

**PMAC**

**Saint  
Mary's  
University**

A Study on the Impact of  
**Business-to-Business  
E-Commerce**  
In Canada

**August 2000**

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# EXECUTIVE SUMMARY

A Canadian national study of business-to-business (B2B) E-Commerce was conducted in March-April, 2000. The Purchasing Management Association of Canada sponsored the study. Highlights of the study and key findings are presented in this summary.

## Sample and Participants

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The participants came from more than twenty-five different sectors of the Canadian economy. The sample included a wide range of firms, with sales below \$1 million to over \$1 billion. Canadian as well as foreign owned companies participated in the study. In each company a senior purchasing professional responded to a detailed questionnaire.

## Methodology

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A questionnaire was mailed to one thousand members of the PMAC. Two weeks after the initial mailing, a reminder letter with another copy of the questionnaire was mailed. A response rate of 17.8% was achieved, giving a total sample size of 178 usable responses.

The survey was divided into five sections and included questions on attitude towards E-Commerce, current usage and future plans for E-Commerce in respondent's organization, impact of E-Commerce on cost and productivity, training needs and organizational demographics.

## Results

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**Internet Usage in Purchasing.** A total 58.5% of respondents said that their firm did not use the Internet for purchasing. Among, the firms using the Internet in the purchasing function, "searching for potential vendors" (86%) and use of supplier online catalogues (75.6%) constituted the most common applications. Posting RFQs was done by only 39.5% of companies. Online payment is currently being used by only 14% of firms. On the whole, the Internet is being used more as an information search tool. Actual online purchasing is relatively low in percentage and dollar terms.

Across the entire sample, only 3.25% of purchasing is currently done through the Internet. Among firms that said they were engaged in B2B E-Commerce, this percentage

rose to a healthy 33.9%. In dollar terms, average value of online purchases were \$514,238 for all companies, while the average for companies engaged in B2B E-Commerce was \$3,111,708.

**Inter-Firm Differences.** Service firms are more likely than manufacturing firms to use the Internet for purchasing, whereas manufacturing firms are slightly more likely to have invested in EDI. Service firms are also more likely to use online applications such as posting RFQs on the Internet.

**Drivers and Barriers of E-Commerce.** The key variables that determine a firm's level of E-Commerce use are:

- *Top Management Priority.* If top management sees E-Commerce as a priority, then the firm is more likely to be heavily involved in E-Commerce use.
- *Market Orientation.* Firms that are very responsive to their customers seem to be more active in E-Commerce. These firms may have a greater motivation to streamline their business process and supply chain management, so that they can better serve their end-users.
- *Cost.* Higher costs in terms of systems, infrastructure and training are a deterrent to E-Commerce adoption.
- *Strong Ties to Existing Suppliers.* Firms that have long-standing ties with current suppliers are less likely to embrace E-Commerce. It is likely that their suppliers are not ready for the transition or switching costs are too high.
- *Security.* Most firms see security issues as a major barrier to the future growth of B2B E-Commerce.
- *Knowledge.* Among purchasing professionals, the knowledge level in E-Commerce is very low. This is also an impediment to E-Commerce adoption.

**Attitude Toward E-Commerce.** The vast majority of participants had a very positive attitude towards E-Commerce. They see savings in time, speed of response, higher operational efficiency, and savings in transactional and administrative costs as some of the key benefits.

Five underlying dimensions or considerations can explain attitude toward E-Commerce adoption. They are: Efficiency, Strategy, Financial and Technical, Security and Competition. Organizations must understand and address these five areas, which can be critical to the success of their E-Commerce implementation.

**Satisfaction with E-Commerce.** All participants, those using E-Commerce and those not using E-Commerce, felt that their organization is not taking full advantage of E-Commerce. They are dissatisfied with how their organization is using E-Commerce.

**Knowledge and Training.** Purchasing professionals rate themselves very low in terms of their knowledge in E-Commerce. This could be another barrier to growth of B2B E-Commerce in Canada.

They also indicate, in very strong terms, that there is a need for systematic training of purchasing professionals. PMAC as well as universities and private institutions can play a role here.

## **Conclusion**

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An astonishingly low 3.9% of firms claim that their organization is taking full advantage of E-Commerce. Consistent with earlier studies, the results of this study indicate that there is a lack of urgency on the part of Canadian firms.

There is a need for systematic training of purchasing professionals in E-Commerce. PMAC and universities across the country can play an important role. Canadian firms will also need to devise strategies and commit resources to realize the benefits of E-Commerce. By 2004, B2B E-Commerce will represent 7 percent of the \$104 trillion global sales transactions. Purchasing and supply chain management will be most directly affected by this trend. The global competitiveness of Canadian firms depends on how quickly they move forward to embrace E-Commerce and e-business.

# OVERVIEW OF BUSINESS-TO-BUSINESS E-COMMERCE

Why should any business care about E-Commerce? The most compelling reason may be economic. E-Commerce promises to deliver greater efficiency, lower transaction processing cost, fewer mistakes in order processing and a tight integration across the supply chain, allowing suppliers to replenish on a real-time basis.

## 1.1 Economic Impact

---

According to technology research firm Gartner Group ([www.gartner.com](http://www.gartner.com)), there will be a dramatic explosion in B2B E-Commerce, leading to fundamental changes in how businesses deal with and do business with each other. To put things in perspective, according to Gartner's research, the worldwide B2B market will grow from \$145 billion in 1999 to \$403 billion in 2000, and \$953 billion in 2001. In 2002, the market will explode to \$2.18 trillion, and by the end of 2003 worldwide B2B E-Commerce is expected to reach an estimated \$3.95 trillion. By 2004, B2B E-Commerce will represent 7 percent of the forecasted \$105 trillion in total global sales transactions.<sup>1</sup>

A study by the Boston Consulting Group ([www.bcg.com](http://www.bcg.com)), predicts that the transaction value of B2B E-Commerce done over the Internet will be more than \$2 trillion in 2003, with nearly \$800 million in purchases made through Electronic Data Interchange (EDI).<sup>2</sup>

The Canadian Internet economy was estimated at \$28 billion, with a workforce of 95,000 in 1998. In 2003, the total revenue of the Internet economy is estimated to reach \$155 billion, with a workforce of 180,000 being employed.<sup>3</sup>

## 1.2 B2B Exchanges and Business Models

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The driving force behind such growth and projections is the market maker businesses. Market makers are businesses that develop a B2B, Internet-based, e-marketplace of

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<sup>1</sup> "B2B E-Commerce: \$403 Billion in 2000," CyberAtlas.com, January 26, 2000.

<sup>2</sup> "Higher Growth Rates Predicted for B2B E-Commerce," CyberAtlas.com, December 23, 1999.

<sup>3</sup> "Report of the Canadian E-Business Opportunities Roundtable," Boston Consulting Group, January 2000.

buyers and sellers within a particular industry, geographic region, or affinity group. There are two kinds of e-marketplaces – the vertical and the horizontal.

Verticals are B2B sites designed specifically to meet the needs of a particular industry, such as retail. Vertical sites are the most likely to contain community features like industry news, articles, and discussion groups.

Horizontals provide products, goods, materials, or services that are not specific to a particular industry or company. Horizontals that retailers could use might provide travel, transportation services, office equipment, or maintenance and operating supplies.

These electronic marketplaces become industry-focused hubs that bring buyers and sellers together. VerticalNet is, perhaps, the best-known B2B marketplace. VerticalNet operates over fifty vertical marketplaces. Each marketplace is a community filled with content, stores, auctions and online purchasing capability. Every major industry now has one or more vertical marketplaces. Steel.com, PlasticsNet.com, Chemdex.com (chemicals) and Hsupply.com (hotel industry) are some examples of such hubs.

In the auto industry, the big three automakers (GM, Ford and Daimler-Chrysler) have joined forces to create what could be the largest B2B exchange called Covisint. The “big three” collectively buy over \$200 billion worth of parts and supplies each year. All suppliers will be required to conduct their transactions via Covisint, forcing a downward pressure on prices. As the automakers pool their purchasing power, they are expected to save billions.

Similar trends are visible in the computer industry, where Compaq, Gateway and HP have joined together to create an online exchange in computer parts. The grocery industry (Grocery Manufacturers Association, with combined sales of \$460 billion) has recently completed a pilot test of a B2B E-Commerce system, which provides retailers and Direct Store Delivery (DSD) suppliers with the ability to synchronize pricing, promotions, sales, inventories, invoices, and other data via the Internet.<sup>4</sup> The pilot study resulted in a 70% decrease in invoice deductions and also nearly eliminated item and price mismatches. Major grocery chains, which previously invested in EDI, are now aggressively moving to take advantage of the Internet.

The retail industry has the Worldwide Retail Exchange ([www.worldwideretailexchange.org](http://www.worldwideretailexchange.org)), an exchange that includes J C Penney's, Walgreen, Wal-Mart, Macys and others. Sears and Carrefour recently launched the GlobalNetXchange ([www.globalnetxchange.com](http://www.globalnetxchange.com)), another global B2B exchange for the retail industry.<sup>5</sup>

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<sup>4</sup> “Food Manufacturers Take First Step Toward 'Real B2B E-Commerce' For Grocery Industry; GMA Scan-Based Trading Pilot Uses Internet To Achieve Cost Savings, Retail Sales Growth,” Grocery Manufacturers Association, August 3, 2000.

<sup>5</sup> Michelle Dennehy, “Sears, Carrefour Form Retail B2B,” AuctionWatch.com, February 29, 2000.

In addition to these vertical hubs, there are also horizontal hubs that cater to different industries. B2B catalogue companies such as Grainger have now migrated online. Grainger is an MRO supplier catering to a variety of industries.

There is also the direct sales business model. Large companies such as Boeing (spare parts) and Dell Computers conduct E-Commerce directly from their sites.

EDI was and is expensive and beyond the reach of smaller companies. Internet based procurement and Web-based EDI require less investment. The Internet, with its open architecture, does not tie a firm to a specific supplier. It offers the opportunity for global sourcing. There is a vast potential for improving operational efficiency, transaction and administrative cost savings, and overall better business performance.

### 1.3 Key Issues

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As is evident from these examples, there is not a single industry that remains untouched by the E-Commerce revolution. It is vital that Canadian firms invest the resources required to lead in this area. Canada's global competitiveness depends on E-business.

A study by Boston Consulting Group ([www.bcg.com](http://www.bcg.com)) gave a bad report card to Canadian firms. Their report on E-business opportunities in Canada indicated that there was:

- A lack of urgency with respect to E-Commerce initiatives
- Only 29% of respondents in a national study said that "exploiting the full potential of Internet/E-Commerce" was a priority
- Only 21% considered E-commerce as a "serious competitive threat"
- At the same time, 84% felt that in five years, their company would be more reliant on E-Commerce.

These results suggest that Canadian firms are not thinking strategically, even though they do see opportunities in this area in the near future. If firms do not invest resources and address E-Commerce as a strategic priority, they run the risk of endangering their competitiveness.

It is against this backdrop that the present study was conducted. There has been no systematic examination of how Canadian firms use the Internet for business-to-business E-Commerce. There is also no clear documentation of how such E-Commerce impacts the firms. This study was intended to be a status report on business-to-business E-Commerce in Canada.

# 2.0 INTRODUCTION TO THE STUDY

The Purchasing Management Association of Canada sponsored this study on the status of B2B E-commerce in Canada. The study was designed and conducted by Dr. Ramesh Venkat, Associate Professor and MBA Director, Frank H. Sobey Faculty of Commerce, Saint Mary's University, Halifax.

The study was conducted during the period March-April, 2000. Focal Research, a professional market research company based in Halifax, handled the data collection.

## 2.1 Objectives of the Study

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Before the emergence of the World Wide Web, EDI (Electronic Data Interchange) was the major form of electronic commerce. EDI systems operate on private networks and are very expensive to install. The Internet/Web has lowered the "total cost of ownership" considerably and now small and medium sized firms (SMEs) can implement E-Commerce solutions. The Internet has the potential to allow firms of all sizes to streamline procurement, while lowering costs and increasing productivity.

Given this potential, are organizations effectively implementing E-Commerce solutions? In the US, a survey of participants at a NAPM conference revealed that most buyers are not satisfied with e-commerce systems and that the systems in use are "haphazard or incomplete" to effectively perform enterprise-wide procurement functions. Such findings do suggest the need for a more thorough examination of E-Commerce adoption and effectiveness in the area of purchasing. In Canada, so far there has not been a systematic study of E-Commerce as it pertains to purchasing and supply chain management.

This study was designed to provide a thorough status report detailing the extent of E-Commerce usage and degree of success within Canadian firms. It also intended to identify areas that need attention. Specifically, this research study addressed:

- *E-Commerce Adoption and Usage.* Nature and extent of E-Commerce usage in purchasing and supply chain management in Canada. What specific E-Commerce tools are being used? What role does EDI play, given the availability of lower cost Web-enabled solutions?
- *Drivers and Inhibitors.* What are the E-Commerce adoption drivers with respect to purchasing and SCM? What are the factors that inhibit E-Commerce adoption?
- *Change Management.* Are businesses changing their business processes? How

- are training needs being addressed?
- *Performance Measures.* Are there savings in transaction processing time and cost? Are there savings in inventory costs or increases in productivity?
  - *Attitude and Satisfaction.* What attitudes do purchasing managers hold towards E-Commerce and how satisfied are they with currently used E-Commerce solutions?
  - *Inter-Firm Differences.* Are there differences across industries or firm sizes or geographical regions, in their E-Commerce adoption, usage or success?

## **2.2 Scope of Research**

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The study is limited to Canada. Only Business-to-Business E-Commerce issues were studied. The study is a snap shot of the situation, as it existed in the first quarter of 2000. It does not reveal long-term trends.

In this study, E-Commerce was defined as, “conducting or enabling the purchasing, marketing and selling of goods or services through electronic networks.” The definition is fairly broad and can encompass a variety of applications through the Internet or other networks.

# 3.0 METHODOLOGY

## 3.1 Design

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The study adopted a cross-sectional survey design. A mail survey was used for data collection. The higher cost of telephone surveys and limited reach of Web-based surveys dictated the choice of the design. Since mailing addresses of potential respondents were available, the chosen method was easy to implement.

## 3.2 Sampling Frame and Sample Size

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The sample was drawn from a membership list provided by PMAC. The members are individuals from a wide variety of organizations covering all the key sectors of the economy. The survey was mailed to respondents from over twenty-five different industry sectors.

The sampling frame was defined as someone in a decision making position with respect to their organization's purchasing function. The PMAC database consisted of purchasing managers, purchasing directors or other senior personnel in the purchasing department who fulfilled this condition. Thus, the individuals targeted by this survey had the knowledge and the qualifications to answer very specific questions.

From the membership data provided by PMAC, one thousand names were randomly drawn. All provinces in Canada were covered. Overseas respondents were ignored. The survey was sent to only one person in each organization.

A total of 178 usable responses were obtained, giving a response rate of 17.8%. This is higher than the typical 10-12% response rate most mail surveys achieve. It is possible that the length of the survey or the relatively short time given after the second mail out, could have affected participation. The sample size does, however, provide the necessary statistical power required to conduct statistical tests and draw meaningful conclusions.

## 3.3 Data Collection Procedure

The data collection procedure followed a two-step approach. First, there was an initial national mail out to a randomly selected sample of one thousand PMAC members. Respondents were given two weeks to return their responses. At the end of the two-week period, a second mail out with a reminder letter and an additional copy of the questionnaire was mailed out.

Participation was voluntary. A cover letter signed by the Executive Vice President of PMAC was included to encourage members to respond. An additional cover letter was included by the Researcher to provide further encouragement and instructions. No monetary or non-monetary rewards were provided to complete the survey.

Focal Research, a professional market research company based in Halifax, Nova Scotia, administered the data collection. The respondents were guaranteed anonymity in the process. Focal Research used a code number to determine whether a respondent had returned the questionnaire or not. However, this code number was not revealed to the Researcher or PMAC, thus providing the respondents complete anonymity.

### **3.4 Questionnaire**

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The questionnaire consisted of ten pages. The first page contained instructions, definition of the term E-Commerce. The first section dealt with E-Commerce attitude, the second section addressed purchase process and supplier relationship issues, the third section addressed current and future planned usage of Internet applications, the fourth section addressed E-Commerce adoption process and training needs, and the last section captured data on the nature of firms participating in the study.

Most questions were structured five-point scale items or categorical items. Some open-ended questions were used to gain further understanding of certain issues. The questionnaire is included in the Appendix section of this report.

### **3.5 Data Coding and Analysis**

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Data coding was done in accordance with the criteria established by the researcher. Open-ended items were coded separately after reviewing all the open-ended responses.

Standard quality control procedures were conducted to ensure there were no errors in data entry. Data entry was done as and when each completed questionnaire arrived.

The analysis was performed using SPSS 10.0 for Windows. The following statistical analyses were used:

- Frequency and Mean Analysis
- Mean comparison – T-test and Analysis of Variance (ANOVA)
- Correlation
- Chi-square Analysis
- Factor Analysis
- Discriminant Analysis

# 4.0 RESULTS

## 4.1 Introduction

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Once the data were collected, Focal Research performed data coding and data entry. Then, SPSS 10.0 statistical package was used to analyze the data. The results are presented in this section, divided into specific headings.

### 4.1.1 Sample Characteristics

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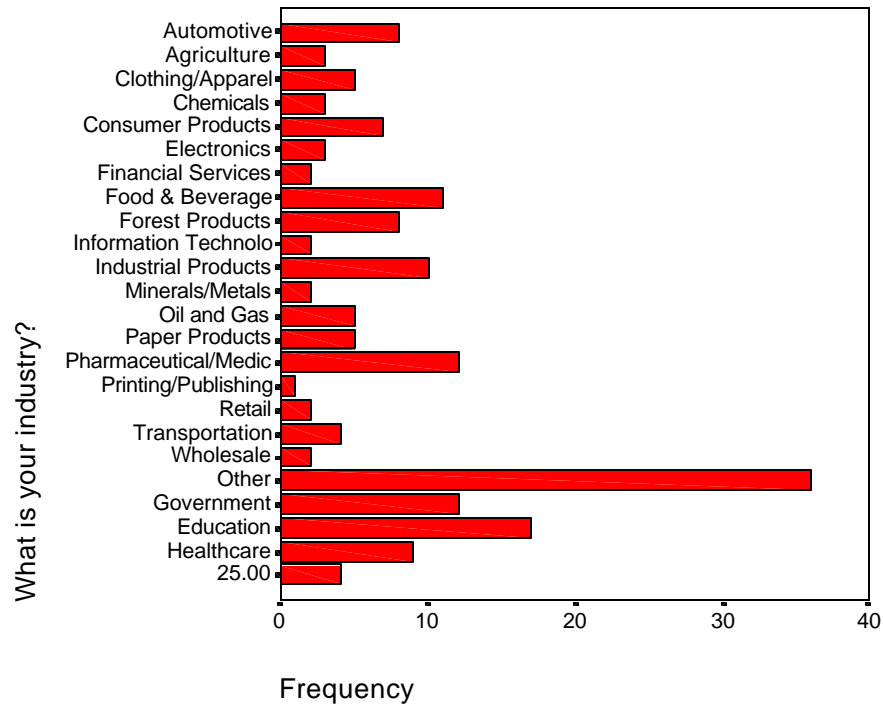
The first step was to study the sample characteristics. The last section of the questionnaire consisted of specific questions such as the type of industry, size of the organization and the nature of ownership.

Some key facts:

- More than 25 industry sectors participated in the study.
- A total of 178 respondents (who were senior purchasing management professionals) responded to the survey.
- The survey had a national representation from all provinces of Canada.
- Participants came from organizations ranging in annual sales of less than \$1 million to over \$5 billion.
- Participants came from organizations ranging in annual purchasing budget of less than \$1 million to over \$1 billion.
- Canadian as well as foreign owned organizations participated in the study.

Figures 1 through Figure 6 provide an overview of the type of organizations that participated in this study.

**FIGURE 1: Industry Type**

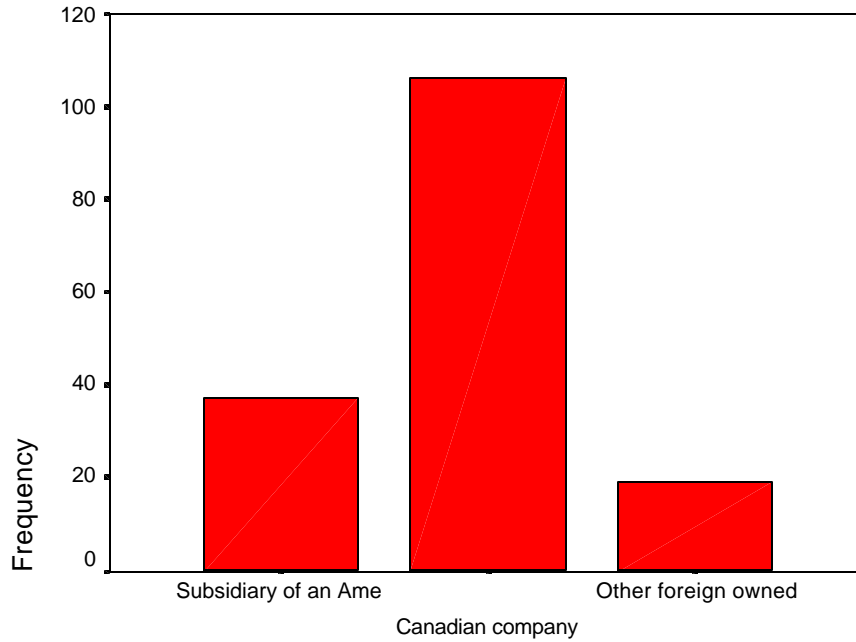


The last bar (labeled 25.00) represents four respondents who did not answer this question.

More than 25 different industry sectors are represented. Education, government, industrial products, pharmaceuticals/medical, forest products, food and beverage, consumer products and automotive have close to or more than 10 responses from different firms within their industry.

The diversity of industries is a positive sign. It facilitates the drawing of a good cross-sectional picture of the status of B2B E-Commerce in Canada.

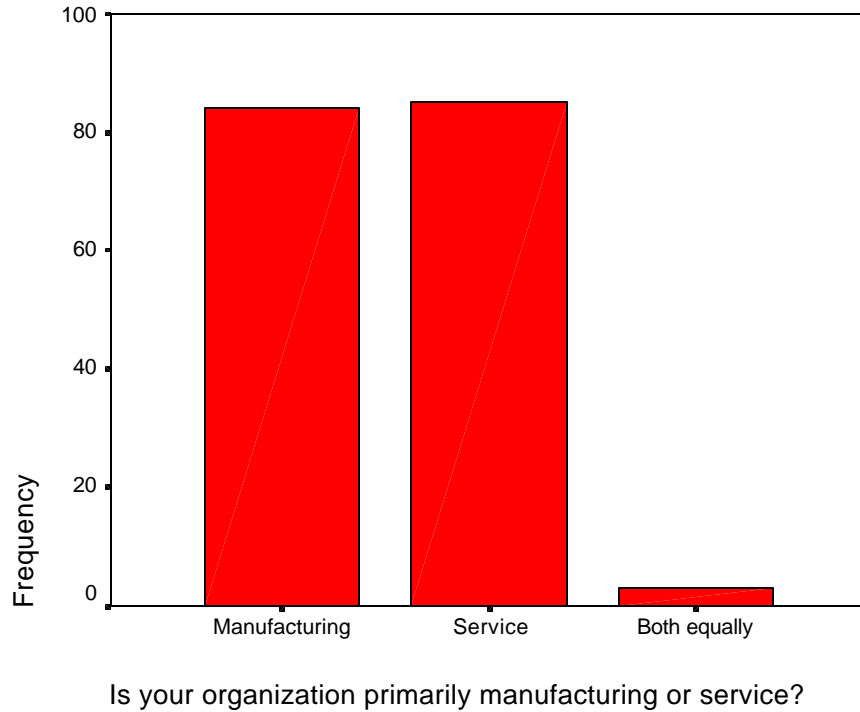
**FIGURE 2: Ownership of Organization**



We are a - Subsidiary of an American company - Canadian corr

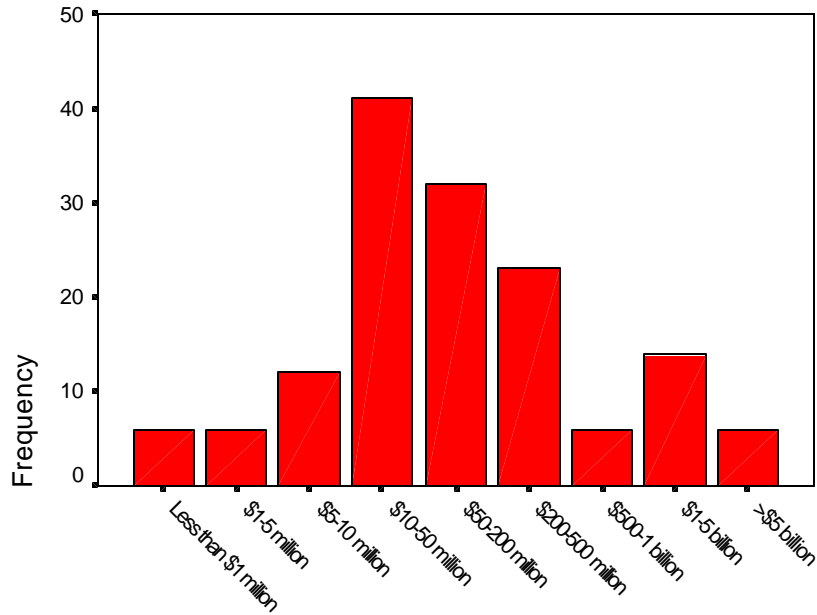
Nearly 60% of the organizations participating in this study were Canadian owned. The rest were either an American subsidiary or other foreign owned companies.

**FIGURE 3: Nature of Organization**



There were an equal number of firms that classified themselves as Manufacturing or Service companies. Only three organizations were listed as both. These figures suggest that the sample was not drawn disproportionately from any one sector.

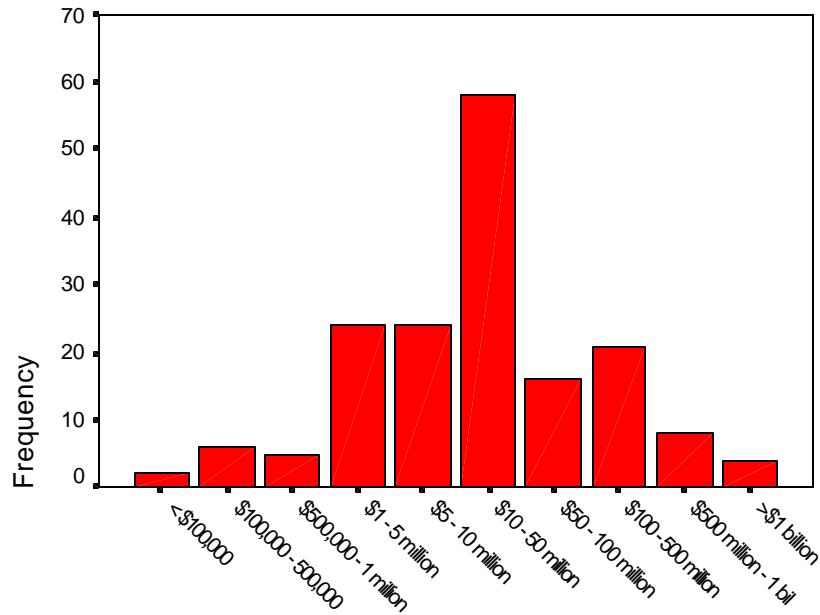
**FIGURE 4: Annual Sales Revenue**



Approx. annual sales or revenue in the last fiscal year

The vast majority of the organizations came from the \$10-200 million range in terms of annual sales revenues. \$10-50 million annual revenue was the modal figure. The range of organizations participating went from less than \$1 million to greater than \$5 billion, suggesting a very good cross-sectional representation of Canadian businesses.

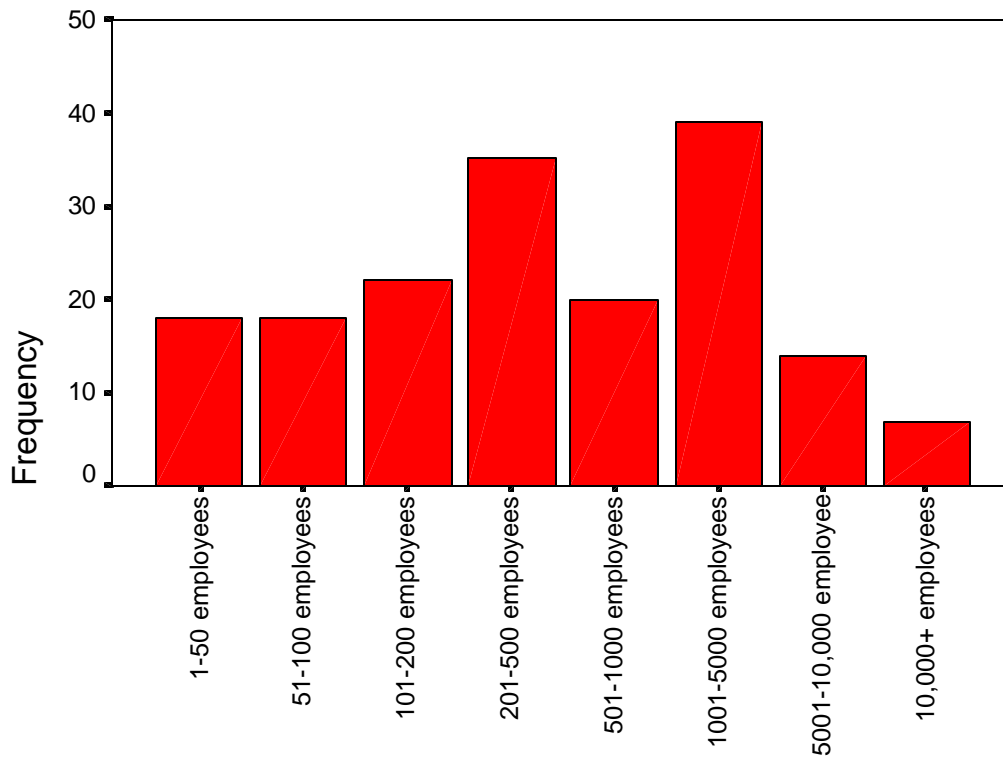
**FIGURE 5: Annual Purchasing Volume**



What is the annual purchasing volume (in Canadian dollars)

Similar to Figure 4, the above figure also indicates a broad range in terms of the size of the organizations that participated in the study.

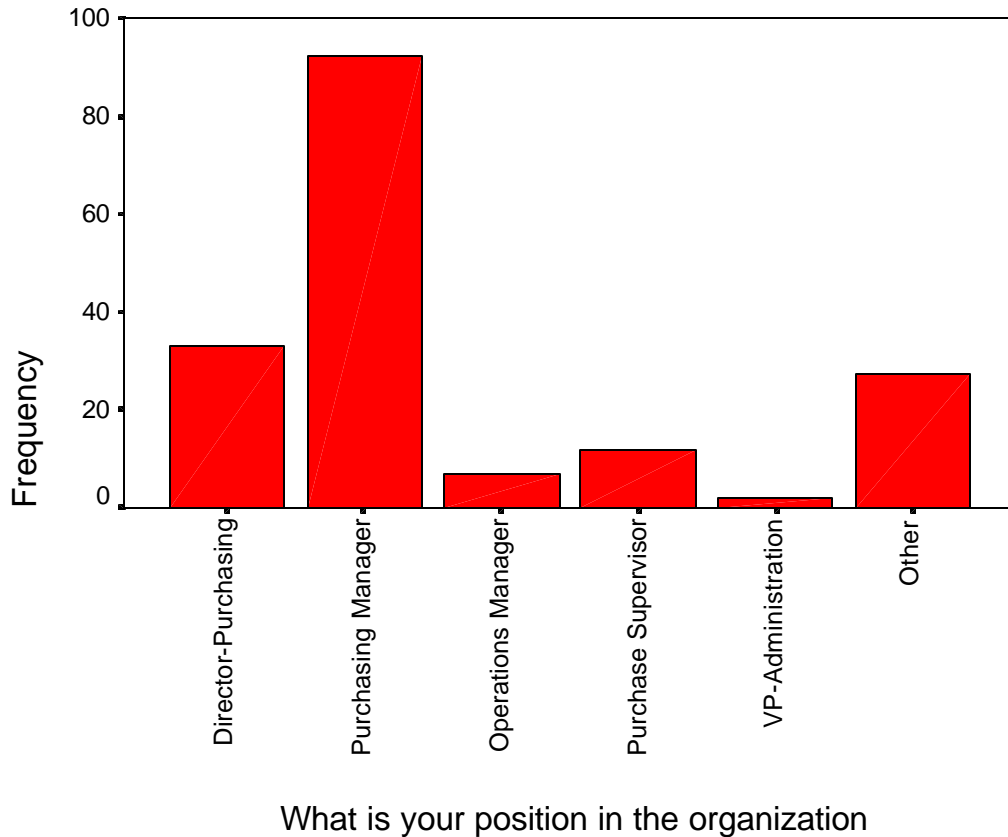
**FIGURE 6: Number of Employees in the Organization**



Approx. how many employees work in your organization

This is another measure of the size of participating organizations. Consistent with Figures 4 and 5, we again see a wide range from 1-50 employees all the way to over 10,000 employees. The vast majority of companies fell in the mid to large size category by Canadian standards.

**FIGURE 7: Position of Respondents in Their Organizations**



The participants held high positions in the purchasing area. Director of Purchasing and Purchasing/Procurement Manager were the most common titles mentioned.

The high expertise level of the participants in the purchasing function was important to ensure thorough and complete answers to the questions in the questionnaire. The job titles of participants do give some assurance that they understand and know the issues raised in the questionnaire intimately.

## 4.2 Use of Internet for Procurement

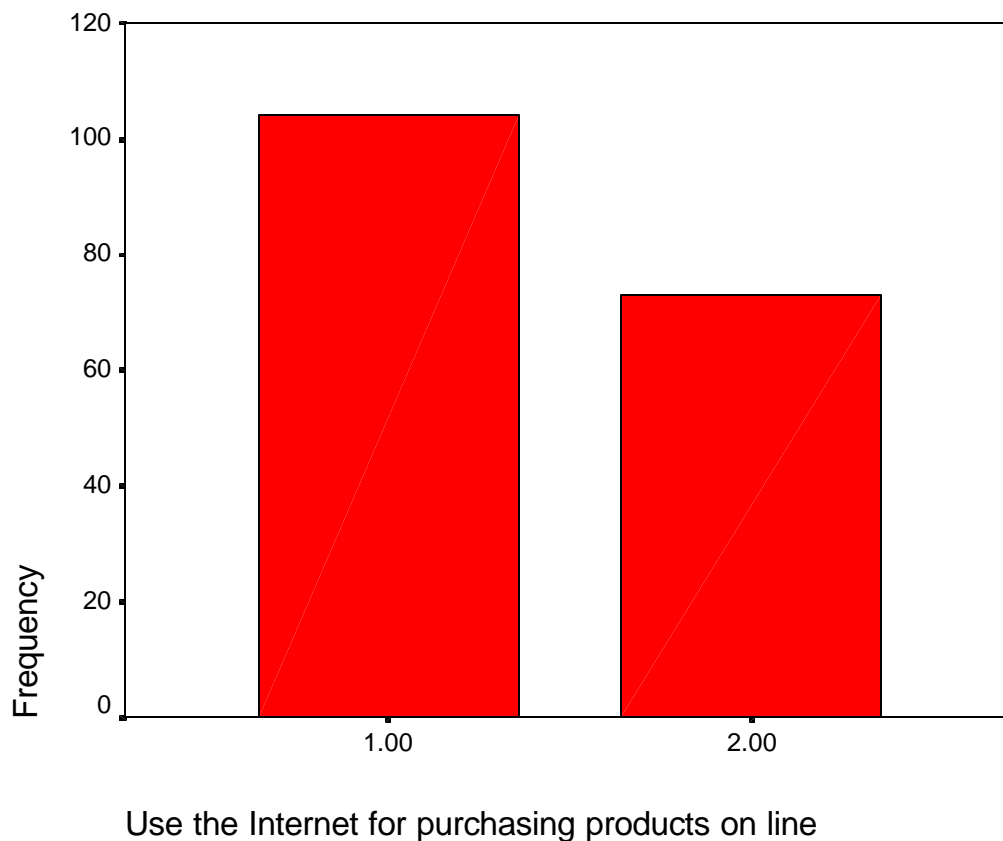
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### 4.2.1 Current Use of Internet

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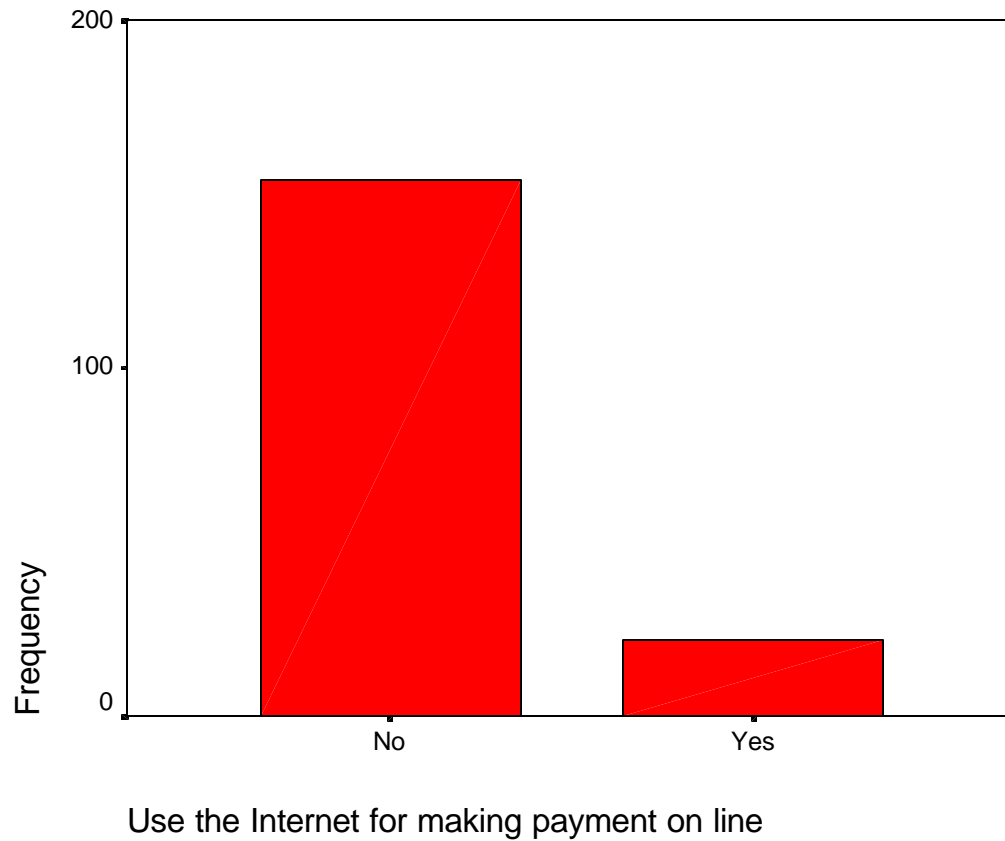
The analysis in this section (Figure 8 to Figure 14) is based on the “screening questions” in the first page of the questionnaire.

**FIGURE 8: Use Internet for Purchasing**



A total 58.5% of respondents said that their firm did not use the Internet for purchasing. The rest, 41.5%, indicated that their firm did use the Internet for purchasing. This question did not address the issue of frequency of usage, which means firms that used the Internet occasionally for purchasing may have answered “yes” to this question.

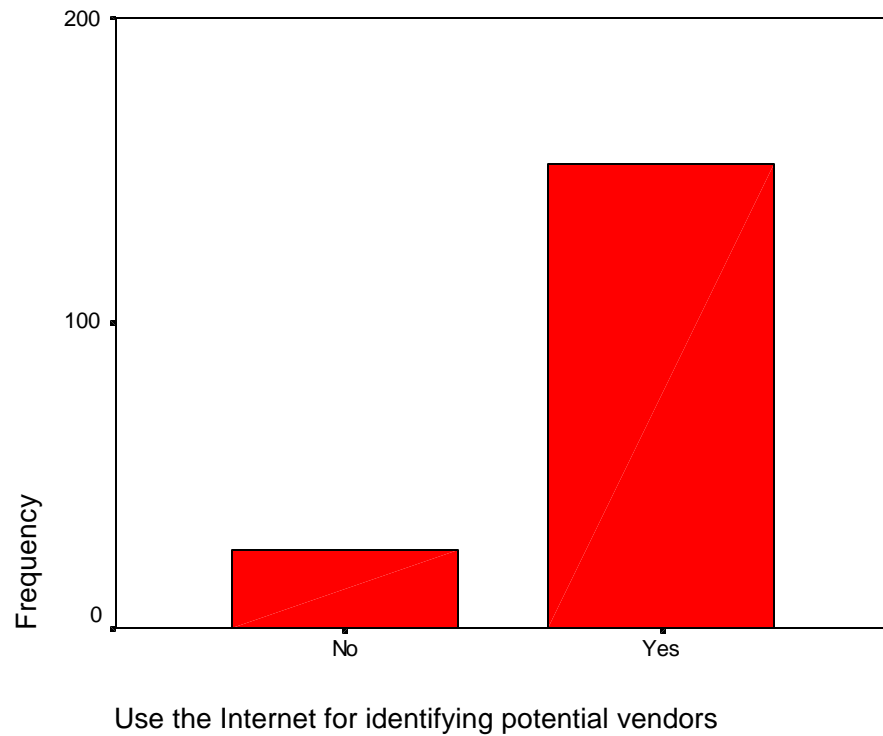
**FIGURE 9: Online Payment**



Only 14% of the firms use the Internet for making an online payment, whereas 86% of the firms do not. This is a significant finding.

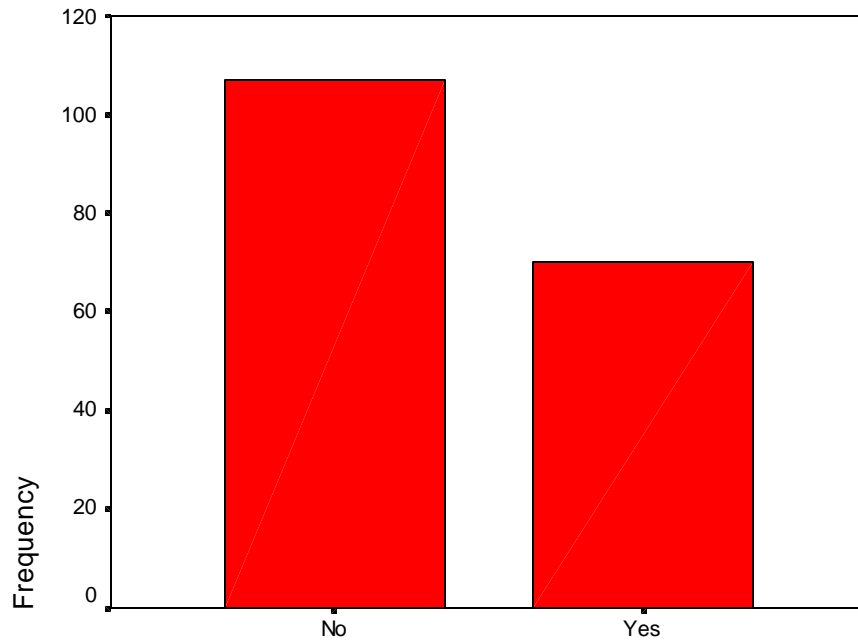
Security of online financial transactions is still a concern for the vast majority of participants. This concern is apparent in the low usage of online payment methods.

**FIGURE 10: Use of Internet to Identify Potential Vendors**



This is one of the more popular applications of the Internet in the purchasing area. A vast majority of Canadian firms, 86%, use the Internet to search and identify potential vendors or suppliers. Only 14% of the firms do not use the Internet for this application.

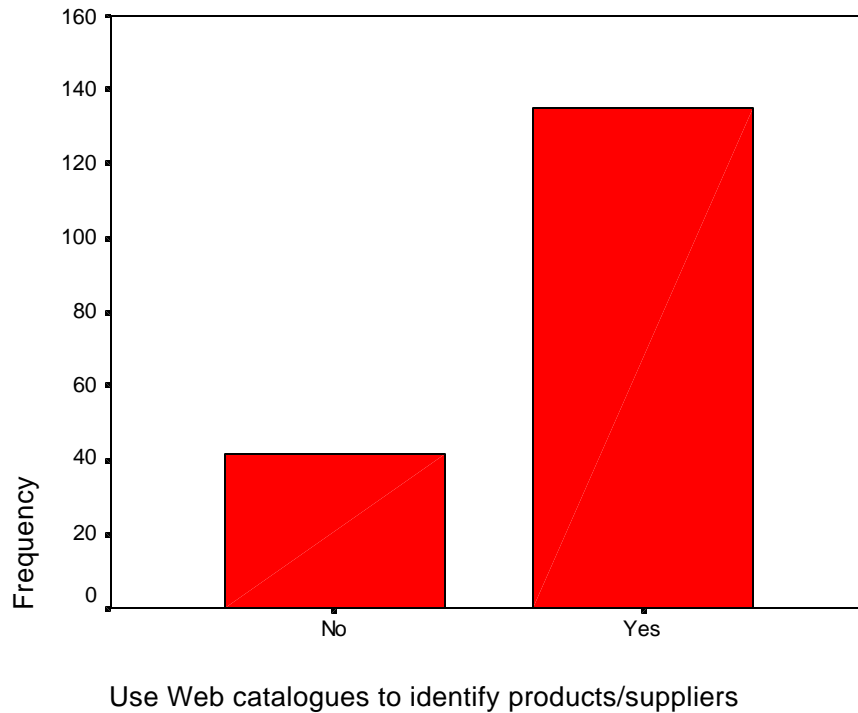
**FIGURE 11: Use of Internet to Post RFQ/RFP**



Use the Internet for posting Request for Quotes/Proposals

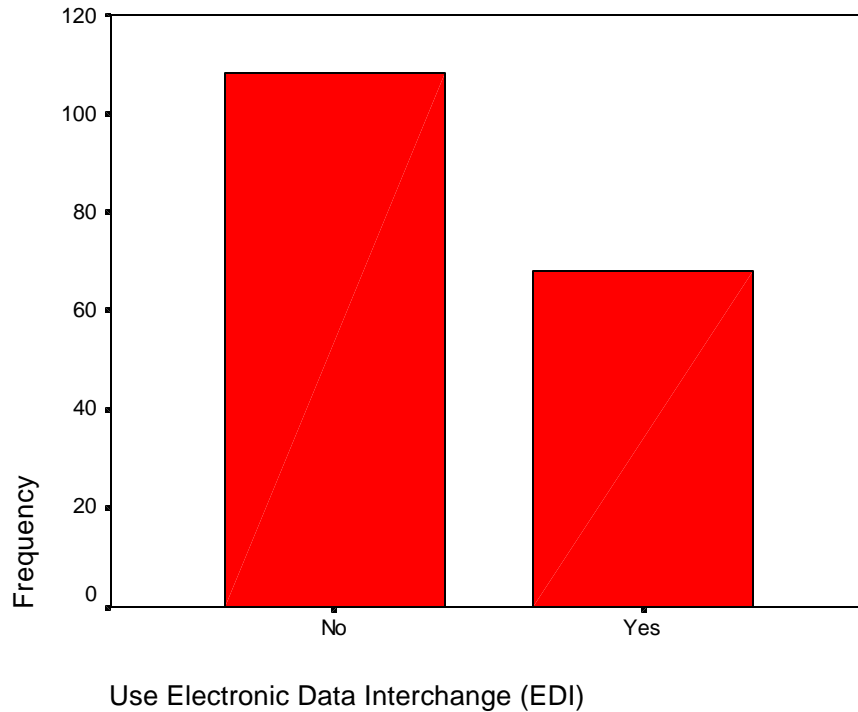
While a large number of firms use the Internet to post RFQs/RFPs, majority does not. A substantial 39.5% of firms do post RFQs/RFPs, but there are still 60.5% that do not. This is one of the low risk applications of the Internet that purchasing departments can benefit from. There are a growing number of market makers and electronic exchanges that allow a double blind posting of RFPs/RFQs for a small percentage of the final contract.

**FIGURE 12: Use of Web Catalogues**



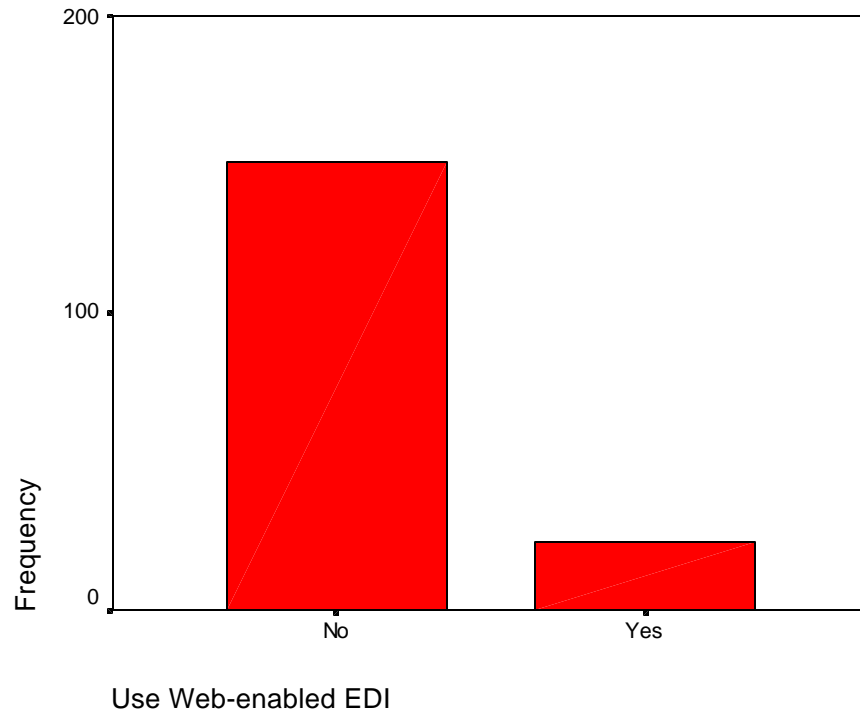
Consistent with the earlier question on identifying potential vendors, a vast majority (76%) of firms use online catalogues from different suppliers. Only 24% do not use Web catalogues. For decades, purchasing professionals have been using print catalogues. It seems like the transition to online catalogues is a rather simple one. Web catalogues, compared to print catalogues, contain current information. Even if a firm is not using E-Commerce systems for purchasing, people in the purchasing department can use Web catalogues to perform their jobs more efficiently.

**FIGURE 13: Use of EDI**



While the use of Internet for purchasing is low, based on the data in this study, it would be incorrect to conclude that there is very little B2B E-Commerce occurring in Canada. Among the companies that responded to the survey, 39% currently use EDI, whereas 61% do not. It seems like a sizable number of firms, even though not a majority of Canadian firms, have invested in the private networks and technology required to implement EDI.

**FIGURE 14: Use of Web-enabled EDI**



In contrast with Figure 13, we see here that only 13% of firms use Web-enabled EDI, whereas 87% of firms do not.

Taken together, the results in Figure 13 and 14 have significant implications for B2B E-Commerce in Canada.

## 4.2.2 Future Plans for E-Commerce

The analysis in this section is based on the eighteen statements in Section 3. Respondents were asked to indicate if they currently had/used a specific Internet application or if they planned to in future. The results are summarized below in Table 1.

**TABLE 1: Future Plans Regarding E-Commerce/Internet Applications**

Statements from Section 3	Yes, we have/use this	No, intend to implement this	No, do not intend to implement this
Our organization has a corporate web site	91.5%	5.1%	3.4%
We have an E-Commerce site where we sell our products/services	18.6%	46.9%	34.5%
We have corporate Intranet to access vendor or supplier info	51.1%	26.4%	22.4%
Have an Extranet connecting our organization with suppliers	24.6%	37.1%	38.3%
We use purchasing cards.	35.2%	25.0%	39.8%
We use EFT or other electronic payment	44.3%	25.6%	30.1%
We can track our orders through the Internet	18.2%	38.6%	43.2%
We have access to electronic catalogues of major suppliers	57.7%	28.0%	14.3%
We use E-catalogues (on Internet) to purchase products	40.8%	39.1%	20.1%
We purchase products through online intermediaries	5.3%	38.0%	56.7%
We participate in online auctions	3.4%	26.4%	70.1%
We use the Internet for posting RFPs/RFQs	27.3%	26.7%	46.0%
Our suppliers submit bids/quotes through the Internet	24.7%	33.9%	41.4%
Sometimes conduct online negotiation with suppliers on Internet	11.5%	32.8%	55.7%
Sometimes procure products through an online barter exchange	1.7%	20.8%	77.5%
Have online vendor catalogues accessible to end-users	31.6%	35.7%	32.7%
We use e-mail to communicate with our suppliers	89.1%	6.3%	4.6%
We have automated most of our purchasing activities	48.3%	38.5%	13.2%

In terms of the applications currently in use, almost all companies have a Web site and use e-mail for contact with suppliers. About 51% have an Intranet with supplier catalogues and 57% have direct access to electronic catalogues of major suppliers. Only 18.6% sell directly to their customers through the Web.

The last figure is consistent with PricewaterhouseCoopers' finding that in the retail sector only 26% of firms had implemented E-Commerce.<sup>6</sup> The present study looked at over 25 different sectors.

Use of online auctions, online barter exchanges, purchase of products through online intermediaries are used by less than 5% of companies. Online negotiation tools are used by 11.5% of companies. While many vertical industries electronic exchanges are promoting these online purchasing options, the data suggest that Canadian firms have been slow to adopt these new online purchasing methods.

In terms of payment methods, 35% use purchasing cards and 44% use EFT or other electronic payment method. In both cases, 25% of organizations said they plan to use these payment methods in the near future.

Among the non-users of a particular application, Table 1 reveals that not every organization is keen on implementing the application. Large proportion of firms said that they do not plan on implementing some or all of the applications stated in Table 1 (see last Column). This is not surprising. A report by Boston Consulting Group found that there is lack of urgency among Canadian firms when it comes to E-Commerce and e-business issues.<sup>7</sup>

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<sup>6</sup> Andrzej Jablonski and Rosie Lombardi (2000), "O E-Canada," CIO Canada Magazine, May 2000.

<sup>7</sup> "Report of the Canadian E-Business Opportunities Roundtable," Boston Consulting Group, January 2000.

### 4.3 Internet Adoption For E-Commerce

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#### 4.3.1 Differences Between Manufacturing and Service Firms

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**FIGURE 15: Internet Use by Manufacturing Vs. Service Firms**



The first set of bars (labeled 1.0) represents firms not using the Internet for purchasing and the second set of bars (labeled 2.0) represents firms using the Internet for purchasing.

Service firms seem to be using the Internet more for making purchases. Further statistical analysis revealed that the difference in Internet use for E-Commerce by service and manufacturing firms is statistically significant. A cross tab analysis was performed, which produced a significant chi-square value [Chi-square = 6.4,  $p < 0.01$ ].

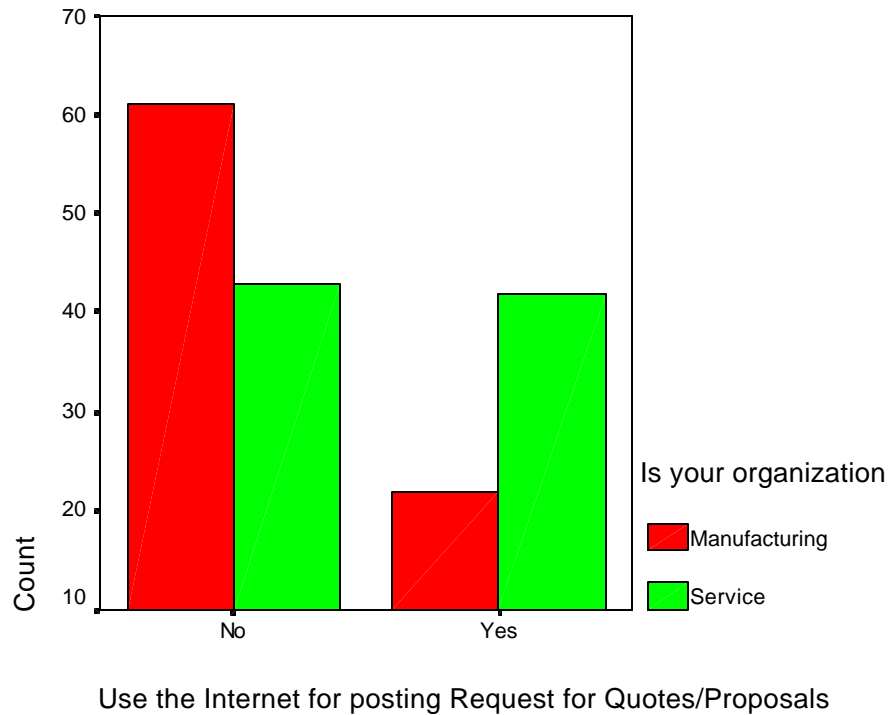
It is possible that service firms have more flexibility in terms of adoption of B2B E-Commerce. Manufacturing firms may spend a significant portion of the purchasing budget on direct materials and parts. It is possible that given the nature of their operations, they are tied closely to their existing suppliers. Service firms, on the other hand, spend most of their budgets on indirect purchases and office supplies. Perhaps,

switching costs are lower in this case. This is a plausible reason for the observed differences.

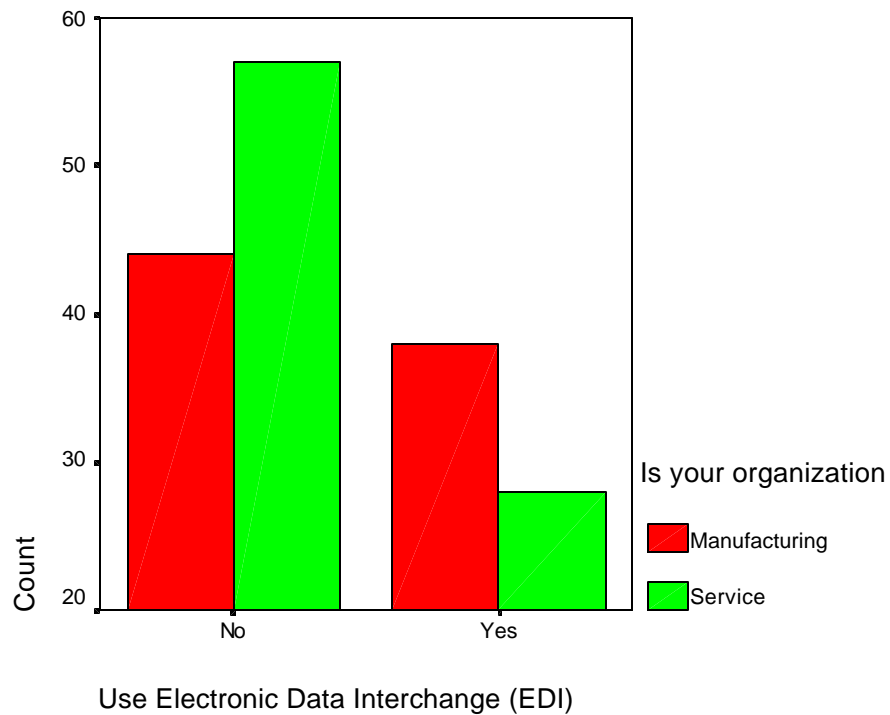
A T-test was conducted to see if Service and Manufacturing firms responded differently to the statement “it would be difficult or costly to replace our major suppliers.” A significant t-value was obtained [ $t(df=166)=3.9, p<0.05$ ], with Service firms (Mean=3.3) less likely to agree with that statement than manufacturing firms (Mean=3.86). These results, although only marginally significant, do support the notion that it may be easier for service firms to switch suppliers and hence they may be more willing to adopt the Internet. Manufacturing firms may be tied to existing suppliers.

Figure 16 shows a difference in the use of the Internet for posting RFQs/RFPs by service firms as compared to manufacturing firms. A cross tab analysis revealed that this difference is significant [ $\text{Chi-square}=9.3, p<0.005$ ]. This means services firms are significantly more likely than manufacturing firms to use this application.

**FIGURE 16: Online RFP by Manufacturing Vs. Service Firms**



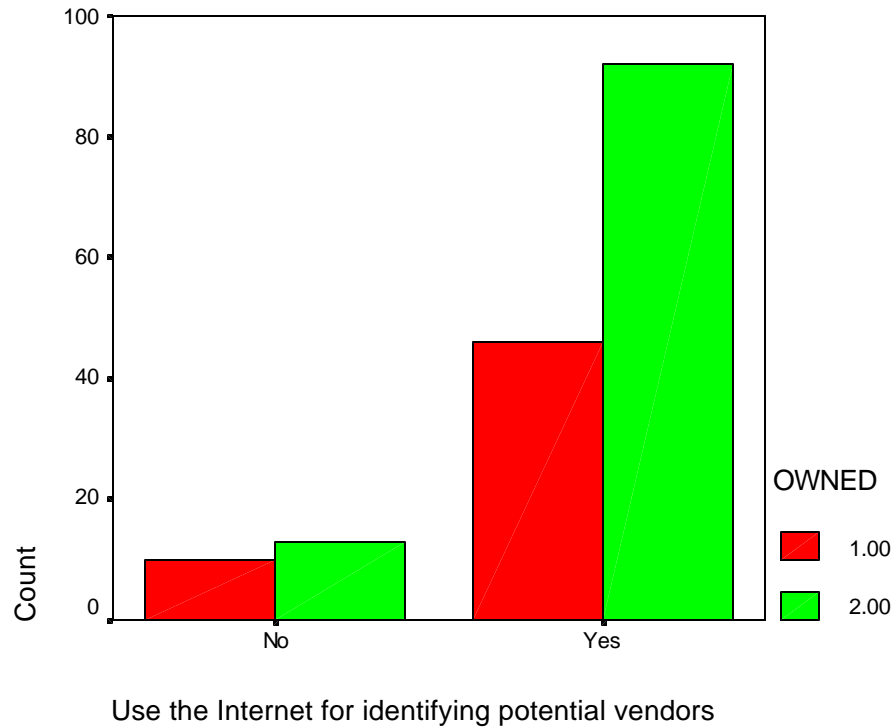
**FIGURE 17: EDI Use by Manufacturing Vs. Service Firms**



A marginally significant Chi-square value [Chi-square = 3.2,  $p < 0.05$ ] was obtained for a cross tab analysis examining the difference in EDI use by manufacturing and service firms. Manufacturing firms are slightly more likely to use EDI than service firms. It is possible that for some firms, issues involved in switching from EDI to Internet may be hampering adoption of Internet for purchasing.

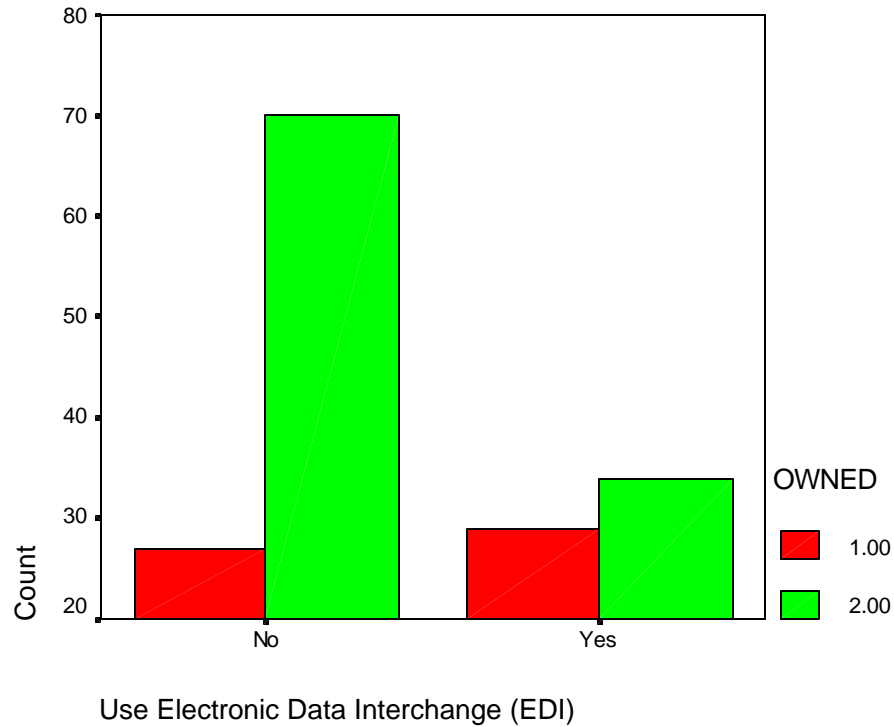
### 4.3.2 Differences Between Foreign (1.0) and Canadian (2.0) Ownership

**FIGURE 18: Vendor Identification by Canadian Vs. Foreign Firms**



Canadian owned companies were more likely to use certain applications such as using the Internet to search for potential vendors. Since the sample was disproportionately Canadian owned companies, one should not read too much into this finding.

**FIGURE 19: EDI Use by Canadian Vs. Foreign Firms**



There are no significant differences between Canadian and foreign owned companies in their use of EDI.

### 4.3.3 Impact of E-Commerce

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So far, the type of Internet/E-Commerce applications used, future plans, differences between manufacturing and service firms, and differences between Canadian and foreign firms have been analyzed.

In this subsection the impact of E-Commerce on the firm's performance is examined. Table 2 below examines the extent of E-procurement and its impact on financial performance.

**TABLE 2: Real Impact of B2B E-Commerce and E-Procurement**

Performance Measure	Mean – All Firms	Mean – Firms Using Internet Purchasing	Mean – Firms Using EDI
Percent suppliers reachable through B2B applications on Internet	13.3%	29.2%	23.5%
Percent of your purchasing done through Internet (except EDI)	3.25%	33.9%	-
Percent of your purchasing done through EDI	5.3%	-	71.61%
Total dollars of your purchasing through E-commerce last year	\$514,238	\$3,111,708	\$4,034,999
Percent your cost savings due to E-purchasing last year	2.07%	5.77%	6.95%
Percent saved in inventory carrying costs due to E-commerce	0.73%	2.31%	0.95%
Percent procurement you like to do through E-commerce next year	17.7%	33.9%	-

- Based on the data, only 13.3% of all Canadian firms in the study had direct access to their suppliers through a business-to-business E-Commerce application. This includes electronic marketplaces. However, among those who do Internet purchasing and those who use EDI, direct electronic access to suppliers rises to 29.2% and 23.5%.
- Excluding EDI, only 3.25% of purchasing was done through the Internet last year. This is an astonishingly low figure. However, among those firms using Internet for purchasing, the figure rises to a healthy 33.9%. Given that B2B E-Commerce is still in its early stages, this is a very positive figure.
- EDI accounts for 5.3% of all purchasing across all firms. This average by itself does not reveal much, since the majority of firms do not use EDI. The last column shows the total purchasing done through EDI (for firms using EDI), which stands at 71.6%. Thus firms using EDI are heavily invested in their systems. This could mean they would either be unwilling or face barriers in switching to Internet-based procurement.
- Total cost savings and inventory cost savings are higher for firms using Internet for purchasing or EDI for purchasing than all firms in the sample.
- Lastly, firms currently using the Internet for purchasing expect to do a greater percentage of their purchasing online next year, compared to all firms in the sample.

### 4.3.4 Efficiency and Productivity

When asked if purchasing process is more efficient due to e-purchasing (column 2 in Table 3), 25.8% said YES and 15.2% said NO. However, 43.3% felt it was too soon to judge the results.

**TABLE 3: Impact on Efficiency and Productivity**

	<b>Purchasing process more efficient due to Internet purchasing?</b>	<b>Productivity gains within due to Internet based purchasing?</b>	<b>Organization taking full advantage of B2B E-commerce?</b>
<b>YES</b>	25.8	22.5	3.9
<b>NO</b>	15.2	23	92.1
<b>May Be</b>	11.2	7.9	NA
<b>Too soon to Judge</b>	43.3	41	NA

In terms of productivity gains (column 3 in Table 3), the YES (22.5%) and NO (23%) responses were similar, indicating very mixed results. It is harder to assign productivity gains to E-Commerce, especially in the absence of specific data in that regard. Again, a significant number (41%) felt it was too soon to judge the impact of E-Commerce on productivity gains.

The most telling result in this section is in the fourth column of Table 3. Only 3.9% of the respondents felt that their organization was taking full advantage of B2B E-Commerce. A staggering 92.1% felt that their organization could greatly improve in that regard. Even among the firms that are currently using the Internet for purchasing and EDI, only 5.6% and 6.3% respectively said their organization was taking full advantage of the B2B E-Commerce.

Respondents were probed further, using a five-point scale, and asked to indicate their overall level of satisfaction with their organization's current E-Commerce usage for purchasing.

**TABLE 4: Satisfaction with E-Commerce**

<b>Satisfaction Measure</b>	<b>Mean – All Firms</b>	<b>Mean – Firms Using Internet Purchasing</b>	<b>Mean – Firms using EDI</b>
Are you satisfied with how your organization is currently using E-Commerce (as it pertains to purchasing)?	2.44	2.55	2.56

Table 4 is related to the last column in Table 3. On a five-point scale (5=very satisfied and 1=very dissatisfied), the average satisfaction score of 2.44 is a strong indication that purchasing managers across the country are dissatisfied with how their organizations are using B2B E-Commerce. Even among firms using the Internet or EDI, there is a great deal of dissatisfaction.

Taken together, Table 3 and Table 4 strongly suggest that there is a great deal of room for improvement in Canadian firms in terms of B2B E-Commerce.

## **4.4 E-Commerce Adoption**

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Several statistical analyses were conducted to study which factors affected E-Commerce adoption. The results are presented in this section.

### **4.4.1 Drivers and Barriers of B2B E-Commerce Adoption**

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Using the E-commerce adoption items at the beginning of the questionnaire, a composite index was computed. The responses to six items (from *Use the Internet for Purchasing Products Online* to *Use Web-enabled EDI*) were summed to create a composite score. This score was labeled as a new variable, “Total Internet Use for E-Commerce.”

In order to understand what was driving E-commerce adoption by businesses, a correlation analysis was conducted. The correlation between this new variable and several other variables was studied.

It was hypothesized that E-commerce adoption may be driven by the following factors:

- Relationship with existing suppliers
- Switching costs involved in adopting a new system
- Senior management commitment to E-commerce
- Market orientation – how well does the company listen to and address the needs of its customers (this is a summed composite measure using most of the statements in the Market Orientation scale at the beginning of Section 2 in the questionnaire).
- Competitive intensity and rate of change in the industry
- Security concerns
- Size of the organization (sales and employees)

**TABLE 5: Variable Correlated to E-Commerce Use**

Variable	Correlation (Pearson r)	Significance Level
Competitive Intensity in the Industry	-0.221	0.005
Market Orientation	0.174	0.05
Priority by Senior Management	0.155	0.05

Only the above three variables had significant correlation with E-Commerce use. Interestingly, the more competitive the industry, the less likely were companies to use extensive E-Commerce applications. This result may be somewhat counter-intuitive. It is likely that in very competitive industries, the attention is on other factors such as innovation.

It is also worth noting that the two factors that positively affect E-Commerce use are Market Orientation and Senior Management Priority. If a firm is Market Oriented (i.e., listens closely and responds to the needs of its customers) it is more likely to use various E-Commerce applications in the supply side of the business.

At this stage, one can only speculate as to what the cause of this relationship between Market Orientation and E-Commerce use could be. It is possible that firms are responding to demands from customers and incorporating demand-side E-Commerce applications (online ordering etc.). This may in turn put pressure on firms to implement further changes down their supply chain.

The other interesting finding is that the priority placed by senior management on E-Commerce significantly impacts the firm's use of various B2B E-Commerce applications. This should not come as a surprise. Organizations that are lagging behind did not have senior management support or direction. While purchasing professionals within organizations may see the need for E-Commerce, unless management sees this as a priority, nothing tangible is likely to happen.

#### **4.4.2 Predicting the Adopters**

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Following the above analysis, a more advanced statistical technique called Discriminant Analysis was used. This analysis uses a set of variables to identify if a particular case belongs to Group A or Group B. The particular technique used is called descriptive discriminant analysis, where the focus is on revealing major differences among the groups.<sup>8</sup> In this study, those who used the Internet for purchasing and those who did not use the Internet for purchasing were defined as the two groups.

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<sup>8</sup> Stevens, J. (1996). Applied multivariate statistics for the social sciences, 3<sup>rd</sup> Edition, Mahwah, NJ: Lawrence Erlbaum Associates, Inc.

Several variables were used to see if the group membership could be accurately predicted. These included:

- Type of organization – manufacturing or service; Canadian or foreign.
- Size – volume of annual purchasing.
- Management – is E-Commerce a priority?
- Market Orientation – how responsive is the company to its customers?
- Major Issues – Security concerns delaying E-Commerce; Legacy systems are a barrier; Cost is a barrier.

A technique called Stepwise analysis was used to see: (a) if firms could be accurately predicted as either users or non-users of Internet for purchasing, and (b) which variables are powerful predictors of such group membership.

The analysis resulted in a prediction success rate of 65.4%, which is significantly higher than chance (which would be 50%).

**TABLE 6: Canonical Discriminant Function**

<b>Variable/Statement</b>	<b>Function</b>
Management has not made E-Commerce a priority in the purchasing area	-0.513
We have long-term relationships with the majority of suppliers	-0.480
Cost to set up Internet based procurement is too high for us	-0.440
Market Orientation	0.579

The interpretation of Table 6 is as follows. Essentially there are four important determinants of whether a company uses Internet for purchasing or not.

Higher the value in the function column, the stronger is that variable in influencing/predicting E-Commerce use. The first three variables have an inverse relationship with E-Commerce use. In other words, lack of management priority, having a long-term relationship with current suppliers and not having the financial resources – all adversely affect the use of the Internet for purchasing. Hence the negative sign in front of the coefficient values.

Market-orientation, on the other hand, has a positive influence. Higher the market-orientation, greater the likelihood of using the Internet for purchasing.

Summarizing the findings from the discriminant analysis:

1. Does top management see E-Commerce as a priority? If the top management does not, then E-Commerce adoption is low.

2. Does the firm have a long-term relationship with suppliers? If the firm has a strong relationship with suppliers, that seems to inhibit adopting of new purchasing methods such as E-Commerce.
3. Can the firm afford the cost of setting up an Internet-based procurement system? If a firm cannot afford the cost, adoption of E-Commerce is low.
4. Is the firm responsive to its customers? Higher market-orientation seems to lead to higher E-Commerce adoption on the supply side. Why? Firms that are responsive to customers are perhaps working backwards to improve their business processes. Such improvement can lower costs, improve efficiency and even enable just-in-time delivery to their customers. While this reasoning is speculative, the relationship between market-orientation and E-Commerce usage has never been explored in any previous study.

These variables do provide a good indication of what may be driving E-Commerce adoption in the B2B arena.

#### 4.4.3 E-Commerce Adoption Process

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In addition to looking at the factors driving E-Commerce adoption, the study also examined some issues in the adoption process. The challenges faced by organizations and the methodology followed in the adoption process was studied (Section 4 in the questionnaire). A simple frequency analysis was performed on seven items in this section. The results are presented in Table 7.

**TABLE 7: Process Issues in E-Commerce Adoption**

Statements from Section 4	Yes	No	N/A
Changed many procedures migrating to Internet purchasing system	16.8%	15.6%	67.6%
Reengineered business processes to have Internet based system	15.1%	18.0%	66.9%
We adopted Electronic Commerce in small steps	33.9%	2.9%	63.2%
Had to train employees before adopting E-Commerce purchasing	27.3%	5.8%	66.9%
Our IT/MIS staff worked with purchasing to install E-Commerce	24.4%	7.6%	68.0%
Outside consultant did the systems integration and training	8.2%	24.6%	67.3%
Integrating E-Commerce system with Enterprise system was important	19.9%	9.9%	70.2%

Salient findings in this area are as follows:

- Among the firms that adopted E-Commerce, virtually everyone did it in small steps.
- IT/MIS and purchasing department had to work together to accomplish the installation of E-Commerce systems. It would be a mistake to leave the task entirely to the technical staff.
- Only a minority of firms used an outside consultant (a third of those who answered either Yes or No).
- Among those who answered Yes or No, respondents were equally split on whether (a) purchasing and internal procedures had to be significantly changed, and (b) whether major business process reengineering was required in order to implement the Internet purchasing system. This suggests that for many organizations there may be a major reengineering of business processes required as they move towards E-Commerce.

Taken together, these findings suggest that adoption of E-Commerce has to be a careful, planned effort, with adequate resource commitment. The importance of top management commitment becomes even more apparent in light of the results presented in Table 7.

In sections 4.4.4 and 4.4.5, open-ended responses that deal with “perceived benefits” and “perceived concerns” are discussed. These two sections also provide insight into factors that are driving or impeding E-Commerce adoption in Canadian firms.

#### **4.4.4 Perceived Benefits of E-Commerce**

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The respondents were given two open-ended questions to state their perception of major benefits of E-Commerce to their organization and their perception of the areas of concern to their organization. Not every respondent chose to answer these open-ended questions (see Page 9 of Appendix). Among those who answered, most mentioned multiple benefits and/or concerns. Since the responses were unprompted, it does provide insight that cannot be captured by structured questions.

The responses were coded into different categories. The most common responses are presented in Table 8 and Table 9 respectively.

**TABLE 8: Perception Regarding Benefits of E-Commerce**

<b>Issue</b>	<b>Percentage<sup>9</sup></b>
Streamline Processes, Greater Efficiency	27.5%
Reduction in Transaction or Administrative Costs	26.7%
Speed and Reduction in Time	22.2%
Greater Access to Suppliers, Global Sourcing	12.0%
Better Communication, Information Flow	12.0%
Can Focus on Strategic Issues (Instead of Tactical)	10.0%

A total of 90 respondents, out of a sample of 178, mentioned at least one benefit of E-Commerce. It was obvious that the respondents clearly understand the various benefits of E-Commerce. Some organizations are still in the early stages or have not yet adopted E-Commerce. There were a few responses indicating that some time is required before benefits can be judged. Some sample responses are provided below.

- There are too many benefits to mention. Put it this way – if we don't go there: we will be left behind.
- Lowering costs of procedures. Increasing time on other procedures (rather than preparing daily p/o's. Open communications with new vendors. Will not look like a fool to other purchasers when asked if my company is using E-commerce, yet! Unfortunately, I always reply that I still work for Fred Flintstone!
- Time and cost savings. Automating routine processes to allow for greater focus on strategic development and long term planning.
- Less paper work, increased effectiveness, empowerment of middle managers, customer service.
- Streamline processes. Less order process time. Less transaction time and costs. More time for strategic initiatives.

#### **4.4.5 Perceived Concerns Regarding E-Commerce**

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Respondents were also asked what concerns they had with respect to the implementation of E-Commerce in their organizations. The most common responses are presented in Table 9.

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<sup>9</sup> Out of all the responses to the question, a percentage was computed. This measure is a rough indication of how frequently a certain issue was mentioned.

**TABLE 9: Perception of Concerns Regarding E-Commerce**

<b>Issue</b>	<b>Percentage<sup>10</sup></b>
Security (transactions and data security)	41.5%
Cost (systems, training)	11.2%
Technology – Implementation and Integration; Lack of Standards	11.2%
Training	10.1%

A total of 89 respondents provided open-ended responses to the question on concerns regarding implementation of E-Commerce. It is important to note that security issues were the most commonly cited concern. A sample of the verbatim responses to the question on concerns regarding E-Commerce implementation is provided below.

- Security of information re: paying invoices, transfer of funds, using information.
- Security. Integration with existing ERP software. Supplier readiness.
- Healthcare is way behind in this field. Dollars for funding are being spent on patient care. Administration is not being funded.
- I utilize a manual inventory system so utilizing E-commerce is something way in the future.
- Cost of change, reduced budgets, lack of training, shortage of staff.
- The buying solutions available are incomplete. No one provider has it all. Suppliers have very low capability for E-Commerce in our business. To date our EDI is mainly treated as electronic fax.

#### **4.5 Attitude Toward Adoption of E-Commerce in Organization**

There were seventeen statements in this section, which were intended to uncover the respondents' attitudes toward the adoption of E-commerce and Internet based procurement in their organization.

Two types of analyses were conducted with the statements in Section 1 of the questionnaire. The first analysis was a factor analysis on the entire set of seventeen statements. Factor analysis is a data reduction technique, which takes a large number of statements and based on the relationship between these statements, it reduces the statements to fewer underlying factors. In other words, rather than using seventeen statements to explain the respondents' attitudes towards adoption of E-commerce, we may be able to explain their attitudes using fewer underlying factors.

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<sup>10</sup> Out of all the responses to the question, a percentage was computed. This measure is a rough indication of how frequently a certain issue was mentioned.

**TABLE 10: Factor Analysis of E-Commerce Attitude Variables**

Statements from Section 1	Factors				
	Efficiency	Strategy	Financial & Technical	Security	Competition
E-Commerce enables more efficient use of employees time	.861				
E-Commerce reduces errors in purchase orders.	.788				
E-Commerce offers convenience.	.783				
Lowering costs is important reason for adopting B2B E-Commerce	.651				.401
Time, effort for p/o reduced by Internet based purchasing	.640				-.301
We have a comprehensive E-Commerce strategy		.826			
E-Commerce is a top priority by senior management		.800			
E-Commerce is crucial to maintain competitiveness in our industry		.753			
Management has not made E-Commerce a priority in purchasing area		-.454			.355
Concerned to invest in E-Commerce as no technology standards yet			.715	.401	
Cost to set up Internet based procurement is too high for us			.714		
Legacy systems constrain ability to adopt Internet technologies			.702		
We haven't pursued E-Commerce due to finance constraints			.589		
Security concerns delay(ing) our adoption of E-Commerce				.803	
Concerned about security/integrity of confidential data				.780	
Lack of skilled people is a barrier to adopting E-Commerce			.334		.620
Our main competitors are utilizing Internet-based B2B applications					.434

The results of the factor analysis are presented in Table 10. The items that were scored in a similar fashion by respondents are listed together. The factor analysis

produced five factors. The five factors explained 63% of the variance in the data, which indicates that the factors can provide a reasonably good explanation of attitudes.

The five factors uncovered can be labeled as follows: (1) Efficiency Considerations, (2) Management Strategy Considerations (presence or lack of strategy), (3) Financial and Technical Considerations, (4) Security Considerations, and (5) Competition (competitive advantage) and Labour Considerations. Organizations that wish to move forward with E-commerce adoption in the business-to-business area must address these five considerations.

In addition to the factor analysis, the attitudes of organizations that are currently making very good use of E-commerce versus those lagging behind were studied. In terms of E-Commerce applications used, based on the screening questions, firms were divided into High, Medium and Low E-Commerce users. Analysis of Variance (ANOVA) was used to see if these three groups differed in their attitudes.

Companies using Internet for more procurement applications were:

- More likely to believe that E-commerce is a top management priority in their organization.
- More likely to state that their organization has a comprehensive E-Commerce strategy
- Less likely to believe that E-Commerce reduces purchasing errors.
- Less likely to be concerned about security issues.

Clearly, the firms that are very involved in E-Commerce report a different experience from those who are not as much involved. Once again, the importance of top management support is underscored. The only surprise here is that High E-Commerce users felt that E-Commerce did not greatly reduce errors. It is likely that actual experience for some firms is different from what is seen in a lot of media hype.

## **4.6 Implications for Training and Educational Programs by PMAC**

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In this section the respondents were asked to indicate how knowledgeable they were in E-Commerce, how they acquired/updated their knowledge, and their opinion regarding training needs.

### **4.6.1 Respondents' Knowledge in E-Commerce**

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First, respondents were asked to rate their “knowledge in E-Commerce business-to-business applications.”

**TABLE 11: Respondents' Knowledge in E-Commerce**

Measure	Mean
Knowledge in E-Commerce	2.74
Level of Expertise	2.39

Most respondents felt that they did not possess a great deal of knowledge or expertise in this field. A score of 5 would indicate very high knowledge or expertise, whereas a score of 1 would be very low knowledge or expertise. The scores observed here suggest that purchasing professionals have a significant knowledge gap in the area of E-Commerce. This can be a major barrier for any adoption of E-Commerce.

How do purchasing professionals keep current or learn about E-Commerce? Among all respondents, 55.1% attend conferences or seminars, 25.3% have taken courses in this area, and 50% read books on E-Commerce. It should be noted that among the companies that have adopted some form of E-Commerce, the vast majority did offer their employees training in technology and E-Commerce (see Table 7).

The fact that purchasing professionals consider themselves to have low knowledge in E-Commerce could be a major impediment to the adoption of E-Commerce. Even though most respondents agreed that E-Commerce had many benefits to offer, unless they have the knowledge and skills required to use (and even select) the technology, the technology may not serve its true purpose. In response to an open-ended question on “concerns with E-Commerce” (see Section 4.4.5), one respondent said, “To date our EDI is mainly treated as electronic fax.” This statement underscores the importance of training.

#### **4.6.2 Training and Potential Role for PMAC**

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In this section, the respondents were asked to specifically indicate their opinion regarding the need for training (see Table 12). The respondents indicated a high degree of consensus that there was a need for training purchasing professionals in E-Commerce.

**TABLE 12: Opinion Regarding Need for Training**

<b>Training Related Issue</b>	<b>Mean<sup>11</sup></b>
My organization needs training in E-Commerce use/application	4.1228
Purchase pro's should embrace the new Internet tools	4.3214
Difficult to keep up with new technologies in E-Commerce area	3.5471
Interested in training courses in B2B E-Commerce applications	3.8713
Professional development seminars, hands-on experience helpful	4.0760
Need for continued training/education in E-Commerce area	4.1893

The fact that purchasing professionals, in general, do not see themselves as very knowledgeable in E-Commerce can impede the adoption of E-Commerce. The respondents strongly feel that there is a need for systematic training. PMAC can play a role here by organizing seminars and conferences, working with universities, and sponsoring research studies. Specific recommendations are presented in the last section of this report.

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<sup>11</sup> The scales are scored 1-5, with five representing a very strong agreement with the statement and one representing a very strong disagreement. Thus a score about 4.0 can be interpreted a moderately strong agreement with the statement.

# CONCLUSIONS

## 5.1 Summary of Findings

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- Internet usage is focused more on information gathering (information about products, identifying new suppliers) and less towards actual online purchasing. Only a minority of firms is actually using the Internet to purchase directly. Searching for vendors and posting RFQs are among the major uses of the Internet by purchasing professionals.
- Service firms show a greater inclination towards B2B E-Commerce than manufacturing firms at this stage.
- Those who are using the Internet for purchasing do report significant cost savings and even productivity gains.
- Attitude toward E-Commerce consists of five dimensions. These are five key considerations in E-Commerce adoption: Efficiency, Strategy, Financial and Technical, Security and Competition. These issues must be understood and addressed in order to successfully implement E-Commerce in any organization.
- Adoption of E-Commerce is driven by whether management sees this as a priority, whether a company is market-driven (responsive to its customers or not), cost of implementation (infrastructure and training), and security considerations.
- Purchasing professionals rate themselves low on an E-Commerce knowledge scale. They see a vital role for training in this area.
- Overall, Canadian firms are still not taking full advantage of E-Commerce. Only 3.9% said that their organization was taking full advantage of E-Commerce. Many are apprehensive about security issues, cost and technical issues. Many organizations are suffering from a lack of vision and direction from senior management.

If Canadian firms are to retain and improve their global competitiveness, business-to-business E-Commerce must be given greater attention. Training, resources, senior management commitment and strategy are necessary if Canadian firms are to realize the full potential of E-Commerce.

## 5.2 Limitations of Research

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This research suffers from some limitations. First, due to an untraceable error, the initial mail out had incorrect address labels, where the recipient's name was not matched with the address. This did not seem to affect the response rate from the first wave. To address the problem, the second mail out, which occurred two weeks later, included another copy of the questionnaire with a letter explaining the error. By comparing

responses from the first and second mail outs, it was concluded that this error did not affect the study significantly. It is possible that the response rate may have been slightly higher, if the error had not occurred. It is, however, the Researcher's firm belief that the integrity of the study was not in anyway compromised. The consistency in the data and findings support this belief.

Second, the sample size of 178 represented a 17.8% response rate. Initial expectation was 20-25%. However, the response rate in this study is higher than the typical 10-12% rate seen in most mail surveys. The study does provide an adequate sample size, drawn from a wide variety of industries and covering all regions of Canada, to afford reasonable generalizability.

Third, this study is a snap shot of the status of B2B E-Commerce in Canada. It does not provide any indication of trends, even though the questionnaire did contain some questions regarding future plans.

### **5.3 Future Research Directions**

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E-Commerce is still in its inception stage. Most organizations are grappling with issues ranging from lack of management commitment or direction to security, cost and technical issues. Many experts feel that businesses have barely begun to scratch the surface in terms of integration of e-business.

It would be informative and worthwhile to conduct an annual tracking study of the status of E-Commerce, attitudes and issues surrounding E-Commerce as well as the impact of E-Commerce. Such a study would allow for a longitudinal view.

Future research can also include focus groups with industry participants to generate more in depth, qualitative responses. Even though some open-ended items were used in the present study, a full-fledged qualitative study can provide more insight.

It may also be worthwhile getting the perspective of a purchasing professional and a representative of the top management from each organization. The different perspectives can provide further understanding of the issues involved in E-Commerce implementation.

# APPENDIX: QUESTIONNAIRE

# Purchasing Management Association of Canada

## E-Commerce Survey

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### Please Note:

1. This survey is concerned with business-to-business E-Commerce.
2. Even if your organization has not yet embarked on any E-Commerce initiative in the purchasing area, we would still like to know your opinions. In order to fully understand the current purchasing management practices in Canada, we need responses from a broad spectrum of organizations.
3. This survey is divided into FIVE sections. Please read the instructions at the beginning of each section.
4. This questionnaire has 10 pages.
5. Please try to respond to all questions applicable to your organization.
6. For questions that ask for facts or figures, please provide actual figures or your best estimates.
7. For the purpose of this survey, we define the terms E-Commerce and EDI as follows:
  - a. **E-Commerce:** Conducting or enabling the purchasing, marketing and selling of goods or services through electronic networks.
  - b. **Electronic Data Interchange (EDI):** A way of passing structured documents, such as purchase orders, forecast data and invoices, from one company to another.
8. This survey will take about 20 minutes to complete.
9. All responses will be anonymous and strictly confidential. No individual or organization will be identified in the questionnaire.

*We greatly appreciate your time and cooperation.*

**The report based on this survey will be available through PMAC.**

**PLEASE RETURN TO FOCAL RESEARCH BY WEDNESDAY MARCH 15/00**

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### SCREENING QUESTION

**Does your organization:** (Please CIRCLE the appropriate response for each question)

Use the Internet for purchasing products online?	YES - 2	NO - 1
Use the Internet for making payment online?	YES - 2	NO - 1
Use the Internet for identifying potential vendors?	YES - 2	NO - 1
Use the Internet for posting Request for Quotes/Proposals?	YES - 2	NO - 1
Use Web catalogues to identify products/suppliers?	YES - 2	NO - 1
Use Electronic Data Interchange (EDI)?	YES - 2	NO - 1
Use Web-enabled EDI?	YES - 2	NO - 1

**PLEASE PROCEED TO SECTION 1**

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## SECTION 1

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In this section we would like to know your opinion regarding online purchasing. Even if your organization is not using E-Commerce for purchasing, your opinions are still important to us. Please consider each statement and express your level of agreement according to the following scale. If you are “unable to judge” a statement after careful consideration, please circle “8”.

**Please CIRCLE ONLY ONE number for each statement.**

**Scale: 5 = Strongly Agree; 4=Agree; 3=Neutral; 2=Disagree; 1=Strongly Disagree**

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### **What are the issues involved in adopting E-Commerce in your organization?**

	<b>Strongly Agree</b>	<b>Agree</b>	<b>Neutral</b>	<b>Disagree</b>	<b>Strongly Disagree</b>
In our organization E-Commerce has been made a top priority by senior management.	5	4	3	2	1
E-Commerce is crucial for maintaining competitiveness in our industry.	5	4	3	2	1
We have a comprehensive E-Commerce strategy.	5	4	3	2	1
Our main competitors are utilizing Internet-based business-to-business applications.	5	4	3	2	1
Lowering of costs is an important reason for adopting business-to-business E-Commerce.	5	4	3	2	1
E-Commerce offers convenience.	5	4	3	2	1
E-Commerce enables more efficient use of employees' time.	5	4	3	2	1
E-Commerce reduces the errors in purchase orders.	5	4	3	2	1
The time and effort required to draft a purchase order is significantly reduced due to Internet-based purchasing.	5	4	3	2	1
We are concerned about security and integrity of confidential data on the Internet.	5	4	3	2	1
Security concerns have delayed or are delaying our adoption of E-Commerce.	5	4	3	2	1
Our management has not made E-Commerce a priority in the purchasing area.	5	4	3	2	1
We have not pursued E-Commerce due to financial constraints.	5	4	3	2	1

	<b>Strongly Agree</b>	<b>Agree</b>	<b>Neutral</b>	<b>Disagree</b>	<b>Strongly Disagree</b>
The legacy systems we have are constraining our ability to adopt the new Internet-based technologies.	5	4	3	2	1
We are concerned about making investments in E-Commerce when technology standards are not yet established.	5	4	3	2	1
Cost of setting up an Internet-based procurement system is too high for us.	5	4	3	2	1
For us, lack of skilled people is a barrier to adopting E-Commerce.	5	4	3	2	1

**What do you see as the pros and cons of online purchasing?**

	<b>Strongly Agree</b>	<b>Agree</b>	<b>Neutral</b>	<b>Disagree</b>	<b>Strongly Disagree</b>
Online purchasing lowers transaction costs in purchasing.	5	4	3	2	1
Online purchasing lowers inventory carrying costs.	5	4	3	2	1
Online purchasing increases productivity.	5	4	3	2	1
The Internet increases the ability to comparison shop.	5	4	3	2	1
Online purchasing saves time by automating many tasks.	5	4	3	2	1
By automating daily tasks, the Internet can allow greater focus on strategic issues.	5	4	3	2	1
Technical standards for E-Commerce are not yet fully developed.	5	4	3	2	1
Purchasing through the Internet leads to a closer relationship with the suppliers.	5	4	3	2	1
Online crime (such as denial of service attacks and theft of information) is a serious concern.	5	4	3	2	1
Internet purchasing reduces errors in purchase orders.	5	4	3	2	1
Internet lowers switching costs, making it easier to change suppliers.	5	4	3	2	1

	<b>Strongly Agree</b>	<b>Agree</b>	<b>Neutral</b>	<b>Disagree</b>	<b>Strongly Disagree</b>
Internet makes the purchasing process very impersonal.	5	4	3	2	1
The Internet is making information management easier.	5	4	3	2	1
Most organizations may require Internal change or process re-engineering to make effective use of E-Commerce.	5	4	3	2	1
Internet will likely reduce loyalty towards suppliers.	5	4	3	2	1
The Internet allows information sharing across the supply chain.	5	4	3	2	1

Other Comments (pro or con): \_\_\_\_\_  
 \_\_\_\_\_

**PLEASE PROCEED TO SECTION 2.**

## SECTION 2

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In this section we would like to know something about your organization and its management philosophy.  
**Please respond to ALL statements in this section.**

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
We meet with our customers at least once a year to find out what products or services they will need in the future.	5	4	3	2	1
We do a lot of in-house market research.	5	4	3	2	1
We are slow to detect changes in consumer preferences.	5	4	3	2	1
We poll end-users at least once a year to access the quality of our products and services.	5	4	3	2	1
We are slow to detect fundamental shifts in our industry (e.g., technology, competition, regulation).	5	4	3	2	1
We have interdepartmental meetings at regular intervals to discuss market trends and developments.	5	4	3	2	1
Purchasing department personnel meet with operations and marketing personnel at regular intervals to understand the needs of our customers.	5	4	3	2	1
Data on customer satisfaction are distributed throughout the organization.	5	4	3	2	1
When one department finds out something about competitors, it is slow to alert other departments.	5	4	3	2	1
There is minimal communication between marketing, operations and purchasing departments concerning market developments.	5	4	3	2	1
It takes us forever to respond to competitor's price changes.	5	4	3	2	1
When our company finds that customers would like us to modify our product, the involved departments make a concerted effort to do so.	5	4	3	2	1
Different departments meet periodically to plan a response to changes taking place in our business environment.	5	4	3	2	1

	<b>Strongly Agree</b>	<b>Agree</b>	<b>Neutral</b>	<b>Disagree</b>	<b>Strongly Disagree</b>
The activities of different departments are well coordinated.	5	4	3	2	1

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**Purchasing Process:**

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There are established purchasing procedures and guidelines.	5	4	3	2	1
Unforeseen fluctuations in demand for materials do occur in our business.	5	4	3	2	1
We have instituted just-in-time inventory management.	5	4	3	2	1
The Internet has (or will) required (require) new procedures.	5	4	3	2	1

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**Supplier Relationship:**

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	<b>Strongly Agree</b>	<b>Agree</b>	<b>Neutral</b>	<b>Disagree</b>	<b>Strongly Disagree</b>
We have long-term relationships with the majority of suppliers.	5	4	3	2	1
We change suppliers when someone offers a better deal.	5	4	3	2	1
We do hold a lot of power over our suppliers.	5	4	3	2	1
We are dependent on our suppliers.	5	4	3	2	1
It would be difficult or costly to replace our major suppliers.	5	4	3	2	1
We have to ensure that our systems (IT and procurement) are compatible with that of our suppliers.	5	4	3	2	1
We trust our suppliers.	5	4	3	2	1
We provide our suppliers access to our internal data.	5	4	3	2	1
Our suppliers provide us access to their internal data.	5	4	3	2	1
On the whole, we are satisfied with our current suppliers.	5	4	3	2	1
Our relationship with our suppliers could be better.	5	4	3	2	1

	<b>Strongly Agree</b>	<b>Agree</b>	<b>Neutral</b>	<b>Disagree</b>	<b>Strongly Disagree</b>
The Internet will reduce dependence on any one supplier.	5	4	3	2	1
For us, the Internet will reduce the number of suppliers.	5	4	3	2	1
Internet will increase our global sourcing.	5	4	3	2	1

### **Organizational Process:**

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In our organization, the average employee views the business as a series of linked processes.	5	4	3	2	1
The business processes are sufficiently defined so that most people know how they work.	5	4	3	2	1
Most jobs in our organization include problem solving.	5	4	3	2	1
Our employees are constantly learning new things on the job.	5	4	3	2	1
Resources are allocated based on process.	5	4	3	2	1
Process outcomes are measured.	5	4	3	2	1
Specific process measurement goals are in place.	5	4	3	2	1
Important decisions, such as adoption of E-Commerce, are often made top-down.	5	4	3	2	1

**PLEASE PROCEED TO SECTION 3.**

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### SECTION 3

**In this section we would like to know how your organization is currently using the Internet or is planning to use the Internet in future.**

**Please Circle ONE of the responses for each statement in the first column.**

	<i>YES</i>	<i>NO but we intend to implement this</i>	<i>NO we do not intend to implement this</i>
Our organization has a corporate web site.	2	1	0
We have an E-Commerce site where we sell our products/services to customers.	2	1	0
We have a corporate intranet for employees to access vendor or supplier information.	2	1	0
We have an extranet connecting our organization with our suppliers.	2	1	0
We use purchasing cards.	2	1	0
We use electronic funds transfer (EFT) or other electronic payment.	2	1	0
We can track our orders through the Internet.	2	1	0
We have access to electronic catalogues of major suppliers.	2	1	0
We use electronic catalogues (on the Internet) to purchase products.	2	1	0
We purchase products through online intermediaries (e.g., vertical portals or organizations such Ariba, CommerceOne ).	2	1	0
We participate in online auctions.	2	1	0
We use the Internet for posting RFPs/RFQs.	2	1	0
Our suppliers submit bids/quotes through the Internet.	2	1	0
We sometimes conduct online negotiations with our suppliers through the Internet.	2	1	0
We sometimes procure products through an online barter exchange.	2	1	0
We have online vendor catalogues that are accessible to end-users.	2	1	0
We use e-mail to communicate with our suppliers.	2	1	0
We have automated most of our purchasing activities.	2	1	0

We use E-Commerce for (Check all applicable):

All indirect material / MRO purchases	<input type="checkbox"/> 1
All direct material purchases	<input type="checkbox"/> 2
Only some indirect item purchases	<input type="checkbox"/> 3
Other _____	

Examples of items you buy through the Internet: \_\_\_\_\_



## SECTION 4

Changing from a previously established purchasing system to an Internet-based purchasing system may involve varying degrees of reorganization and change within the organization. We would like to know something about how you made this transition.

If your organization does not use any type of Electronic Commerce for procurement, please circle N/A (not applicable) for the following statements. **Please respond to ALL statements in this section.**

We had to change many of our internal procedures in order to migrate to an Internet-based purchasing system.	YES -2	NO - 1	N/A - 0
We had to reengineer our business processes in order to adopt an Internet-based system.	YES -2	NO - 1	N/A - 0
We adopted Electronic Commerce in small steps.	YES -2	NO - 1	N/A - 0
We had to train our employees before adopting E-Commerce for purchasing.	YES -2	NO -1	N/A -0
Our technology (IT or MIS) people worked with the purchasing department when installing and integrating our E-Commerce systems.	YES -2	NO- 1	N/A -0
We had an outside consultant do the systems integration and training.	YES -2	NO -1	N/A -0
Integration of our E-Commerce system with our enterprise system (ERP systems such as SAP, Peoplesoft etc.) was an important issue for us.	YES - 2	NO -1	N/A -0

**What are the top three priorities for your organization in the purchasing and supply chain area?** (e.g., lowering cost, global sourcing, e-commerce, integration of supply chain etc.).

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_

How would you rate your knowledge in the E-Commerce area as it pertains to business-to-business applications (such as procurement and supply chain)?

**Very knowledgeable**      5   4   3   2   1   **Not at all knowledge**

**Expert**      5   4   3   2   1   **Novice**

How do you keep current or learn about E-Commerce (Please CHECK all applicable responses)

Conferences/Seminars  1    Courses  2    Books  3

Other \_\_\_\_\_

**What training and education needs do you see as necessary?**

	<b>Strongly Agree</b>		<b>Neutral</b>		<b>Strongly Disagree</b>
I feel that in my organization there is a need for training on the use and application of E-Commerce in purchasing.	5	4	3	2	1
Purchasing professionals should learn to embrace the new purchasing and supply chain management tools available through the Internet.	5	4	3	2	1
It is difficult to keep up with new technologies in the E-Commerce area.	5	4	3	2	1
My colleagues and I would be interested in attending training courses in business-to-business e-commerce applications.	5	4	3	2	1
Professional development seminars that provide hands-on experience in using E-Commerce will be helpful.	5	4	3	2	1
I see a need for continued training and education in the E-Commerce area.	5	4	3	2	1

What issues in the business-to-business E-Commerce area are of concern to your organization?

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What do you see as the major benefits of E-Commerce (business-to-business) to your organization?

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**PLEASE PROCEED TO SECTION 5.**

## SECTION 5

In this section, we would like to know a little bit about the companies participating in this survey. This data will be used for classification and statistical analysis purposes only. No individual organization will be identified in any manner. Please try to answer all questions. **Please CHECK appropriate responses.**

1. What is your industry?

- |   |   |  |   |
|---|---|--|---|
| 01-Automotive <input type="checkbox"/>          | 02-Agriculture <input type="checkbox"/> | 03-Clothing/Apparel <input type="checkbox"/>       | 04-Chemicals <input type="checkbox"/>                       |
| 05-Consumer Products <input type="checkbox"/>   | 06-Electronics <input type="checkbox"/> | 07-Financial Services <input type="checkbox"/>     | 08-Food & Beverage <input type="checkbox"/>                 |
| 09-Forest Products <input type="checkbox"/>     | 10-Hospitality <input type="checkbox"/> | 11-Information Technology <input type="checkbox"/> | 12-Industrial Products <input type="checkbox"/>             |
| 13-Minerals/ Metals <input type="checkbox"/>    | 14-Oil and Gas <input type="checkbox"/> | 15-Paper Products <input type="checkbox"/>         | 16-Pharmaceutical/Medical/Bio-Tech <input type="checkbox"/> |
| 17-Printing/Publishing <input type="checkbox"/> | 18-Retail <input type="checkbox"/>      | 19-Transportation <input type="checkbox"/>         | 20-Wholesale <input type="checkbox"/>                       |
| 21- Other (Specify) _____                       |   |  |   |

2. Is your organization **primarily** a manufacturing organization or a service organization? Manufacturing  1 Service  2

3. We are a: Subsidiary of an American company  1 Canadian company  2 Other Foreign Owned  \_\_\_\_\_

4. How would you rate the level of **competitive intensity** in your industry? (5=very competitive; 1=not at all competitive)

**Very competitive**      5   4   3   2   1      **Not at all competitive**

5. How would you rate the **dynamism of the business environment** in which you operate? (If technology or competition or consumer preferences or regulation are often changing or are very unpredictable, then rate the environment as “very dynamic.” If these factors are not changing very much and are fairly predictable, then rate the environment as “very stable”).

**Very dynamic**      5   4   3   2   1      **Very stable**

6. Approximately how many employees work in your organization?

- 1-50  1    51-100  2    101-200  3    201-500  4    501-1000  5  
 1001-5000  6    5001-10000  7    Above 10000  8

7. What was the approximate annual sales or revenue in the last financial year (in Canadian dollars):

- Less than \$1million  1    \$1-5 million  2    \$5-10million  3    \$10-50 million  4  
 \$50-200 million  5    \$200 – 500 million  6    \$500-1 billion  7    \$1-5 billion  8  
 More than \$5 billion  9

8. How many employees work in the purchasing/procurement area or department?

- 1-3  1    4-6  2    6-10  3    10-20  4    More than 20  5

9. What percentage of your suppliers are: Canadian Firms \_\_\_\_\_%    US Firms \_\_\_\_\_%    Other Foreign Firms \_\_\_\_\_%

10. What is the annual purchasing volume (in Canadian dollars)?

- Less than \$100,000  1    \$100,000-500,000  2    \$500,000-1 million  3    \$1-5 million  4  
 \$5-10 million  5    \$10-50 million  6    \$50-100 million  7    \$100-500 million  8  
 \$500 million – 1 billion  9    Above \$1 billion  10

11. What is your position in the organization?

- Director of Purchasing/Procurement  1    Purchasing/Procurement Manager  2    Operations Manager  3  
 Purchasing Supervisor  4    VP-Administration  5    Other (specify) \_\_\_\_\_

**Please check to ensure you have answered all appropriate questions in all the sections.**

*Thank you very much for your time and cooperation.*