The Internet and Canada's financial services sector.

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THE INTERNET AND CANADA'S FINANCIAL SERVICES SECTOR

by

Ted Dodds

A Thesis
Submitted to the Faculty of Graduate Studies and Research
through the Faculty of Business
in Partial Fulfilment of the Requirements for
the Degree of Master of Business Administration at the
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1996

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ABSTRACT

This thesis is an investigation into the potential impact of the Internet on sustainable competitive advantage in Canada's financial sector. The Canadian banking industry and payments system are often perceived as conservative, safe entities. By contrast, the Internet has been characterized as a dynamic and insecure environment for commerce. Exploratory research results are reported to suggest if and how these worlds will come together in the near future to provide financial service firms with new opportunities for differentiation, cost reduction and enhanced customer service.

The thesis concludes by suggesting that early movers have achieved differentiation from their competitors by means of deploying unique services to their customers over the Internet. This advantage will be short-lived if the early movers do not continue to innovate. Overall, the Internet is viewed as a beneficial technology for the financial services industry. However, its open nature means that once all Canadian banks reach the same degree of Internet service delivery, the technology will not longer be a source of differentiation. Instead, it will become a new marketing and distribution channel. The real source of enduring competitive advantage will be driven by the banking services themselves.
DEDICATION

This thesis is lovingly dedicated to my beautiful family, whose patience and understanding through many a dreary winter week-end made my small accomplishment possible. To my wife, best friend and soul mate, Loretta, my deepest and most sincere thanks for the sacrifices entailed in four long years of study leading up to and including this thesis. To my remarkably empathic sons, Colin and Tyler, my thanks for occasionally breaking up a day spent at the computer with little interruptions in the form of jokes, stories and questions that took me briefly away from the narrow focus this type of project requires. We really are a team, and all of the members of our family team had a share in what is contained in these pages.
ACKNOWLEDGEMENTS

I would like to acknowledge the support, guidance and encouragement I received from all members of my thesis committee. They included Dr. Andrew Templer, Faculty of Business, and Dr. Richard Lewis, Department of Communications Studies, Faculty of Social Science. A special word of appreciation goes to the chair of my committee Dr. Michael Prince, Faculty of Business, who not only helped keep my efforts focused and on schedule, but did so in a positive and friendly way. I do not see how I could have asked for a better group of advisors to work with.

I also wish to acknowledge the help of Ms. Laurie Butler, Computing Services, who cheerfully and willingly helped with many important tasks associated with the final production of the thesis document. All of this support was above and beyond the call of duty, and was deeply appreciated.
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1. **Overview of Thesis**

1.1 **Introduction**

This thesis investigates the current and potential impact of the Internet on Canada’s financial services sector. This topic could be examined from a variety of viewpoints, including those of the consumer or the merchant. The perspective taken here is that of the financial institutions themselves.

A study of the Internet in the financial arena is timely and important for several reasons.

1. There have been claims in the popular press that Internet technology will revolutionize many aspects of contemporary society, from education and government, to entertainment and business. Conversely, there have been predictions of the demise of the Internet, on the basis that it is not readily adaptable to widespread commercial use. It is useful to develop an understanding of Internet use in what may be its most challenging environment, namely financial services, in order to see if either of these two extremes can be supported, or if a more moderate view is warranted.

2. The Internet’s role in commerce is currently hampered by the lack of a secure system of payments. This thesis explores the relationship between the Internet and Canada’s payments system.

3. As Canadian banks post record profits, they continue to seek ways of reducing costs and improving customer convenience. The Internet shows great potential to enable financial institutions to pursue these important goals. However, the conservative nature of Canada’s banking industry appears to be in opposition to the dynamic and democratic orientation of the Internet.

Internet use in this industry is still very new, and with the exception of the technological pioneers, the scope of services these firms provide on the Internet is rather limited. Nevertheless, there is genuine excitement over the Internet and the possibilities of using it as a vehicle for secure on-line financial transactions.
The main research questions are the following:

- To what degree is the Internet a beneficial technology for financial institutions?
- Will secure Internet services, including on-line payment over open networks, be adopted by the major firms in Canada’s banking industry?
- What impact will the conservative nature of Canadian banks have on the deployment of Internet systems?
- Will smaller firms that are more willing to accept the risks of early technology adoption pre-empt the big banks and capture an attractive segment of consumers who are currently using the Internet?
- Is the Internet a likely source of competitive advantage for individual firms? If so, how can the advantage be sustained?

The industrial-organization model comprising four tests of beneficial technologies, proposed by Michael Porter (1985), is used as the basis for determining whether or not the Internet is potentially beneficial to the financial services industry.

Since it can be difficult to discuss the impact of information technology on business strategy without some reference to technical terminology and concepts, a glossary of terms is included in Appendix D.

1.2 Purpose of the Research

Although the Internet was first established in the 1960s, for most of its history it has been the province of educational and research organizations. The introduction of the World Wide Web, earlier in this decade, sparked enormous popular interest in the Internet as a means of communication, information dissemination and commerce.

But the road to Internet commerce has been fraught with problems, including security, accessibility, network speed, and consumer acceptance. Even today, a solid business model has not yet emerged. New Internet business models are being introduced constantly, often before older business models have had time to work (Resnick 1996).
Perhaps the most important missing ingredient needed to make Internet commerce work is a secure system of processing financial transactions, including payments, that is supported by major banks and credit card companies. This would overcome the limitations of most Internet markets where the consumer can look at, learn about, and perhaps even order products on the web, but must resort to off-line payment mechanisms. In fact, the need for an integrated system of electronic payments is one of the four key elements identified by Tenenbaum (1994) as prerequisites for widespread commerce on the Internet, including:

1. Simpler access
2. Better systems for resource location
3. Tighter communications security
4. Workable financial exchange mechanisms

The first two issues, simpler access and improved resource location, are technical problems that are being addressed by IT firms, telecommunications organizations, and cable television companies. Consequently, they are not explored here. However, an overview of the important issue of information security is included due to its relevance to the payment process.

The fourth of these points, methods of payment in Internet commerce, is central to the topic of this thesis. Although a great deal of effort and investment has gone into the development of secure financial exchange mechanisms, it is fair to say that Internet payment systems as of early 1996 are only marginally functional and in need of much more ongoing development.

It is only a matter of time before a broadly accepted model of Internet payments is established, and banks offer their customers Internet access to personal financial information and on-line transactions. However, the last major technological innovation of comparable scope, the Automated Banking Machine (ABM), was considered by some to have had a negative impact on the banking industry by reducing some services to commodity status. According to this view, consumers became attached to the convenient
services offered by ABMs at the expense of brand loyalty to a particular bank. In that sense, ABMs may have eroded competitive advantage, rather than enhanced it.

In light of the hyperbole which surrounds the Internet, there appears to be a risk that it, like ABMs, will further reduce competitive advantage and reduce banking services to commodity status. Conversely, the distinctive range of capabilities offered by Internet systems might enable financial services firms to differentiate themselves from competitors. Furthermore, the web may enable firms to develop other technology-based mechanisms of achieving sustainable competitive advantage.

The time for this investigation is right. Record profits reported by Canadian banks in 1995, coupled with the attention the web is receiving in the business community, indicate that the stakes are high. The Internet is being transformed from a researchers environment into an important tool that contributes to business strategies.

1.3 Approach to Research

Due to the relatively recent involvement of financial services firms with the Internet, and the scarcity of scholarly literature on the topic, an exploratory approach to research was taken. A group of ten financial companies was selected. This group includes five of Canada’s major chartered banks, the two largest international credit card companies, and three firms which might be considered “first movers” in this area.

A telephone interview was conducted with executives from each of these firms. Interview questions were designed to obtain an understanding of the importance the firms place on information technology, the Internet, and Internet payments. The interview then delved into the main elements of Porter’s model of beneficial technologies to determine how the Internet fits the model.

Other models, including those with a resource-based perspective, were also considered. However, Porter’s approach is highly relevant to the main research questions which relate to the common theme of how (and if) the Internet will benefit the financial services industry.
1.4 Summary of Findings and Conclusions

The general findings suggest that the deployment of unique Internet based solutions can provide a source of competitive advantage for first mover firms. However, sustainability of this advantage is tenuous. It relies primarily upon relentless ongoing innovation to retain first mover status, rather than through the erection of barriers to other firms.

Eventually, all banks should reach the same level of Internet systems deployment. This will occur as soon as robust security systems are in place, possibly by late 1996. If, at that time, some of the major Canadian banks launch full on-line services, consumer acceptance of Internet banking will likely increase.

In the longer term, the technology will cease being a source of differentiation because all firms will have relatively equivalent access to expertise. At that point, the source of differentiation will revert to banking services themselves. Considering the strategic importance of information technology to the banking industry, bank services will reflect how Internet technology is deployed through proprietary applications developed with open systems, rather than simply the technology itself. Yet in light of the rapidity with which Internet related technologies continue to develop and change, it is possible that a mature state of these technologies is still far in the future.

1.5 Structure of the Thesis

This thesis is divided into seven main chapters, plus appendices. Following is a brief description of each of the remaining chapters.

- Chapter two, entitled Electronic Commerce and the World Wide Web, discusses the general business environment of Internet commerce. It includes a list of the potential benefits of Internet commerce, a taxonomy of the types of Internet application systems available today, and a discussion of information security and privacy.
• Chapter three on Internet payments outlines the Canadian system of payments. Payments have become increasingly information based (or virtual), leading to new opportunities stemming from information technology innovations such as the Internet.

• Chapter four contains a review of scholarly literature. The main thrust of the chapter is the Internet’s potential role in affecting competitive advantage as seen from the industrial-organization perspective and the resource-based viewpoint. However, because the Internet is a very new technology to the business world, there is little in the way of literature that pertains directly to that topic. Consequently, the broader topic of information technology becomes the focus, with extensive examples from Internet banking and payments to draw linkages to information technology-based theory.

• Chapter five describes the methodology and limitations of the research study.

• Chapter six is a discussion of the findings of the research study. Results are presented and discussed in terms of the Porter model of beneficial technologies.

• Chapter seven presents a set of observations and conclusions drawn from the research findings.

• The appendices include a summary history of the growth and development of the Internet; an overview of web sites operated by the financial institutions included in the research; the interview form; and a glossary of terms used throughout the thesis.

The rate of technology change and adaptation is too dynamic to know with certainty how Internet commerce, banking or payments will look in as little as one year’s time. The overall intent of this thesis is to make a modest contribution to our understanding of how the Internet, specifically its use as a payment medium, will affect competitive advantage.
2. **Electronic Commerce and the World Wide Web**

2.1 **Introduction**

This chapter provides an introduction to the Internet business environment. Details regarding the history and development of the Internet and the World Wide Web are provided in Appendix A.

The chapter begins by suggesting that although the true commercial potential of the Internet is still largely unknown, it has already shown the ability to reduce costs in certain applications. The business capabilities of the Internet are summarized, together with the different types of Internet applications in use. An overview of what firms are doing on the Internet is provided, with some specific reference to Canadian business. The important issues of information security and privacy are also discussed.

2.2 **What Business is Doing on the Internet**

The widespread introduction of the World Wide Web in the early 1990s triggered enormous popular interest in the Internet. Consumers and corporations alike are now exploring new forms of electronic commerce on the global network.

But a frenzy of hyperbole surrounds the web, making it difficult to separate fact from fiction, as corporations try to assess the web’s value to their business. Indeed, some firms may simply assume some level of future value will accrue from the Internet.

As McCready (1995, p. 7) states, “once you’ve scraped away the glitzy marketing applets, what lies beneath (the Internet) is a genuine business-mutation engine of unknown potential.”

At a minimum, investing in an Internet presence in the form of a web home page is becoming a cost of doing business in the 90s. This uncharacteristic act of faith - investing in technology with no clear indication of when or if returns will follow - is not uncommon when it comes to the Internet. Despite the general lack of certainty regarding
its ultimate impact on competitiveness or profitability, public expectations are such that many firms feel compelled to participate on the web.

Nevertheless, even the most cursory examination of the Internet today reveals that global electronic markets are already well established. The software industry, where the product is information was perhaps the easiest to adapt to electronic media. Hence, these firms were the initial adopters and are the most fully developed to date. They are understandably advanced in their use of the Internet as a means of product distribution, customer support and promotion.

Software firms were also among the first to create Virtual Private Networks (VPNs) more commonly known as intranets. The term intranet refers to a firm’s internal business applications that use Internet technologies within a private and secure corporate environment.

One of the attractive characteristics of an intranet is its impact on cost. By building some of their internal electronic communications systems (known as groupware) on an Internet foundation, Booz Allen and Hamilton Inc. reportedly spent “hundreds of thousands of dollars instead of millions” on the applications (Horwitt 1996, p. 22).

Some firms also may create intranet applications in order to gain experience and to develop an understanding of how best to employ the technology in other ways. Applications developed using earlier technologies, such as mainframes, were too difficult for customers to use by themselves and could not have been widely deployed to the public without considerable expense in proprietary networking and training. By contrast, with the open network access and relative ease of use associated with Internet, firms can apply their new-found experience developing intranet systems (internal) directly to Internet systems used by their customers (external). In that sense, the technology

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1 Trade publications, observation plus anecdotal evidence all corroborate the considerable interest in intranets. Major computer companies such as Sun Microsystems and Silicon Graphics Inc. have well developed intranets that support internal business applications such as expense reporting and pricing generators.
supports a continuous learning paradigm and gives firms multiple uses of a single technology.

Despite the utility of internal systems, most of the popular focus is on the consumer market, where early signs of cost savings are also evident. According to figures appearing in *Webmaster* (1995), Sun Microsystems reported savings of approximately US$1.2 million generated in a single month by offering Internet-based product literature requests, software module deliveries and answers to frequently asked questions. But as outlined in Table I, there are a great many other reasons why business use of the Internet is increasing. In addition to the potential for cost reductions, advantages include immediate globalization, new marketing opportunities, and improved communication and customer service.

In order to derive some of these benefits, firms must develop Internet applications\(^2\) for their customers to use. There are a number of different application types listed in Table II. Each application type has certain functional capabilities that suit it to a particular set of needs.

The table indicates that, within the range of Internet applications available today, the electronic brochure is the most common. Electronic brochures have supplanted text-only information available in earlier Internet technologies such as Gopher. While they represent an improvement over these earlier systems, by including visual images and sound in addition to plain text, they are still limited primarily to a descriptive function. Interactive applications, such as investment modeling tools currently offered by some Canadian financial institutions (see Appendix B) are more useful because they provide direct benefit back to the user (i.e. the customer), in this example by giving the customer personalized investment information.

\(^2\) The term "applications" used here refers to software written to perform a certain function or set of functions.
<table>
<thead>
<tr>
<th>Internet Capability</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>Communication (internal and external)</td>
<td>Asynchronous communication with electronic mail, news groups and list processors enables project teams to interact independent of time and space constraints.</td>
</tr>
<tr>
<td>Corporate logistics</td>
<td>Support of new modes of work, such as telecommuting.</td>
</tr>
<tr>
<td>Levelling the playing field - globalization</td>
<td>Small firms can achieve immediate global scope with negligible investment in infrastructure.</td>
</tr>
<tr>
<td>Achieving and maintaining competitive advantage</td>
<td>Numerous examples from banking and payments are given in the following section.</td>
</tr>
<tr>
<td>Cost containment</td>
<td>Web sites can dramatically reduce the cost of information distribution compared to other means.</td>
</tr>
<tr>
<td>Collaboration and development</td>
<td>Strategic alliances between firms, both large and small, are enabled through electronic links and resource pooling.</td>
</tr>
<tr>
<td>Information retrieval and utilisation</td>
<td>The vast amount of information available on the Internet includes up-to-the-minute data on products, services and training materials that can be accessed publicly or by arrangement with the vendor.</td>
</tr>
<tr>
<td>Marketing and sales</td>
<td>One of the most popular uses of the Internet, currently in the form of “electronic brochures” that illustrate products available for sale, promotions, contests, and links to other interesting Internet sites.</td>
</tr>
<tr>
<td>Transmission of data</td>
<td>This was one of the initial objectives of research and scientific organisations and is now important to businesses and consumers for a variety of purposes including payment.</td>
</tr>
<tr>
<td>Creating a corporate presence</td>
<td>To not have a web site in the mid-1990s brands a corporation as out-of-touch with the times. Even if it serves no immediate competitive purpose, having a presence on the Internet has become a cost of doing business.</td>
</tr>
</tbody>
</table>

Source: Adapted from Ellsworth (1994)
<table>
<thead>
<tr>
<th>Internet Application</th>
<th>Capability</th>
<th>Status</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basic Internet Presence</td>
<td>Text only. More likely to be associated with Gopher than with the web.</td>
<td>Declining in favour of multimedia applications.</td>
<td>Provides basic information about the firm such as products, markets, mailing address, etc.</td>
</tr>
<tr>
<td>Electronic Brochure</td>
<td>Text and graphics.</td>
<td>Currently the most prevalent type of application.</td>
<td>Expands upon the text only application by including visual images (pictures of the firm's products, staff, etc.) to make the site more interesting and worth revisiting.</td>
</tr>
<tr>
<td>Interactive Forms</td>
<td>Text, graphics and formatted information fields.</td>
<td>Growing in use. Provides an evolutionary step from electronic brochures to complete systems</td>
<td>Client can fill in a form and send it to the firm. For example, an order form or survey.</td>
</tr>
<tr>
<td>Interactive Applications</td>
<td>Includes Internet programming languages such as Java.</td>
<td>Growing, although most current examples appear to be more show than value adding.</td>
<td>The introduction of Java as an Internet programming language enables a user to download applications (such as a word processor) from the Internet to run on a local PC.</td>
</tr>
<tr>
<td>Interactive Links to Internal Systems</td>
<td>All of the above plus proprietary links to internal databases and application systems.</td>
<td>Only a few samples currently offered. Some good examples are in the banking community.</td>
<td>This can include forms and reports tailored to a specific client in both content and context. The most sophisticated type of Internet application currently. Examples include full service Internet banking where customers may apply for loans, reconcile statements and make payments through a bank.</td>
</tr>
</tbody>
</table>

Source: Personal observation of Internet sites
There are similarities between the electronic brochure applications and catalogue shopping in that a combination of pictures and text is used to market commodity products. It may be that commodities, adapt readily to catalogues and simple Internet markets because they are relatively easily described and not highly differentiated. For instance, some book stores and florists were successful in the early days of Internet marketing. Customers can make their decision to purchase these kinds of products without an elaborate evaluation or trial usage that might be required for more complex products such as software or automobiles.

Any merchant can create a global presence on the Internet for $3,600 to $6,000 per year by outsourcing the project to an Internet Service Provider (ISP). The ISP can also supply technical and operating expertise, so that small firms do not need to build the technological expertise internally. Therefore the barrier to entry for firms of any size is very low. The cost barrier to consumers is also low since Internet access through an ISP is charged based on the amount of time they are connected to the system, rather than on the volume of information accessed or downloaded.

The modest cost of creating a web presence seems to account for the fact that firms are willing to become involved with the Internet without a clear forecast of financial rewards. Put another way, although the returns from Internet commerce may be marginal, these returns result from equally marginal investments (Metcalfe 1995). Not exactly a strong endorsement, but this perspective helps understand the pioneering spirit behind Internet commerce.

Technological developments should help widen the scope of products and services that can be marketed on the Internet as firms become more advanced in their use of the technology. Sophisticated Internet applications are needed to support the sale and marketing of complex products that have a high level of information content and which

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3 Forrester Research Inc. as reported in Webmaster, June/July 1995. In addition, first year start-up costs can be in the $2,000 to $4,000 range.
benefit from interaction with potential customers. Computer software is a good example of such a product. It is an inherently information-based product and is often marketed on the Internet by having potential customers download a demonstration version of the package. There may be a limited time period for evaluation after which the software stops working. Prospective customer can use the trial period to decide if they are willing to pay for the purchase of the full product. Netscape, the popular Internet browsing program, is marketed in this way.

According to the model depicted in Figure 1 (Cronin 1994) the Internet offers significant advantages over traditional forms of advertising and promotion for this type of product. When the product is information-intensive, and it is best marketed with a high level of interaction with customers, Cronin states that information servers and personal sales visits are the optimal approaches. Information servers, such as those available on the Internet, have the added advantage of being less expensive to maintain than a large sales force.

The consumer market is not the only place where the potential for Internet-induced cost advantages are attracting attention. Significant returns may exist in business-to-business transactions that currently employ Electronic Data Interchange (EDI) on proprietary Value Added Networks (VANs) (Thierauf 1990). Such transactions, which
include purchase orders and invoice processing, are highly structured in both format and context, and contain none of the graphical or multimedia components found with Internet applications. Yet according to one source (Buchanan 1995), Internet transactions are 90% less expensive than equivalent EDI/VAN transactions.

One of the key reasons for the lower cost of the Internet when compared to proprietary networks, is that the Internet is an open network. To underscore the significance of the Internet’s openness, consider the contrast between it and Value Added Networks. VANs are proprietary networks, often running specially developed software and operated by a firm or group of firms. These firms are also responsible for the network’s operation and management. Users of a VAN pay the network provider a fee based on either subscription or usage. Some large organizations may run their own private networks analogous to VANs in most respects, except that the network is used only by that firm, it is not shared.

On the other hand, the communications protocols used by the Internet result in a single transaction being decomposed into numerous packets of data, each of which may take a different route from source and destination. Thus, information flowing across the Internet will pass through multiple links operated and paid for by any number of universities, government agencies, Internet Service Providers and other corporations. In that sense, the cost of moving information between two companies is subsidized by all of the intermediate sites along the way.

From the Canadian perspective, one possible measure of the business impact of the Internet is the number of new “domain names” assigned to commercial firms. By the end of 1993, 420 companies were registered on the Internet. Two years later, at the end of 1995, the total had risen to 3,452. Within the first four months of 1996, an additional
1,986 firms had registered, bringing the total to 5,438. As a result, 75% of all registered Internet domains in Canada are considered commercial.  

A survey by Andersen Consulting Canada in 1995\textsuperscript{5} indicates that the overall awareness of the Internet among businesses is extremely high. The majority (76.3%) of those firms use or plan to use the information highway to deliver or access products and services, while 42% of the businesses surveyed have already made use of the Internet.

<table>
<thead>
<tr>
<th>Table III - Percent of Canadian Financial Firms Intending to Use the Internet</th>
</tr>
</thead>
<tbody>
<tr>
<td>To exchange and retrieve information</td>
</tr>
<tr>
<td>To conduct business-to-business transactions</td>
</tr>
<tr>
<td>To engage in advertising and promotions</td>
</tr>
<tr>
<td>To distribute products and services to clients</td>
</tr>
</tbody>
</table>

Source: Andersen Consulting Canada 1995

The financial services sector was among the business groups surveyed. An overview of their intended use of the information highway is summarized in Table III. According to these figures, very few of the firms who responded to the survey intended to use the Internet as a mechanism of distributing services to clients (only 5.5%). It is also interesting to speculate on whether or not the percentage would be greater today than it was when the study was conducted in 1995.

The Andersen survey suggests that electronic banking services rank second in importance to customer communication among the products and services of interest to business. See Table IV. The table also shows that internal communication, which could be facilitated by an intranet system, is another important capability of interest to firms.

\textsuperscript{4} Source: CA*Net Domain Name Report as reported in ftp.cdnnet.ca/ca-domain/statistics, May 5, 1996

\textsuperscript{5} From "What Canadian Businesses Think of the Information Highway" as distributed through http://www.ac.com/canda/welcome.html
Table IV - Percent of Canadian Businesses Interested in Various Internet Services

<table>
<thead>
<tr>
<th>Service</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Communication with customers</td>
<td>83%</td>
</tr>
<tr>
<td>Banking services</td>
<td>68.9%</td>
</tr>
<tr>
<td>Communication within own org.</td>
<td>65.6%</td>
</tr>
<tr>
<td>Distance or other ed programs</td>
<td>56.9%</td>
</tr>
<tr>
<td>Ordering tickets (e.g. airline)</td>
<td>44%</td>
</tr>
<tr>
<td>Buying other goods and services</td>
<td>32.8%</td>
</tr>
</tbody>
</table>

Source: Andersen Consulting Canada 1995

Overall results from the survey seem to indicate that Canadian businesses prefer to minimize the unknowns when considering Internet-based commerce. This is reflected in key findings which show a tendency to rely on more traditional service providers. For instance, established telephone companies were preferred as the suppliers of infrastructure, rather cable-television companies who are relatively new to this area. And Information Service Providers were the choice for the firm launching a presence on the Internet, rather than partnering with telephone or cable companies. These findings tie into the research questions explored here, which include the impact of a conservative industry like Canadian banking on the adoption and successful use of the Internet as a means of delivering services to customers.

The high degree of business interest in the Internet shown in the Andersen survey is consistent with findings reported by Burwell (1995). According to this study, current trends in the growth of electronic information are such that by the year 2000, half of the Canadian working population will be on-line.

2.3 Information Security

Perhaps the most widely known problem in Internet commerce, and the issue which has caused the greatest concern among would-be participants, is information security. While a variety of different security problems have been reported in the popular press,
there are certain issues that impact directly upon the payments process. Of particular interest is the ability of "an honest buyer to convince a seller to accept legitimate payment while preventing the dishonest buyer from doing unauthorized payments" (Janson, Waidner 1995, 3).

It could be argued that the concern over Internet security is overstated; that the risk of transmitting a credit card number to a web site is no greater than the risk associated with traditional plastic cards. According to this view, many consumers are willing to surrender their credit card to an unfamiliar gas station attendant whose trustworthiness is unknown. These consumers then wait patiently as the attendant takes the card into a payment kiosk to presumably authorize payment. While in the kiosk, the attendant could easily copy the credit card number and use it to purchase goods over the telephone where a signed receipt is not required for payment.

What is lacking in this argument is acknowledgement of the difference in scope between a single gas station attendant, and a global network of millions of computers. With the former, if a card number is stolen, there are relatively few sources of fraudulent use, namely those individuals who have had the opportunity to learn the credit card number through direct handling of the card, telephone authorizations, or by obtaining carbon copies of receipts. With the Internet, the number and location of possible thieves is virtually unknown and extremely difficult to trace.

A great deal of research effort has gone into developing encryption techniques designed to withstand known forms of electronic snooping with the expectation that once this problem is solved, new opportunities for competitive advantage will emerge from the Internet's world-wide infrastructure.

More recently, Visa and Mastercard, along with a variety of business partners, began a collaborative effort to develop a security standard for electronic transactions. The protocol, called SET (Secure Electronic Transactions) includes detailed published

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6 As reported in a Mastercard press release on http://www.mastercard.com/press/release-960201.htm
standards of how encryption techniques can provide appropriate security for banks, merchants and consumers.

Systems implementing the SET protocol are expected to be offered by the end of 1996. The following excerpt from the published SET specifications illustrates how the protocol will use public-key encryption to provide secure transactions on the Internet.

Public-Key cryptography, also known as asymmetric cryptography, uses two keys: one key to encrypt the message and the other key to decrypt the message. The two keys are mathematically related such that data encrypted with either key can only be decrypted using the other. Each user has two keys: a public key and a private key. The user distributes the public key. Because of the relationship between the two keys, the user and anyone receiving the public key can be assured that data encrypted with the public key and sent to the user can only be decrypted by the user using the private key. This assurance is only maintained if the user ensures that the private key is not disclosed to another. Therefore, the key pair should be generated by the user. The best known public-key cryptography algorithm is RSA (named after its inventors Rivest, Shamir and Adleman).


2.4 Concerns About Privacy

Security of information is universally regarded as a prerequisite for successful commercial Internet applications. Concerns about information privacy, particularly about the credit card numbers and bank account details of individual consumers, is also a highly debated issue and one which can engender emotional responses.

The amount of information that is collected about consumers through existing ordering and payment systems is considerable and itself raises legitimate concerns for individual privacy, the confidentiality of records, and potential for abuse by government or business. Widespread use of Internet payments will add to those concerns. The global
nature of the network raises new questions regarding the ease with which information moves across international borders.

According to a 1990 research study, 21% of large public and private sector organizations exchange personal information relating to Canadians clients and employees with organizations outside the country (Laperrière 1991). The most frequent destinations for such information were the United States, Great Britain and France. The financial services sector, represented primarily by banks and other deposit-taking institutions, ranked about average in the amount of cross-border personal information flow. The large majority of clients whose data was transmitted outside Canada had the opportunity to access and correct errors contained in the data.

The self-reporting technique used by survey respondents would suggest that the 21% average figure noted above is, in all likelihood, a minimum (it is improbable that respondents would over-report the volume of cross-border data). And since this study pre-dates the widespread use of inter-networking technologies by Canadian financial institutions, one can reasonably surmise that the amount of private information related to Canadians transmitted to foreign destinations has increased since 1990.

2.5 Summary

The still unknown business potential of the Internet is not deterring companies from getting involved with various types of web-based systems, from simple to complex. Interactive applications should enable firms to derive more benefits from the Internet than the commonplace electronic brochure by supporting the sale of more complex products. There is a market for Canadian banking services, according to the Andersen study, yet most of the bank web sites still feature the brochure concept.

And while concerns over security and privacy are likely to linger for some time, the single largest inhibiting factor to widespread Internet commerce continues to be the absence of a secure system of payments.

The following chapter delves further into the role of the Internet in Canada’s payment system and the ongoing evolution of “virtual payment”. 

19
3. Internet Payments

3.1 The Internet and Canada's Financial Sector - A Clash of Cultures

It would be difficult to imagine two entities more dissimilar than Canada’s financial institutions and the global cluster of networks known as the Internet.

The major chartered banks, trust companies, credit unions and caisses populaires are perceived as conservative, careful in their approach to change, and generally risk-intolerant. They are also considered highly reliable, trustworthy and stable organizations. Egner (1991) describes banking as a “conservative industry by nature” that now finds itself in the “uncomfortable role of a quintessential information age technology leader”. This statement is echoed by White (1991) who says that survivors in the banking industry in the 1990s “will be those who can anticipate the future, look beyond the boundaries of how it has always been, and look at the current situation from a new perspective.”

The Internet, by contrast, is dynamic. Its importance to commerce and to society in general has been the object of considerable speculation in the popular press. It is developing at breathtaking speed, risk-prone, and essentially managed by no one. Table VI summarizes some key differences which illustrate the clash of cultures between financial institutions and the Internet.

In the face of the apparent disparities between these two worlds, and considering the potential security risks, why are Canadian financial institutions, multinational credit card companies and retail merchants so keen to offer their customers electronic payment options over the Internet? Perhaps their desire is fuelled by demographic studies on users of the Internet which report results such as those summarized in Table V. Although the data in

<table>
<thead>
<tr>
<th>Table V - General Internet Users Profile</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average age</td>
</tr>
<tr>
<td>Sex</td>
</tr>
<tr>
<td>Average household income</td>
</tr>
<tr>
<td>University educated</td>
</tr>
<tr>
<td>Professional or managerial position</td>
</tr>
<tr>
<td>Self-employed</td>
</tr>
</tbody>
</table>

Source: Hermes Project, University of Michigan (1994)
Table V reflect general Internet demographics, it is reasonable to assume that they apply equally well to the Canadian environment. According to the figures, Internet consumers are relatively young and seem to be well-educated, financially comfortable, and to have above-average career prospects. Clearly they represent an attractive customer segment.

**Table VI - Perceived Characteristics of Canadian Banks Compared to the Internet**

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Canadian Banks</th>
<th>Internet</th>
</tr>
</thead>
<tbody>
<tr>
<td>Behavioural norms</td>
<td>Conservative, procedural</td>
<td>Democratic, anarchic</td>
</tr>
<tr>
<td>Ability to change</td>
<td>Historically low, as measured by previous opportunities for technology innovation</td>
<td>High, constantly subject to significant technological change and rapid evolution in usage patterns</td>
</tr>
<tr>
<td>Attitude toward risk</td>
<td>Risk is to be managed and minimized, not avoided entirely</td>
<td>Pioneering exploration</td>
</tr>
<tr>
<td>Current and recent growth</td>
<td>Relatively mature state</td>
<td>Very rapid: growth estimates vary between 10% and 15% per month</td>
</tr>
<tr>
<td>Geographic scope</td>
<td>International</td>
<td>Global (growth occurring in developing countries in addition to established locales in North America, Europe, Australia and Japan)</td>
</tr>
<tr>
<td>Information integrity and standards</td>
<td>High: In addition to the comprehensive sets of checks and balances, the entire Canadian banking and payments systems requires a high degree of trust between institutions</td>
<td>High, as regards resistance to failure of a single network node; Low, in terms of consistent response results and the quality and currency of information and references</td>
</tr>
<tr>
<td>Management</td>
<td>Hierarchical, command and control</td>
<td>Unmanaged: the whole is comprised of a set of regional carriers with no formal management structure. Some self-appointed agencies attempt to codify conduct and acceptable behaviour</td>
</tr>
</tbody>
</table>

Sources: Adapted from Egner (1991), and anecdotal evidence from personal experience.
3.2 The Canadian Payments System

In order to see where the Internet fits within the financial services environment, it is helpful to understand some of the characteristics and mechanics of the payments system itself. The payments system of any nation is of pivotal importance to modern economies. It provides the mechanism for transactions between buyers and sellers of all manner of goods and services. The sheer scope and size of Canada’s payment system makes it an important factor in any discussion of electronic commerce.

Over two billion payment items, mainly paper-based, were cleared through the Canadian payments system in 1991 with a value of over $18 trillion, roughly 26 times the value of our gross domestic product (Crow 1992). Paper-based payment transactions still predominate the system (McDougall 1994).

Figure 2 illustrates how the current payments system works in clearing and finalizing settlement of a paper-based transaction (i.e. a cheque). McDougall (1994), Crow (1992) and Poriah (1991) describe Canada’s paper-based payments and clearing system as one of the finest and possibly the most efficient in the world.

According to Crow, the characteristics of a payment system considered most important by businesses and consumers include:

1. Speed
2. Security
3. Reliable confirmation that a transaction has taken place and been cleared
4. The ability to obtain information on resulting changes in accounts
5. Obtaining finality of payment
6. Overall cost of payment-related services

In addition to these capabilities, the payments system must operate within an appropriate regulatory framework. These controls must encourage competition, provide
Figure 2 - Canadian Payments Clearing and Settlement System

Steps in the Process

1. Company A prepares and mails a cheque to Company B.
2. Company B receives and processes the cheque.
3. Company B deposits the cheque in its account at Bank B.
4. Bank B processes the cheque and transports it to the Regional Settlement Point for exchange to Bank A.
5. Value is given to Bank B in the amount of the cheque and subtracted from Bank A for the same amount via CPA's Automated Clearing and Settlement System.
6. Company B's account is credited with funds.
7. The amount is deducted from Company A's account on the day of posting. Company A must have funds available in Bank A to cover the amount of the cheque.
8. Both banks provide reports to their respective companies in the form of periodic bank statements.

Source: McDougall (1994)
standards to enhance efficiency, and assure the integrity of the system by effectively managing risk.

Characteristic of the Canadian payments system are large volumes of small dollar value transactions ($10 to $20) and a small number of very large transactions (averaging $2 million) that comprise a disproportionate amount of the total value processed (using figures from April 1992 to March 1993, McDougall 1994). Development of a large value transfer system, or LVTS, is now underway in response to concerns raised over obtaining same-day finality of payments, especially for high value transactions.

The absence of such a system is cited by Crow as a competitive weakness in Canada relative to other nations, which is particularly worrisome in light of the increasingly global and interactive nature of financial markets. Unfortunately, as recently as 1995 the LVTS had not been implemented (but was at the “call for proposals” stage) resulting in Canada’s ongoing lag behind many other industrial countries (Thiessen 1995).

The current emphasis in the role of the Internet in payments is mainly in the area of small or micro payments, rather than the large value payments. In that regard there is a good fit between Internet capabilities and the majority of the transactions in the Canadian payments system.

3.3 The Canadian Payments Association

The Canadian payments system is managed by the Canadian Payments Association (CPA) which was formed in 1980 by an Act of Parliament “to establish and operate a national clearings and settlement system and to plan the evolution of the national payments system” (Poriah 1991). Prior to that time, the payments system had been operated by the Canadian Bankers association.

Formation of the CPA resulted from two trends in the way Canadians were making payments by the late 1970s. Non-bank deposit-taking institutions, such as trust companies and credit unions, were becoming more important to the household/consumer sector as providers of financial services, chequing in particular. Yet these institutions had
no direct voice in the evolution of the system of payments. Second, an increasing number of financial transactions were becoming electronically-based (Vachon 1988).

Today, the CPA has approximately 150 members, comprising virtually all financial establishments in the country and including 14 “direct clearers”, institutions who are empowered to clear payments for all other members and settle net claims in accounts held at the Bank of Canada. The central bank acts as lender of last resort to the financial system (Crow 1990).

Among the innovations the CPA has introduced to the payments system is the Automated Clearing Settlement Systems (ACSS) which logs payment items to and receipts from the 14 direct clearers. It also calculates the aggregate due-to and due-from balances with the Bank of Canada. The importance of the ACSS to the payments system is noted by the central position it occupies in the diagram in Figure 2. However, even with this automated system, finality of payment does not occur until one to two days after a financial transaction is initiated. It is therefore possible that a financial institution that is unable to meet its payment obligations through the Bank of Canada will continue to do business for a corresponding period, thereby escalating the level of risk of total system failure (McDougall 1994).

It is unlikely that any of the various forms of payment associated with Internet commerce will solve this problem directly. The Internet’s current role in the payment system is at the front-end, involving transactions between merchants, consumers and banks. The finality of payments problem, on the other hand, comes at the back-end of the process, where the existing private networks that connect financial institutions are already in place and likely to remain active for the foreseeable future.

However, Internet payments should have an overall positive effect. Even though they are limited to the front-end of the process, electronic forms of payment provide verification at the time of a transaction of the payer’s ability to pay. As paper-based payments are increasingly substituted with electronic payments, more use will be made of
high-speed electronic funds transfers between banks. This will result in faster settlement for more transactions, thereby reducing the risk from finality of payment.

According to Roberts (1985) existing forms of electronic payment such as electronic funds transfer have been embraced by Canadians and make payments easier and somewhat cheaper in the long run. Roberts goes on to say that there is "no financial institution of any size that doesn't regard the move toward more electronic methods of making payment as inevitable and desirable."

3.4 The Evolution of Virtual Payments

Internet-based financial transactions are only the latest example in an ongoing process of evolution in the payment process. From the earliest (and still active) systems of barter, to the so-called smart cards featuring imbedded microprocessors, information content has steadily gained in importance over the physical entities it represents in trade (Peters 1987).

Table VII summarizes the progressive movement from physical units of payment to those that are entirely virtual or information-based. The table shows the development of common units of value which, over time, take on increased information content with concomitant increases in flexibility, universality and convenience.

The attractiveness of information-based systems, as compared to hard currency, stems in part from the drawbacks associated with paper cash and coins. As Johnson (1994) states, "cash is heavy, dirty, awkward and expensive to handle and store". Banking institutions spend large sums counting, sorting, moving, securing and disposing of cash. In 1992, 41 percent of the Bank of Canada's operating costs resulted from the production and issue of bank notes, the majority of which last only two years in circulation (Johnson 1994).

As recently as forty years ago, multipurpose credit cards did not exist. Plastic cards such as Visa and MasterCard were introduced in Canada during the late sixties and early seventies, at which time they were readily accepted by Canadians. By 1991 these cards
accounted for over $40 billion in retail sales, roughly 10% of total consumer purchases that year. **Thomas** (1993) noted a trend toward cash alternatives between 1979 and 1990.

**Table VII - Evolution of Virtual Payments**

**Physical**

<table>
<thead>
<tr>
<th>Method</th>
<th>How Payment is Made</th>
<th>Drawbacks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Barter</td>
<td>Trade one product or service of value for another</td>
<td>No common unit of exchange, difficulty in determining value of either side of transaction</td>
</tr>
<tr>
<td>Gold</td>
<td>Trade an amount of precious metal for product or service of value</td>
<td>Gold is heavy and difficult to transport, prone to theft</td>
</tr>
<tr>
<td>Paper Cash</td>
<td>Paper notes are redeemable for equivalent value in goods</td>
<td>Wears out quickly, can be heavy, dirty and prone to theft</td>
</tr>
<tr>
<td>Cheque</td>
<td>Signed promissory note enables financial transactions between two parties without need for cash</td>
<td>Elaborate security and clearing systems required, possibility of forgery, time to complete the transaction</td>
</tr>
<tr>
<td>Telegram</td>
<td>Transfer funds by using telegram as advice of payment</td>
<td>Requires dedicated infrastructure of telegraph poles and cables, possibility of fraudulent use</td>
</tr>
<tr>
<td>Credit Card</td>
<td>Plastic card enables holder to purchase goods on credit which can be paid within a predefined period or accrue interest</td>
<td>Cards can be lost or stolen, reliance on signature means risk of forgery</td>
</tr>
<tr>
<td>ATM</td>
<td>Bank machines enable cash withdrawal or transfer without need to accommodate banking hours or locations</td>
<td>Limited functions, require substantial investment by financial institutions, not ubiquitous</td>
</tr>
<tr>
<td>Digital Cash or Credit</td>
<td>Various forms emerging, may include debit or credit-based transactions over the Internet</td>
<td>Lack of acceptable security, requires access to personal computer</td>
</tr>
</tbody>
</table>

*Increasingly Virtual (Information-based)*

Sources: Adapted from Finlayson (1993), Johnson (1994), Singleton (1995)
During that time, the use of hard currency outside banks grew by just 3.3% in inflation-adjusted terms, whereas overall bank card use increased by 230% in real terms.

Credit cards were a significant step in the evolution of virtual payments; one which also presented opportunities for differentiation. The adaptation of brand specific card-oriented technologies can be attributed, at least in part, to differentiation strategies. American Express markets a certain level of exclusivity associated with its service,\(^7\) while Visa stresses the universality of its system over competitors such as American Express. And virtually all of the card companies have varying forms of value added services such as associations with automobile manufacturers, airlines, etc. In this way the credit card has avoided becoming relegated to the status of a commodity, despite the fact that the basic service provided by each firm is identical.

Today, the major credit card companies are on the verge of extending their reach from the plastic card to the computer screen through the Internet. The established giants are not alone, and are not the first, in providing secure payments on an open network. New forms of digitally-based payment systems are or soon will be available on the Internet, based on existing models of currency as well as plastic-card transactions.

However, the impact of the two major credit card companies on Internet commerce will be enormous if the scope of usage of their card-based payment systems in Canada is any indication:

1. In 1991 there were an estimated 46 million credit cards in circulation, or 2.3 cards for every Canadian adult over the age of 18;

2. Of those, 24 million were Visa or MasterCard, 14 million were issued by large retailers and three million were gasoline cards;

3. From 1981 to 1991 the number of Visa and MasterCards doubled - from 12 million to 24.3 million while the average sale transaction charged to the cards grew from $42 to

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\(^7\) Membership has its privileges
During the same period the accumulated outstanding balance on these cards increased 300 percent to $11 billion.8

3.5 Digital Banking and Payments

A reliable method of payment is still the missing ingredient in Internet commerce. Existing Internet-based payment systems are very new and are coming into use more slowly than less risky applications such as marketing and customer service.

Of the payment methods listed in Table VII, digital cash and digital credit are the most applicable to Internet payments. Table VIII compares some characteristics of information-based systems such as credit cards and debit cards, with the capabilities of the purely digital systems that are emerging on the Internet. The information in this table is based on a survey of six existing Internet payments systems conducted by Singleton (1995). References to product names have been omitted.

Only one of the systems reviewed by Singleton was ranked as “good” in terms of overall suitability to consumers, merchants and banks. He points out that the evolution of electronic commerce is difficult to predict because demands are still changing frequently. Since Internet payment systems are literally in their infancy, some approaches that work today may become completely unworkable within a year.

Such predictions have not deterred the pioneers. In Canada, Toronto-based Bayshore Trust has been offering a full suite of financial services on the Internet for several months (Partridge 1995), using its technological capabilities to promise loan approvals in as little as two minutes. This places at least one Canadian financial institution on the same

8 Source: Credit Cards in Canada in the Nineties - Report of the Standing Committee on Consumer and Corporate Affairs and Government Operations (1992)
Table VIII - Information-based Payment Systems

<table>
<thead>
<tr>
<th>Method</th>
<th>Financial Limits</th>
<th>Source of Funds</th>
</tr>
</thead>
<tbody>
<tr>
<td>Credit Card</td>
<td>In most instances some form of limit is placed on the total value that can be charged to the card. The limit is based on creditworthiness of the card holder. Some cards also have an annual membership fee and associated benefits such as travel points.</td>
<td>Purchases charged to the card may be paid in full or in part (a minimum payment determined by the card-issuer) at monthly intervals. Card holders who pay the full amount at each interval effectively receive interest free credit for that period. The card issuing company is charged with the float.</td>
</tr>
<tr>
<td>Debit Card</td>
<td>The spending limit is related to the card-holders bank balance.</td>
<td>When a transaction occurs, the funds are immediately debited to the card-holder’s account.</td>
</tr>
<tr>
<td>Smart (or Stored Value) Card</td>
<td>Spending limit is determined by the amount transferred to the card from the card-holders account.</td>
<td>Purchases may be made up to the amount stored on the card. This system is the most analogous to “real” cash since the card-holder carries the cash equivalent encoded on the card. If the card is lost, so is the value encoded.</td>
</tr>
<tr>
<td>Digital Cash</td>
<td>Similar to debit or smart card systems.</td>
<td>Customer buys digital tokens or coins through a bank interface. When a purchase is made, the customer uses the digital tokens as payment. Merchant redeems the tokens through a bank. Customer is responsible for float.</td>
</tr>
<tr>
<td>Digital Credit</td>
<td>Similar to credit card systems. Major credit card companies are or soon will be offering these services.</td>
<td>Customer enters a credit card number when making a web purchase. Normal authorisation procedures take place. As with plastic credit card transactions, credit card company responsible for float if customer pays at end of current period.</td>
</tr>
</tbody>
</table>

Source: Singleton (1995)
footing as some US banks. The American-based Security-First Network Bank (SFNB), considered the world’s first virtual bank, and Wells Fargo which has a much more substantial customer base than SFNB, also went online in 1995⁹.

Bayshore’s early use of the Internet, relative to American counterparts, differs considerably from the speed with which other technological innovations have been adopted in Canada’s financial sector. Finlayson (1993) points out the five year delay (compared to the US) in Canadian banks issuing their own credit cards. In that sense, Canada’s relatively early adoption of Internet banking may be a sign of greater readiness to exploit new information technologies. On the other hand, the summary of financial firm’s web sites in Appendix A suggests that the major chartered banks are proceeding much more carefully than these early movers.

Electronic credit and payment systems are not new to Canadians. In fact many consumers already rely on technology-based services such as Automated Banking Machines (ABM), Point of Sale (POS) retail systems, and signatureless electronic payment authorizations at gas pumps and public telephones. However, because it is an open network, the Internet has important distinguishing capabilities when compared to other network systems used for financial transactions.¹⁰

Yet despite the growing popularity of electronic currency and payment systems, we are far from becoming a cashless society. One need only point to the newly-minted two dollar coin as an example of the public interest in hard currency that can be felt, handled, played with, and jingled in a pocket or purse. Kettle (1996) suggests that the widespread introduction of ABMs in the late 1980s actually slowed the trend to a cashless society by making it easier and more convenient for people to obtain cash.

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¹⁰ See page 14 for a description of the significance of an open network.
It was suggested in Table VII that the trend toward virtual, information-oriented payment forms has existed for centuries. Similarly, the notion of a cashless society is not new. Its roots date back to the last century when American novelist Edward Bellamy wrote his novel *Looking Backward*. It describes a utopian society in which poverty and capitalism have been banished and currency is no longer necessary because everyone has a credit card (*Finlayson, Martin* 1993). In Bellamy’s futuristic vision, a benevolent government supplied its citizens with sufficient credit to enable a good quality of life in the absence of market-based competition. While this idyllic civilization has not emerged in the years since *Looking Backward* was published, many cash-alternative innovations have developed, including the credit card, the debit card, and the so-called smart card. Each of these technologies replaces physical bearer notes with a greater level of information-enabled abstraction.

### 3.6 Summary

This chapter has described some of the roles and risks of the Internet in Canada’s system of payments. It has been shown that payments systems are becoming increasingly based on information rather than physical objects, like cash and cheques. Internet payment systems in the form of digital cash and digital credit are now emerging. The next major step forward in the evolution of payments will occur when major credit card companies and banks begin offering secure financial transactions over an open network, something which could take place by the end of 1996.
4. Review of the Literature

4.1 Introduction

Business use of the Internet provides a timely and interesting illustration of how the commercialization of information technology (IT) innovation can affect competition. Yet it is only very recently that the Internet has played a meaningful role in commerce, and its widespread use in payment transactions still lies in the future (although perhaps not too distantly). Consequently, there is a relative scarcity of scholarly literature specifically addressing this topic.

Conversely, much has been written regarding the broader role of information technology in competitiveness and value creation, both from an industrial-organization (I/O) perspective and from a resource-based viewpoint. It is this body of knowledge which forms the basis of this critical review of the literature.

The chapter is broadly organized into four sections covering information technology innovation, the role of IT in creating competitive advantage from both an I/O and resource-based viewpoint, and the impact of information on the value chain. Examples of Internet based banking and payments are used throughout to illustrate if and how Internet applications fit within the various models discussed.

None of the authors surveyed refer to the payments process per sé within these frameworks. Yet this is a key factor in breaking out of the current state of affairs regarding Internet commerce - where most companies offer little more than the equivalent of electronic brochures - to a radically transformed market where entire transactions are information based, including secure payment over a ubiquitous open network.

Throughout this chapter, the broad definition of information technology developed by Porter and Millar (1985) is used. According to this definition, information technology includes "the information that businesses create and use as well as a wide spectrum of increasingly convergent and linked technologies that process the information". The inclusion of information itself in the definition is significant. It
reflects the high level of integration that, according to *Rayport and Sviokla* (1995), exists among the three elements which collectively comprise the virtual business environment of Internet services:

1. Content - the information;
2. Context - where and how the information is stored and accessed;
3. Infrastructure - the physical elements of the network, including computers and telecommunications equipment.

It is also important to point out that information technology historically has involved proprietary hardware and software systems, as exemplified by the long-standing prevalence of mainframe-based computer applications. Generally speaking, proprietary technologies tend to resist imitation as a result of the substantial resource investments involved in their creation. For instance, the millions of dollars and hundreds of “man months” that IBM expended developing its breakthrough computer operating system OS/360, gave it a highly advantageous position in the computer marketplace of the 1960s. Few other firms could match the level of investment or technical expertise required to duplicate or improve upon IBM’s effort (*Brooks* 1975).

The Internet, by contrast, is founded on an open set of industry standards. Compared to proprietary mainframes, the hardware and software required to launch a web site is very affordable (see page 12), with some software components available in the public domain at no cost. Therefore, it is important to recognize that some elements in information technology strategy theory may not apply to the Internet as a result of this fundamental difference between it and previous applications of information technology.

**4.2 Information Technology Innovation**

This section includes an examination of three important aspects of information technology innovation: the process of transformation from invention to innovation; the relationship of IT innovation to organization theory, including its impact on firm size
(which in the case of the internet can have a direct impact on firm competitiveness); and the impact of IT innovation in the global marketplace.

Several authors have commented on the important distinction between the invention of a new technology through research and development breakthroughs, versus technology innovation which may have genuine commercial potential (Roehrich 1985, Swanson 1994, Zahra, Nash, Bickford, 1994).

Senge (1990) offers one of the clearest descriptions of the process required to transform an invention - in this example, the airplane invented in 1903 - to a commercially viable innovation - the first trans-Atlantic commercial flight service introduced in the mid-1930s. In this instance, the shift from invention to innovation required three decades and the introduction of at least five related technologies in order to occur.

Today, the time lag between invention and innovation is shrinking\textsuperscript{11}. Yet there are striking parallels in the time-frame and development of Internet related technologies that further emphasize the applicability of Senge’s example. First, it has taken approximately 30 years from the inception of the Internet as a means of assuring continuity of communication in the event of a military attack (ARPAnet), to its general level of acceptance for use in commerce. Second, achieving the current level of innovation required the introduction of several supporting technologies over and above the initial ARPAnet infrastructure. The development of robust open communication protocols such as TCP/IP, fibre optics, powerful client/server computer systems, and viable information encryption and security schemes are among the contributing technologies needed to support commercial Internet applications. These relationships are depicted in Figure 3.

\textsuperscript{11} Consider, for instance, the rapid deployment of successive new generations of microprocessors over the past two decades.
These parallels in the invention-to-innovation evolution are not conclusive nor are they predictive of what may occur in the future. But the relationships support the notion that the Internet has reached a point in its development where it manifests many of the characteristics Senge ascribes to commercially viable innovations.

Turning to organizational theory, Swanson (1994) argues that there exists no foundational theory of IT innovation from organizational theory in general, citing available research as “both fragmented and limited”. He proposes initial groundwork for such a theory based on three distinct IT innovation types, namely:

1. Administrative and technological process innovation;
2. Product and business administrative process innovation;
3. Product and business innovation relative to technological, product and integration processes.
Swanson’s framework will not be analyzed in depth here. It is presented primarily as a means of illustrating the relative scarcity of information technology (and by extension, Internet related) innovation theory as applied to organization theory.

Brynjolfsson, Malone, Gurbaxani and Kambil (1994) examine the relationship between information technology innovation and the size of firms in a given industry. In their study, no correlation was found in the financial services sector, where firm size remained relatively constant between 1976 and 1989 while IT investment grew tenfold from less than $2,000 billion to nearly $20,000 billion during the same period.

While no clear conclusions can be drawn that Internet capabilities necessarily lead to smaller firms, it is reasonable to suggest that such capability tends to improve the relative competitiveness of smaller firms in terms of the scale and scope advantages that would normally accrue only to larger corporations. For instance, smaller firms are unlikely to be able to afford the high cost of operating a private network\(^{12}\), whereas most firms regardless of size should be capable of the investment required for basic Internet access (see page 12 for Internet access costing information).

A global economic perspective on IT innovation is provided by Sainsbury (1994) who focuses on the role of technology innovation in international competition. Describing innovation as a “coupling process which brings together technology and customer needs”, he points to the increasing importance of Newly Industrialized Countries (NICs) whose share of world manufactured exports went up from 1.6% in 1983 to 8.8% in 1989. The near total elimination of sheltered markets in developed countries and the growing ease with which NICs can acquire needed technologies, are given as two indications of the growing impact of technology on global competitiveness. While Sainsbury does not limit this statement to information-based technologies, much less its use in the financial services sector, parallels do exist:

\(^{12}\) In March 1996, the cost of a reasonable speed telecommunications connection (e.g., 1.5 million bits per second) is a minimum of $70,000 per year according to published figures from an Ontario regional network service provider. See http://www.onet.on.ca
• **Near total elimination of sheltered markets in developed countries** - The Free Trade Agreement and NAFTA have led to some erosion of government supported protections in Canadian markets. Despite the oligopolistic nature of the Canadian banking industry, which is dominated by the "big six", the broader financial services sector cannot accurately be described as sheltered. Witness the increasing scope of member firms into each other’s territory as banks enter the insurance and mutual fund arenas. And Canadian banks are increasing their presence in foreign markets such as Mexico (Partridge, Waldie 1996).

• **Growing ease with which NICs can acquire needed technologies** - A limiting economic factor in many developing nations has been inadequate infrastructure in the form of physical transportation and distribution networks. To remedy this, some developing countries are moving quickly to build their Internet infrastructures. The China Internet Company planned to build Internet sites in 40 industrial cities in 1995. In this way, rather than addressing weaknesses in the physical infrastructure China lacks, the strategy is to build an information infrastructure first thereby placing participating firms in the global marketplace immediately (Rayport, Sviokla 1995).

Missing from Sainsbury’s argument is reference to the managerial and technological know-how that would enable the high level of innovation necessary to transform NICs into competitive players in the global market. The reduction of international trade barriers, together with ready availability of cost-effective technologies, are necessary but insufficient factors to ensure a country (or a firm) of a strong competitive position.

However, these factors could contribute to a trend where traditionally underdeveloped countries draw disproportionate advantage from information technology innovation because they do not have old systems and structures to support while trying to move into new technological areas. This notion of legacy systems acting as an inhibitor to innovation, or actually becoming a disadvantage to current first-movers, reappears in the study of Canadian banks’ use of the Internet, reported in later chapters.
4.3 IT and Competitive Advantage - The Industrial-Organization Perspective

The industrial-organization model generally views competitive advantage as the benefits a firm derives from offering products at low cost or charging a premium for products that are differentiated from those of the competition. This implies that the environmental conditions of a given industry impose pressures and constraints to which a firm must respond. The industry orientation has caused this model to be criticized for ascribing a firm's success to external factors rather than to specific capabilities and resources that are unique to the firm (Lado, Boyd, Wright 1992).

Porter and Millar (1985) describe three specific ways technology changes the nature of competition: by altering industry structure; by supporting new cost and differentiation strategies; and by spawning entirely new businesses.

- **By altering industry structure** - Five competitive forces combine to shape the structure of an industry: the power of buyers, the power of sellers, the threat of new entrants, the threat of substitute products, and the rivalry among existing competitors (Porter 1979). Most if not all of these forces are evident in the banking industry. A technologically innovative firm like Bayshore Trust represents a new entrant that is creating substitute products (near-instant loan approval through the Internet) which affect the power of buyers (Internet approved loans are charged a lower interest rate than those arranged at a Bayshore office). Another relevant example is ABM deployment which had a relatively negative impact on the competitive position of the banking industry by commoditifying some services, thereby improving the power of bank customers (buyers) and changing the structure of the industry to the detriment of firms (Rayport, Sviokla 1994).

- **By supporting new cost and differentiation strategies** - Information technology can alter cost drivers in an industry to enable individual firms to improve their competitive position. CIBC may be doing just that in its pilot project to develop two-tier banking. In this scheme, customers with small bank balances will use electronic interfaces almost exclusively, with more costly face-to-face contact reserved for those with more sizeable balances (Partridge 1996). Differentiation
strategies currently employed by banks and credit card companies include information services customized to the demands of customers through personalized home pages. Such customized services are indicative of a shift away from the established norm in banking products which historically have relied on mass scale as an important means of producing advantage (Pine 1993).

- **By spawning entirely new businesses** - Three elements are included here, each of which corresponds with an aspect of Internet financial services. See Table IX.

<table>
<thead>
<tr>
<th>Factor Leading to New Businesses</th>
<th>Example from Internet Financial Services</th>
</tr>
</thead>
<tbody>
<tr>
<td>Makes some businesses technologically feasible</td>
<td>Internet banking</td>
</tr>
<tr>
<td>Creates demand for new products and services</td>
<td>Rapid electronic loan approval</td>
</tr>
<tr>
<td>Creates new businesses in old ones</td>
<td>Adaptation of the Canadian payments system to include an Internet component.</td>
</tr>
</tbody>
</table>

Sources: Porter (1985), Author.

Porter and Millar argue that IT can no longer be the exclusive province of the firm's technical staff. Rather, executives must become directly involved in the face of a rapidly changing competitive environment. Without such involvement, they argue, it may not be possible to derive maximum benefit from information technology investments to achieve strategic goals.

Porter (1985) also asserts that not all technological change is strategically beneficial nor does technology always lead to profitability. He offers four tests to determine if a planned technology change is desirable:

1. The technological change lowers cost or improves differentiation and it is sustainable;
2. Innovation shifts cost or uniqueness drivers in favour of a firm;
3. Pioneering use of the technology leads to first-mover advantages;
4. Technological change improves overall industry structure.

Regardless of their adoption of innovative technologies, few would argue that Canadian banks are not profitable. But Porter's model raises the more interesting question of how Internet based services would be assessed against these four criteria. In particular, in view of the proposition that innovation can be used as a way of attacking well entrenched competitors, does Bayshore Trust have an evident first mover advantage? If so, is that advantage sustainable considering the inherently open nature of Internet technologies? These questions are examined through exploratory research in following chapters.

Porter also outlines some considerations for determining whether to adopt a strategy of either pioneering technology innovation (leadership) or learning from the pioneering experiences of others (followership). The choice of strategy is based on three factors:

**Table X Porter's Model on Technology Leadership versus Followership**

<table>
<thead>
<tr>
<th>Factor</th>
<th>Decision-Making Considerations</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Sustainability of the Technology Lead</strong></td>
<td>• Source of the technology change: internal or external</td>
</tr>
<tr>
<td></td>
<td>• Presence/absence of sustainable advantage in IT development spending</td>
</tr>
<tr>
<td></td>
<td>• Relative IT skills</td>
</tr>
<tr>
<td></td>
<td>• Rate of technology diffusion</td>
</tr>
<tr>
<td><strong>First Mover Advantages</strong></td>
<td>• Reputation</td>
</tr>
<tr>
<td></td>
<td>• Pre-empting a position</td>
</tr>
<tr>
<td></td>
<td>• Switching costs</td>
</tr>
<tr>
<td></td>
<td>• Channel selection</td>
</tr>
<tr>
<td></td>
<td>• Proprietary learning curve</td>
</tr>
<tr>
<td></td>
<td>• Favourable access to scarce resources</td>
</tr>
<tr>
<td></td>
<td>• Definition of standards</td>
</tr>
<tr>
<td></td>
<td>• Institutional barriers</td>
</tr>
<tr>
<td></td>
<td>• Early profits</td>
</tr>
<tr>
<td>Factor</td>
<td>Decision-Making Considerations</td>
</tr>
<tr>
<td>------------------------</td>
<td>-------------------------------</td>
</tr>
<tr>
<td>First Mover Disadvantages</td>
<td>• Pioneering costs</td>
</tr>
<tr>
<td></td>
<td>• Demand uncertainty</td>
</tr>
<tr>
<td></td>
<td>• Changes in buyer needs</td>
</tr>
<tr>
<td></td>
<td>• Specificity of investments to early generations or factor costs</td>
</tr>
<tr>
<td></td>
<td>• Technological discontinuities</td>
</tr>
<tr>
<td></td>
<td>• Low-cost imitation</td>
</tr>
</tbody>
</table>

Some of the elements Porter ascribes to these decision-making considerations (e.g. relative IT skills, reputation, proprietary learning curve) transcend the classic industry-organization model of competitive advantage. They are more closely aligned with resource-based strategies in the sense that they focus on unique, firm-specific capabilities rather than industry factors.

Zahra, Nash and Bickford (1994) offer a slightly different perspective on early mover advantage. They describe five mechanisms by which technological pioneering can lead to sustained growth and profitability.

1. **Acquire a Market Leadership Position:** The authors include points such as redefining the industry rules of competition, using economies of scale, establishing the technology as an industry standard, protecting intellectual property rights and building customer loyalty as some of the means by which a firm can achieve market leadership. Of the points listed only one - build customer loyalty - is well suited to Internet commerce. The remaining elements would apply primarily to proprietary technology that can be nurtured and protected in the ways described.

2. **Overcome Incumbent Inertia:** If a leadership or first mover advantage can be achieved, the firm must not rest on past successes. Rather, it needs to practice continuous innovation, develop ties with the market to reduce risks of upgrades, and utilize environmental forecasting. These approaches seem to apply equally well to
both open and proprietary technologies, making them useful for early movers in Internet adoption.

3. Manage the Duality of Technological Pioneering: The key points here are balancing the technology portfolio and developing organizational capabilities. Research findings bear out the relevance of a balanced approach to technology innovation. Putting all of the firm’s eggs into a single basket can leave it flat-footed when the next inevitable IT innovation appears.

4. Speed up Technological Development and Commercialization: By enhancing cross-functional collaboration, the technologists and the marketers (for example) combine to make a technology commercially viable. Many of the Internet developments occurring today involve grass-roots movements that look upon the technology strictly as an enabler rather than as an end unto itself.

5. Link Pioneering Activities to Competitive Strategy: In addition to traditional industrial-organization strategy components such as creating barriers to entry, the authors suggest making the technology a focal point of firm strategy.

Although the framework proposed by Zahra, Nash and Bickford focuses on some industry factors, it also includes several references to managerial capability. In that sense, it overlaps with the resource-based perspective. Overall, the framework is only marginally applicable to the Internet or other open technologies. Most of the authors’ recommendations apply to proprietary technology, although a few - such as building customer loyalty and engaging in continuous innovation - are more universal.

Parsons (1983) introduces a three-level framework for the analysis of IT and competitive advantage, which contains considerable overlap with Porter’s earlier work on competitive forces (1980). Unfortunately, there is little additional insight to be gained from Parson’s framework that cannot be found in the original.

Roehrich (1987) uses Porter’s five forces framework to emphasize how technology can introduce instability to an industry. He uses examples from various industries including tires, ethical drugs, steel and supermarkets to illustrate that high return on
equity from technology innovation is linked to the overall profitability of the industry. Roehrich does not provide specific evidence from the banking industry.

However, from his premise it might be reasonably asserted that highly profitable Canadian banks have much to gain from continuing their pattern of information technology investment including Internet based information systems and services. This analysis does not identify, nor does it aid in understanding, the impact that an individual firm's IT investments have on its ROE.

In determining how IS\textsuperscript{13} can produce competitive advantage, McFarlan (1984) suggests five questions that companies must answer:

1. Can IS technology build barriers to entry?
2. Can IS technology build in switching costs?
3. Can the technology change the basis of competition (with reference to Porter's three generic strategy types)?
4. Can IS change the balance of power in supplier relationships?
5. Can IS technology create new products?

Like some other authors, McFarlan goes on to indicate that management must change the way it operates in light of the issues raised around IT and competition. The true competitive impact of IT expenditures must be clearly understood. He cautions against prevalent rules-of-thumb (such as percentage of sales) for guiding such investments because these measures tend to focus on the efficiency aspects of the IT functions rather than on its contribution to competitive effectiveness. Unfortunately, McFarlan does not provide suggestions for how this contribution to competitive effectiveness can be measured.

\textsuperscript{13} McFarlan uses the term IS, meaning information systems, in reference to the equipment and systems but not including the information component included in the operational definition of IT used elsewhere in this thesis.
McFarlan, McKenney, Pyburn (1983) propose a strategic grid to be used to portray how certain industries fit within four different IS environments: strategic impact of existing systems (high-low) and strategic impact of future systems (high-low). In this grid, major banks ranked at the high end of both categories. This underscores the strategic importance of information technology in banking and credit card companies where IT represents a significant component of the product or service costs and hence can be used as an important differentiable feature, and where those very products are information intensive. The information intensiveness of banking is echoed by several research respondents as well.

The Information Technology Association of Canada (ITAC) describes a matrix framework to analyze the impact of IT on competitiveness, wealth creation and quality of life improvement as shown in Table XI.

This model bears some resemblance to the work of Porter (1985) discussed earlier. The first two levels are analogous to the low-cost leadership and differentiation strategies, while the remaining three levels tie in with Porter’s suggestion of information technology “spawning entirely new businesses”.

However, ITAC’s descriptive model is actually a matrix which proposes that, over and above its impact on competitiveness, IT innovation can result in the creation of new wealth and markets, and can improve the quality of life. For the purposes of illustration, some examples taken from Internet banking and payments have been added to the framework. These examples may be arguable, but they do illustrate the intent behind the ITAC model.

While providing a useful descriptive framework, ITAC’s model is not overly helpful in determining strategy or in identifying opportunities where IT innovation can be beneficially applied.
### Table XI - ITAC Model of IT and Competitiveness

<table>
<thead>
<tr>
<th>Impact of Information Technology</th>
<th>Competitiveness Enhancement</th>
<th>Wealth Creation &amp; New Markets</th>
<th>Quality of Life Improvement</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Level 5:</strong> IT based new concepts and paradigms</td>
<td></td>
<td></td>
<td>Secure Internet payments, Personalized web banking services</td>
</tr>
<tr>
<td><strong>Level 4:</strong> IT enabled strategic management</td>
<td>Internal and external communication improvements</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Level 3:</strong> IT dependent new commodities</td>
<td>ABM deployment, Debit card</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Level 2:</strong> Quality enhancement</td>
<td>Electronic funds transfer</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Level 1:</strong> Cost reduction</td>
<td>Manual records replaced by computerized records</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: Information Technology Association of Canada

In summarizing this section, it is reasonable to suggest that industrial-organization perspective has provided considerable insight into the role of information technology in competition. No firm operates in a vacuum, and it would be difficult to imagine developing useful competitive strategies without considering inputs such as suppliers, buyers, the general nature of the industry, and so forth.

However, as its critics point out, I-O theory does not adequately consider the unique capabilities of an individual firm. In the information technology realm, where the pace of innovation is rapid, the ability of companies to develop a high level of internal knowledge, and to keep that knowledge current, is critical to competitiveness. The following section of this chapter provides a closer look at competitiveness from the firm level as proposed in resource-based theory.
4.4 IT and Competitive Advantage - The Resource-based Perspective

In contrast to the industry focus of the industrial-organization perspective on competitive advantage, the resource-based model is oriented toward the distinctive competencies that give a particular firm the edge over its rivals. The firm is viewed as a bundle of specialized resources that combine to provide it with a superior position within the market (Barney, 1986). Nevertheless, the resource-based view does not entirely ignore the industry context within which firms compete. Several authors have contributed to the greater understanding of what constitutes sustainable competitive advantage from this perspective.

Collis and Montomery (1995) propose five tests that a resource must pass in order to qualify as the basis for effective strategy.

1. **The Test of Inimitability:** Is the resource hard to copy? No matter how well protected it may be, no resource resists imitation forever. Patents ultimately expire, computer hardware can be reverse engineered, and employee turnover can result in the loss of trade secrets. One factor that inhibits imitation is called *path dependency*, meaning that a resource is unique as a result of all that happens in its accumulation. Possession of a strong brand name is given as an example of a path dependent resource that a competitor cannot duplicate even if it invests considerable time and effort.

*Causal ambiguity* is another source of inimitability stemming from the difficulty of disentangling the source of value creation. For instance, Wells Fargo’s Internet capabilities are easy to perceive by simply accessing their web site. But comprehending the links to their internal information infrastructure is extremely difficult, making these links a source of advantage for Wells Fargo.

2. **The Test of Durability:** How quickly does this resource depreciate? According to the authors, “most resources have a limited life and will earn only temporary profits.” In an arena such as information technology, and the Internet in particular, companies
must be wary of their investments that are state of the art today, only to be obsolete tomorrow.

3. **The Test of Appropriability:** Who captures the value that the resource creates? A competitive strategy should be bound to resources that are inextricably linked to the company. Clearly Internet resources, apart from the links to internal technologies, would not pass this test.

4. **The Test of Substitutability:** Can a unique resource be trumped by a different resource? This echoes Porter’s five forces framework (i.e. the threat of substitution). In the Internet environment, substitutability may be achieved by a firm altering the context of information delivery. A credit card firm may have a bland web home page but establish context sensitive links to its services through other sites. In this way, it can provide a convenient means of payment to a customer purchasing an item at an Internet mall.

5. **The Test of Competitive Superiority:** Whose resource is really better? This final test stresses the importance of assessing the firm’s competencies against those of the competition, similar to the notion of benchmarking which has long been a component of Total Quality Management.

The importance of Collis and Montgomery’s five-test model lies in its comprehensiveness. It includes elements of both resource-based and industrial-organization strategies, and highlights both positive and negative aspects of the Internet. Further, it is apparent that these tests could be useful in managerial decision making, a capability lacking in many other articles reviewed here.

**Lado, Boyd, and Wright** (1992) describe a competency based model of sustainable competitive advantage that contains four major components which are linked to one another and to the environment as shown in Figure 4.
The managerial competencies and strategic focus component in this model allows for the important contribution of managerial competencies to competitive advantage. These competencies include leadership, strategic vision, communication and employee empowerment, factors that are not well accounted for in the I-O model.

Resource-based competencies include anything that can be a strength or weakness that affects the competitiveness of the firm, including human and non-human resources as well as tangible and intangible assets. In the model, this component is linked to the output based and transformation based competencies to illustrate the “synergistic interactions” among them.

The transformation based competencies are those which transform inputs to outputs, and in that sense are linked to the concept of the value chain. It is here that information technology can play a key role (although that role is not emphasized by the model’s developers). While information technology can have a positive effect on scale and scope economies, the authors argue that such gains are imitable and likely to erode over time in the absence of matching managerial capabilities. Hence this component is linked to all three of the other components of the model.
Finally, output based competencies are said to include not only physical goods and services delivered to customers, but also invisible outputs such as reputation, brand image and other elements that provide real or perceived value to customers. In many ways, these invisible outputs are key to sustainable advantage, since a reputation built on quality service, responsiveness, flexibility and consistent understanding of customer requirements, would be difficult for a competitor to copy.

This generic resource-based model illustrates some of the firm specific competencies that are, to varying degrees, lacking in industrial-organization models. It does not, however, specifically address information technology strategies and how a firm might develop specific IT based capabilities that would be difficult to imitate.

To that end, Haeckel and Nolan (1993) recommend that companies recognize the difference between IT capabilities as compared to investment in isolated IT systems such as e-mail, reservation systems and inventory control systems. They suggest the need for an enterprise-wide model of the business within which components such as databases, software, and expert systems are integrated. Only with this level of integration will information technology fully enable competitive advantage by reducing time and space constraints in acquiring, using and making decisions based on information.

The importance of intangible resources to overall business strategy is examined by Hall (1993) who includes in the list of such resources: data bases, information in the public domain, personal and organizational networks, know-how of employees, and the culture and reputation of the company. To varying degrees, each of these intangibles corresponds with information technology in general and the adaptation of the Internet in particular. If a resource such as information in the public domain is able to lead to sustainable advantage, then it could be argued that publicly available information technologies (such as Internet and web software) can do the same.

As outlined in Figure 5, Hall divides intangible resources into those which are people dependent (skills) and others which are people independent (assets). These aspects relate to the functional, cultural, positional and regulatory capabilities available to the firm.
Functional capabilities (the ability to do specific things) and cultural capabilities (the habits, values and beliefs of an organization) are skills based factors. In the context of Internet banking and payments, it may be argued that functional capabilities are of less importance to sustainable competitive advantage than cultural ones since the know-how is, to a considerable extent, equally available to all firms. The firm's ability to learn and to creatively adapt new technology solutions to existing and emerging business opportunities, takes longer to cultivate and is more difficult for a competitor to imitate.

Positional capabilities bridge skills based factors (e.g. reputation) and asset based capabilities (e.g. data bases). The positional capabilities of Canada’s major financial institutions are likely to play a critical role in how Internet services are rolled out to customers. In all probability, the conservative nature of the industry will lead to a slow and steady implementation, opening opportunities for less risk-averse firms such as Bayshore Trust to gain a first mover advantage. Regulatory factors are unlikely to have significant bearing on Internet based competitive advantage since trade secrets, for instance, do not apply in the realm of open technology.

However, the links that exist between open systems and proprietary firm-specific capabilities can be a key to competitive advantage because they are difficult for competitors to perceive and/or to imitate.
Hall’s model is valuable as a descriptive framework of intangible resources that may contribute to competitive advantage, and for the very fact of highlighting these important non-physical resources. Like many of the models surveyed here, it does not provide a normative base for determining IT strategies.

Williams (1994) states that the sustainability of competitive advantage varies considerably even within a single industry. Pointing to the information technology field, he observes that microcomputer software products evolve slowly over relatively long periods of time, perhaps as much as a decade. Conversely, microcomputer hardware becomes obsolete in one to two years. Sustainability of advantage therefore stems from the classes of resources and capabilities that create the advantage. Citing several constituents of time-based advantage, Williams suggests that organizational learning processes are at the heart of adaptability to changing competitive conditions.

Hammer and Mangurian (1987) also emphasize that the business value of information technology depends on the total system, rather than separately deployed communications or processing functions. As summarized in Table XII, they describe the impact of information on time, geography and relationships, while the potential business

---

**Figure 5 - Hall’s Model of Intangible Resources and Capabilities**

<table>
<thead>
<tr>
<th>People Dependent</th>
<th>Functional</th>
<th>Cultural</th>
<th>Positional</th>
<th>Regulatory</th>
<th>Skills</th>
</tr>
</thead>
<tbody>
<tr>
<td>Know-how of employees, suppliers, distributors</td>
<td>Perception of quality, ability to learn</td>
<td>Reputation Networks</td>
<td>Contracts, licences, trade secrets</td>
<td>Assets</td>
<td></td>
</tr>
</tbody>
</table>

Source: Hall (1993)
value of IT is assessed against efficiency, effectiveness and innovation. Examples of Internet banking and payments are again used to show a concrete link between this framework and current levels of innovation in these areas. Once again the model does not provide assistance in developing IT specific strategies.

Table XII Impact of Information on Time, Geography and Relationships

<table>
<thead>
<tr>
<th>IMPACT</th>
<th>VALUE</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Efficiency</td>
</tr>
<tr>
<td>Time</td>
<td>Accelerate business process: e.g. Electronic funds transfer</td>
</tr>
<tr>
<td></td>
<td>Reduce information float: e.g. Customer-supplied information enables instant alterations to service delivery</td>
</tr>
<tr>
<td>Geography</td>
<td>Recapture scale: e.g. Global infrastructure accessible at low cost</td>
</tr>
<tr>
<td></td>
<td>Ensure global management control: e.g. Electronic mail and similar tools facilitate global communication</td>
</tr>
<tr>
<td>Relationships</td>
<td>Bypass intermediaries e.g. Direct contact with customers through web sites</td>
</tr>
<tr>
<td></td>
<td>Replicate scarce knowledge: e.g. Management can provide information directly to all employees and customers</td>
</tr>
<tr>
<td></td>
<td>Create service excellence: e.g. Rapid loan approval via Internet</td>
</tr>
<tr>
<td></td>
<td>Penetrate new markets: e.g. Clients of the China Internet Company go global immediately</td>
</tr>
<tr>
<td></td>
<td>Build umbilical cords: e.g. Internet services based on differentiation raise customer's switching costs</td>
</tr>
</tbody>
</table>

Source: Hammer & Mangurian, 1987

The notion that a firm’s ability to outperform its rivals is based - at least to some extent - on its own capabilities is consistent with the common sense notion that survival is related to individual, specific and sometimes unique competencies. Indeed, at least some empirical evidence exists to further support the validity of resource theory (Mosakowski, 1993). Thus, the resource-based models provide useful insights into how competitive advantage is achieved.
4.5 Information Technology and the Value Chain

Porter (1985) describes the concept of a value chain which comprises five primary activities and four support activities that combine to create value in a product or service. "Downstream" value activities such as sales and marketing are augmented by "upstream" activities which transform the raw supplier inputs into products or services that are ultimately purchased by consumers. Along the way, each value activity has a physical and an information component. (See Table XIV, page 12 for a summarized diagram of the physical and virtual value chains.)

According to Porter, by the 1980s the pace of IT advancement was already more rapid than improvements to physical processing technologies. Information technology is also highly influential in managing the linkages that exist among activities and which also exist between the firm and the buyers and sellers of its products. These linkages - which would be called interfaces is the computer field - are important because they are not readily evident to competitors, and therefore contribute to the sustainability of competitive advantage.

A relevant example of these linkages would be the interface between the open, public web site operated by a financial services firm, and the mechanisms of accessing existing corporate data stored in internal, private systems.

The collective value chains of all firms, suppliers, channels and buyers create a value system for the industry overall. Within that value system, Internet based links are already established for communications (internal and external), customer support and a variety of other tasks.

Rayport and Sviokla (1994) illustrate how information technology is "recasting the value proposition". To remain competitive, companies must compete not only in the traditional marketplace, but also in the information-based marketspace where entirely new forms of commercial transactions have emerged. The marketplace and the marketspace differ in terms of content, context and infrastructure. Table XIII illustrates these differences, with marketspace examples from banking and credit-card purchases.
Table XIII - Marketplace versus Marketspace

<table>
<thead>
<tr>
<th>Marketplace Banking</th>
<th>Internet-Based Marketspace Credit Purchase</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Content</strong></td>
<td><strong>Banking</strong></td>
</tr>
<tr>
<td>Physical product: bank statement, passbook, cash.</td>
<td>Personal financial information, savings and loan rates.</td>
</tr>
<tr>
<td><strong>Context</strong></td>
<td><strong>Face to face interaction with bank staff.</strong></td>
</tr>
<tr>
<td><strong>Infrastructure</strong></td>
<td><strong>Bank branch, proprietary networks.</strong></td>
</tr>
</tbody>
</table>

The authors suggest that banks have done a poor job adapting to the *marketspace*, citing the fact that some banking services have become commodities as a result of ABM deployment. Originally, ABM deployment was based on a strategy of banking automation, chiefly to lower costs for frequent transactions (deposit and withdrawal of funds) by customers with low balances\(^{14}\). What banks did not predict was that customers would respond to the convenience of ABM technology rather than to the institution providing the service, thereby eroding customer loyalty and reducing some bank services to commodity status.

However, one may reasonably argue that the problems arising from ABM deployment can be addressed or at least mitigated with Internet-based services because the latter enables greater manipulation of the context of service delivery. Unlike ABM networks, Internet-based banking and payment services present possibilities to customize consumer access points to banking services through the creation of a personal home page for literally every customer. Since this process can be fully automated, the bank’s

\(^{14}\) This is mentioned anecdotally in several other sources and was confirmed in several of the interviews held with Canadian financial institutions as reported in subsequent chapters.
incremental cost to provide personalized customer access is almost zero. At least one Canadian bank offers this very capability already, and uses it as a means of differentiating its services from those of the competition\textsuperscript{15}. Bayshore Trust (in Canada) and Wells Fargo (in the United States) have taken this a step further, manipulating the content itself by providing full services through their Internet sites. And unlike ABM networks, the Internet's global infrastructure enhances a bank's ability to reach customers regardless of time and place, without the need to invest further in its own proprietary network infrastructure. Therefore, to the extent their context and content differentiation strategies are successful, there should be opportunities for financial institutions to increase scope dramatically at negligible cost.

Personal home pages for banking or other Internet services illustrate what Rayport and Sviokla call the "disaggregation of content". Unlike most forms of print media where information of value to a customer is blended with other information of lesser or no perceived value, customers using Internet banking pick and choose the information they wish to receive. They can subsequently change this personal profile when and as they see fit.

In addition to obvious customer service benefits, the information a customer provides in order to customize a home page is itself valuable to the bank. Factors such as age, sex, income level and of course the services of interest to the customer, are some of the data elements captured by these systems. In so doing, firms develop a single database of valuable demographic and service information that can be used for multiple purposes. While similar data may be available elsewhere to the bank, different elements are often stored in separate and perhaps incompatible database systems, making the Internet-based data capture more convenient and useful.

Clearly it would seem that information captured for one transaction can be reused and recycled to provide new sources of value for other purposes. Such is the premise of

\textsuperscript{15} Bank of Montreal - http://www.bmo.com
the Virtual Value Chain (VVC) as described by Rayport and Sviokla (1995). By combining the notion of the *marketspace* and Porter’s description of the Physical Value Chain, the authors introduce the VVC as a non-linear, information-based matrix of value creation and extraction. Value can be created at any stage in the VVC by gathering, organizing, selecting, synthesizing and distributing information. Table XIV contains an integrated illustration of the Physical Value Chain, the Virtual Value Chain and the Value Matrix.

Five management principles are introduced by Rayport and Sviokla, and have applicability in the banking and payments arenas as shown in these examples.

1. **The Law of Digital Assets**: Digital assets, unlike physical ones, are not used up in their consumption. Example: Customer profile information required for personal home pages can be reharvested for numerous marketing and service planning purposes.

2. **New Economies of Scale**: Companies can achieve low unit costs for products and services. Example: Existing Internet infrastructure extends the geographic reach of bank services without corresponding increases in network costs.

3. **New Economies of Scope**: A single set of digital assets can be deployed across multiple markets. Example: Customer profile information can lead to focused marketing efforts (sometimes called “narrowcasting”) to sell related services such as insurance and RRSPs.

4. **Transaction-Cost Compression**: Price-performance of information technology is doubling every 18 months (a phenomenon often called “Moore’s Law” named after the former CEO of Intel who initially made the observation). Example: The reduced cost of data storage and calculation enables banks to tailor customer services on demand and to build massive information warehouses to improve marketing and service development effectiveness.
5. **Rebalancing Supply and Demand**: A synthesis of these four axioms resulting in the opportunity to address customer demands rather than simply sell products and services. Example: Personal home page.

**Table XIV - The Physical and Virtual Value Chains**

<table>
<thead>
<tr>
<th>Automated Warehouse</th>
<th>Flexible Manufacturing</th>
<th>Automated Order Processing</th>
<th>Telemarketing</th>
<th>Remote Equipment Servicing</th>
<th>Examples of Information-Based Activities (Support activities excluded)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inbound Production</td>
<td>Outbound</td>
<td>Marketing</td>
<td></td>
<td></td>
<td>Physical Value Chain</td>
</tr>
<tr>
<td>logistics processes</td>
<td>logistics</td>
<td></td>
<td></td>
<td></td>
<td>Value Matrix</td>
</tr>
</tbody>
</table>

Cronin is the only author reviewed who adapts the value chain concept directly to the Internet. She illustrates the impact of the Internet on three types of value activities which have their roots in Porter's value chain: inputs from suppliers; internal operations; and relationships with customers. Cronin offers Internet value chain illustrations for each of these three categories. They are summarized in Table XV.
Table XV - Cronin’s Internet Value Chain

<table>
<thead>
<tr>
<th>Inputs from Suppliers</th>
<th>Internal Operations</th>
<th>Customer Relations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pricing and Ordering</td>
<td>Global Connectivity</td>
<td>Market/Product</td>
</tr>
<tr>
<td>Product Support</td>
<td>Collaboration</td>
<td>Research</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Customer</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Support/Feedback</td>
</tr>
<tr>
<td>Easy, efficient access</td>
<td>Savings in</td>
<td>Data for market research</td>
</tr>
<tr>
<td>Faster problem resolution</td>
<td>telecommunications</td>
<td>Consumer responses to new products</td>
</tr>
<tr>
<td>Interactive</td>
<td>Facilitates partnerships and joint ventures</td>
<td>Immediate response to customer problems</td>
</tr>
<tr>
<td>Non-proprietary system</td>
<td>Shortens development time</td>
<td>More customer contact</td>
</tr>
<tr>
<td>Improved planning</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: Cronin (1994)

Benjamin (1995) suggests that the Internet will not only give consumers access to vast amounts of information, but will “cause a restructuring and redistribution of profits among the stakeholders along the (value) chain”. Citing three elements that determine the price of a product - production costs, co-ordination costs, and profit margin - Benjamin argues that firms always want to economize on co-ordination costs, often through the deployment of information systems. Single source sales channels such as those enabled by networks can disintermediate wholesale and retail functions, resulting in direct contact between producer and consumer through the Internet. More simply put,
the Internet enables firms to cut out the middle-man, resulting in lower prices to consumers as well as greater choice and convenience. Internet markets are thus similar to catalogue shopping services in that both rely on products/services that are easy to describe and not very asset specific (i.e. commodities). This is of particular relevance to the system of payments and the degree to which entire transactions, including payment, can be achieved over open networks such as the Internet. The relationship between the Internet and Canada's payment system was described in greater detail in an earlier chapter.

**Davenport** (1996) elaborates on the disintermediating effect of some information technologies by suggesting four key attributes such technologies possess. They are:

1. Broadly available to both buyers and sellers;
2. Easy to use;
3. Not limited purely to text display but comprise multiple media;
4. Supportive of easy switching from summary to detailed information content.

Based on the earlier discussion of the Internet's key characteristics, all four of these attributes are applicable. (On the other hand, the Internet may be relatively easy to use and readily accessible for firms, but less so for consumers). Davenport points out that Internet services can also lead to efficient markets, making price-based competition increasingly important. **D'Cruz and Rugman** (1994) also refer to the disintermediating effect of information technologies (which they call deintegration) in the context of business networks such as the Stentor consortium of Canadian telecommunications companies.

### 4.6 Summary

Although there is very little scholarly literature devoted to Internet based technologies, the breadth of business strategy theory based on information technology is evident from the samples included here.
Many of the frameworks are helpful in describing and understanding some of the underlying elements that can contribute to a successful strategy and by extension to competitive advantage. Fewer of them are useful in actually devising a strategy for the deployment of information technology and the field narrows further when applying the literature to the Internet. The attempt in this chapter has been to bridge that gap, by showing the elements of strategy theory that do or do not apply to the Internet or indeed any open information system.
5. Methodology

This chapter describes the main questions addressed in the research, the methodology chosen, the framework used for analysis, and participants in the research.

5.1 The Research Questions

Most of Canada’s major financial institutions offer some form of Internet service, and initiatives are underway to provide Internet-based payments by the end of 1996.

In that context, the primary research issue is the degree to which the Internet represents a beneficial technology for Canada’s financial institutions. The potential benefits are assessed based on the Internet’s ability to provide sustainable competitive advantage to firms in this industry.

The research attempts to uncover a potential source of competitive advantage stemming from secure Internet services and payments. Alternately, it is possible that the Internet may have a negative effect on competition by weakening each institutions’ ability to differentiate its services from those of competitors. This problem has been attributed to other recent technology innovations such as ABMs.

Theoretically, a first mover (such as Bayshore Trust, Canada’s first full service Internet bank) may have an initial advantage, simply as a result of being the first firm to offer a new technology. The study looks for the existence of this first-mover advantage and for evidence to indicate if the advantage can be sustained, assuming other firms will eventually deploy the same technology. These are some of the key issues explored in the research.

5.2 Description of Research Method

The method chosen is exploratory research through a series of personal telephone interviews.

An exploratory research methodology was chosen for several reasons:
1. Internet banking services are still very new.

2. The web sites operated by most Canadian financial institutions primarily feature the electronic brochure application type (described earlier). Only a small number of interactive applications have been deployed, making current levels of customer involvement limited in scope.

3. Internet payments systems are literally in their infancy and likely to change in significant ways within the next year.

4. The structure of the Canadian banking industry limits the maximum sample size to a small number of firms.

5. Because banks are so new to the Internet, there is insufficient data on this topic to support a more quantitative approach to the research.

This scarcity of data also precluded the use of sophisticated statistical techniques. Rather, descriptive statistics were employed, primarily frequencies and percentages.

A panel of ten participants was assembled. Participating firms were chosen in order to reflect a cross-section of financial firms involved in Internet services. The five chartered banks alone, for instance, represent a significant portion of Canada's financial community.

Since the focus of the research was on strategy formulation rather than the technology itself, participants were garnered from positions in areas such as marketing, customer service, and planning. To help ensure a broad strategic perspective, the selected participants were senior executives with their respective firms.

A telephone interview of approximately 30-40 minutes duration was conducted with each person. Some participants requested and received facsimile copies of the questions in advance. Since the research was exploratory, prior knowledge of the questions was not considered detrimental to obtaining valid results.

The interview was divided into five sections. The first three sections provided information on the firm's strategic use of information technology, the Internet, and
Internet payments. Section four contained seventeen questions relating to Porter's model of beneficial technologies. The final section was a general wrap-up and opportunity for additional remarks by the interview participant.

5.3 Limitations

The methodological limitations are listed below:

1. **Sample size:** With only ten firms included in the study, it is not possible to derive statistically significant trends from the results. Nevertheless, the inclusion of the largest Canadian chartered banks means the sample represents the major competitors in the national market so that reasonable observations and conclusions can be drawn.

2. **Time Commitment of Participants:** While an executive perspective was needed for the research, such individuals are usually very busy and unwilling to devote much time to the interview.

3. **Confidentiality:** A few respondents were reluctant to divulge detailed information regarding strategy formulation, training budgets, or other data that could potentially benefit competitors. When in doubt as to whether or not to answer a question that might include confidential information, some respondents simply refused to answer. Given the small sample size, even one unanswered question could have a significant impact on the results.

4. **Limited Scope of Current Internet Service Offerings:** At present, most of the firms surveyed have only a limited set of services deployed on the Internet. Many are moving cautiously. Some are using their web site more as a sign to their customers of their involvement in the Internet rather than for strategic business purposes. Consequently, the range of different applications is somewhat limited.

5. **Self-reported Perceptions:** The interview data gathering technique required subjects to report their perceptions or opinions in many instances. On several occasions, the respondent would ask for clarification regarding whether the response should reflect their personal opinion or corporate policy. The instruction always was to focus on
corporate policy, although it is likely that some element of personal opinion or perception was included in the open ended responses.

6. **Non-predictive Results:** The previously stated limitations mean that the outcome of the study cannot be used to predict the nature of competition between financial institutions as a result of the deployment of Internet systems. However, it should provide a clearer picture of how these firms believe they can achieve and sustain an advantage over their competitors.

5.4 **Framework for Analysis**

Analysis of the research findings is based on a four-element model suggested by Porter (1985) as a means of gauging whether or not a technological change is beneficial to an industry. These four elements were described in detail in the Literature Review. The model reflects an industrial-organization viewpoint on competition, and centres on issues such as sustainable improvements in differentiation or cost drivers, first mover advantage, and the technology's impact on industry structure.

In light of the uncertainty surrounding the Internet and its role in competitive advantage, it seems particularly appropriate to use this general framework to gain an understanding of how and if financial institutions will gain advantage. It should also be possible to determine what first-move advantages are enjoyed by the first adopters of full service Internet banking: Bayshore Trust (Canada) and Wells Fargo (United States).
6. FINDINGS

6.1 Introduction

This chapter contains the research findings from a total of ten telephone interviews with executives from leading financial institutions in Canada (7) and the United States (3). The interviews were conducted in March and April 1996.

6.2 List of Participants - Canadian

Five of the Canadian participants were chosen because they are large chartered banks who are among the major firms in the industry. Bayshore Trust was included because it was the first fully on-line bank in the country. Visa Canada represents one of the two largest international credit cards companies.

1. Bank of Montreal
2. Bank of Nova Scotia
3. Bayshore Trust
4. Canadian Imperial Bank of Commerce
5. Royal Bank of Canada
6. Toronto Dominion Bank
7. Visa Canada

6.3 List of Participants - Non-Canadian

Other participants were chosen for their distinctive involvement in the Internet or the North American financial community.

1. First Data
2. Mastercard
3. Wells Fargo

First Data Inc. processes more than fifty percent of all Visa and Mastercard transactions in the United States. Mastercard is one of the two largest credit card companies. Wells Fargo was selected because of its innovative and highly functional Internet capabilities, plus its size in the American financial community (it is the sixth largest institution in the country following an acquisition earlier in 1996).

The following table lists the positions held by the subjects interviewed. To ensure confidentiality, the list is presented in random sequence unrelated to the alphabetized list of firms above. The intent of the table is to show that participants were drawn from managerial and executive ranks of participating firms.

Despite the limited sample size, firm names are not associated with any data reported here. Instead, all results are shown in aggregate.
Table XVI - Positions Held by Interviewees

<table>
<thead>
<tr>
<th>Position Title</th>
<th>Area of Responsibility</th>
</tr>
</thead>
<tbody>
<tr>
<td>Associate Marketing Manager</td>
<td></td>
</tr>
<tr>
<td>Marketing Manager</td>
<td></td>
</tr>
<tr>
<td>Marketing Manager</td>
<td>New Channel Development</td>
</tr>
<tr>
<td>Product Manager</td>
<td>Internet Services</td>
</tr>
<tr>
<td>Product Manager</td>
<td>Cash Management</td>
</tr>
<tr>
<td>Senior Vice President</td>
<td>Customer Service</td>
</tr>
<tr>
<td>Senior Vice President</td>
<td>Strategic Procurement</td>
</tr>
<tr>
<td>Treasurer</td>
<td></td>
</tr>
<tr>
<td>Vice President</td>
<td>Interactive Marketing</td>
</tr>
<tr>
<td>Vice President</td>
<td>Information Technology Planning</td>
</tr>
</tbody>
</table>

6.4 Summary Table of Current Interactive Service Capabilities

This summary table indicates the availability of a service. It does not describe how well that service is provided, nor indeed whether the service adds clear value to a customer.

Interactive services are considered of importance in the context of this paper because they illustrate capabilities that could lead to improved competitive position. Two institutions stand out as a result of unique features they offer:

- **Bayshore Trust** offers on-line rapid loan application and approval;
- **Bank of Montreal** offers personalized home pages for customers or browsers;
Figure 6 - Summary Table of Current Interactive Service Capabilities

<table>
<thead>
<tr>
<th>INTERACTIVE SERVICES</th>
<th>Bayshore Trust</th>
<th>Bank of Montreal</th>
<th>CIBC</th>
<th>Royal Bank</th>
<th>Toronto Dominion</th>
<th>Scotia Bank</th>
<th>Canada Trust</th>
<th>MasterCard</th>
<th>Visa</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Personalized home pages</td>
<td></td>
<td></td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2</td>
</tr>
<tr>
<td>On-line loan application and approval</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Mortgage application</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>On-line account balance</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2</td>
</tr>
<tr>
<td>RSP investment guide</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td>6</td>
</tr>
<tr>
<td>Mutual fund guide</td>
<td>✓</td>
<td></td>
<td></td>
<td>✓</td>
<td></td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td>5</td>
</tr>
<tr>
<td>Application forms</td>
<td>✓</td>
<td></td>
<td></td>
<td>✓</td>
<td></td>
<td></td>
<td>✓</td>
<td>✓</td>
<td></td>
<td>4</td>
</tr>
<tr>
<td>Interest rate comparisons</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2</td>
</tr>
<tr>
<td>ABM locator</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>✓</td>
<td></td>
<td>4</td>
</tr>
<tr>
<td>Customer newsletter</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>✓</td>
<td></td>
<td>2</td>
</tr>
<tr>
<td>Keyword search facility</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>✓</td>
<td></td>
<td>4</td>
</tr>
<tr>
<td>Electronic mail</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td>9</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>INFORMATION SERVICES</th>
<th>Bayshore Trust</th>
<th>Bank of Montreal</th>
<th>CIBC</th>
<th>Royal Bank</th>
<th>Toronto Dominion</th>
<th>Scotia Bank</th>
<th>Canada Trust</th>
<th>MasterCard</th>
<th>Visa</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Financial and investment information</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td>7</td>
</tr>
<tr>
<td>information not likely to be available</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>through other sources</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stock and bond prices</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>5</td>
</tr>
<tr>
<td>Promotional material about</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>9</td>
</tr>
<tr>
<td>financial services</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Special information targeted to</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>4</td>
</tr>
<tr>
<td>small business Internet use</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

6.5 Importance of Information Technology to the Firm

The initial group of five questions was designed to develop an understanding of the strategic importance each firm ascribes to information technology. Respondents provided their perception of where the firm stands according to four attributes that combine to indicate the importance of IT. These included: IT as a source of competitive advantage, the firm as an IT leader, the size of IT budgets, and the strategic contribution of IT to corporate objectives. Aggregate responses are shown in Table XVII.
The results indicated that the firms interviewed attributed a great deal of importance to information technology:

1. Ninety percent of the responses indicated that information technology is a source of competitive advantage;

2. Eighty percent of the firms consider themselves leaders in information technology;

3. Ninety percent of firms said their IT budgets reflect the strategic importance of information technology to the business;

4. All respondents believed that their firms set information technology priorities with strategic business objectives in mind.

Table XVII - Perceived Importance of Information Technology to the Firm

<table>
<thead>
<tr>
<th>Question</th>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
<th>Did Not Answer</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Information Technology is a source of competitive advantage for your firm.</td>
<td>7</td>
<td>2</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Your firm considers itself a leader in the development and application of IT.</td>
<td>4</td>
<td>4</td>
<td>1</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>3. The relative importance of Information Technology is reflected in the size/significance of IT budgets.</td>
<td>5</td>
<td>4</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Information Technology priorities are determined on the basis of their contribution to the achievement of strategic objectives.</td>
<td>6</td>
<td>4</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
A summary of these findings is presented in Figure 7 shows the strong perception that information technology is of strategic importance to the firms represented in the sample. The chart in Figure 7 is based on aggregate responses from questions 1 through 4, grouping answers of Strongly Agree and Agree as indicative of a high level of importance for information technology.

Question 5 was an open-ended follow up to the previous four. It provided an opportunity for respondents to elaborate on the reasons why they felt their firms were IT leaders. As summarized in Table XVIII, half of those surveyed felt that information is core to the business of the firm; that information is the "product" the firm produces and deals in. Almost as many indicated that their firm had achieved some form of first mover advantage in the information technology arena. Examples mentioned included the firm being first to offer on-line banking (through a

<table>
<thead>
<tr>
<th>Response</th>
<th>Frequency</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Information is core to the business</td>
<td>5</td>
<td>All financial products are inherently information based or have a technology component. The importance of the information content versus the physical product is increasing. The only real “product” the firm deals in is information.</td>
</tr>
<tr>
<td>First mover</td>
<td>4</td>
<td>These firms have deployed innovative interactive IT applications in the past. In some cases there is a history of innovation dating back several years.</td>
</tr>
<tr>
<td>IT leadership is a corporate goal</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Did not answer</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>
private network), being first to launch ABMs, and being an award winner for innovative
deployment of new client/server technology systems.

6.6 Importance of the Internet to the Firm

As was the case with the initial group of five questions, the next seven questions can be readily grouped together. Here, the information technology focus began narrowing to the Internet and its perceived importance to the firms interviewed.

Similar measures to those in the previous section were used to obtain an overall picture of the importance of the Internet to participating firms: the Internet as a source of competitive advantage; the firm as an Internet leader; the strategic orientation of Internet initiatives; and the expectation of return on investment (ROI) in the Internet context.

<table>
<thead>
<tr>
<th>Question</th>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
<th>Did Not Answer</th>
</tr>
</thead>
<tbody>
<tr>
<td>6. The Internet is or will be a source of competitive advantage for your firm.</td>
<td>5</td>
<td>4</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. Your firm considers itself a leader in the development and application of Internet financial services.</td>
<td>3</td>
<td>4</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8. Your firm's Internet strategy falls within a larger overall framework for Information Technology strategies.</td>
<td>5</td>
<td>4</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9. Internet initiatives are expected to show a positive return on investment.</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>

The results shown in Table XIX indicate a significant importance attributed to the Internet, although not as strong an endorsement as for information technology in general:

1. Ninety percent believed the Internet is, or will be, a source of competitive advantage;
2. Seventy percent believed their firm is already a leader in Internet technology;

3. Ninety percent of the firms indicated that their Internet strategy is part of overall IT strategy (as opposed to the grassroots movements that are sometimes associated with establishing a corporate home page in some industries);\(^{16}\)

4. Only fifty percent of respondents thought that the Internet would show a positive return on their investment.

The aggregate results of questions 6 - 9 are shown in Figure 8, with responses for all four questions accumulated according to specific response. The aggregation is based on grouping answers of Strongly Agree and Agree together as being indicative of a high level of importance for the Internet.

Considering that ninety percent of the firms indicated that the Internet is or will be a source of competitive advantage, it is important to understand what they believe will be the source of that advantage. As outlined in Table XX, there was a wide range of responses to this question (10) and respondents were free to name as many sources of advantages as they deemed important.

---

\(^{16}\) This is perhaps particularly true in the public sector where pressure to be on the web can bubble up from individuals or departments who see its importance and utility before corporate IS departments.
Table XX - Question 10 - How the Internet May Provide Competitive Advantage

<table>
<thead>
<tr>
<th>Response</th>
<th>Frequency</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low cost</td>
<td>3</td>
<td>Some described “huge” savings in processing Internet transactions versus either branch or phone. Savings may be passed on to customer in the form of lower service charges. Internet service deployment means fewer costly branches have to be built and maintained. Internal intranets were also cited as a source of cost reduction.</td>
</tr>
<tr>
<td>Differentiation</td>
<td>3</td>
<td>Target or “micro” marketing.</td>
</tr>
<tr>
<td>Availability of new products &amp; service delivery channels</td>
<td>3</td>
<td>Some products will only be available on the Internet. New services will make it possible to attract and retain customers.</td>
</tr>
<tr>
<td>First mover</td>
<td>2</td>
<td>These firms are among the first movers in the deployment of Internet technologies as they were with information technology in general.</td>
</tr>
<tr>
<td>Changes in value chain</td>
<td>2</td>
<td>The disintermediating effect of Internet systems will create new opportunities for financial services companies. Old means of service provision will be inadequate.</td>
</tr>
<tr>
<td>Switching costs</td>
<td>2</td>
<td>Brand or firm preferences in the financial services sector are mature and difficult to change. The Internet will make it easier to “steal” customers from competitors.</td>
</tr>
<tr>
<td>Adaptability</td>
<td>1</td>
<td>Some firms may make or have already made investments in Internet technologies that will soon be outdated. It is important to avoid sinking large amounts into narrow technology choices. Instead, remain flexible and adaptable to the rapid and sometimes unpredictable changes in technology.</td>
</tr>
<tr>
<td>Internet demographics</td>
<td>1</td>
<td>Current Internet users are an attractive and potentially profitable segment.</td>
</tr>
</tbody>
</table>

Seventy percent of respondents indicated that their firm considered itself an internet leader. Question 11 probed the reasons why, with results summarized in Table XXI. Two firms cited first mover advantage. In both cases, these assertions of first mover status seem reasonable in light of the advanced functionality of the respective web sites.
Being involved in industry standards development was also mentioned twice, both times in the context of security standards. This matches with current initiatives in the SET standard, which is being collaboratively developed by the major credit card firms.

<table>
<thead>
<tr>
<th>Table XXI - Question 11 - Why Firm Considers Itself Internet Leader</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Response</strong></td>
</tr>
<tr>
<td>----------------</td>
</tr>
<tr>
<td>First mover</td>
</tr>
<tr>
<td>Taking the lead in standards development</td>
</tr>
<tr>
<td>Quality of web site</td>
</tr>
<tr>
<td>Avoid investing too much too early</td>
</tr>
</tbody>
</table>

A further three firms did *not* consider themselves Internet leaders for a variety of reasons:

1. The current web sites are very limited, they only offer electronic brochures rather than true interactive applications;

2. The Internet is still a technical person’s realm rather than an effective place to do business, therefore the firm is not pursuing a leadership position;
3. The current leaders are basically trying to establish standards for doing business on the Internet and (our) firm will become involved once those questions have been straightened out;

4. The firm is very conservative and does not consider the Internet a priority.

Only about half of the firms sampled were expecting a return on their Internet investments in the next two years. In many respects this is not surprising, given the relatively small size of Internet investments and the uncertainty of the longer term business prospects for electronic commerce.

The planned measures of the impact on ROI appear somewhat vague and only three responses were recorded. The results are summarized in Table XXII and Table XXIII.

Table XXII - Question 12 - Planned Measures of Internet’s Impact on ROI

<table>
<thead>
<tr>
<th>Response</th>
<th>Frequency</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Visits to Web Site</td>
<td>2</td>
<td>Tracking what services are used</td>
</tr>
<tr>
<td>Closure rates</td>
<td>1</td>
<td>The ability to get and retain customers over the long haul</td>
</tr>
<tr>
<td>Did not answer</td>
<td>2</td>
<td>Number of total who said they were looking for ROI but would not say how they would know they got it.</td>
</tr>
</tbody>
</table>

Table XXIII - Question 12 - Non-financial Reasons for the Firm’s Internet Investments

<table>
<thead>
<tr>
<th>Response</th>
<th>Frequency</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gaining experience</td>
<td>3</td>
<td>The firm is learning “how to play” in the Internet arena. Concerns regarding commodification. Some firms also called this “intellectual ROI”.</td>
</tr>
<tr>
<td>Low cost of experimentation</td>
<td>2</td>
<td>There is very little incentive not to launch a web site because the cost of doing so is low. Even if it contributes nothing, the low cost and potential for future opportunities make it attractive.</td>
</tr>
</tbody>
</table>
6.7 Internet Payments

The next group of seven questions continued to narrow the focus of the study to Internet payments.

Eighty percent of respondents agreed or strongly agreed that Internet payments would become a source of competitive advantage; that the firm would offer such payments within the next 12 months; and that the firm has satisfactorily addressed security issues.

Only about half of the firms felt that the Internet would play a role in the clearing and settlement system. Overall aggregate results are shown in Table XXIV.

<table>
<thead>
<tr>
<th>Question</th>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
<th>Did Not Answer</th>
</tr>
</thead>
<tbody>
<tr>
<td>13. Internet payments are or will be a source of competitive advantage for your firm.</td>
<td>4</td>
<td>4</td>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>14. Your firm will offer Internet payments within the next 12 months.</td>
<td>3</td>
<td>5</td>
<td>1</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>15. Your firm has a satisfactory security strategy for Internet payment services.</td>
<td>2</td>
<td>6</td>
<td>1</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>16. The Internet will play an important role in the clearing system.</td>
<td>1</td>
<td>4</td>
<td>3</td>
<td></td>
<td>2</td>
</tr>
</tbody>
</table>

Similar to the answers to question 10, several respondents indicated that they have, or anticipate having, a first mover advantage in providing Internet payments. In some cases this was expected to be an outgrowth of the firm’s overall first mover advantage in technology and other Internet services.

Several firms also cited increased convenience for their customers as an important benefit of Internet payments. The ability to handle routine banking tasks, or to easily and
securely pay for purchases from home, were the examples given of increased customer convenience. See Table XXV for the full results.

**Table XXV - Question 17 - Competitive Advantage Through Internet Payments**

<table>
<thead>
<tr>
<th>Response</th>
<th>Frequency</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>First mover</td>
<td>3</td>
<td>Similar to question 10. This advantage applies primarily in the short term.</td>
</tr>
<tr>
<td>Increased customer convenience</td>
<td>3</td>
<td>To a bank, the customer is the end consumer. To card companies and processors, the bank is the customer.</td>
</tr>
<tr>
<td>Cost Reduction</td>
<td>2</td>
<td>For payments and funds transfer</td>
</tr>
<tr>
<td>Switching costs</td>
<td>1</td>
<td>Once a customer is accustomed to banking or paying on the Internet they are likely to remain with whatever firm gets the business first.</td>
</tr>
<tr>
<td>Did not answer</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>

Two firms did not feel the Internet will be a source of competitive advantage because all of their major competitors will be able to provide the same capability. That is to say, there would be no opportunity for differentiation. On the other hand, they noted that there could be some disadvantage if their firm is not involved at least in a perfunctory way, simply because the Internet is so popular.

Of the firms who responded to question 18 regarding how they are approaching the security issue, most indicated the need to partner with other firms. They cited numerous interdependencies required to make a broad security standard work. Multiple stakeholders from different parts of the transaction must agree to the protocol: merchants, card companies, banks, etc. Thus, partnerships with customers, suppliers and even competitors were said to be necessary. See Table XXVI.
Table XXVI Question 18 - How the Firm is Addressing Security for Internet Payments

<table>
<thead>
<tr>
<th>Response</th>
<th>Frequency</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Partnerships with other firms</td>
<td>5</td>
<td>The firm is developing its security strategy in collaboration with other firms, including rival firms, because it is too expensive to undertake alone.</td>
</tr>
<tr>
<td>Setting and modifying security standards</td>
<td>2</td>
<td>The firm is addressing security by taking the lead in standards development.</td>
</tr>
<tr>
<td>Experimentation with internal intranets</td>
<td>1</td>
<td>Experimentation with encryption and firewall technology is taking place first. Once it is proven internally, similar approaches can be deployed for publicly available services on the Internet.</td>
</tr>
<tr>
<td>Did not answer</td>
<td>4</td>
<td></td>
</tr>
</tbody>
</table>

Most respondents felt the Internet would have a very limited role in the Canadian clearing and settlement system. As indicated in Table XXVII, the most likely role suggested was the predictable one of enabling merchants and consumers to complete a payment transaction.

Table XXVII - Question 19 - The Internet’s Expected Role in the Clearing/Settlement System

<table>
<thead>
<tr>
<th>Response</th>
<th>Frequency</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minimal or none</td>
<td>5</td>
<td>It will be integrated as a channel and is not in the immediate future.</td>
</tr>
<tr>
<td>Significant</td>
<td>2</td>
<td>Eventually, the Internet will be the preferred choice compared to private networks due to lower cost. This will only happen when security issues have been resolved.</td>
</tr>
<tr>
<td>Did not answer or did not know</td>
<td>2</td>
<td></td>
</tr>
</tbody>
</table>
6.8 Porter's Model of Beneficial Technologies

The second section of the interview is concerned with Porter's (1985) model of what constitutes a beneficial technology. There are four elements in the model, with the first of these elements broken down further into four factors that indicate the sustainability of competitive advantage.

6.8.1 Model Element 1 - The technological change lowers cost or improves differentiation and it is sustainable

Only one respondent indicated that some cost savings had already been achieved through the deployment of Internet services. This firm felt that its Internet capabilities meant it did not need to expand the number of expensive branch locations in order to increase customer scope. The resultant cost savings were then passed on to customers in the form of interest rate bonuses, making them a source of competitive advantage.

More frequently, however, respondents indicated an expectation that costs would be reduced as a result of being on the Internet, although the time frame for such savings varied widely. Aggregate responses are shown in Table XXVIII.

Table XXVIII - Question 21 - Internet’s Expected Impact on Cost Drivers

<table>
<thead>
<tr>
<th>Internet Services Expected to Reduce Costs</th>
<th>Frequency</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Within 1 year</td>
<td>3</td>
<td>Cost savings will result from paper, postage, in-branch brochures, and other advertising costs. Some speculation that staff savings may contribute, but these are not well defined.</td>
</tr>
<tr>
<td>Within 2 years</td>
<td>2</td>
<td>Electronic banking is a lower cost channel than branch banking. Routine or low-value-added transactions will be migrated to electronic delivery.</td>
</tr>
<tr>
<td>More than 2 years</td>
<td>4</td>
<td>Direct mail and other advertising costs. Need to migrate a large existing customer base. Exploring many other alternative delivery channels in addition to the Internet (e.g. PC banking, phone banking)</td>
</tr>
</tbody>
</table>
The firm’s ability to differentiate itself from competitors was the focus of question 22 as summarized in Table XXIX. The factors the firms gave as being important sources of differentiation match quite well with the types of services being provided on their corporate web sites. For instance, several firms feel they provide added-value content through small applications such as interactive financial modelling tools, and several such tools are to be found among the web sites of participating firms. Similarly, a few also felt they provide unique services such as those noted in the overview of web sites (see Appendix B).

Table XXIX - Question 22 - Internet’s Expected Impact on Service Differentiation

<table>
<thead>
<tr>
<th>Response</th>
<th>Frequency</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Value Added Information Content</td>
<td>5</td>
<td>Content is aimed at being useful for customer without being overtly promotional for the firm. Examples include wealth allocation models and other financial planning tools.</td>
</tr>
<tr>
<td>Unique services</td>
<td>4</td>
<td>Provision of unique services makes the firm different from others in industry. First to offer these services, no other competitors appear to be close to matching these capabilities. Examples include personal home pages for customers, loan approval, bank balances online.</td>
</tr>
<tr>
<td>Currency of Information Content</td>
<td>4</td>
<td>Time sensitive information such as interest rates and stock prices.</td>
</tr>
<tr>
<td>Context appropriate content</td>
<td>1</td>
<td>The quality of the firm’s web site, and the information it contains, is of less strategic importance than the context in which a client accesses the firm’s services. For instance, a client should be able to “seamlessly” use the firm’s on-line payment services from an Internet mall(^{17}) rather than have to leave the context of the mall and access the firm’s web site in order to arrange payment.</td>
</tr>
</tbody>
</table>

\(^{17}\) An Internet site modelled on a shopping mall, involving multiple vendors marketing and selling products from the same “location”.

81
6.8.2 Sustainability Factor 1: Source of Technological Change

Porter’s model indicates that the source of a strategically beneficial technology is important. Internal sources are preferable to external ones because they are harder for competitors to perceive and to copy. Since most Internet systems are built on industry standards that are readily available in the public domain, the key to internal technology capabilities is more likely to lie with the development of unique and proprietary applications.

Responses to question 23 revealed that seven of the ten firms interviewed are planning to deploy proprietary applications in the foreseeable future:

1. Four will have applications on-line in less than a year (e.g. bill payments);
2. Two will have applications ready in less than 2 years (e.g. fraud and risk management);
3. One will deploy new systems later (more than 2 years).

Three other firms were not yet planning to develop proprietary applications. These firms were taking a more cautious approach to the Internet generally. There was some indication from these respondents that while their firms may be appear out-of-step with more advanced competitors, they believed that if a profitable business model were to emerge for the Internet, the firm could make the necessary investments to deploy applications quickly.

6.8.3 Sustainability Factor 2 - Internal R&D Spending

The next group of four questions focused on cost or differentiation advantages that may be forthcoming through research and development spending in the area of Internet systems and applications. All firms reported an increase in internal spending on Internet
related projects, with further increases expected in coming years. However, when compared to total information technology budgets, these investments still represented a "drop in the bucket" as one respondent put it. See Table XXX.

Some interesting comments arose from question 27 regarding the staff resources allocated to Internet projects. Several firms indicated that while the number of staff on such projects may be limited, the quality of those individuals is well above average. In one case it was stated that measuring IQ points is more important than measuring the number of people assigned to a project. The emphasis on quality suggests a higher level of importance associated with the Internet projects than would be inferred from financial investments alone.

Table XXX - Questions 24-27 - Cost or Differentiation Advantages Through R&D

<table>
<thead>
<tr>
<th>Measure</th>
<th>Frequency</th>
<th>Response</th>
</tr>
</thead>
<tbody>
<tr>
<td>24 Internet budget relative to total IT budget</td>
<td></td>
<td>insignificant, drop in the bucket</td>
</tr>
<tr>
<td></td>
<td>7</td>
<td>did not answer or did not know</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>25 Changes in level of investment in Internet in past 2 years</td>
<td></td>
<td>increase</td>
</tr>
<tr>
<td></td>
<td>10</td>
<td>same</td>
</tr>
<tr>
<td></td>
<td>-</td>
<td>decrease</td>
</tr>
<tr>
<td></td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>26 Expected changes in level of investment in Internet in coming year</td>
<td></td>
<td>increase</td>
</tr>
<tr>
<td></td>
<td>8</td>
<td>same</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>decrease</td>
</tr>
<tr>
<td></td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>27 Percentage of Internet costs that are R&amp;D related</td>
<td></td>
<td>more than 50%</td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>less than 50%</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>did not answer</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td></td>
</tr>
</tbody>
</table>

6.8.4 Sustainability Factor 3 - Internal Technical Skills

Another important factor in determining a beneficial technology is the availability of internal skills. This was measured in questions 28-32 as summarized in Table XXXI. Most firms did some or all of their internet developments in-house, rather than
contracting it entirely to an outsourcing agency. Additional comments in the interviews indicated that of those firms who currently do some outsourcing, all but one intend to do more of the work in-house within the next year. In most cases, in-house development was said to facilitate the creation of strategically important applications, whereas outsourcing would make its greatest contribution for operational (i.e. non-strategic) systems.

The staff of most information systems departments in banks and other institutions surveyed are traditionally focused on highly structured internal applications (i.e. mainframe systems). Therefore, in order to get a rapidly develop Internet expertise, many firms are hiring knowledgeable people “off the street” rather than developing a core of capability through training of existing staff. One firm is developing additional expertise by concentrating on intranet applications first, then transposing those skills to external applications when a business case for such systems becomes more obvious.

Table XXXI - Questions 28-32 - Availability of Internal Skills

<table>
<thead>
<tr>
<th>Measure</th>
<th>Frequency</th>
<th>Response</th>
</tr>
</thead>
<tbody>
<tr>
<td>28 Internet services provided in-house or outsourced</td>
<td>5</td>
<td>In-house</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>Outsourced</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>Both</td>
</tr>
<tr>
<td>29 Training budget to build internal technical skills</td>
<td>4</td>
<td>Hiring trained staff</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>Insignificant</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>Did not answer</td>
</tr>
<tr>
<td>30 Approximate number of staff with Internet technical skills</td>
<td>9</td>
<td>“Handful”</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>Did not or could not answer</td>
</tr>
<tr>
<td>31 Percentage of total IS staff with Internet skills</td>
<td>7</td>
<td>“Handful”</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>Did not or could not answer</td>
</tr>
</tbody>
</table>
6.8.5 Sustainability Factor 4 - Rate of Technological Diffusion

Question 33 is linked to question 23 in the sense that both examine the development and implementation of Internet systems. Both of these questions caused the greatest amount of hesitation among respondents. Possibly they were reluctant for outsiders to have this information.

Of those firms who did respond to this question, four indicated plans to deploy new Internet applications in the next year. One respondent indicated a “wait and see” attitude. Sample applications to be deployed include: lending on-line (information, application, and approval) and Internet mall payments.

6.8.6 Model Element 2 - Cost or Differentiation advantages even if technology imitable

Question 34 asked respondents about any unique or firm specific Internet applications that had reduced cost or improved differentiation.

Timing on this question is a critical issue. While some first movers believe they have achieved a cost advantage, most respondents were unable to determine this until more applications had been deployed. Differentiation was perceived to be more prevalent than cost reduction.

<table>
<thead>
<tr>
<th></th>
<th>Yes</th>
<th>No</th>
<th>Too Soon to Tell</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Cost</strong></td>
<td>2</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td><strong>Differentiation</strong></td>
<td>4</td>
<td>4</td>
<td>2</td>
</tr>
</tbody>
</table>

Table XXXII - Cost or Differentiation Advantages

6.8.7 Model Element 3 - How Firms Protect Their Advantage

Following is a series of paraphrased responses to the question of how firms intend to protect an existing advantage they may have in the Internet arena.

1. Stay ahead of the game and ahead of the curve;
2. Cannot prevent others from copying what you do, therefore must continually strive to be first to keep the advantage, let others play catch-up and imitation will be perceived by customers;

3. Ensure the brand is protected (more difficult to do this in a virtual marketplace);

4. Competition is based on speed not protection ("it is a race, not a fortress");

5. Avoid becoming bogged down in a single concept (i.e. the Internet). Instead, have multiple new channels under development and evaluation;

6. Cast the net wide and create many different projects knowing some of them will fail;

7. The key to proprietary advantage is not the surface technology but the links to proprietary information and systems that cannot be duplicated;

8. Any advantage will be inherently short-lived and cannot be protected.

6.8.8 Model Element 4 - Technological Change Improves Overall Industry Structure

Question 36 asked respondents to describe the role of Canadian banking industry in the adoption rate of Internet technology, and the resultant impact on the industry itself.

Most respondents attached a significant importance to the Canadian banking industry’s role in the adoption and diffusion of Internet services. Following are sample responses:

1. It (the industry) drives public perception of Internet issues such as security and safety;

2. As more of the big players become more heavily involved, more consumers will be willing to use Internet based services;

3. There is an enormous threat of disintermediation;

4. The industry is inherently conservative. Most major players will take a wait and see attitude while US banks and smaller competitors in Canada (like Bayshore Trust) will continue to be on the leading edge;
5. The big chartered banks want to "own the client" and will be slow to move into full Internet services;

Question 37 examined the perceived impact of the Internet on the banking industry by relating it (the Internet) to an earlier technological innovation, the Automated Banking Machine. As discussed earlier, the ABM had the effect of reducing differentiation and brand awareness. Although responses are somewhat mixed, the predominant feeling was that some low value transactions will indeed be made more of a commodity by the Internet. Other transactions, especially those of a higher value (and thus more readily differentiated) will not become commodities.

**Table XXXIII - Perceived Risk of Commodification**

<table>
<thead>
<tr>
<th>Response</th>
<th>Frequency</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Either or both is possible</td>
<td>6</td>
<td>Could go either way: demographics may not support brand loyalty; existing customers have to be brought into this new channel; will happen in some cases; need to be intelligent and &quot;get it&quot; re the potential of the technology in order to avoid commodification. Both: will commodify lower value-added transactions (such as cashing a cheque) but higher value-added services are also likely (i.e. it will enable entirely new ways of buying). It is acceptable for some products to become commodities as long as others can be differentiated. Brand and image protection may be more important than whether or not services become a commodity.</td>
</tr>
<tr>
<td>No</td>
<td>2</td>
<td>The web brings a face back to the bank which was lost through the ABM, the technology enables this. ABMs are capable only of simple transactions whereas the Internet can support higher value-added transactions, therefore the risk of services becoming commodities is much lower for Internet than for ABMs.</td>
</tr>
<tr>
<td>Yes</td>
<td>2</td>
<td>The risk of services becoming commodities is significant.</td>
</tr>
</tbody>
</table>
6.9 Summary

The research findings provide the basis for some interesting discussion regarding the Internet's actual, perceived and expected role in the financial services industry. The results indicate that information technology, and the Internet in particular, are seen as sources of competitive advantage in this industry. While information technology expenditures are significant, Internet resource allocation is still quite modest. However, the relatively small size of these allocations is compensated in part by the calibre of staff assigned to Internet-related projects.

With the exception of the first movers, cost reductions through Internet systems deployment are not evident yet. But participating firms have a strong expectation that both cost reduction and differentiation will take place within the next one to two years. Firms are differentiating themselves by developing proprietary applications that are not readily copied by competitors. In the longer term, relentless innovation is viewed as the only realistic way to attain and keep competitive advantage.

The next concluding chapter attempts to put these points in perspective.
7. Discussion and Conclusions

7.1 Introductory Comments

Perhaps the most obvious conclusion derived from the research findings presented in the previous chapter is that most of the firms that participated in this study did not seem to have elaborate business strategies for the Internet. Despite the fact that information technology is a core part of their business, many were taking a wait-and-see approach with the anticipation of being able to react quickly if and when profitable competitive opportunities emerge from the Internet.

At first, such results seem rather disappointing. After all, during the time this thesis was being developed, the web became even more prevalent in the commercial sector. Indeed, it is becoming impossible to avoid. It is now the norm to see an Internet address displayed for popular television programs, films, or upcoming events. Such was not the case even six months ago. One forms the impression that the Internet has been woven into the fabric of modern business, and in a sense that is true.

But on closer scrutiny it becomes clear that most of these sites offer standard fare: electronic brochures, company profiles, email links to anonymous “webmasters” and marketing gimmicks like contests or jokes-of-the-day, the purpose of which is to gather information about customers rather than to provide valuable services to them. Companies have learned how to build attractive web sites that are stimulating in terms of sight and sound. In fact, many of the handbooks on business use of the web concentrate on telling firms how to make their site interesting to the consumer while not violating the established behavioural norms of the Internet.

Recall the example of technology convergence required to make the airplane a commercially viable technology (Senge 1990) and the issues noted by Tenenbaum (1994) regarding technical advances needed for widespread adoption of Internet commerce. There is a need for significant progress along these lines. The following
points are suggested as examples of the technology convergence that is still required for Internet commerce.

1. **Speed of data transfer**: Even the fastest modems on the market today are too slow for complex applications involving large amounts of graphics, video, sound, and payment. Much of the existing telecommunications infrastructure was installed to carry voice traffic, and does not have the capability of transporting the volume of data generated by multi-media applications. Joint ventures between telephone and cable television companies could solve this problem so that existing home cable hook-ups can be used to deliver Internet services at very high speeds.

2. **The utility cost of a personal computer**: The price-performance of personal computers continues to improve dramatically and more PCs are finding their way into people’s homes. But a suitably configured personal computer with multi-media capabilities still costs between $2,500 and $4,000, making it a sizeable financial commitment. And while PCs are becoming increasingly affordable, they represent a poor financial investment because new generations of technology are introduced frequently and render existing equipment obsolete. Other “home appliances”, such as televisions or stereo systems, are far more resistant to obsolescence and their value is better understood by consumers. Consequently, when an average family weighs the costs and benefits of a PC against other purchases, they may respond in the same way financial firms have responded to the Internet: they will wait-and-see. New information devices that rely on the network for most of their processing capabilities are now coming onto the market. They are said to cost a few hundred dollars and to provide a greater level of portability than personal computers. Perhaps these new devices will be sufficiently affordable and functional for most consumers.

3. **Ease of use**: The popular windowing systems now in use are a great advance over earlier computer interfaces. However, the computer is still a complicated device. Setting one up, especially for network access, is fraught with problems. Because of the complexity involved, problems are difficult to diagnose and solve without some technical training. Considering the popularity of jokes about people who are unable
to set the clock on a VCR, the ease of use problem is a significant disincentive to average consumers becoming involved with the Internet.

4. Accessibility: Most Internet Service Providers are located in large urban areas. Smaller or more remote communities may find Internet access very limited. In Ontario, there is an initiative underway to provide toll-free Internet access to all residents of the province. It remains to be seen if OPNet will provide the hoped-for geographical breadth of access.

In light of the foregoing, the research findings reported here are useful. Financial firms are not so far from the mainstream of Internet business use. It could even be said that the first movers in this industry (Bayshore Trust and Wells Fargo, for instance) are among the most innovative firms on the Internet, since they are offering personal financial products to customers on the web.

It is also possible that the results of the study were simply diluted because firms were not willing to discuss confidential business strategies in the interview.

7.2 The Importance of Information Technology to the Firm

It is clear from the research findings that, at least according to the perceptions of interview respondents, information technology plays a strategic role in the business success of these firms. All of the firms link information technology priorities and budgeting to the achievement of strategic objectives.

The earlier discussion of how payments have evolved from barter systems to information-based transactions, supports the notion that information is the actual product sold by these firms. This assertion was made by several respondents as an indication of why their firm was a leader in the information technology field. The purpose of most of the IT systems deployed by banks has been to enable faster and more efficient processing of financial transactions and records using proprietary technology. Consequently, there

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was not the same clash of cultures inherent in their foray into Internet services. The
financial institution had control over its system deployment for internal purposes,
whereas it must think like the customer when providing on-line services on the web.

Thinking like an Internet customer has further connotations for financial institutions.
The democratic Internet culture, which supports free expression of opinion but is highly
intolerant of overt marketing "come-ons", represents a singular challenge for Canadian
banks. Here is another good reason for the cautious approach. Conversely, a first mover
like Bayshore Trust shows its comprehension of the Internet culture by using interesting
graphics and humour throughout its web site. Bayshore actually uses the culture to its
own advantage by poking fun at chartered banks while at the same time pointing out cost
incentives to consumers using their Internet banking services.

7.3 The Importance of the Internet to the Firm

Respondents showed less certainty regarding the Internet's importance than was the
case with information technology generally. In light of the preceding discussion, this is
no surprise. Nevertheless, there is evidence that the firms are taking a strategic approach
to the Internet with the expectation of future competitive advantage and financial returns.

It is interesting to note that two elements from industrial-organization strategy theory
(cost reduction and service differentiation) were among the most frequently mentioned
sources of current or future competitive advantage. Particularly among the first mover
firms, Internet transactions were said to be significantly less costly than traditional
methods, including branch banking, telephone access and ABMs. This seems intuitively
correct, but participants were not willing to share specific cost comparison figures.

Only Bayshore Trust has demonstrated the degree of their commitment to low cost
strategies on the Internet by offering their customers better rates for loans or deposits
transacted on the web. At the other end of the spectrum are firms that think Internet cost
savings will stem from the lower printing, handling and postage costs associated with
electronic media versus paper. Doubtless there are savings to be had in this area. The
savings may be significant if the paper can be eliminated, but will be limited if electronic
publishing is simply a duplicate vehicle of information dissemination. And besides, surely there must be greater scope for benefit from technology of such promise as the Internet.

The low cost advantages noted in this portion of the interview were especially intriguing in light of the results from a subsequent question (21) wherein all but one respondent indicated that the Internet had not yet reduced their operating costs. Most expected it to do so in the foreseeable future. This suggested that low cost advantage stemming from Internet services was an expected advantage rather than one that has already been obtained.

Differentiation advantages stem from the firm’s ability to target services to individuals or groups. Recall the study by Andersen (1995) which indicated that Internet clients are a highly desirable segment, and the discussion of the near-zero incremental cost of customizing customer home pages. It seems clear that differentiation has real potential to be an important source of advantage.

The next most frequently mentioned sources of competitive advantage - first mover, disintermediation, and switching costs - are somewhat related and can be grouped together. Each has to do with the ability of a firm to obtain and retain customers. A first mover in this area, Bayshore Trust for example, has changed the value proposition by eliminating intermediate steps in loan application and approval. Once a customer becomes accustomed to the new way of doing business, there is a built-in switching cost resulting from the increased convenience and lower cost of the Internet-based service. At the same time, Bayshore has taken steps to reduce the cost to customers of moving their business to Bayshore. They provide an on-line form which can be used to authorize transferral of bank accounts from competitors.

These are clever tactics, and show a deep understanding of the capabilities of the technology. A successful Internet strategy is especially important to Bayshore, since it is
clearly at a competitive disadvantage relative to the chartered banks in terms of its assets, the size of its customer base, and even public awareness of its existence.\textsuperscript{19}

Only one respondent indicated that the Internet was not expected to be a source of competitive advantage. Rather, the firm regarded it as “the thing to do” at present. According to this view, the current purpose is to learn and gain experience for whatever technology (presumably one that is more useful) comes later. Although this respondent’s firm does have a presence on the Internet, it was described as a cost of doing business required to not be perceived as behind the times.

Perhaps this firm is unduly conservative. Then again, when taken in the context of general ROI expectations, a cautious approach is more understandable. Only three responses were recorded to the question of how the firm intends to measure the Internet’s effect on ROI. Half of those interviewed did not express the belief that financial returns would be forthcoming from the Internet in the foreseeable future. It could thus be concluded that the more realistic responses were from the firms that indicated they were on the web in order to gain experience with a potentially beneficial technology, and felt they could do so at a relatively modest cost.

Measures such as the number of times a web site is accessed are not useful indicators of a successful Internet strategy. There are an abundance of statistics reporting massive numbers of “hits” on various web sites. However, the nature of the web is such that a page containing, say, five images plus accompanying text, is accessed six times in order to download the full page of information. This translates into six “hits”, illustrating the futility of using this measure of success.

\textsuperscript{19} As of December 1994, Bayshore Trust’s assets totalled under $500 million. Total assets reported by the Royal Bank of Canada for the same period were $173,000 million.
7.4 Internet Payments

Eighty percent of the firms involved in this study expressed the belief that they would derive a source of competitive advantage from Internet payments, and that such payments would be offered within the next year. This seems at odds with responses in the previous section which indicated considerable caution toward the adoption of Internet transactions. Perhaps some firms have confidential plans for new Internet applications that they were not willing to divulge during the interview. Others may be looking to the SET protocol, established by Visa and Mastercard, as a source of secure electronic payments. Obviously, security is of paramount importance in any discussion of Internet payments.

Internet payments were thought to provide competitive advantage in many of the same ways as overall Internet services: first mover benefits, cost reduction and switching costs being among the factors mentioned. Some firms also thought the increased convenience to the customer will be important. It may be that they were referring to services such as bill payments on the Internet, in addition to the more obvious interactions between merchant and consumer. In this latter case, it is easier to see an advantage to the merchant obtaining the sale than to the bank which processes the transaction.

Results regarding the Internet’s impact on the overall payments system indicated that most firms think its role will remain limited to the front-end of a purchase and sale transaction, as is the case today. Two responses from early mover firms, however, indicate the possibility that the lower cost of the Internet will lead to the demise of private networks.

But there are too many uncertainties to draw this type of conclusion. The Internet is low cost today in part because of government funding that has gone into the development of the telecommunications infrastructure. And existing private networks for such functions as settling daily transactions between major financial institutions are firmly entrenched, stable and reliable. While they may be costly to operate relative to the Internet, there is no guarantee that this cost differential will exist permanently if the
Internet is more subject to free-market cost structures. And the loss of control over management and operation of the network is likely to be a significant disincentive to a risk-averse group of firms.

7.5 The Internet as a Beneficial Technology

Much of the previous discussion in this chapter relates to the benefits of the Internet to financial firms. This final section concentrates on how these elements relate to Porter's model of beneficial technologies.

One way in which Porter identifies a beneficial technology is that it lowers cost or improves differentiation in sustainable ways. Apart from one first mover that reported known cost savings, all other respondents indicated the expectation of lower costs. And many of these firms do not expect savings to begin for more than two years. While these institutions may genuinely have a solid plan that forecasts cost savings in the future, it is perhaps more likely that their long-term expectations are largely speculative. That is not to say that savings will not occur, they probably will. But they will not result from formal strategies identified by the firms in this study. In much the same way as any business can benefit from, say, continuing improvements in the price-performance of personal computers, it could be argued that savings from Internet services are almost inevitable. The real cost advantage will go to those firms who approach the cost reduction opportunity strategically. Again, Bayshore Trust stands as a current example of the strategic use of lower costs available through technology.

A key element in determining cost reduction will be whether Internet services replace or simply augment existing channels. If they replace existing services, then cost reductions are likely, whereas if they merely augment what is already available, cost reductions will not be as easily gained.

It is too early to tell which will happen until customers move en masse to the new medium. However, it was also pointed out that baby boomers (who make up a sizeable market segment) are still cautious regarding electronic banking and payments. On the
other hand, the so-called “Nintendo generation” is less risk-averse. They are expected to be the first big group of adopters, and will soon be a large consumer group as well.

Firms also try to differentiate their services on the Internet. Bearing in mind that most banking web sites currently offer little more than electronic brochures, the present potential for differentiation appears limited. Apart from first movers, the most advanced applications are, for example, financial modelling tools. These systems enable users to anonymously enter information about their financial situation. During RSP season there are numerous models to determine an individual’s optimal level of investment, or to identify the financial impact of borrowing to invest in a RSP.

These applications are far more valuable than electronic brochures, yet it is still difficult to see the sustainability of advantage stemming from readily imitable capabilities such as simple financial modelling tools. Unless the modelling tool offered by a particular institution is matched by a RSP program that fits the user’s need, these applications present the same drawbacks as ABMs. That is, the end user appreciates the convenience of the service rather than building loyalty to the company offering it.

The financial modelling tools may also be replaced by services from other firms that do a better job and are not affiliated with banks. For instance, a new web service was recently launched which provides personalized news and financial information 24 hours a day at no cost. The consumer need not go to a web site to get these services because once the software is installed, it comes on as a screen saver. This product shows the potential to disintermediate banks from providing such information, and also indicates the growing convergence of broadcast technology with the Internet (Resnick 1996).

Financial services firms need to develop proprietary applications that provide customers with access to personal banking services. Otherwise, they will be limited to offering services that are readily imitated. This is consistent with Porter’s assertion that benefits from a technology are more readily sustainable if the technology source is internal to the firm, rather than external.
Sustainability is also enhanced by the amount of research and development spending the firm is willing to commit. Results from this study showed that the current level of Internet R&D spending among these firms was very small, in both absolute and relative terms. In fact most respondents estimated it at less than one percent of the total information technology budget.

The low research expenditures were matched by the seemingly insignificant number of staff resources assigned to Internet projects. Most firms indicated that only a handful of people were involved in this area. Although in most cases the number is growing, it is still trifling when compared to the total staff involved in other information technology areas.

But staff numbers only tell part of the story. Most firms self-assessed their internal skill level regarding Internet systems as "primitive to low", but in most cases on the rise. Several firms commented that while they may not allocate a lot of people to Internet development, they carefully choose the brightest individuals possible. One respondent said that when it comes to Internet systems, "people either get it or they don't." This is a significant comment, for as we have seen in earlier discussion, the development of an Internet business model is challenging. It also underscores the notion that firms see likely potential in the Internet even if that potential is not quite clear. Many firms want to be the one to develop a highly profitable business model. A holy grail for Internet commerce.

7.8 Opportunities for Further Research

It has been stated here that Internet commerce, and Internet payments in particular, are recent developments in the business environment. There are few other studies of the impact of the Internet on competition, and certainly there is a need for more research. This study was exploratory in nature, and consequently is limited in its ability to help formulate business strategy. Hopefully, however, it can act as a basis for additional research of a more quantitative nature. Following are some possibilities for such study:
1. The current study focused on large financial services firms, predominantly Canadian banks and trust companies using brief exploratory interviews and observation of Internet sites as the main methodologies. A case study approach could prove useful in gaining insight into the internal issues resulting from the clash between the banking and Internet cultures.

2. An examination of Internet competitive advantage from a resource-based perspective, rather than the industrial-organization orientation taken here, may cast a different light on the issues.

3. A future follow-up on the stated intention of firms involved in this study would be interesting. Presumably, in one year’s time, most of these firms will be participating in some form of Internet payment system. It would then be clearer whether these interactive systems do have the expected positive effect on cost drivers and differentiation described here.

7.9 Summary

There is little doubt that the Internet will continue to be the focus of considerable attention for some time to come. A growing number of firms will deploy innovative applications to a growing segment of consumers. New technologies in the form of Internet “appliances” and high bandwidth networks should result in even more rapid adoption of the technology by the public.

First movers can differentiate themselves from competitors through the implementation of unique systems that later adopters are not offering.

In the Canadian financial services industry, where conservatism continues to be a strong characteristic of member firms, the adoption rate will depend on the perceived level of security which in turn will be influenced by the presence of major chartered banks in the electronic marketplace. Because Internet technology is readily available to all firms, the enduring source of competitive advantage will not come from the technology.
Competitive advantage will result from the quality of the services these firms offer to customers.

Finally, a brief comment on the impact of information technology on people. It is heartening to think that the Internet will enable banks, and other firms, to reduce their costs and enhance consumer convenience through improved service. Canada needs a globally competitive business environment, and profitability is essential to that competitiveness. But it is distressing to consider that much of the cost savings comes in the form of reductions in employment. And it is disturbing to note that despite record profits by Canada’s chartered banks, they continue to eliminate jobs to reduce operating costs even further. As we deploy new and better technology in the workplace, one can only hope that some people will remain employed to benefit by it.
Appendix A - A Brief History of the Internet and World Wide Web

The Internet had its origins in a project launched by the US Department of Defence in 1969. The Advanced Research Projects Agency (ARPA) wanted to build a network that would enable researchers to share computer resources and communicate with each other. Packet switching protocols were chosen to run the network so that, in the event of a military attack, the system would continue to operate even if one or more nodes stopped functioning. Similar protocols are used today and give the Internet its high degree of reliability for data transmission. If individual packets are damaged or routed in error, they are resent. Rather than create a breakdown in transmission, these errors usually result only in a reduction in overall speed of the network.

Over the following two decades, the original Department of Defence needs diminished, while universities and government agencies began using the emerging global Internet for a variety of new purposes. Ironically, electronic mail, which is still the most used Internet application, was added to the ARPAnet only as an afterthought. (Tapscott 1995) In the late 1980s new and oddly-named applications (Gopher, Archie, Veronica) began to emerge. These systems introduced greater convenience in locating and accessing the already vast information repositories on the Internet. Gopher offered a user a series of menus from which an item of interest could be chosen. When selected, the Gopher system would look up the address of the computer on which the information was stored, regardless of its geographic location, and connect the user to that site.

Although there was some business use of the Internet using Gopher and similar systems in the early 1990s, the amount and scope were negligible. A major drawback to these applications was their text-only presentation, which compared unfavourably with an information technology industry that was increasingly multimedia and "windows" oriented.

In 1989, the World Wide Web was developed by the European Particle Physics Lab. In order to readily exchange research information across the international network,
the developers created a data representation standard called the Hypertext Markup Language (HTML). In January 1993, Mosaic became the first program to enable easy navigation of the web by employing the HTML standard to link Internet documents containing text and graphics. In 1994, four thousand people a day downloaded a free copy of Mosaic. Correspondingly, the number of web servers grew from fifty worldwide in January 1993 to 100,000 in December 1995 (Tapscott 1995).

The aggregate Internet user population has grown from an estimated 1 million in 1988 to more than 25 million from over 100 countries in 1995, with growth continuing at approximately 15 percent per month. Despite well publicised concerns over issues such as security, low-cost accessibility and ease-of-use, commercial internet sites now outnumber the long-standing domains of education and government (Internet World May 1995).
APPENDIX B - SUMMARY OF FINANCIAL-SERVICES WEB SITES

This section is comprised of summaries listing the interactive and information based services available on nine financial services web sites as of early March 1996. The sites summarized include five of the major Canadian chartered banks, two trust companies, and the two major credit card companies.

Since these sites are modified and improved frequently, the services offered at each site are likely to increase in number and sophistication with the passage of time. Most of the sites reviewed here were either not on-line one year ago, or contained many fewer services than is the case today.

The summaries were developed from a subjective assessment of what services each site provided that (a) were unique, distinctive or interesting, and (b) were unlikely to be available through the normal branch banking context.

BAYSHORE TRUST

GENERAL CHARACTERISTICS

- Web Slogan: “Every Dollar Counts”;
- Total of 8 branches in Canada: 6 in Toronto, 1 in Ottawa, 1 in Calgary;
- Free unlimited chequing account paying GIC interest (single account);
- Better returns on savings than banks;
- Aggressively “anti-bank” with captions such as “Bayshore Bashes the Banks”;
- Bayshore has no tellers in its branches. The customer deals directly with an Account Manager who has more authority and capability than a teller;
- Claim to be first financial institution in the world to offer online financial transactions and first to offer online RSP contributions;
- Internet RSP returns 1/8% higher than from branches;
• Lower loan interest than other banks (chart provided);

**INTERACTIVE SERVICES**

• Chart comparing Bayshore to major banks showing lower service costs and better returns on chequing;

• GIC rates offered through Internet yield 1/8% higher returns than is the case in their own branches which are, in turn, higher than bank return rates;

• They claim to be passing on cost savings that result from not maintaining a large network of physical branches

• GIC purchases can be done through an application form;

• Mutual Funds link to a “financial advisor” via email;

• RSP segment has an interactive, semi-confidential “retirement tracker” to advise if you are saving enough for your retirement goals, assist in developing a retirement action plan

• Instant RSP loans at prime interest;

• Interactive RSP contribution calculator;

• Online transfer of RSP holdings from other institutions;

• On-line loan approval can be in as little as 60 seconds

• Calculator shows total savings on interest comparing Bayshore rates to bank rates over life of the loan

• Provide an interactive form for loan application

• “Bash the banks” - a contest to submit bank jokes with a $500 weekly prize awarded for joke of the week;

**INFORMATION SERVICES**

• Mutual funds limited promotional information given;
- Emphasize that they are, at heart, conservative business people;

- Copy of 1994 annual report on-line;

- Founded in 1977, growth milestones charted;

- Secured mortgages represent 90% of their total loan base;

- A chart shows Bayshore mortgage rates compared to banks;

- Bayshore is up to 0.1% lower for short terms and up to 0.35% lower on longer terms (i.e. 5 years)

- NOTE: no information given on how to apply for a mortgage, which is a problem since they only have 5 branches
Canada Trust

General Characteristics
- Overall rich in current information content
- Wide array of service options provided
- Includes "soft" information, such as environmental issues related to investments
- No Internet-specific strategies evident

Interactive Services
- Internet account summary of transactions in past 30 days
- PC Banking (not yet available)
- ABM Locator (map of North America, click on your location, list of local addresses of ABMs)
- Interactive investment planner - comprehensive and anonymous unless user chooses to identify self
- RSP: comprehensive guide, detailed information on investment strategies such as whether or not to borrow for RSPs
- Application for MasterCard

Information Services
- EasyLine telephone banking service (promotional)
- Investor Newsletter - comprehensive, is it available in branches or only on line?
CIBC - “Define the Role of Internet Banking”

General Characteristics
- Interesting looking home page with Java applet (photos of customers flash on and off the screen);
- This is mainly a R&D site at the moment, little in customer value;

Interactive Services
- Interactive questionnaire on Internet banking services;
- ABM locator;

Information Services
- A list of comments from customers since site went live in December/95
- Promotional material on telephone banking, RSPs etc, none of which is interactive
- Phone Banking overview
- Interac Direct Payment promotion
Bank of Nova Scotia

General Characteristics

- Web site slogan - “Third Edition On-line”, (The site is regularly updated with new features and information, this being the third major edition);

Interactive Services

- Interactive VISA savings calculator;
- Mutual Fund prices (full prospectus);
- Interactive questionnaire “Reality Check” to assess if current savings are adequate for retirement plans;
- Make business software available, endorsed by professional organizations (e.g. College of Family Physicians of Canada);
- Planning information for different professions;
- Interactive action plan developer for RSP strategies;
- ABM and branch locator;
- Keyword search of web site;

Information Services

- Information on services for seniors, students, others;
- Economic commentary - analysis of leading economic indicators including Global Economic Outlook;
- Provides information on different options to make up any shortfalls in RSP contributions;
ROYAL BANK

GENERAL CHARACTERISTICS
- Choice of languages - English or French;

INTERACTIVE SERVICES
- Interactive business planner;
- Interactive EDI application analyzer (for larger businesses);

INFORMATION SERVICES
- Analysis of federal budget;
- Daily currency and market reports;
- A “10 minute guide” to small business use of the Internet, with information on what the Internet is (and isn’t), what uses it has (information distribution, marketing, etc.);
- How to do business with Royal Bank on Internet:
Toronto Dominion

General Characteristics
- Offer language choice - English, French or Japanese;
- Award winner for web site;

Interactive Services
- Wealth allocation model to design personal portfolio of investments;
- Retirement savings planner;
- RSP loan application forms;
- “Wealth Manager” helps plan and optimise capital;
- Interactive questionnaire called Business Forum, user can also post a question;
- Case studies and business library;
- Interactive questionnaire on investment planning, but most is information;
- Interactive budget planner;
- Keyword search of web site;

Information Services
- Information on market prices, economic reports, etc.;
- Information on home buying, including checklist of things to do, mortgage selection, closing, etc.;
- Commentary on current issues (e.g. 1996 federal budget);
Bank of Montreal

General Characteristics

- Award winner for top web site;
- Very cool “look and feel” (e.g. first page enables download of animation sequence);
- Includes “soft” references such as community services the bank is involved with;

Interactive Services

Custom home page for individual customer or browser:

- Customer enters following information to customize page: name, email address, gender, age range, occupation, income range, residence (own or rent), and whether or not user is Bank of Montreal customer and what account type;
- Preferences can be updated anytime;
- Personal pages involve a few steps and a password to access, can be cumbersome, slow and irritating;
- Personal pages are also used to market services: if Mutual Fund information is in preferences, then a mutual fund promotion will appear on the first access of personal page;

Small Business Centre - The “Virtual Head Office”

- The Virtual Head Office is comprised of several virtual departments or functions analogous to those found in many corporations;
- Finance Department: information on rates and technology centres;
- Loading Dock: documents on success factors in business, free clip-art site information;
- Strategic Planning: does not work;
• Mail Room: recommended news groups about small business, suggestion box which includes all posted suggestions;

• Water Cooler: mainly news groups;

• Corner Office: humour and news groups;

• Boondoggles: humour;

• Research Department: web resources for small business (links), Institute for Small Business (includes a research study);

• Public Relations: as you might expect;

  RSP Services

• Interactive game rather than questionnaire

INFORMATION SERVICES
• Technology Innovation Centres

• PC Banking (not through Internet)

• Phone based banking

• Personal banking

• Investment information

• North America-wide financial news
MASTER CARD

GENERAL CHARACTERISTICS
- One of the target markets is college students, with considerable resources devoted to issues from a student’s perspective;
- Overall the site has an unfinished look. The main hook to get browsers to return to the site would be the list of links to other sites which may be of interest (e.g. an entire set of links and text concerning health-care issues);

INTERACTIVE SERVICES
- Currency exchange rate converter;
- ABM locator (this service lists ABMs in only 8 cities worldwide, none in Canada);
- List of links to other web sites of interest to students;
- Downloadable spreadsheet for students to do financial planning;
- Link to one site that provides on-line card application through AT&T, but no on-line application directly at the MasterCard web site;
- List of links to banks that provide web-based services. Canada Trust is the only Canadian link, plus one in Argentina, two in Japan, and seven in the USA;

INFORMATION SERVICES
- Student information resources include information on the benefits of their becoming MasterCard members and advertisements for a job-hunting book commissioned by Mastercard which sells for $9.95;
- Many other links and pointers to other sites of no clear relevance to credit cards, banking or electronic commerce;
Visa

General Characteristics
- The site has a "global expo" theme with images of clocks showing the time of day in various cities around the world including one in Canada (Montreal);
- Generally sophisticated and polished appearance to the site;

Interactive Services
- Browser can customize a home page without identification, simply a mnemonic that the system recognizes;
- The custom page groups existing information content according to the preferences indicated by the client;
- Links to on-line shopping malls where Visa is accepted;
- Student services include an interactive financial planning package that can be downloaded;
- Interactive explanation of the various components of a standard Visa statement. Enables the client to get information on specified fields on the form;

Information Services
- Newsletter on the topic of money power;
APPENDIX C - THE INTERVIEW FORM

Text that appears in bold italics will not form part of the interview. It is included here to indicate the purpose of each block of questions.

<table>
<thead>
<tr>
<th>Importance of Information Technology to the Firm</th>
</tr>
</thead>
</table>

Does the firm take a strategic approach to information technology investment?

Also serves as introduction and warm-up to the interview.

<table>
<thead>
<tr>
<th>Question</th>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Information Technology is a source of competitive advantage for your firm.</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>2. Your firm considers itself a leader in the development and application of Information Technology.</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>3. The relative importance of Information Technology is reflected in the size/significance of IT budgets.</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>4. Information Technology priorities are determined on the basis of their contribution to the achievement of strategic objectives.</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
</tbody>
</table>

Follow-up questions

5. Re question 2 on technology leadership:

Please explain why the firm does or does not consider itself an information technology leader?
Importance of the Internet to the Firm

*Does the firm have a strategic approach to Internet services (i.e. proactive rather than reactive)?*

<table>
<thead>
<tr>
<th>Question</th>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>6. The Internet is or will be a source of competitive advantage for your firm.</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>7. Your firm considers itself a leader in the development and application of Internet financial services.</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>8. Your firm’s Internet strategy falls within a larger overall framework for Information Technology strategies.</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>9. Internet initiatives are expected to show a positive return on investment.</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
</tbody>
</table>

*Follow-up questions*

10. **Re question 1 on competitive advantage:**
    If yes, please explain the nature of competitive advantage gained through the Internet.
    If no, why is the firm deploying Internet services? (i.e. cost of doing business)

11. **Re question 2 on Internet services leadership:**
    Please explain why the firm does or does not consider itself a leader in the development of Internet applications.

12. **Re question 4 on ROI:**
    How is the firm measuring return-on-investment regarding its Internet services?
(Few firms are doing this today, so these questions are relevant to future developments of Internet based payment systems.)

<table>
<thead>
<tr>
<th>Question</th>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>13. Internet payments are or will be a source of competitive advantage for your firm.</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>14. Your firm will offer Internet payments within the next 12 months.</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>15. Your firm has a satisfactory security strategy for Internet payment services.</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>16. The Internet will play an important role in the clearing system.</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
</tbody>
</table>

Follow-up questions

17. Re question 13 on competitive advantage:

If yes, please explain the nature of competitive advantage gained through Internet payment.

18. Re question 15 on security:

How is the firm addressing the issue of security for Internet payments?

19. Re question 16 on the clearing system:

What role will the Internet play in the clearing system?

20. Probe for any inconsistencies between plans for payments within 12 months but inadequate security.
Item 1 - The technology lowers cost drivers or enhances differentiation and is sustainable (difficult for others to copy).

Sustainability is determined by four factors:
(a) Source of Technology - Internal or External
(b) Cost or differentiation advantages through R&D
(c) Available of internal technological skills
(d) Overall rate of technology diffusion

Item 1 - General Questions - What is the Internet’s impact on cost drivers?:

21. Have the firm’s Internet services reduced the cost of delivering services?
   If yes:
   In what way?
   By how much?
   How is it measured?
   If not:
   Is it expected to reduce costs in the future?
   If so, when?
   How will it be measured?
What is the Internet's impact on service differentiation strategies?

22. In terms of the Internet services currently offered, how does the firm differentiate itself from competitors? (i.e. Does it provide unique content or services, project a specific image, etc.?)

Explain (examples will be helpful)

1a questions: Source of Technology - Internal or External (Note that because the Internet is an open network, employing open technology standards, the "source of technology" is assumed to be external unless proprietary uses or new firm-specific developments are present)

23. Is your firm developing any unique or proprietary Internet related application systems or tools that will be unavailable to other firms?

If yes:

Please describe these application systems or tools.

Are they in use today?

If not, when will they be available?

If no: (for clarification and reinforcement)

Does this mean you are using the same Internet technologies as your competitors?

1b questions - Cost or differentiation advantages through R&D

24. As a percentage of total Information Technology budgets, what is the firm's current level of investment in Internet services?

25. How has that level changed in the past two years? (up/down/same)

26. What is the planned level of investment in the next year or beyond?

(May ask if detailed information is available for the years 1994/5/6/7/8?)
27. What percentage of those investments is R&D as opposed to operational support?  
(A pie-chart showing relative proportions of Internet related budget expenditures  
would be ideal.)

Ic questions - Availability of internal technological skills

28. Are your current Internet service developments outsourced or provided in-house?  
Is that expected to change in the next 12 months?  
If outsourced, what firm are you employing?  
(Does more than one competitor outsource to the same company, thereby further eroding any proprietary advantage?)

29. What is the firm’s current training budget to develop the technical skills required to  
build, deploy or manage Internet services?  
30. What is the approximate number of staff who have been trained on Internet system development?  
31. What does that amount represent relative to the total number of IS staff?  
32. In your own words, how would you assess the firm’s overall internal skill level  
regarding Internet systems?

Id questions - Overall rate of technology diffusion

(The current level of Internet technology diffusion can be assessed using the summary of available services through Canadian financial institutions)

33. What new Internet services does your firm plan to offer in the next 12 months?
Item 2 - The technology results in cost or differentiation advantages through R&D even if the technology can be imitated

34. Comparing your firm to other competitors in the industry:
Has your deployment of Internet services had any unique firm-specific impact on your company's cost drivers or its ability to differentiate itself from the competition?

Item 3 - Technology pioneering leads to first-mover advantages besides those inherent in the technology itself

(OPTIONAL: This question is only relevant to those who answered agree/strongly agree to the question regarding leadership in Internet developments.)

35. You mentioned earlier that your firm is a leader in the development and application of Internet systems.
- How are you protecting the leadership advantage you currently enjoy?
- How are you preventing others from simply copying what you already do?

Item 4 - Technology improves the overall industry structure

36. What role, if any, does the structure of the Canadian banking system (i.e. the big six) have on the diffusion/adaptation rate of Internet technology?

37. Please comment on the following statement: Internet services, because they are based on "open technologies", will lead to the commodification of services. (ABM example)
Is the Internet mentioned anywhere in general corporate literature such as annual reports?

38. Can you supply a copy of current and recent annual reports?

39. Any other final comments before concluding the interview?

40. Would you be willing to have a short follow-up discussion in case any points require clarification?

41. If you think of anything, please contact me.
# APPENDIX D - GLOSSARY OF TERMS

<table>
<thead>
<tr>
<th>Term</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Archie</td>
<td>A tool (software) for finding files stored on anonymous FTP sites. User must know the exact file name or a substring of it.</td>
</tr>
<tr>
<td>Anonymous FTP</td>
<td>A very common method of moving files between two Internet sites. FTP is a special way to login to another Internet site for the purposes of retrieving and/or sending files. There are many Internet sites that have established publicly accessible repositories of material that can be obtained using FTP, by logging in using the account name &quot;anonymous&quot;. thus these sites are called &quot;anonymous ftp servers&quot;.</td>
</tr>
<tr>
<td>Automated clearing settlement systems (ACSS)</td>
<td>A computer-network system that performs the tasks of (a) logging payments to and receipts from Canadian financial institutions, and (b) calculating the “due-to” and “due-from” balances based on the amount of funds transferred.</td>
</tr>
<tr>
<td>Circuit switching</td>
<td>A switching method where a dedicated path is set up between the transmitter and receiver. The connection is transparent, meaning that the switches do not try to interpret the data.</td>
</tr>
<tr>
<td>Client</td>
<td>A software program that is used to contact and obtain data from a Server software program on another computer, often across a great distance. Each Client program is designed to work with one or more specific kinds of Server programs, and each Server requires a specific kind of Client. A &quot;Web Browser&quot; is a specific kind of Client.</td>
</tr>
<tr>
<td>CommerceNet</td>
<td>A consortium formed to address issues related to Internet-based electronic commerce. A non-profit organization of over 130 electronics, computer, financial service, and information service companies, working to accelerate the use of the Internet for business applications.</td>
</tr>
</tbody>
</table>

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20 Source: http://www.matisse.net/
21 Source: Poriah (1991)
22 Source: http://www.wiltel.com/glossary/glosc.html
23 Source: http://www.comercenet.com
| **Commodification** | The tendency of some forms of information technology to turn products and services into commodities.  

Source: Author. |
| Digital cash | The digital equivalent of a cashier’s cheque or bearer bond. That is, a token issued and authorized by a financial institution, with a random unique identifying number and the amount of money represented.  

Source: Singleton (1995) |
| Disintermediate (also disintermediation) | Reducing or eliminating intermediaries from the value chain by substituting their products or services with information or information technology, resulting in direct contact between producer and consumer.  

Source: Benjamín (1995) |
| Electronic brochures | Term to describe a prevalent use of World Wide Web documents to duplicate the function of a colour marketing brochure with information content that is similar to that found on paper, though with additional features such as links to other web sites.  

Source: Author (1996) |
| Electronic commerce | The ability for buying, selling and payment transactions to occur through computers and telecommunications networks.  

Source: Author. |
| Electronic data interchange (EDI) | An industry standard (ANSI X12, X.400) for direct computer-to-computer information exchange.  

Source: Author. |
| Electronic Mail (E-mail) | Messages, usually text, sent from one person to another via computer. E-mail can also be sent automatically to a large number of addresses, called a mailing list.  

Source: Author. |
| Encryption | Altering the format of information in such a way that it can be transmitted over an open network securely. It includes “public key encryption” systems such as SET which use a public key to encrypt, say, a credit card number, together with a private key known only to the card holder.  

Source: Author. |
| Gopher | A widely successful method of making menus of material available over the Internet. Gopher is a Client and Server style program, which requires that the user have a Gopher Client program. Although Gopher spread rapidly across the globe in only a couple of years, it is being largely supplanted by Hypertext, also known as WWW (World Wide Web). There are |
still thousands of Gopher Servers on the Internet and we can expect they will remain for a while.  

Home page

The information screen that appears at the first level of a world wide web site, usually containing overview information and links to other pages or documents at the same or other sites.  

Hypertext markup language (HTML)

The coding language used to create Hypertext documents for use on the World Wide Web. HTML looks a lot like old-fashioned typesetting code, where you surround a block of text with codes that indicate how it should appear, additionally, in HTML you can specify that a block of text, or a word, is "linked " to another file on the Internet. HTML files are meant to be viewed using a World Wide Web Client Program, such as Mosaic or Netscape.  

Information highway

Commonly used term for the presumed successor to the Internet, which will provide faster speed and wider access networks. For an overview of the Canadian government's approach to the information highway see: http://info.ic.gc.ca/ic-data/info-highway/general/report.april94.e.txt  

Internet

(Upper case I) The vast collection of inter-connected networks that all use the TCP/IP protocols and that evolved from the ARPANET of the late 60's and early 70's. The Internet now (July 1995) connects roughly 60,000 independant networks into a vast global Internet.  

internet

(Lower case i) Any time you connect 2 or more networks together, you have an internet - as in inter-national or inter-state.  

Internet service provider (ISP)

A commercial institution that provides access to the Internet in some form, usually for profit.  

Intranet

Web based networks used for internal rather than external applications.  

Java

An Internet programming language developed by Sun Microsystems to create a greater level of interactivity through the web. A simple example of Java programming can be found at CIBC's web site http://www.cibc.com. Images of the bank's customers flash on and off the screen in various locations and for varying periods of time. See also http://www.sun.com
| Marketspace | Analogous to the physical marketplace, this term is used to describe transactions that are defined by information and which create and extract value through information.  

| Moore’s Law | An observation or rule of thumb that the price performance of computer hardware doubles every 18 months or so. |
| Mosaic | The first WWW browser that was available for the Macintosh, Windows, and UNIX all with the same interface. "Mosaic" really started the popularity of the Web. The source-code to Mosaic has been licensed by several companies and there are several other pieces of software as good or better than Mosaic, most notably, "Netscape". |
| National Information Infrastructure | A Clinton/Gore administration plan to deregulate communication services beginning with 1994 legislation. It will integrate concepts from Internet, CATV, telephone, business, entertainment, information providers, education, etc. The potential impact to businesses, schools, homes and society as a whole are significant. CATV will be allowed to provide telephone and video-conferencing services. Phone companies will be allowed to provide movies and information services. Aggressive companies could be major winners in the next few years. The potential is only limited by our imagination and creativity. The rate of change sparked by the Information Superhighway may be faster than anything the telecommunications industry has ever experienced before. |
| Netscape | A WWW Browser and the name of a company. The Netscape (tm) browser was originally based on the Mosaic program developed at the National Center for Supercomputing Applications (NCSA). Netscape has grown in features rapidly and is widely recognized as the best and most popular web browser. Netscape corporation also produces web server software. Netscape provided major improvements in speed and interface over other browsers, and has also engendered debate by creating new elements for the HTML language used by Web pages -- but the Netscape "extensions" to HTML are not universally supported. The main author of Netscape, Mark Andreessen, was hired away from the NCSA by Jim Clark, and they founded a company called Mosaic Communications and soon changed the name to Netscape |

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28 Rayport & Sviokla (1994)
Packet switching
The method used to move data around on the Internet. In packet switching, all the data coming out of a machine is broken up into chunks, each chunk has the address of where it came from and where it is going. This enables chunks of data from many different sources to co-mingle on the same lines, and be sorted and directed to different routes by special machines along the way. This way many people can use the same lines at the same time.

Payment system
The chain of events that occurs in making a payment with a cheque, automated banking machine, credit card, etc. from the point the transaction begins until all funds have been cleared through the payer and payee's financial institutions and the Bank of Canada.

Point of sale (POS)
Point of sale systems enable merchants to create multiple simultaneous transactions at the time a sale is made. In addition to recording the sale, inventory levels may be immediately updated, and payment can be instantly completed.

Secure Electronic Transaction Protocol (SET)
Visa and MasterCard have jointly developed the Secure Electronic Transaction (SET) protocol as a method to secure bankcard transactions over open networks. SET is being published as open specifications for the industry. These specifications are available to be applied to any bankcard payment service and may be used by software vendors to develop applications.

Server
A computer, or a software package, that provides a specific kind of service to client software running on other computers. The term can refer to a particular piece of software, such as a WWW server, or to the machine on which the software is running, e.g. "Our mail server is down today, that's why e-mail isn't getting out." A single server machine could have several different server software packages running on it, thus providing many different servers to clients on the network.

Smart card
See "digital cash".

TCP/IP
The suite of protocols that defines the Internet. Originally designed for the UNIX operating system, TCP/IP software is

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30 Source: http://www.mastercard.com/Press/release-960201.htm
now available for every major kind of computer operating system. To be truly on the Internet, your computer must have TCP/IP software. 20

**Value added network (VAN)**

These networks are often associated with Electronic Data Interchange (EDI) systems. They enable computers from different companies to exchange information over privately owned and operated telecommunications networks. Added value services such as servers and electronic mailboxes mean that users do not have to invest in or operate their own systems. 24

**Veronica**

Developed at the University of Nevada, Veronica is a constantly updated database of the names of almost every menu item on thousands of gopher servers. The Veronica database can be searched from most major gopher menus. 20

**Virtual**

In the context of information technology, a term often used to describe an information system or structure that is a logical representation of a physical entity (e.g., virtual reality). 24

**Virtual private networks (VPI)**

Switched network with special services like abbreviated dialing. A customer can call between offices in different area codes without having to dial all eleven digits. 22

**World Wide Web**

Two meanings - First, loosely used: the whole constellation of resources that can be accessed using Gopher, FTP, HTTP, telnet, Usenet, WAIS and some other tools. Second, the universe of hypertext servers (HTTP servers) which are the servers that allow text, graphics, sound files, etc. to be mixed together. 20


Hall, Richard. “A Framework Linking Intangible Resources and Capabilities to


House of Commons Standing Committee on Consumer & Corporate Affairs & Government Operations. *Credit Cards in Canada in the 90s*, Parliament Library.


Vita Auctoris

Ted Dodds has held a variety of information technology related positions in two Ontario universities over the past 15 years. He is currently employed as Director, Computing Services, at the University of Windsor. His undergraduate degree is a double major in Information Science and Psychology, received from the University of Guelph in 1987.