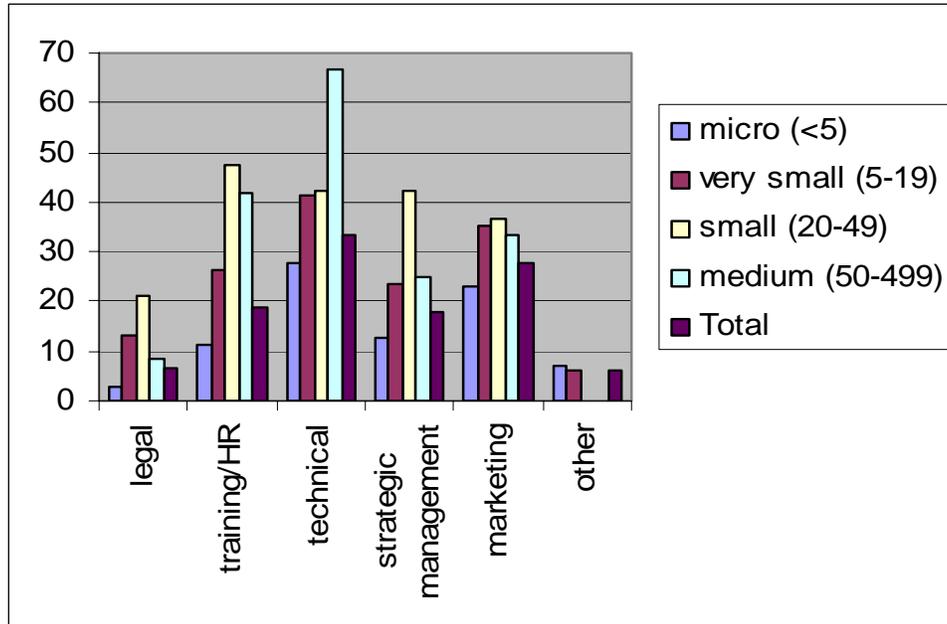
Scale: percent of firms in each size category.

Figure 16: builder of SMEs' e-business solutions (Q55)



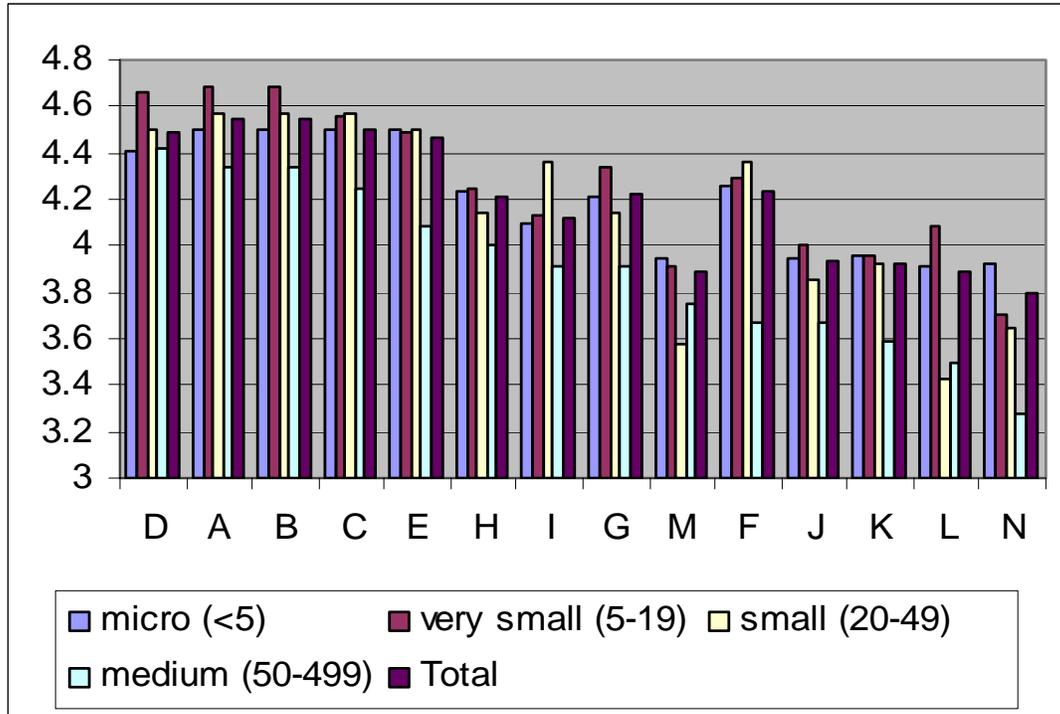
Scale: percent of firms in each size category.

Figure 17: use of business services by SMEs (Q94)



Scale: percent of firms in each size category reporting use of business service.

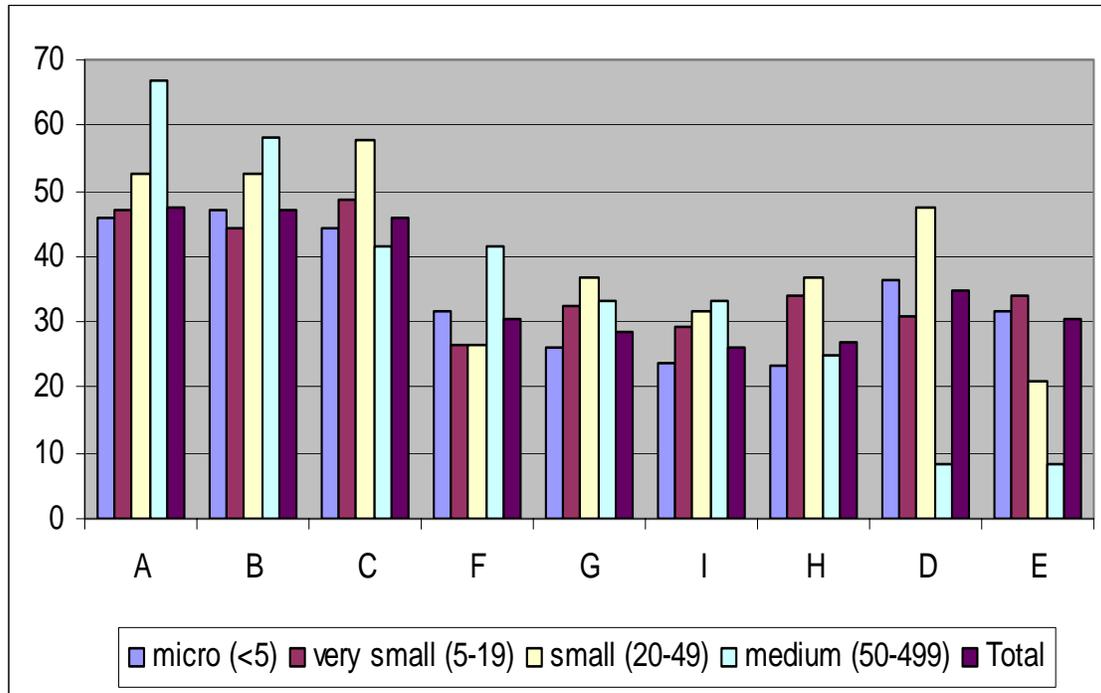
Figure 18: desired qualities of training, consulting, or other support services (Q95)



Scale: 5 = Very Important, 4 = Important, 3 = Neutral, 2 = Little importance, 1 = No Importance

Legend: A: credibility and expertise. B: Good reputation/referrals, image. C: Flexible scheduling. D: Affordable; reasonable price. E: Locally supplied. F: Offline support available. G: Simple language. H: Online, always available. I: Certified. J: Conveniently located. K: Effective, practical. L: Speed of delivery. M: Follow-up stages and reliable support. N: Available in language of choice.

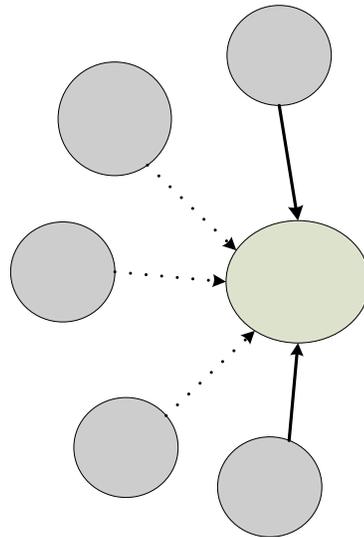
Figure 19: support tools or services most likely to be used (Q110)



Scale: percent of firms in each size category reporting use of business service.

Legend: A: Personalized, expert advice on e-commerce for your business. B: Examples (case studies) of businesses similar to yours, using e-commerce successfully. C: Recommendations about e-commerce solutions relevant to your type of sector or business. D: Directory of organizations that can offer help in using e-commerce. E: Online seminars on e-commerce in your sector (i.e. tourism, fisheries, manufacturing, etc.). F: Classroom-based seminars about e-commerce in your sector (i.e. tourism, fisheries, manufacturing, etc.). G: Interactive questionnaire to help you define an e-commerce strategy. H: Statistics and graphics about e-commerce adoption and use among different sizes or types of companies in New Brunswick. I: Visits to successful companies.

Figure 20: model of determinants for drivers of e-business capability in New Brunswick SMEs



Dark arrows represent significant ($p < .1$) causal pathways. Dotted arrows represent hypothesized causal pathways that were not supported by the survey data. Significant Indicators for each construct are shown below. This model explains 38% of the variance in level of e-business capability among New Brunswick SMEs.

construct	Significant indicators
e-Business capability	Use of: applications software, shared file folders, intranet, extranet, remote help desk, hosted solutions, remote data storage, online meetings, network security technologies, secure transactions (B2C and B2B).
Barriers to e-business success	Purchasing supplies and raw materials, equipment costs, increasing staff productivity, attracting new domestic customers, finding customers abroad, managing customer information, getting marketing message out, managing and communicating with mobile staff, managing office information technology, implementing new information and communication technologies, managing and reporting financial and tax information.
Facilitators of e-business enablement	Nature of goods or services bought or sold, possibility to access new markets, competitive threats, demanding customers or suppliers, skillful and resourceful employees, business processes that facilitate learning, capability to manage technological change, access to specialized suppliers, management effectiveness, management commitment, leadership quality, strategic objectives, internal business culture, attitude toward risk, focus, access to financial resources, favourable regulatory environment

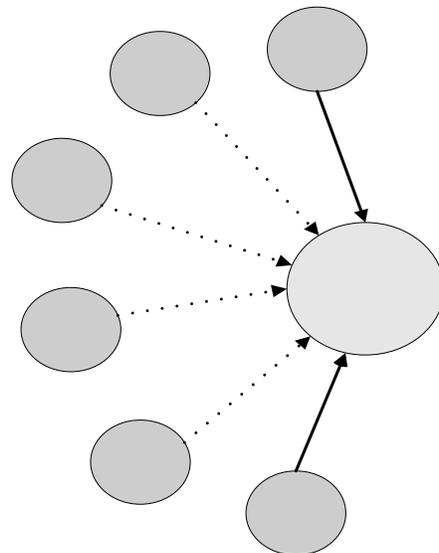
Intensity of perceived competition

Market orientation

Sociodemographic factors

Barriers to e-business success
Facilitators of e-business enablement

Figure 21: model of determinants of perceived business impacts of use of Internet technologies and e-business solutions among New Brunswick SMEs



Barriers to business success

Dark arrows represent significant ($p < .1$) causal pathways. Dotted arrows represent hypothesized causal pathways that were not supported by the survey data. Significant Indicators for each construct are shown below. This model explains 25% of the variance in level business impacts of Internet technologies and e-business solutions among New Brunswick SMEs.

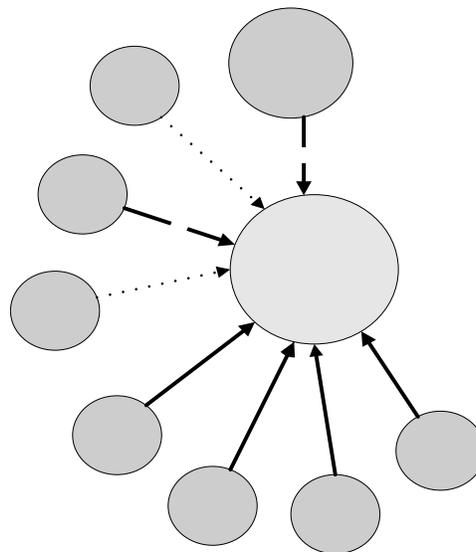
Intensity of perceived

construct	Significant indicators
Business impacts of Internet technologies and e-business solutions	Annual growth rate, past three years; increased productivity; increased profitability; increased speed of delivery; increased adaptability; increased domestic market share; increased international market share; increased customer service; increased customer service; improved relationships with existing customers; decreased cost of production; increased quality of goods and services; improved coordination with partners or suppliers; improved rate of new product development; developed unique expertise or market; improved brand or image.
e-Business capability	Use of: wireless; shared file folders; Internet; intranet; extranet; remote help desk; hosted solutions; remote data storage; online meetings; network security technologies; secure B2B and B2C transactions.
Facilitators of e-business enablement	Nature of goods or services sold; possibility to access new markets; competitive threats; demanding customers or suppliers; skillful employees; business processes that support learning; capability of managing technological change; access to specialized suppliers; management effectiveness; management commitment; leadership quality; strategic objectives; internal business culture; attitude toward risk; entrepreneurship; focus; access to financial resources; favorable regulatory environment.

Market orientation

Sociodemographic factors

Figure 22: model of determinants of planned adoption of Internet technologies and e-business solutions among New Brunswick SMEs



Dark arrows represent significant ($p < .1$) causal pathways. Dotted arrows represent hypothesized causal pathways that were not supported by the survey data. Significant Indicators for each construct are shown below. This model explains 33% of the variance in planned adoption of Internet technologies and e-business solutions among New Brunswick SMEs.

competition

construct	Significant indicators
Planned adoption of Internet technologies and e-business solutions	Technical consulting; website design; website content development; hosting; promotional/Internet marketing services; catalogue management; shopping cart; payment services; security/Access management; delivery, fulfillment and order tracking; customer support; business process integration
Business impacts of Internet technologies and e-business solutions	Annual growth rate, past three years; increased productivity; increased productivity; increased speed of delivery; increased adaptability; increased domestic market share; increased international market share; increased customer service; increased customer service; improved relationships with existing customers; decreased cost of production; increased quality of goods and services; improved coordination with partners or suppliers; improved rate of new product development; developed unique expertise or market; improved brand or image.
Intensity of competition	Canada; international
Sociodemographic factors	Population weight; number of employees; gross sales; urban location
Facilitators of e-business enablement	Nature of goods or services sold; possibility to access new markets; competitive threats; demanding customers or suppliers; skillful employees; business processes that support learning; capability of managing technological change; access to specialized suppliers; management effectiveness; management commitment; leadership quality; strategic objectives; internal business culture; attitude toward risk; entrepreneurship; focus; access to financial resources; favorable regulatory environment.
e-Business capability	Use of: dial-up; cable modem; high speed (ISDN/DSL); T1 line or greater; wireless connection; organization has website; organization sells goods on Internet; website features online payment; asynchronous two-way communication; synchronous two-way communication; digital products or services; security; privacy policy statement; wireless access; information about products; information about the business; percentage of revenues from online sales; percentage of online sales revenues from outside of Canada
Desired capabilities	interactivity with customers; supply management; purchasing; strategic planning; marketing; new product development; entrepreneurship and leadership; change management; technology

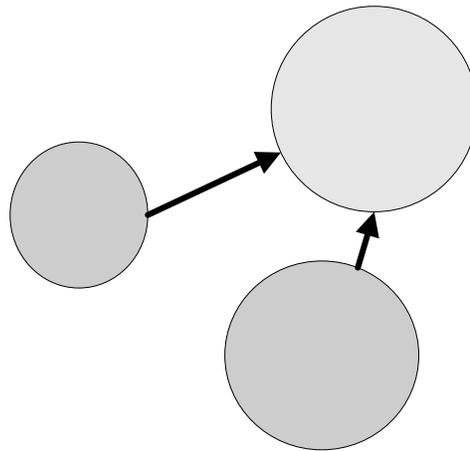
(~)

Market orientation

Sociodemographic factors

facilitator

Figure 23: model of determinants of desired e-business support services among New Brunswick SMEs



Dark arrows represent significant ($p < .1$) causal pathways. Insignificant and minor pathways are not shown. This model explains 34% of the variance in desired e-business support services among New Brunswick SMEs.

construct	Significant indicators
Desired e-business support services	Directory of organizations that can offer help in using e-commerce; interactive questionnaire to help define an e-commerce strategy; online seminars on e-commerce in specific sector (i.e. tourism, fisheries, manufacturing, etc.); classroom-based seminars about e-commerce in specific sector; personalized, expert advice on e-commerce; examples (case studies) of businesses using e-commerce successfully; recommendations about e-commerce solutions; statistics and graphics about e-commerce adoption and use among different sizes or types of companies in New Brunswick; visits to successful companies
Planned adoption of Internet technologies and e-business solutions	Technical consulting; website design; website content development; hosting; promotional/Internet marketing services; catalogue management; shopping cart; payment services; security/access management; delivery, fulfillment and order tracking; customer support; business process integration
Desired capabilities	interactivity with customers; supply management; purchasing; strategic planning; marketing; new product development; entrepreneurship and leadership; change management; technology

Desired capabilities

Plan
tech
e

Appendix 1 - Survey Questionnaire

Survey on Adoption and Use of e-Business for SMEs in New Brunswick in 2003

Invitation letter:

Dear ...

You are invited to participate in this survey on the Adoption and Use of e-Business among SMEs (Small and Medium Enterprises) in New Brunswick.

By doing so, you will have a good chance to win a new Palm Pilot - personal digital assistant with retail value of aprox. \$150. As we are only aiming to survey around 2,200 businesses, your chances of winning this useful business tool are relatively high.

By completing the questionnaire, you will help us gain a picture of how well small businesses are doing in terms of adoption and use of new information technologies, such as computers, or e-mail and websites.

This research will build the base for the development of e-business support services, such as training and information resources. It will also enable us to formulate recommendations regarding e-business policy and promotion strategy for the Province. Therefore your participation is very important, even though your organization may not be buying or selling over the Internet just yet.

The survey should take no more than fifteen minutes to complete. All participants will receive an Executive Summary of the results in June, 2004.

Click the following link to start...

<http://survey2.inquisiteasp.com/surveys/GFEVA6>

Thank You,

Director of the Electronic Commerce Centre

Opening

Welcome to our survey on e-Business adoption and use among SMEs in New Brunswick!

This survey is being undertaken by the Electronic Commerce Centre with financial support from the Atlantic Canada Opportunities Agency and the University of New Brunswick in Saint John. Our ultimate aim is to find ways to help New Brunswick businesses obtain the maximum benefits from information technology.

You are invited to respond to the questionnaire even if your firm does not buy or sell over the Internet. The study comprises over 2,200 interviews around the Province and is the largest study of its kind. All the answers will be collected and analyzed, and a Report produced by the end of May. When the report has been published, in June 2004, we will send (e-mail) you a link to the Executive Summary of the Report. Upon request, than we can also send you the link to our website with the report which you can view or download at no cost.

If you require assistance in the completion of the questionnaire or have any questions regarding the survey, please contact us:

Director of Electronic Commerce Centre,
127 Carleton Street,
Saint John, New Brunswick
Telephone: (506) 646 8321

Confidentiality

Electronic Commerce Centre is prohibited by law from publishing any statistics that would divulge information obtained from this survey that relates to any identifiable business or institution without the previous written consent of that business or institution. The data reported on this questionnaire will be treated in strict confidence, used for statistical purposes and published in aggregate form only.

Your participation is much appreciated and is voluntary; you are free to withdraw any data pertaining to you and your organization, at any time and without penalty.

Please complete this questionnaire for your entire enterprise, that is, all of the operating units within your organization.

Please click "Next" if you agree with all of the above and to begin the survey

QUESTIONS

Section 1 - Business Details

Q1: Select (language)

1. French
2. English

Q2: Principal sector in which your company operates:
[dropdown list of sectors]

Q3: Short description of main product or service:

Q4: Location of the business (region in New Brunswick):

1. Carleton
2. Central NB
3. Chaleur
4. Charlotte
5. Fredericton
6. Fundy
7. Grand Falls
8. Greater Moncton
9. Kent
10. Madawaska
11. Miramichi
12. Peninsula
13. Restigouche
14. Saint John
15. South East

Q5: Established in New Brunswick in year:
[dropdown list]

Q6: Total number of full-time employees in your organization:
(check appropriate range):

1. Owner only
2. 1 to 4
3. 5-9
4. 10-19
5. 20-49
6. 50-99
7. 100-299
8. 300-500
9. 500+

Q7: Please estimate your average growth of annual sales over the past three years
(%):

1. Negative
2. 0% - 5%
3. 6% - 10%
4. 11% - 15%
5. 16% - 20%
6. 21% - 30%
7. 31% - 40%
8. 41% - 50%
9. 51% - 60%
10. 61% - 70%
11. 71% - 80%
12. 81% - 90%
13. 91% - 100%
14. +100%

Q8: Please estimate your gross sales for last year (Canadian Dollars):

1. Up to \$100,000
2. \$100,001 - \$250,000
3. \$250,001 - \$500,000
4. \$500,001 - \$1,000,000
5. \$1,000,001 - \$5,000,000
6. \$5,000,001 - \$10,000,000
7. \$10,000,001 - \$20,000,000
8. > \$20,000,001

Q9: What percentage of your last year gross sales was from customers located in:

- New Brunswick?

1. No sales
2. 1% - 5%
3. 6% - 10%
4. 11% - 15%
5. 16% - 20%
6. 21% - 30%
7. 31% - 40%
8. 41% - 50%
9. 51% - 60%
10. 61% - 70%
11. 71% - 80%
12. 81% - 90%
13. 91% - 99%
14. 100%

- Atlantic Canada?

1. No sales
2. 1% - 5%
3. 6% - 10%
4. 11% - 15%
5. 16% - 20%
6. 21% - 30%
7. 31% - 40%
8. 41% - 50%
9. 51% - 60%
10. 61% - 70%
11. 71% - 80%
12. 81% - 90%
13. 91% - 99%
14. 100%

- Canada?
 1. No sales
 2. 1% - 5%
 3. 6% - 10%
 4. 11% - 15%
 5. 16% - 20%
 6. 21% - 30%
 7. 31% - 40%
 8. 41% - 50%
 9. 51% - 60%
 10. 61% - 70%
 11. 71% - 80%
 12. 81% - 90%
 13. 91% - 99%
 14. 100%

- United States?
 1. No sales
 2. 1% - 5%
 3. 6% - 10%
 4. 11% - 15%
 5. 16% - 20%
 6. 21% - 30%
 7. 31% - 40%
 8. 41% - 50%
 9. 51% - 60%
 10. 61% - 70%
 11. 71% - 80%
 12. 81% - 90%
 13. 91% - 99%
 14. 100%

- Other international markets?
 1. No sales
 2. 1% - 5%
 3. 6% - 10%
 4. 11% - 15%
 5. 16% - 20%
 6. 21% - 30%
 7. 31% - 40%
 8. 41% - 50%
 9. 51% - 60%
 10. 61% - 70%
 11. 71% - 80%
 12. 81% - 90%
 13. 91% - 99%
 14. 100%

Q14: How intense is competition in your industry?

- Locally
 - 3: High
 - 2: Medium
 - 1: Low

- In Canada
 - 3: High
 - 2: Medium
 - 1: Low

- Internationally
 - 3: High
 - 2: Medium
 - 1: Low

Q17: Please assess the importance of the following potential barriers to greater success in your business:

- Purchasing supplies and raw materials
- Keeping overhead costs down (i.e. office space, consumables)
- Equipment costs
- Improving the quality of the products/services
- Developing niche or specialized markets
- Increase staff productivity
- Attracting and retaining key staff
- Delivery of products/services to customers
- Attracting new domestic customers
- Finding customers abroad
- Managing customer information
- Getting marketing message out
- Geographical distance from clients and suppliers
- Managing and communicating with mobile staff
- Managing office information technology
- Implementing new information and communication technologies
- Managing and reporting financial and tax information
- Other, please specify in the following box:

Scale:

5: Very Important
 3: Neutral
 1: No Importance

4: Important
 2: Little Importance

Section 2 - Internet Use

Q35: Please indicate all of the methods that your organization uses to access Internet: (*check all that apply*)

- Regular dial-up telephone line with a standard modem
- Cable modem
- High speed (Vibe, ISDN/DSL line)
- T1 line or greater (1.544 Mbps or greater)
- Wireless connection
- Do not know

Q36: For each of the items listed, please indicate if your organization currently uses, not use, or plans to use each of the following: (*check all that apply*)

- Personal computer, workstations or terminals
- E-mail (electronic mail)
- Wireless communications
- Functional software packages (e.g. accounting, human resources, marketing).
- Shared file folders
- Internet (surfing the Internet, visiting websites, etc.)
- Presenting your own website (on the Internet)
- Internal company website and communications (intranet)
- Extranet
- Remote help desk assistance for your employees
- Hosted software solutions
- Remote data storage
- Meeting over the network (e.g. videoconferencing)
- Network/information security technology (e.g. firewall, anti-virus software, access control)
- Conducting secure business transactions with consumers
- Conducting secure business transactions with other businesses or government.

Scale:

- 0: Don't Use
- 1: Plan to Use
- 2: Use Now

Q52: Does your organization use the Internet to purchase goods or services (e.g. supplies, bill payment, airline tickets, etc.)?

- 0. no
- 1. yes

Q53: Does your organization have a web site?

- 0. no
- 1. yes

Q54: Which of the following does your web site offer on the Internet: *(check all that apply)*

- On-line payment (complete transaction and payment online)?
- Two way communication (e.g. feedback form)
- Interactivity (e.g. two way communication in real time like online chat)?
- Digital products or services (e.g. music, software, business services)?
- Secure web site?
- Privacy policy statement?
- Access via wireless mobile devices?
- Information about product or services (e.g. pricing, terms and conditions, after sales service, etc.)?
- Information about the business?
- None of the above.

Q 55: Please indicate who built your e-business solutions:
(select all that apply)

- Designed, developed, and operated internally by the business
- Installed and operated internally, but developed to specifications by another company
- Turnkey (externally developed, provided self -contained and ready to install)
- Hosted solution (off-site), including pre-specified or tailored Web design
- Other (please specify)

Q56: Does your organization use the Internet for selling goods or services?

0. no
1. yes

Q57: Please estimate what percentage of your organization's gross sales was conducted over the Internet in 2003:

1. 1% - 20%
2. 21% - 40%
3. 41% - 60%
4. 61% - 80%
5. 81% - 100%

Q58: Please estimate what percentage of your Internet sales was to customers located outside of Canada:

1. 0% - 20%
2. 21% - 40%
3. 41% - 60%
4. 61% - 80%
5. 81% - 100%

Q59: What was the impact of the adoption and use of Internet technologies and business solutions (e-commerce) in your firm?
(Please check as appropriate for each statement)

- Increased the business productivity
- Increased the business profitability
- Increased the speed of supplying and/or delivering services or goods
- Increased the ability to adapt to different client demands
- Increased the business domestic market share
- Increased the business international market share
- Increased level of customer service and satisfaction
- Building and enhancing relationships with existing customers
- Allowed business to keep up with its competitors
- Decreased the cost of producing goods or services
- Improved the quality of goods or services
- Improved co-ordination with partners or suppliers
- Improved rate of development and introduction of new products/services
- Developing unique expertise or a unique market

- Improved the brand and image of the business and its product/service
- Other (please specify).....

Scale:

- 5: Very High
- 4: High
- 3: Medium
- 2: Low
- 1: No Impact

Q74: What Internet technologies and related business solutions (e-commerce), are you planning to acquire in the near future?
(Check all that apply)

- I have no plans in this regard
- Technical consulting
- Website design
- Website content development
- Hosting
- Promotional/Internet marketing services
- Catalogue management
- Shopping cart
- Payment services
- Security/Access management
- Delivery, fulfillment and order tracking
- Customer support
- Business process integration
- Other (please specify)

Section 3 - Enablers of Internet Business

Q75: Please rate the importance of the following factors that might facilitate adoption and use of the Internet, in your firm's case:

- Nature of the goods or services you buy or sell
- Possibility to access new markets
- Competitive threats
- Demanding customers or suppliers
- Skillful and resourceful employees
- Business processes in place that facilitate learning
- Capability to manage technological change
- Access to specialized suppliers
- Management effectiveness
- Management commitment
- Leadership quality
- Strategic objectives
- Internal business culture
- Attitude towards risk
- Entrepreneurship
- Focus
- Access to financial resources
- Favorable regulatory environment

Scale

- 5: Very Important
- 4: Important
- 3: Neutral
- 2: Little Importance
- 1: No Importance

Section 4 - Training and Support

Q 93: Have you used training and/or consulting services during the last three years?

- 0. no
- 1. yes

Q 94: What kind of training, consulting, or other support services have you used (or are you still using) for Internet commerce? (*check all that apply*)

- Legal
- Training/HR
- Technical, including Information and Communication Technology
- Strategic Management or Planning
- Marketing
- Other

Q 95: Please rate the importance of the following qualities when contracting for training, consulting, or other support services: (*assess its importance*)

- Credibility and expertise
- Good reputation/referrals, image
- Affordable, reasonable price
- Locally supplied
- Effective, practical
- Flexible scheduling
- Online, always available
- Speed of delivery
- Simple language
- Offline support available
- Follow-up stages and reliable support
- Certified
- Conveniently located
- Available in language of choice
- Other (specify).....

Scale

- 5: Very Important
- 4: Important
- 3: Neutral
- 2: Little Importance
- 1: No Importance

Q 110: Which of the following tools or services designed to assist you with e-commerce would you most likely use?

- Directory of organizations that can offer help in using e-commerce
- Interactive questionnaire to help you define an e-commerce strategy
- Online seminars on e-commerce in your sector (i.e. tourism, fisheries, manufacturing, etc.)
- Classroom-based seminars about e-commerce in your sector (i.e. tourism, fisheries, manufacturing, etc.)
- Personalized, expert advice on e-commerce for your business
- Examples (case studies) of businesses similar to your using e-commerce successfully
- Recommendations about e-commerce solutions relevant to your type of sector or business
- Statistics and graphics about e-commerce adoption and use among different sizes or types of companies in Atlantic Canada
- Visits to successful companies
- Others (specify)

Scale

- 0. No
- 1. Yes

Q111. Overall, what capabilities would you like to develop in your firm? (*check all that apply*)

- Interactivity with customers
- Supply management
- Purchasing
- Strategic planning
- Marketing
- New product development
- Entrepreneurship and leadership
- Change management
- Technology

Scale

- 0. No need
- 1. Yes

Section 5 - Contact Person

Q112: Name

Q113: Name of business

Q114: Email

Q115 City

Q116: Postal Code

Q117: Website

Q118: Position within organization

1. Owner or Partner
2. Director
3. Senior/Executive Management
4. Staff
5. Other (please specify)

Section 6 - Feedback about this Survey

Definitions

*The definitions below refer to the items in the questionnaire

E-mail (electronic mail)

Used to communicate with contacts within or outside of your organization. This includes electronic mail by Internet or other computer networks.

Wireless communications

Wireless communications is a term used to describe communications in which radio waves (rather than a physical connection such as wires or cables) carry the signal between users (e.g. mobile phones, wireless data devices like a Personal Digital Assistant, wireless laptops, pagers).

Intranet

An internal company communications network using the same rules/protocol as the Internet, allowing communication within an organization. They are typically set up behind a firewall to control access to the corporate information.

Extranet

A secure extension of an Intranet that allows external users to access some parts of an organization's Intranet.

Electronic Data Interchange (EDI)

A standard format for exchanging business data. EDI is based on the use of message standards, ensuring that all participants use a common language. A message standard consists of uniform formats for business documents that have been adopted for electronic transmission purposes. EDI may be transmitted on the Internet or on a closed, internal computer network.

Network/Information Security Technology

Network Security technologies are used to prevent and detect unauthorized use of your company's computer network. (e.g. firewalls prevent access from certain Internet locations, anti-virus software prevents a virus from entering your company's network).

On-line Payment

Ability to complete financial transaction over the Internet. This does not include purchases of goods or services ordered or requested over the Internet and paid for by telephone.

Interactive

Two-way information flow via the website. (e.g. complete forms and submit, online customer service, product ordering, and interactive product information). Note that this does not include "Contact Us" sections or e-mail replies.

Digital Products or Services

The Internet offers a wide variety of goods and services. Some goods and services can be ordered and delivered directly to your computer over the Internet. Such goods and services are called digital products and include products such as music, videos, game ware, computer software, on-line newspapers, consulting services, etc.

Secure Website

Policies and technologies to secure transactions and/or information (e.g. Secure Socket Layer, Public Key Infrastructure, password or password generation system, digital signature, certificate authorities, smart cards/tokens).

Wireless Mobile Device

Mobile device is a portable wireless device than can be used to access the Internet. Mobile devices include mobile phones, wireless PDAs and wireless laptops.

Total gross sales conducted over the Internet with or without on-line payment

This includes the value of your organization's goods or services that were sold over the Internet by your organization. This includes all orders that were placed over the Internet and paid for using the following: the Internet, telephone, facsimile or another technology. Include only goods and services that were sold directly by your organization and exclude sales that were done over the Internet on your behalf by another organization. Include orders placed: by E-mail, on your website, by EDI over the Internet, using Extranets on the Internet and other methods of receiving orders via the Internet. If exact numbers are not available, please provide your best estimates.

Cable Modem

A modem that uses cable TV lines for connection to the Internet.

High speed ISDN/DSL line

Integrated Services Digital Network (ISDN) is a high-speed connections service that uses existing phone wire, but replaces modems with special digital adapters. ISDN speeds are roughly 64 kbps (kilobits per second) to 128 kbps -- up to 5 times faster than a conventional modem. A Digital Subscriber Line (e.g. ADSL, HDSL, HDSL2, VDSL) is a technology that provides high-speed Internet connection over regular telephone lines. The initial specification provides connections at speeds up to 8 Mbps (Megabits per second) for downloading data and 640 kbps for uploading data. However, normally speeds are about 1Mbps for downloading data, and 100 or 200 Kbps for uploading data.

T1 line

An Internet backbone (high speed) line that carries 1.544 million bits per second (1.544 Mbps).