

**THE IMPACT OF EVOLVING HEALTH INFORMATION
NETWORKS ON HEALTH SYSTEM INTEGRATION IN CANADA**

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By

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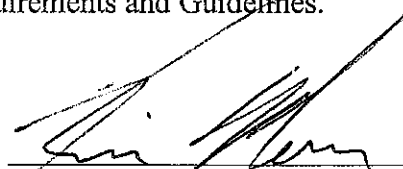
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October 31, 2000

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CHAPTER I

Introduction

The effect of computerization and automation on business and industry has been profound in the latter part of this century. Futurists, such as Alvin Toffler have theorized and speculated on the radical impact of the microchip on institutions originally developed during the industrial revolution.¹ Clearly, the advancement of automation has prompted polarized views from an Orwellian vision of 1984 and the threat of electronic power to a vision postulated by Price Pritchett of the opportunities of the information age.² The status quo in organizations is being challenged on a daily basis as the work place responds to a move to a knowledge-based economy.

Globalization, e-commerce, and the internet have changed the manner by which industries transact business and provide services. National boundaries were once barriers to international commerce and are becoming increasingly transparent as companies develop electronic trade and partnerships. Organizations are no longer dependant on the traditional centralized office systems and infrastructure to carry out operations. “Bricks and mortar” have now been replaced with “clicks and mortar” and workers with wireless and remote support work from their homes, airports and automobiles. Industry is now able to define virtual partnerships to provide specialized products and compete in a changing marketplace. The use of “interac” in the banking industry is a positive example of a common infrastructure and financial service provided to consumers by different financial institutions. Consumers are now able to access funds from their bank from a

variety of conveniently located ATMs throughout the world. Connectivity and the sharing of access to information is a core feature of the automation revolution.

In this research paper the connectivity relationship to efficiency of health agencies is explored. Essentially, the research endeavours to define the integration dimensions in health care as a direct result of IT connectivity projects. Has the organizational transformation experienced in the financial industry through the introduction of ATMs been experienced in health care and what is the role of technology in terms of the evolution?

The analysis of computer based health networks, though, must be considered in the context of the economic and political situation of health care in Canada. In order to understand the potential impact of technology in terms of connectivity, it is necessary to first understand the context within which the health sector operates. The history, economic conditions, policy directions and organizational structural realities are all factors that form the essential background for understanding the relationship of connectivity to higher health system efficiency. The policy context also provides the necessary information to generate a generalized hypothesis in reference to this research.

This first chapter focuses on the evolution of health policy and structures in Canada and provides an understanding of the current policy pressures. Clearly, the problems, issues and system priorities as articulated by contemporary analysts are presented. These viewpoints and the examination of historic trends in health care form the backdrop for the analysis of the relationship of computer connectivity to health system integration. In comparative terms, once again to the banking industry, there is a

general understanding of the operation and model of service employed by the financial industry, prior to the introduction of automation and connectivity. There are a number of integration dimensions that the banking service can be and have been evaluated, as a result of knowing that contextual information. The contextual information pertinent to the health sector is required for this same type of analysis to occur for this research.

The policy context of health care services in Canada is best considered from the perspective of three major themes: (1) Funding and Provincial/Federal Relations, (2) Emerging Trends and System Pressures, and (3) Traditional and Contemporary Organizational Structures. These thematic topics provide a comprehensive interpretation of the historic governmental and organizational responses to political and economic forces in health care.

FUNDING AND PROVINCIAL/FEDERAL RELATIONS

As with most industrialized nations in the world, Canada has been constantly struggling with the challenge of investing adequate resources in health care services. Physicians, hospitals, provincial governments, home care providers, regional health authorities and consumers all have opinions with respect to where the system is underfunded. Since the inception of medicare in 1968, the federal and provincial governments have been faced with the challenge of developing a comprehensive, universal health system while at the same time balancing cost. The rapid growth of the demand for health services has historically exceeded economic growth and balancing cost has meant controlling the supply of service.³ Trade-offs in health services have never

come easily and invariably any change that is contemplated in terms of service supply results in public debate and/or confrontation. Balancing the health budget or managing escalating costs has often required significant “political grit” in order to resist the pressure politics of various health and consumer groups.

“The accelerated turnover of Canadian health ministers, both provincially and federally, reflect the anxiety and political turmoil which accompanies altering our view of health.”⁴

The management, philosophy, values and the balance of priorities of the health care system has been and continues to be the subject of public debate. A plethora of government task forces, royal commissions and position papers are a testimonial to the significance of health care funding to our culture.

The current health services in Canada are the product of several years of national and provincial financial negotiations and funding agreements. The financial control process commenced three years after the introduction of medicare when the federal government appointed a task force on the cost of health services in Canada. This 1971 task force report concluded that a major organizational restructuring was required and planning for system revamping be considered.⁵ And yet as noted by Tommy Douglas in 1982, the revamping had not occurred.

“When we began to plan Medicare, we pointed out that it would be two phases. The first phase would be to remove the financial barrier between those giving the service and those receiving it. The second phase would be to reorganize and revamp the delivery system – and of course that’s the big item. It’s the big thing we haven’t done yet.”⁶

Over time, the “big thing” as identified by Tommy Douglas, the revamping of the system has become increasingly difficult due to the institutionalization of physician and organizational practice.

The policy context for understanding the current state of the health care system is rooted in the origins of medicare and governments inability to institute proper controls. Medicare was inflationary and focussed on a treatment based approach to health and ignored preventative or less costly options.⁷ The 1974 Lalonde Report challenged the formula that hospitals and physicians equal good population health.⁸ And yet, provinces had great difficulty controlling rising health expenditures shared on a 50/50 basis with the federal government. In the late 1970s the federal government ushered in a new era of health policy implementation with the dissolution of the shared programs. In 1977, the federal government introduced the *Federal-Provincial Fiscal Arrangements and Established Programs Act* (EPF) as a means to control spending. The new act allowed the provinces to collect increased taxes in the corporate and personal tax fields. The “catch” was that the federal treasury would no longer provide the shared costs of Medicare. Instead the federal funds would provide a 25% unconditional block grant of the total program’s cost. Richard Van Loon viewed the change in the funding formula as a transmuting of medical care politics into the politics of cost control. He concluded that

the new funding formula and the politics it evoked would not curb spending.

“This paper concludes that instability due to cost escalation – or, what politically is equally important, to the public perception that costs are increasing – is likely to persist. This will be the case in spite of (and perhaps even because of) the financial arrangements enacted in 1977.”⁹

In fact, spending continued to grow at both a federal and provincial level and the new funding formula did not address escalating costs.

Provinces tried to restrain rising physician costs and physicians responded with extra-billing. The 1980s saw a proliferation of private markets and doctors opting out of medicare.¹⁰ In order to protect the universality of medicare, the federal government introduced *The Canada Health Act* in 1985. The Health Act established conditions by which transfer payment under the EPF would occur with the province. The act essentially imposed a financial penalty to the provinces if they permitted extra-billing and private user charges.¹¹

“To preserve accessibility the CHA gave to the federal government the authority to reduce the cash transfer to a province on a dollar-for-dollar basis any amount that the province allowed physicians to bill their patients or that hospitals charged in the form of user fees for medical services.”¹²

The Established Programs and Financing Act was replaced in 1995 with the *Canada Health and Social Transfer (CHST)*. It appears that a major reason for the introduction of the CHST was to alter the amount of the federal government transfer to the provinces. The efficacy of being able to maintain a lower financial investment into the future has been questioned.

“At most, the new arrangement would alter the amount of cash currently in the “pool” and may, by a few years, affect when the transfer falls to zero ... at this point, the most one can safely say is that the CHST serves notice to the provinces that major changes in financial arrangements are in the offing.”¹³

At the beginning of the millennium the provincial and federal governments continue to struggle with questions regarding jurisdiction and funding responsibility. Most recently, the federal government has announced a scorecard for medicare that will be used to evaluate the performance of the provincial health systems.¹⁴ The clear message from the federal government is that system investment in new priority areas must occur. As well, funding is being tied to a notion of outcome-based evaluation.

EMERGING TRENDS AND SYSTEM PRESSURES

As has been noted, since the introduction of Medicare, funding has been a major consideration in the policy-making process. However, the provincial/federal struggle over health funding has occurred as additional demographic/economic and programming factors have emerged as significant pressures in the system. The major factors to be considered here are:

1. An aging population that requires increasingly more health and social services in order to be maintained.¹⁵
2. An acute and long term care health system that is financially constrained during a time when the demand for service is increasing.¹⁶

3. The growing public policy support for preventative and community-based models of health care delivery which public expectations are still anchored in beliefs of medical-treatment based solutions.¹⁷
4. Trend to consumer involvement in health policy-making.¹⁸

These trends and issue areas have emerged within the health system and have caused heightened stress as agencies and government try to cope with fiscal pressures and new organizational priorities. Traditional organizational coping practices of closing beds and reducing staff are not adequate. The problems in the system require serious systemic re-engineering and fiscal reallocation. The aging population requires more targeted long term care services, geriatric specific acute services, home care and supportive housing.

There is also increasing public policy support for community-based solutions to health service demand issues. The Ontario government has recently announced a major reinvestment in Home Care as a result of downsizing hospitals and the aging population.¹⁹

There is also increased emphasis by governments on the need to move from the medical-treatment based model to more of a prevention-based model. In other words, government should invest more in preventative based solutions as opposed to medical-treatment based solutions. The evidence supporting this type of shift in the health care system is compelling.²⁰ A growing preponderance of research on the “determinants of health” has caused serious review of our system priorities. The hallmark 1974 Lalonde Report presented the notion that lifestyle factors are a crucial feature in population health

and more policy emphasis should be placed on prevention. This theme continues today in terms of the correlation of social factors as determinants of health.

“The association between low life expectancy and higher rates of unemployment and lower levels of education indicates that non-medical factors may play a role. A similar association among lower level of income, lower level of education, poorer health and chronic illness has been observed among Canadians as a whole.”²¹

The ability of hospitals and health care organizations to embrace new initiatives focussed on prevention, or the aging population and more consumer representation has been difficult. Collaboration across the system to pursue new directions and reduce duplication has been problematic due to the organizational culture of health care organizations. The individual organizational structures and internal support systems continue to be molded and rigidified around historic objectives. There is an absence of flexibility in organizational planning and decision-making to embrace new organizational objectives and directions.

TRADITIONAL AND CONTEMPORARY HEALTH ORGANIZATION STRUCTURES

The current health services in Canada are the product of several years of federal and provincial policy developments and modifications. Unfortunately, the revamping of the system to pursue new system objectives has not occurred. The services delivered by the health care system are an organizational translation of public policy to practice. However, the organizational translation of policy has created a fragmented and disparate

set of services. Our system is aptly described by Leatt, Guerriere and Pink as:

“a series of disconnected parts, a hodge podge patchwork, healthcare industry comprising hospitals, doctors offices, group practices, community agencies, private sector organizations, public health departments and so on.”²²

The traditional specialized organizational units within health care have been referred to as “silos.” The “silos” are resistant to change and are viewed as a major impediment to reforming the health system toward new objectives and priorities.

“The evolution of health services has resulted in healthcare being organized around functions; that is, healthcare organizations have responsibility and authority flowing up and down through a series of chimneys. These chimneys are usually more concerned with protecting the territory of providers than with the quality of the experiences of consumers or patients.”²³

The organizational inertia related to establishing health reform, as well as continued concern about capacity to finance has prompted aggressive health discussions in the 1990s. A proliferation of literature has emerged offering new organizational and system models directed at establishing rationalized services and streamlined organizational structures. The new area of system development is focussed on integrated delivery systems (IDS). A sampling of the global forces driving the development of IDS are noted below:

- populations in industrialized countries are aging which will result in an increase in the prevalence of chronic disease ...
- fragmentation of the health system

- determinants of health
- improved technology for patient care
- no proven benefit of several health care services
- increased expenditures for health do not necessarily lead to improved individual or population health
- industrialized economies are unable to continue to support the current and increasing proportion of GDP consumed by health care services.²⁴

Essentially, the environment within which health care organizations have evolved and grown has changed dramatically. Throughout the 1990s health organizations have attempted to change to adapt to the new context and reality, and different management models of redesign have been selected by organizations. Research has revealed that organizational strategies tend to be “centred within the institutions themselves.”²⁵ However, in the process of re-thinking health care services, re-engineering approaches have been adopted by several health care organizations that have primarily focussed on program management. The emphasis largely by hospitals has been solely on program management and has resulted in organizational decision-making “being pushed down in the organization to teams of management with strong clinical leadership.”²⁶ Change across the various system components has been for the most part overlooked.

It is the premise of this thesis that the need and motivation to restructure and reform the health system is now critical. The complexity of the environment has increased since the 1970s and the ability to sustain the current system in its present form

is questionable.

“Let there be no doubt about the urgency of the re-engineering challenge in our health care delivery system. Without improvements it will drift rapidly into unaffordable crisis.”²⁷

The emergence of models of IDS present a conceptual framework and a practical range of models for the redesign and delivery of health care. The IDS provides a rationalized set of medical services through a network of providers. The Canadian Health Services Research Foundation has provided a comprehensive definition of integrated delivery systems.

“... a health network responsible for the provision of specified, publicly funded services, including at least those currently defined in Medicare (i.e. physician and hospital care), as well as publicly funded pharmaceuticals, rehabilitation, home and long term care, mental health services, disease prevention, health promotion and other public health services.”²⁸

There is a myriad of opinions regarding the actualization of an ideal integrated health system. Discussions and re-engineering initiatives have ensued during the 1990s regarding “horizontal integration” of hospital services and many view “vertical integration” of all health providers and services as an essential next step toward the IDS. Leading authorities such as Duncan Sinclair, the chair of the Health Services Restructuring Commission in Ontario, offer the view of integration as a partnership.

“... the concept of integration as being a simple one which involves a group of health service providers joining together to provide or arrange for the provision of a complete continuum of care.”²⁹

It is this notion of partnership and strategic alliance for the purpose of integration that this research paper is examining. The reality is that integrated health systems will form through a variety of organizational alliances across the continuum. The historic organizational development of health care agencies prevents, or at least to date has prevented, the radical structural change envisioned by several IDS theorists. And as noted by the CHSRF,

“... in the real world the assumption that IHSs are already large and comprehensive systems may be mistaken. In many actual models, an IHS is indeed a first line health services organization, often in the form of a network connecting public and private resources ... Most IHSs are still small, pioneering institutions ...”³⁰

There is no single prescription for IHS and it is recognized that in Canada, given our regional diversity, a range of integrated models will develop.³¹

The foundation of the integrated health system and a significant catalyst of the change process is information technology. The premise of this paper is that organizational change is precipitated through IT connectivity. The thesis of this paper contends that IT connectivity projects in health care in Canada are advancing the integrated health systems model. Higher levels of integrated service delivery and partnering amongst multi-organizations are occurring as a result of computer connectivity and tele-health projects. The advancement of technology is in fact a major driver of the organizational change process and is resulting in changed work processes and functional integration across organizations.

The hypothesis of this paper is that jurisdictions that have achieved connectivity projects amongst multi-health organizations are also operating at a higher level of integration. Through a sample of Canadian connectivity projects in health care, this relationship of connectivity to “dimensions of integration” is explored. The next chapter provides an account and review of IT policy and projects in health care. This review demonstrates the significance of IT and connectivity as a policy thrust which is effecting organizational change across the system. The following chapters will examine specific projects across Canada to illustrate using a “dimensions of integration” analysis the impact connectivity is generating with respect to health system integration.

CHAPTER II

The Health Information Highway in Canada:

A Vision in Progress

The development of connectivity and telehealth projects in health care across Canada has been prompted by various government strategies. Federal and provincial governments in conjunction with organizations such as Canadian Institute for Health Information (CIHI) and Canadian Network for the Advancement of Research, Industry and Education (CANARIE) have established policy priorities with respect to connectivity projects and their respective objectives. Several, policy initiatives have targeted health care and have served as the catalyst for advancing IT connectivity and telehealth projects.

This chapter provides an overview of the government and health planning agencies role in terms of IT policy and infrastructure development in health over the last decade. There are important and significant policy priorities that have developed at a national level and have influenced the evolution of regional connectivity projects. A review of the policy objectives, issues, funding initiatives and implementation plans provide important information for understanding the national vision of connectivity and its relevance in health care. This policy understanding provides an important perspective in terms of analyzing and evaluating the specific projects that are the subject of this study.

At a broad level of understanding, the relationship of governmental policy to

regional projects and the advancement of the objectives of IHS is relevant to this study. There is naturally a cause–effect relationship between government action and regional outcomes; particularly when there are funding and legislative strategies administered.

In order to understand the origins of health connectivity project funding in Canada, it is important to first review discussions on the Health Information Highway. The advent of the internet in the late eighties and early nineties, stimulated governments to appreciate the significance of this electronic infrastructure in transforming the Canadian marketplace. The anticipated changes as a result of the information highway are set out below in a chart from Industry Canada.

**CHART 1. IMPACTS OF THE INFORMATION HIGHWAY
ON THE ECONOMY**

<u><i>From Old Economy</i></u>	<u><i>To New Economy</i></u>
- Resource based	- Ideas based
- Stable comparative advantage	- Dynamic comparative advantage
- Resource extraction, manufacturing fundamental wealth creation	- Knowledge increases importance of service sector in wealth creation
- Investment in physical capital key to competitiveness	- Investment in human capital key to competitiveness
- Safety nets	- Trampolines
- Monopolistic, low value added infrastructure	- Competitive, high value-added infrastructure
- Protection	- Openness
- Discrete domestic and international markets	- Interdependence of domestic and international markets
- Multinational firms	- Global firms / strategic partnering
- Quantity: economies of scale	- Quality: economies of scope
- Hierarchical organizations	- Total quality, strategic alliances
- Subsidies to slow change	- Encouragement to adapt

The anticipated changes to contemporary organizations and the manner by which business is transacted as a result of connectivity, was considered to be dramatic and governments felt ill-prepared. As well, the “internet” and “electronic highway” became interchangeable terms and the growth in numbers of internet connections grew at an astounding rate.

“There are nearly five million computer hubs on the internet, with the number of users worldwide estimated at between 30 and 40 million ... Canadians have been quick to participate in the Internet, with their growth rate in using it among the fastest in the world.”³²

The staggering growth and popularity of the internet prompted numerous public policy questions. Questions ranging from “Who should own the advanced network?” to “How can Canadians be assured of universal access?” were posed.

As a first step to addressing these questions and developing a national strategy regarding the information highway, CANARIE was established. CANARIE is the acronym for Canadian Network for the Advancement of Research, Industry and Education, an organization created by Industry Canada to advance the development of networks across Canada. CANARIE is a not-for-profit organization and has over 120 members representing education, research and industry. The mandate and mission of the organization is aptly described in the 1998/99 Annual Report by a founding board member Jocelyn Ghent Mallett.

“When CANARIE was first conceived, the greatest challenge was developing a coherent, truly national vision around the often competing interests of the stakeholders from the industry, the federal and provincial governments and the university-based internet and research communities. With strong leadership and determination, however, the various communities forged a common vision and CANARIE was able to propel Canada to its present pre-eminent position.”³³

Industry Canada created a governance model for CANARIE that allowed multiple sectoral interests to define the network development priorities. Acting as a catalyst, by 1995, two years after its inception, over 200 companies and research institutes had worked on CANARIE projects.³⁴ As well, the federal investment of 26 million for the first phase of development resulted in private sector investments of 125 million for new applications³⁵ developed by 1995. This collaborative model of technological development provided the financial incentives and coherent planning required to build the network nationally. CANARIE pursued in later phases:

“The continuation of the National Test Network; an R&D fund to assist the development of new products and services and a further upgrade of CA net.”³⁶

CANARIE recognized early in their mandate the specific needs of each of the service and support sectors that would be part of the Canadian information highway. Health care was identified as one of the sectors that required specific strategies in order to develop an infrastructure tailored to the unique and specialty needs of providers and the public. CANARIE published a vision paper entitled “*Towards a Canadian Health Iway*” and in this paper presented a possible architecture and concept for connectivity in health care.

“CANARIE sees the Canadian Health Iway (CHI) as a virtual “information centre” created and used by communities and individuals across Canada. It will be open and accessible, yet assure sufficient confidentiality and privacy to assist decision making by health professionals and patients; it will support research and training and facilitate management of the health system; and it will respond to the health information needs of the public. The CHI will be an agent of change for the health system.”³⁷

CANARIE from its inception in 1993 funded several health-related projects across Canada. The underlying objective was to define and determine practical and efficient applications of the “information highway” for health.

Funding for provincial initiatives focussed on the following two approaches for the development of infrastructure:

- “i) Understanding a health information network strategy to create a core provincial infrastructure around which a wide variety of service and client-based applications are developed and delivered;
- ii) Providing regional consortia of health providers and private sector stakeholders with funding to promote local initiatives.”³⁸

Clearly, each province developed its own approach to infrastructure development, however, as noted by the Centre for Health Information Infrastructure in 1995:

“Canada’s provincial health information networks are generally coordinated by each province’s health ministry, with significant input and participation by other health providers and the private sector.”³⁹

The provincial initiatives range from the province wide projects such as the Alberta Well-Net to more of an ad hoc approach with projects such as LARG* net and Health Link in

Ontario.

The approach to connectivity and telehealth systems development has focussed on broad stakeholder consultation and the utilization of pilot projects. There has been a clear recognition by governments and the technology development agencies that the development of the health infrastructure requires ongoing pilot projects and evaluation. CANARIE continues to support this approach and projects such as “Digital Tele-Diagnosis for Improved Access to High Quality Breast Imaging at Sunnybrook Health Sciences Centre” and the “Integrated Laboratory Information Distribution Systems” by the Department of Health in Nova Scotia are excellent pilot project examples. Such projects provide knowledge through evaluation to demonstrate the practicality and importance of the application to further system implementation.

The proliferation of new ventures, pilot projects and information on technology and applications has been difficult to synthesize, however, for national policy purposes. CANARIE and the provincial governments by 1996, had been successful in stimulating infrastructure development and the creation of a myriad of connectivity and telehealth projects throughout Canada. The need to focus and develop a coherent national vision for the Health Information Highway was now apparent. The experimentation with pilot telehealth projects and information sharing were an overwhelming success. A strategic plan and a vision for the further advancement of the Health Information Highway was now required.

“Technological advances have allowed Canadians to build on these pioneering experiences. Telehealth systems have demonstrated that they can improve access to health services for people who live in remote or remote areas ... Similarly, other applications of technology are full of potential to improve health.”⁴⁰

CANARIE was very broad in its focus and mandate and a strategic vision building on the successes of CANARIE needed to be developed.

In 1998, the Federal Government through Health Canada convened a National Conference on Health Information Structure. The conference was a forum designed specifically to consult on a vision for the Health IWay. The forum funded through the Health Transition Fund was basically a broad consultation with over 300 stakeholder representatives. This conference was the first national conference of this type focussed on the Health IWay. A major recommendation from this conference was the need for the National Advisory Council on Health Infostructure to communicate a national vision.⁴¹ As well, the participants in the forum acknowledged the need for more investment in technology development, coordination of technology projects, privacy legislation and the development of standards. A key recommendation from the national conference was the need for Health Canada to assume a leadership role in the development of the national health information system.

“Health Canada should reassert its leadership role in the development of a national information system including:

- bringing key stakeholders together for discussion
- developing standards, particularly on information for the public
- enforcing the current report data requirements
- leading the coordination and strengthening of health information resources, first focussing on existing resources.”⁴²

The national conference on health info-structure provided an excellent background or context for two major policy reports released in 1999. *Canadian Health Infoway*, written by the Advisory Council on Health Infostructure and the *Health Information Roadmap* written by Health Canada, Statistics Canada and CIHI provided specific recommendations and actions building on themes from the 1998 national conference. These two most recent documents are significant policy articulations of the strategy and vision for the health information highway in Canada.

The Canadian Health Infoway is a report published by the Advisory Council on Health Infostructure. The group consulted with an extensive array of stakeholders over an 18 month period in order to develop a vision for the development of health infrastructures in Canada. In February 1999, the committee tabled their report with the Federal Minister of Health, Allan Rock. The advisory committee focussed on four strategic goals for the health infoway.

- “empowering the general public;
- strengthening and integrating health care services;
- creating the information resources for accountability and continuous feedback on factors affecting the health of Canadians; and
- improving privacy protection within the health sector.”⁴³

The council expressed concern that health infostructure projects had not been developed in terms of a national framework. The ability to fit projects together and integrate had not been given adequate consideration.

A major recommendation of this committee was to ensure that there be collaboration between the federal, provincial and territorial governments in the

development of the Canadian Health Infoway.

“9.2 In transferring funds to provincial and territorial governments for health purposes, the Government of Canada should ...

- a) allocation of a portion of the funding to developing provincial and territorial health infrastructures;
- b) mutual collaboration ... on the development of the Canadian Health Infoway ...
- c) ... system for all provincial and territorial governments to set their own plans and priorities in the context of the jointly developed Canadian Health Infoway.”⁴⁴

This report emphasizes the importance of government investments in telehealth, electronic health record and connectivity in order to exploit technology for the benefit of the client.

“It is a positive revolution in the making. Investments in health infrastructure – and in its essential building blocks at the provincial and territorial levels – must take the long term view. Through such investments, we will help to create the Canadian health care system of the 21st century.”⁴⁵

The new system envisaged by the Council would embrace the four objectives established in the strategic framework, namely, empowerment, integration, accountability and privacy protection.

The *Health Information Roadmap – Beginning the Journey* published by CIHI, Statistics Canada, and Health Canada was also published in 1999 and represents the vision for a modernized health information data set in Canada. Based on a national consultation, the “roadmap” identifies the priorities and next steps to be taken to advance the vision. The major initiative areas identified in this report are listed below:

- “Establishing a sustainable, ongoing process to consult with key stakeholders across the country.
- Fostering harmonized data and technical standard to ensure the consistent and comparable collection, exchange, and interpretation of health data.
- Addressing priority data gaps on health services and related cost, outcomes, health status and non-medical determinants of health.”⁴⁶

The report also identified the need to develop a new national project examining population health in the context of new system information and insights.⁴⁷ The projects supporting each of the priority development areas are outlined in the report and establish the strategic plan for improved health information in Canada. Projects such as the “development of a framework for the secure communication of health information” and “the development of a standard Canadian implementation guide for the most common health information exchange” are examples of projects Health Canada has agreed to fund.⁴⁸

The “Roadmap” establishes several building blocks that are being developed to support the standardization of information and information exchange in health care. The notion of broadening the scope of measurement beyond the traditional consideration of medical care is also being pursued. The limitations of existing data on population health is clearly recognized and determinants of health such as housing, education and income will be tracked in the new system.⁴⁹ Health indicators and a more comprehensive reporting of population health over time is emphasized in this report.

The last decade has been characterized by a tremendous advancement in the use of technology in our society. The benefits and efficiencies have been readily embraced in

several industries and new service delivery models have emerged. In the Canadian health care system, there is evidence of several diverse types of pilot projects that have emerged as a response to grant and funding programs.

These projects stimulated by programs such as CANARIE prompted the need for a national vision for the health information highway. Standardization, interoperability, access, privacy and scalability of systems have become major points of concern. *The Canadian Health Infoway, 1999 Report* and the Statistics Canada, Health Canada and CIHI report on the *Health Information Roadmap – Beginning the Journey* are major policy papers establishing a national vision and strategic plan for the Health Information Highway.

CHAPTER III

The Methodology for Assessing the Impact of Connectivity Networks on Health System Integration

The previous chapter has outlined the history of connectivity projects in the health care system and the development of a strategic vision for the Canadian Health Infoway. The purpose of this chapter is to outline the methodological approach which will be used to examine the relationship of computer connectivity to the advancement of integrated health systems. In addition, the hypothesis derived from the theory is operationalized in terms of the methodology. The survey sample and the justification for the selection of the sample are also discussed. The intent of this chapter is to establish the research framework for the data collection and analysis in the following chapters.

As stated in Chapter I, this thesis views connectivity and telecommunications projects involving multi-organizations in health care as the enabler to achieve integrated delivery systems. The thesis therefore, predicts that connectivity and telecommunications projects in health care providing enhanced multi-organizational data transfer, communications and more efficient client records managements results in a higher level of integrated health service; and advances multi-organizational behaviour towards an integrated delivery system. In order to identify the multi-organizational behaviour caused by the connectivity projects, the conceptual model for understanding large computer based projects developed by Zachman will be used. The model will focus on the partnered organizations in a sample of connectivity projects and by means of the

Zachman Enterprise model determine the business case and the goals and objectives for each project. This portion of the research is essentially a content analysis of major documents and reports generated by each project.

The Zachman framework provides an appropriate level of analysis to describe and understand connectivity projects from a governance or strategic perspective. In describing the development of his framework Zachman noted the following:

“I discovered that there is not simply a single architectural representation for a complex product. There is a set of representations. There are representations from different perspectives, or roles, being played in the process of producing the product.”⁵⁰

Zachman in describing the development of his framework or the “Enterprise Model” discusses his breakthrough realization:

“that the representations of the intersecting characteristics, that is “material”, “function” and “geometry”, were actually descriptions of What the product was made of, How the product worked and Where the components were located relative to one another. From that observation, it was obvious that a comprehensive description of the product necessarily would have to include description of Who does what relative to the product, when do things happen and Why are various product choices being made.”⁵¹

The methodology for this research will use the framework developed by Zachman for the content analysis of primary documents. Through the use of this framework, questions will be answered related to who does what relative to a connectivity project, when do things happen in terms of the project, and why are the various project choices being made. These questions are focussed at the governance/senior management level of each

of the connectivity projects examined. Chart 2 provides an illustration of the Zachman Framework and delineates the dimensions of a project in relation to the various participants associated with a project. The aspects of the framework relevant to this research are attributed to Executive Management and Senior Operating Management (highlighted in green).

The information to be gathered with respect to each project is in relation to the overall objectives/scope of the project and secondly in relation to the Enterprise Model. The scope and objectives will focus on the components identified in the framework such as the list of things important to the enterprise, the processes the business performs, business events and list of business goals/strategies. This information will be obtained and analyzed from annual reports, strategic plans, financial reports and evaluations. This content analysis will provide a descriptive overview of the mission, vision and business case for each of the projects in the study. Similarly, the enterprise information required to address the where, why, when questions posed by Zachman will be possible by receiving the documents identified as well as the business process model and business plan.

A key area of understanding, paramount to the hypothesis and research question is the motivation for the project. The business goals and the business plan will provide the required information in this regard. The relationship of connectivity projects to an IDS can be evaluated, if the motivation of the projects is clearly understood. As well, knowing the organizations involved, the network and entity relationships provides the basis for examining the conceptual relationship of the connectivity project to integrated

CHART 2. THE ZACHMAN FRAMEWORK

Primarily Responsible		Data (What)	Function (How)	Network (Where)	People (Who)	Time (When)	Motivation (Why)
Executive Management Overview	Objectives/Scope	List of things important to the enterprise	List of business processes the enterprise performs	List of locations where the enterprise operates	List of organizational units	List of business events/cycles	List of business goals/strategies
Senior Operating Management	Enterprise Model	Entity relationship diagram	Business process model (physical data flow diagram)	Network configuration (nodes and links)	Organization chart (roles; skill sets and security needs)	Business master schedule	Business Plan
Business System Architect	Information System Model	Data model (converged entities, fully normalized)	System Data flow diagram; Application Architecture	Business System Architecture	Human interfaces (roles, data access rights)	Dependency diagram, entity history (process structure)	Business rules model
Information System Architect	Technology Model	Data Architecture (mapped to linked systems)	System design; structure chart, pseudo-code	Technology System Architecture	User interface (what the user will see); security design	Control structure diagram	Business rules design
System Analyst/Programmer	Detailed System Definition	Data design (denormalized); physical storage design	Detailed Program Design	Systems and Network Architecture	Screens and Security Architecture (who sees what)	Timing definitions	Rule specification in program logic
User & Service Provider	Implemented & Operating System	Converted, initialized and production data	Conversion and production application programs	Systems and Network Infrastructure	Trained user, operating and support personnel	Real business events/activities	User procedures and system enforced rules

delivery systems. This portion of the research is termed the summative evaluation by Bailey and Koney “should focus on the achievement of desired outcomes.”⁵² And clearly, this aspect of the research will establish the documented level of achievement of outcomes for the projects examined. The relevance of these outcomes to an IDS will be presented.

However, the content analysis is only one approach to interpreting the data and understanding the causal relationship of connectivity to the evolution of IDS. As noted by Densin:

“no single method ever adequately solves the problem of rival causal factors ... Because each method reveals different aspects of empirical reality, multiple methods of observation must be employed. This is termed triangulation. I now offer a final methodological rule the principle that multiple methods should be used in every investigation.”⁵³

The notion of “triangulation” of methodologies to ensure a comprehensive treatment of the thesis topic is important to this research. The content analysis is viewed as an appropriate method of providing descriptive/factual data related to each project, but does not truly validate the behavioural component of the thesis question. The thesis predicts “the advancement of multi-organizational behaviour towards an integrated delivery system.” A methodology providing a closer examination of the organizational behaviour and relationships is necessary. Bailey and Koney refer to this aspect of research as the:

“formative evaluation – should focus on the processes used by the alliance to establish its organization and its program and services.”⁵⁴

And as noted by Michael Quinn “formative evaluations are particularly valuable in the

early stages of a program when there is a great deal of development and change.”⁵⁵

Connectivity projects in health care have been characterized by the rapid change and the need to adapt to changing technological architecture.

The formative evaluation component of this thesis will focus on the ongoing business/decision-making process determined by the organizations involved in each project. All projects are at or in a state of development and evolution. This portion of the research will focus on questions related to the performance of the project alliance or partnership. The ongoing performance and efficiency of the project alliance is tied to important questions regarding integration and multi-organizational behaviour. For the purposes of this research the “dimensions of integration” are explored through a closer examination of the multi-organizational behaviour in the project alliances. The determination of the “dimensions of integration” characteristics of partnered organizations will be achieved through direct interviews of key organizational participants associated with each project.

The interview questions are structured and tied to an alliance performance monitoring framework developed by Legatt and Leatt. The framework is based on Kaplan and Norton’s balanced scorecard, designed to measure the performance of organizations. The premise of the balanced scorecard is aptly reflected in the following quote:

“Complementing the financial measures with information on customer satisfaction, internal processes and the organization’s innovation and improvement activities provides a more comprehensive review of organizational performance.”⁵⁶

The alliance monitoring framework, the basis for the design of the interview tool is structured around a given set of performance criteria and measures. These measures and criteria are focussed on internal business, innovation and learning, financial perspective and the customer perspective.⁵⁷ Selected key performance measures and criteria proposed by Legatt and Leatt to be used in the monitoring of ongoing performance are set out below in Chart 3.

**CHART 3. MONITORING THE ONGOING PERFORMANCE OF A
STRATEGIC ALLIANCE**

Performance Criteria

Performance Measures

CUSTOMER PERSPECTIVE

- | | |
|------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"> - The alliance improves client flow through services delivered | <ul style="list-style-type: none"> - Functional assessments - Client satisfaction surveys |
|------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|

FINANCIAL PERSPECTIVE

- | | |
|-------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"> - The alliance results in decreased operating costs | <ul style="list-style-type: none"> - Cost per episode of care - Transaction costs - Alliance membership costs |
|-------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------|

INNOVATION AND LEARNING

- | | |
|---------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"> - Alliance results in a stronger position for the participating organizations | <ul style="list-style-type: none"> - Perceptions of legitimacy of key stakeholders - Reputation of organizations |
|---------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------|

INTERNAL BUSINESS

- | | |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"> - Alliance maintains or strengthens the mission and values - Alliance responds to regulation requirements | <ul style="list-style-type: none"> - Perceptions of key stakeholders - Percent of regulation requirements met |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------|

- Alliance results in improved productivity in service delivery
- Related organizational goals are met
- Defined level of functional integration is achieved
- Participants in the alliance perceive the existence of acceptable norms of equity
- Productivity measures
- Percent of organizational goals achieved
- Percent of functional items standardized
- Perceptions of reciprocity
- Perceptions of fair rates of exchange
- Perceptions of distributive justice

The Legatt and Leatt performance monitoring model is intended to assist strategic alliances in benchmarking and monitoring their performance. For the purposes of this research the framework will be utilized to define the behaviour of the organizations in relation to the “dimensions of integration.” These “dimensions of integration” being defined as reduction in service duplication, improved customer access to service and information, less fragmentation, ability to monitor and track information across the system and finally examples of efficiency enhancements resulting in improved client outcomes. The performance measures selected from the Legatt and Leatt model will provide the necessary information to assess the “dimensions of integration.”

The data required and outlined in the performance monitoring model will be gathered through interviews of the key participants of the selected projects. Senior staff representatives and consultants involved in the planning and management of the connectivity projects will be interviewed. The interview technique selected is an interview guide using a standardized open-ended approach. This technique allows for adaptability to new information being presented, while at the same time ensures that a standardized set of topics and issues are covered with each interviewee.

“... using the informal conversational interview early in the interview followed midway by an interview guide and then closing the study with a standardized open-ended interview to provide systematic information from a sample of subjects at the end of the experience or when conducting follow-up of participants.”⁵⁹

The diversity of projects and participants in this study requires a multi-faceted interviewing technique to ensure a comprehensive perspective of each project is possible. As well, the fact that this is a national sample necessitates the use of telephone as the interviewing mechanism. Clearly, a conversational approach is necessary in the absence of face-to-face contact in order to establish a productive interview relationship with the interviewee.

The interview guide has two components. The first part of the guide is structured around the content analysis of the primary documents. Information analyzed from the primary documents will be clarified with the interviewee and gaps in information will be addressed. As well, beliefs and assumptions resulting from the content analysis will be validated or refuted with the interviewees during this part of the interview.

The second part of the interview is focussed on a standard set of open-ended questions. Through a standardized set of open-ended questions aspects of the thesis question relating connectivity to IDS will be addressed through a standardized format for all projects. While the conversational and interview guide provide flexibility to account for the fact that projects are at different stages of evolution; the standardized open-ended questions provide a level of consistent comparability across the sample. The open-ended questions or the Part II of the interview is structured around the performance criteria and

measures outlined in the Legatt and Leatt performance monitoring model, namely, financial perspective, innovation and learning, customer perspective and internal business. The interview guide and questionnaire to be used in the interview is attached as Appendix I.

Finally, in terms of the selection of sites, it was decided that a sample would be selected based on the theory of “criterion sampling.”⁶⁰ The relative newness of connectivity projects and their corresponding partnerships and governance structures necessitated the establishment of certain criterion to achieve a meaningful study. There is no efficacy in adopting a sample that has a dearth of information or experience. Therefore a key criterion established for the sample selection was that it should be information rich. The existence of documents for the content analysis and the availability of participants for interviews was also essential. Coinciding with the requirement or criteria of the site being information rich, there has to be a willingness to share the information and experience of the project.

The nature of the research is an examination of “connectivity projects to “integration”, therefore the participation of multi-organizations in the project is required. More than two organizations participating was an established criterion.

There was also a sense that the credibility of the project had to be established and in large measure is a function of time in operation. It was established that projects had to at least be in partial operation and had been in existence for at least 12 months.

The project had to demonstrate a commitment to a given “dimension of integration” being examined to justify including the site. There had to be a notion that

duplication of service, improved client access or reduced fragmentation of service across the continuum would be an aspect of the business plan or goals of the project.

As this research is examining a national perspective, a sample of projects from across the country was essential. There was also a need to include projects from different types of telecommunications and connectivity projects. Large provincial initiatives provide a set of experiences that are vastly different from very specific applied connectivity applications amongst a small number of partnered organizations. However, all of these projects regardless of the complexity or the size of the application provide valuable information with respect to the thesis question. The breakdown of the scope and the complexity of the projects selected is defined in terms of larger/provincial versus small/regional.

The research sample is categorized and listed below:

Large/Provincial

- B.C. Health Net
- Saskatchewan SHIN
- New Brunswick HCIT
- Nova Scotia Telehealth

Small/Regional

- Manitoba (Telemedicine)
- B.C. - Kelowna Community Hospital
- Chatham-Kent Health Alliance

Both of the above categories provide valuable experiences for comparing and contrasting successes and failures with respect to achieving project goals. Ultimately, these experiences provide the detailed information required to define the organizational behaviour of the partnered organizations and the relationship to integrated delivery systems. The next chapter examines these findings.

CHAPTER IV

Findings

The intent of this chapter is to describe the connectivity and telehealth projects in the sample, in terms of the research question. It reports on the findings with respect to the advancement of health integration systems as a result of connectivity projects. The survey included a sample of seven connectivity and telehealth projects from across Canada. Through the use of the Zachman Framework, each of the projects is analyzed in terms of the objectives/scope and the enterprise. This content analysis of primary documents focusses on motivation, function, people involved, network, time and scope of operation. This data has been substantiated with interview information from senior executives and management with each project.

As well, the data obtained from the interview focussing on the “dimensions of integration” is also presented in this chapter. Based on Kaplan and Norton’s balanced scorecard, Legatt and Leatt’s framework for evaluating the effectiveness of strategic alliances is utilized. The interview data in conjunction with the content analysis provides the information required to address the hypothesis question posed by this research. The question of computer connectivity advancing the integrated health systems agenda is addressed from a qualitative perspective with the data garnered by this research.

For the purposes of continuity and ease of understanding, the findings with respect to the content analysis of the primary documents and the results of the interview will be presented together for each project examined. The projects have been divided

into two categories, namely, large/provincial and small/regional. The profile of the seven projects examined follows.

LARGE/PROVINCIAL

New Brunswick – Provincial Hospital Corporation Strategic Information Management

The vision statement of the New Brunswick IT plan aptly describes the common understanding of the goals of this planning initiative.

“Information management and information technology will provide a secure infrastructure whereby New Brunswick can achieve its goal of a patient-centred health care system, whereby consumers have access to information and services that assist them in managing their own health – where and when needed...”⁶¹

Succinctly stated, the New Brunswick plan envisages: “improving health through information management and information technology.”⁶² The group that formed in New Brunswick to pursue and plan the provincial system is the Hospital Corporation Information Technology forum (HCIT).

The HCIT, is one of five major committees in New Brunswick, advising the Department of Health in terms of IT development. The committee is composed of representatives from the eight regional hospital corporations in the province. The regional hospital corporations all currently have separate standardized regional systems and the plan is to develop a common system that will be used province wide. The corporations have individually accomplished the basic and intermediate steps leading to

the electronic patient record. The business strategies for the HCIT reflect a plan to develop a common electronic health record province wide. Additional business strategies include the adoption of client/server technology, non-proprietary technology and the use of data repositories. The short to medium term expectation for the plan to commence implementation of the client record in two to three years.

Interviews were conducted in New Brunswick with the Chair of the HCIT, Regional Hospital Corporation Representative and the managing consultant. The interviews confirmed that the motivation for pursuing a province-wide system was based on regionalization. The interviewees acknowledged that the implementation of regional structures in 1992 prompted the development of connected systems. Terms such as we became “organizational boundary neutral” were used to describe the transition or “hidden agendas have gone over time.” The connectivity was seen as a need coming out of regionalization – “get everyone connected” and “regionalization pushed the buttons to get us moving” were common phrases used in the interviews.

The HCIT is valued by the participants who are the representatives from each of the regions. The stakeholders developed the HCIT from what started as a forum to share “best practices” information. This group requested that the Department of Health recognize the committee as a standing advisory committee to the government and the province has agreed.

In terms of benefits to the clients, interviewees cited the individual regional systems as providing higher levels of support to rural physicians and patients. Medical test results can now be exchanged electronically and has resulted in enhanced support to

the client. In region 3 for example, there is a scheduling system in place that allows any one of the 14 facilities to confirm access to services on line and book services on line. E-mail and system connectivity at the regional level has demonstrated the benefit of achieving the electronic patient record. This vision of the single record has been embraced by all of the interviewees.

In terms of performance measures and evaluations of the benefits of connectivity, the interviewees admitted that this is an area that is currently being developed. However, there were examples of individual regional evaluative studies that were identified such as a physician participation study and another region is evaluating the benefit of telenephrology. Actual indicators reviewing performance or benefit of the regional or provincial alliance is not currently underway.

From a financial perspective, the interviews revealed that the HCIT has been effective in terms of being able to leverage funding. There is a clear sense that the funding for the project consultation and development of a provincial IT plan would not have occurred without the HCIT. The group has also negotiated as one unit with NBTEL to achieve a flat rate fee structure for line and connectivity charges. Significant savings and better service have accrued to the regions as a result of this action.

There was unanimous agreement of those interviewed that major investments in IT are required. "IT should be 4% of the budget and we are at 2%." A challenge for the provincial group is to establish consistency in funding across the province. The group is excited about the CHIP program and a proposal developed in conjunction with the

Atlantic provinces is currently before the Federal government. Software products and licenses are also being purchased in a provincial basis now as well.

Innovation and learning activities cited in New Brunswick include continuing medical education from Dalhousie University and several on-line educational activities. The group has also convened sessions on security and privacy legislation. Clinical knowledge is seen to have improved with the use of province-wide triage and teleconferencing for cardiac clients.

The provincial initiative is viewed as successful from the perspective of regional goal attainment and the development of a solid provincial plan and vision for IT. There is a strong stakeholder commitment to the provincial vision and a belief that with proper resourcing the vision of the “one client–one record” and seamless sharing of information will be realized.

There is a strong sense by the interviewees that the HCIT has provided a forum whereby the individual regions can better plan services as a group. Data standards are still a goal of this group and the future vision identifies standards as a goal. In terms of reciprocity the HCIT is recognized as a committee where consensus is the method of effecting decisions.

Saskatchewan Health Information Network (SHIN)

In 1992, the province of Saskatchewan, like New Brunswick, introduced health districts and regionalized health services.⁶³ The fragmentation of services and the silo approach to health care prompted the need for health reform. In a report on the Benefit

Analysis of the SHIN, Ernst and Young cited the lack of information support as a barrier to achieving the goals of health reform.

“However the new district structure was required to operate without the information support system necessary for it to be successful. The inability to share accurate and timely health information critical to support both clinical and administrative decision making would become the single, greatest barrier in achieving the vision of health reform.”⁶⁴

The Saskatchewan government acted upon the recommendations of the Ernst and Young, Benefits Report, and established SHIN as a crown corporation in 1997.

The initial investment of 40 million was targeted at network development. Recognizing that the 40 million would not be adequate to develop the entire system for health, SHIN consulted with fifty-seven different stakeholder and provider groups in 1997-98.⁶⁵

The board of SHIN is composed of eighteen members from a variety of stakeholder groups. Stakeholder groups include health districts, rural consumers, nursing association, medical association, utilization commission, provincial government and unions.

The focus of SHIN in its early operation was to establish a strong consultation process with the health providers and stakeholders. Early planning for secured pilot projects and telehealth were also part of the strategic planning. A major goal pursued by SHIN was the development of a master service agreement with the Science Applications International Corporation for system development.

The vision and mission of the SHIN is focussed on developing primary shared information resources and providing the information in a secured fashion.

SHIN currently has a number of projects underway such as:

- Drug Plan Network
 - 360 urban pharmacies are connected to Saskatchewan's Health's Drug Plan
- E-Mail Infrastructure Services
 - provides e-mail infrastructure to 27 health districts
- Saskatoon District Health Electronic Health Record
 - implementation of an electronic health record to integrate ADT, Lab and transcription in St. Paul's Hospital
- Mother/Infant Care Pilot
 - electronic post-partum record is e-mailed to public health nurse from the hospital

These projects are new in development and are operational for the past year. The project manager for the SHIN confirmed the benefits experienced by clients as a result of the connectivity and the sharing of information. The public health to hospital link for the mother/infant care pilot was viewed as a significant continuity of care improvement. As well, the ability to transmit CT scan information between Prince Albert and Saskatoon has improved direct client care and reduced cost.

Performance measures and benefit analysis/evaluation of new initiatives are yet to be developed. It is acknowledged that performance measures are part of the planning for

the SHIN. The strong consultative approach utilized by the SHIN is viewed as the appropriate mechanism for developing measures.

The SHIN corporation is viewed as having a strong rapport with the districts and the IT steering committee. This relatively new provincial structure has clearly established itself as a resource to the districts. The customer-service orientation was evident in the documents and the interviews with SHIN representatives.

HealthNet/B.C.

Regionalization to health districts in B.C. prompted the provincial government to plan and develop as centralized approach to IT implementation. HealthNet/B.C. was created in 1996 with the following vision:

“To promote and enable effective information management in the health sector, by enabling and facilitating the transfer and sharing of information, on a secure authorized and auditable basis, among health service providers, managers, governors, researched and the general public.”⁶⁶

The documentation describing the rationale and creation of the HealthNet clearly establishes the fundamental fragmentation issues in the provincial system. The provincial system in 1991 is outlined as:

“for the most in a fragmented system where practitioners worked independently and unaware of each others contributions. Since coined a “stovepipe system, this method saw clients funnelled into treatment paths by each practitioner, with little or no overlap or sharing of information or test results.”⁶⁷

An example of a client with cancer having to provide the same background information repeatedly to numerous health providers is described in documents by HealthNet. The client resorts to providing only minimal information.

“I couldn’t bear the thought of trying to remember all those surgeries and dates and outcomes after all this time,” she says. “I have a hard time even remembering my first surgeon’s name or on what date he did the surgery.”⁶⁸

The improvement to client service by providing integrated connected IT services is a major motivation of the HealthNet/B.C. project. Client benefits and improvements as a result of the technology are referenced repeatedly throughout the documentation.

Specifically, HealthNet provides the following core services as part of its operation:

- “- stakeholder liaison and consultation
- development and publishing of policies and standards
- operation and administration of common infrastructure components
- distribution of development standards, documentation and tools
- development and deployment of shared common registries.”⁶⁹

HealthNet provides broad connectivity between organizations allowing for basic secure information exchange. A site connected to HealthNet can expect access to the provincial pharmacare database, lab data and a registry. The system is also the gateway to the “meditech” system and a multi-user clinical administration system.

In 1998, HealthNet completed a pilot project evaluating the benefit of connecting hospital emergency departments to the pharmacare database. Physicians were able to access a client medication history and profile through this computer connectivity. The

client and provider benefits through this evaluation were documented and the project deemed to be a success. Benefits such as overcoming language barriers and reducing duplicate prescribing were noted. Pharmanet is viewed by B.C. as the backbone architecture to continue to build provincial connectivity.

Interviews confirmed the importance of the Pharmanet project to the success and future vision for the HealthNet. Despite the pilot project evaluation, there is a belief that performance measures need to be a more substantial part of HealthNet projects. As noted by one of the interviewees “we haven’t done a really good job here (performance measures) – we are now building in performance measures and evaluation in our projects.” Lab tests results on-line are the next planned roll out in B.C.

The low investment of resources in HealthNet is cited as an issue and concern. The annual budget of 5 million is not seen as adequate in terms of the vision for the system. There is great hope that additional funding will be provided by the federal CHIPP program.

HealthNet receives advice from a Management Advisory Committee and there are 4 working committees, namely, Medical Practitioners, Regional Health Authorities, Security and Privacy, and Software Support Organization. Examples were provided of changes and improvement in the system as a result of information generated from the working groups. Homecare workers can now receive information on client deaths so that they are sensitive to the family needs and alter service plans. This initiative was a direct result of committee planning.

The committees of users have assisted in accessing overall financial support for HealthNet/B.C. and are seen as the greatest supporters for the system. The providers have an increased awareness of the Ministry of Health's plan and are looking to the Ministry for leadership.

The Regional Health Authorities (RHA) also believe that the Ministry is "going to do what they are going to do" and a separate society or governance structure for IT has been discussed. However, at this point in time there is no indication that B.C. plans to move to a new administrative or governance structure for HealthNet.

SMALLER/REGIONAL PROJECTS

Coordinated Health Information for Chatham-Kent (CHICK)

The Chatham-Kent Health Alliance, a centralized administration of three hospitals was a driving force behind the CHICK project. Early in 1996, a new strategy of an integrated IT system for the three hospital sites of the alliance was adopted. A vision of developing better data across the system, developing telemedicine applications and standardization was adopted. A common system for the three hospitals was set in place.

The benefits of this centralization, aside from the benefits of the functional integration are:

- increase in the operations in the O.R. from 42% to 73%
- budgets are available online
- remote transcription services

- physicians online

The success of the connectivity of the hospitals led to the broadening of the vision of the benefits and applications of connectivity, when the TAP program was announced.

The Chatham-Kent Health Alliance led the formation of the Coordinated Health Information Chatham-Kent project. This group composed of Chatham-Kent Health Alliance, Healthtech, HBOC, Data General, Chatham-Kent community Care Access Centre, Victorian Order of Nurses, Copper Terrace and physicians, developed a pilot project for wireless connectivity that was approved by the Ministry of Energy, Science and Technology. The motivation and scope of the project is succinctly described in the final report of the project:

“the goal of implementing this network was to integrate a healthcare delivery system that spanned acute care, long term care, and the home healthcare sector within the rural community of Chatham-Kent. The project would test telecommunications and networking technology, which would include radio frequency components, wireless point of care devices and portable devices.”⁷⁰

A steering committee of the partners was established to plan, implement and evaluate the project.

Essentially, the project established network connectivity for each of the partners to the system. However, difficulties with the point of care technology did not allow for a successful implementation for nurses working in the community. It should be noted though that despite the lack of success with the point of care technology in the community with nurses, there is still recognition of the potential benefit.

“Even though the CHICK project itself was somewhat successful in implementing a WAN the limitations in the Pathways Homecare software are problematic. We continue to believe in the tremendous potential for efficiencies and convenience, which could be achieved through the WAN.”⁷¹

The wireless connection with Copper Terrace, the long term care facility in the partnership was deemed to be a success in terms of the performance indicators established for this component of the project. Client information is now successfully transferred electronically via wireless telecommunications between the hospital and the long term care facility.

The interviewees for this project viewed the pilot as a tremendous learning opportunity in terms of recognizing potential applications. There has been a strong focus on supporting the partners and getting the system up and running. Clearly, the transfer of client data between the hospital and the long term care facility is viewed as an important milestone. This successful application, has placed the partnership on the leading edge and has attracted several inquiries from interested external parties. A nurse at Copper Terrace outlined the benefits of the connectivity from the perspective of professional credibility. Her comments are as follows:

“they (nurses in the hospital) take me more seriously now because we are providing a higher level of information – they have a higher level of understanding of long term care now.”

Users also see the standardization of the medical dictionary and documentation as a positive spin-off of this project.

There is a strong sense that the partners will move forward to build the electronic health record. And yet there is significant concern with respect to the underfunding of technology. This group advised of the tremendous benefits of connectivity and the ability to move beyond the mission of the CHICK project. They questioned whether or not the government has the same vision due to the lack of funding.

Members of the advisory committee believed that there was equal opportunity to provide input into decision-making and the group tried to achieve consensus as often as possible.

Telemedicine Pilot Project – Manitoba

In 1996, a consortium of partners in Manitoba received funding through CANARIE for a telemedicine pilot project. The partners included Telesat Canada, Communications Research Centre, Telemedicine Software Developer, the Community of Norway House, the University of Manitoba, the Health Sciences Centre, Manitoba Health, Manitoba Industry Trade and Tourism, Medical Services Branch and Manitoba Telephone System. The total budget for this project of \$1,897,441 was to establish telemedicine links to remote communities in Northern Manitoba. The project was viewed as having a strong developmental and research component.

“The project intended to develop and research telecommunication services ... these will be two-way telecommunications using Asynchronous Transfer Mode over an orbital link to Norway House Indian Hospital ...”⁷²

It was intended that this project would allow physicians in Winnipeg tertiary hospitals to provide consultations to attending physicians in the remote community of Norway House. The project was also to test the useability and reliability of “ultra-sound and radiological consults ... using the electronic data sources over ATM.”⁷³

The interviews for this project confirmed that this was a short-term funded project that focussed on Norway House. There was a sense that the project was not operational long enough to deem it a success. And yet, there was an intuitive sense that had the project been operational for a longer period it would be successful. A project of a similar nature to Churchill has been operational for 8 years and was cited as an example of the potential of telehealth applications.

The technical coordinator for the project advised that it was a technically complex project to implement. The ampeg and EI link for the audio and video was considered to be a success. Quality was superb and physicians continue to ask for this application. Dermatologists were able to view and diagnose skin conditions using the remote technology. X-rays transmitted electronically were not considered to be useable.

Formal performance measures appeared to be lacking in terms of this project. It was noted by the interviewees that it had been intended that a formal evaluation would be conducted at the end of the project.

The planning committee for the project involved northern providers, northern consumers, northern administrators, medical specialists, medical administrators, hospital administrators and technical specialists. There was a sense that missed deadlines and unkept commitments created disenchantment with the northern partners. There was also

a sense by the northern partners that the “technical companies and the south were making all of the decisions.”

A physician, practicing for several years in the north, commented on the need for a “community development” component to the introduction of telehealth projects. It was his sense that there is an “underestimating of the need for technology support in the north.” This same physician expressed concern that the majority of funding for telehealth is research based in pilot projects. There is a need for sustainable, comprehensive funding.

The value and potential of telehealth projects to the north was viewed as significant by all interviewees. The extent of the applications in terms of direct client consults and counselling is still viewed as undefined. The provincial government has recently approved funding physicians for telehealth consults. This action was viewed as extremely positive by the interviewees.

Nova Scotia – Telehealth Network

In 1996, Nova Scotia established 5 pilot sites for telehealth applications in the province. The project was a partnership between Dalhousie University, Tecknowledge Healthcare Systems, N.S. Department of Health and MT&T and a budget of 5 million dollars was established.

The project involved three major applications, namely, radiology, dermatology and continuing medical education. The extremely positive evaluation of the pilot projects resulted in the full roll-out to the province for telehealth applications.

The vision and motivation for the project are outlined in the objectives extracted from a May 2000 evaluation report.

“Specific objectives of the NSTHN are to:

1. Improve rural patient access to health care,
2. Improve rural physician access to specialist consultation, diagnostic services (i.e. teleradiology), and CME,
3. Improve quality of patient care and health outcomes,
4. Provide health care services which are satisfactory to patients, rural physicians and consulting specialists,
5. Enhance physician recruitment and retention in rural areas.”⁷⁴

An evaluation of each of the objectives was conducted by means of survey and review of utilization data. A number and variety of indicators such as physician retention and quality of broadcasts were assessed and the project was deemed to be a success.

The partners for the project report to an advisory committee from the four regions in the province. As well, the medical school from Dalhousie Consumers, Registered Nurses Association and a Tertiary Centre are represented on the steering committee. The interviewees expressed a sense that the “advisory committee really didn’t have any authority” and “people saw it as a top down exercise.”

There is a significant belief that the advisory structure should now be altered to reflect the fact that telehealth is no longer a project but a program. The advisory committee was expanded as the initiative grew and the regional representatives were the conduit to solicit regional participation and buy-in. Initially telehealth was viewed as a “hard sell” until there was actually an application up and running that people could see and relate to.

The benefits of the system are viewed as significant and are well documented in the evaluation report from both a client and organizational perspective. For many rural clients, travel to the city for specialty consultations was reduced or eliminated. Physicians also realized increased access to specialist consultation and diagnostic services as a result of telehealth. Continuing Medical Education (CME) has provided physicians with new techniques and practices and has resulted in physicians adopting new practices.

The evaluation report on telehealth services recommended that the incredible success of the current system be built upon. The recommendations are summarized below:

- “- expand the clinical and diagnostic programs
- continue to provide continuing education programs for physicians and nurses
- expand teleconferencing of specialist grand rounds
- encourage integration of telehealth clinical services into traditional services ...
- further research is needed into how telehealth consultation differ ...
- further research into the impact of telehealth upon the utilization of health care resources ...
- continue with technological improvements
- evaluation of telehealth services should continue ...”⁷⁶

The Nova Scotia Telehealth Network is the first provincial network to be implemented. The partners and stakeholders developed the security and privacy policies as they moved to implementation. Many of the applications were developed as a result of requests from clinicians in the field.

The NSTHN continues to expand and broaden its application with such initiatives as ICON (Improving Cardiac Outcome Network) and patient education is now also on the network. Business processes have also been modified as a function of this network. Radiologists have apparently modified several of their practices as a result of an analysis prompted by telehealth.

Okanagan Similkameen Health Region Community Based Health Services Database and Documentation Pilot Project

The Okanagan Similkameen Health Region project involved a partnership between Kelowna General Hospital, Kelowna Health Unit, Ministry of Health (Systems Division) and the Continuing Care Division. The project, initiated in 1995 was established to achieve the following objectives:

- “- to deploy information systems in a manner that expedites the delivery of care for patients whose management shifts between the acute care institutional and home care environments
- to avoid duplication and redundancy
- to be effective and efficient by avoiding unnecessary delays in arranging for services, referrals
- to improve communication in the field.”⁷⁷

The Ministry of Health approved 72,872 through a funding program entitled, “Closer to Home,” in order to establish the pilot project in the Okanagan. The project provided Continuing Care Division staff “point-of-care” access to the provincial CCD and hospital databases.

For the pilot project, the funding provided cell phones, lap top computers and network cards allowing laptops to connect using land lines. Staff from the CCD were also committed to the pilot project to provide training and education to staff participating in the project. The goal was to enhance the discharge planning process between the hospital to the community through the use of connectivity and the mobile record. Electronic referrals between the hospital and CCD were developed and computer links were established between the Health Unit, KGH, two Home Support Agencies, three LTC facilities and Hospice.

The independent evaluation of this project indicates that the project and the use of the mobile record was a success.

“... although limited objective data is available, the use of cell phones by selected CCD staff appears to have been successful and offers the potential to enhance the productivity and quality of care provided to clients.”⁷⁸

The speed of the cellular data transmissions at the time of the evaluation was deemed to be slow and further roll-out of this dimension of the project was not recommended.

However, the connectivity to hospital and CCD databases for staff through Health Unit and CCD computers was viewed as an area requiring expansion.

Interviewees for this project indicated the improved service as a result of the connectivity.

“clients can come to an outpatient service – Home Care nurse can then access all the information required from a computer terminal”

It is believed that services are now more efficient in the community as a result of the connectivity.

The project materialized as a result of the vision of the Continuing Care–Regional Director. The Director was viewed by the interviewees as the “driver” for the project.

“Leaders in the community were called in and briefed and once clinicians were shown the potential of the system they wanted it.”

The Director of IT in the Kelowna hospital system was identified as the operational and technical driver that made the system happen. There was no governance structure in terms of this project, however, there is a regional information sub-committee that has been established.

Confidentiality of client information is believed to have been improved through the new system. Audit functions are in place to track who is accessing information and why. As well, centralization of all registration of new clients in the Penticton, Summerland, Oliver and Kelowna areas has occurred via the Meditech system. Plans are underway to provide the connectivity to the communities in the more remote parts of the region.

This chapter has provided a sense of the scope, issues and findings regarding the large/provincial and small/regional projects included in the sample. The description from the documents and accounts from the interviews is a highlighting and summary of the investigation. This data has been synthesized in terms of the “dimensions of integration” and for comparative purposes Chart 4 illustrates the presence of the various dimensions

for the individual projects. As can be noted from the chart, the majority of projects demonstrated evidence of improved performance and integration as a result of the alliance. However, it was noted that the performance measures are still to be developed for most projects. The next chapter on the *Analysis* provides a sense of the congruity of the findings in terms of the research question.

CHART 4. DIMENSIONS OF INTEGRATION

	New Brunswick HCIT	Saskatchewan SHIN	B.C. HealthNet	Chatham-Kent Health Alliance CHICK	Manitoba Telehealth-Norway House	Nova Scotia Telehealth	Okanagan Similkameen Health Region
Customer Perspective							
Q.1 Improve Client Outcomes	✓	✓	✓	✓	✓	✓	✓
Q.2 Specific Performance Measures				✓		✓	✓
Financial Perspective							
Q.1 Improved Resourcing	✓	✓	✓	✓		✓	✓
Q.2 Alliance Improved Resourcing	✓	✓	✓	✓		✓	✓
Innovation and Learning							
Q.1 Increased Sharing of Clinical Resources	✓	✓	✓	✓	✓	✓	✓
Q.2 Noted Benefits in Learning	✓	✓	✓	✓	✓	✓	✓
Internal Business							
Q.1 Strengthening of Mission and Values	✓	✓	✓	✓		✓	✓
Q.2 Compliance with Regulatory Requirements	✓	✓	✓	✓	✓	✓	✓
Q.3 Goals of Alliance Met	✓	✓	✓			✓	✓
Q.4 Improved Productivity	✓	✓	✓	✓	✓	✓	✓
Q.5 Individual Organizational Goals Being Met	✓	✓	✓	✓		✓	✓
Q.6 Functional Integration	✓	✓	✓	✓		✓	✓
Q.7 Equity in Decision-Making	✓	✓	✓	✓		✓	✓

CHAPTER V

Analysis

The purpose of this chapter is to analyze the findings of the research in terms of the hypothesis and the history of health care policy development. As set out in Chapter I, computer connectivity is revolutionizing service delivery structures in our society. Globalization and e-commerce have impacted the conventional work place and remote access to shared databases have resulted in service systems across corporations. The “interac” system in the banking industry was used as an example of integration of function in the financial industry.

It was hypothesized that hospitals and health agencies that have embraced technology in the form of computer connectivity or telehealth applications have also realized higher levels of integration. However, before examining the research question, the history and the evolution of health care policy was required. Clearly, the current status of health policy and the challenges faced by policy-makers cannot be appreciated without an appraisal of the system issues.

Chapter I traced the economic and political history of medicare in Canada from the perspective of: Funding and Provincial/Federal Relations, Emerging Trends and System Issues and Traditional and Contemporary Organizational Structures. The funding and federal/provincial relations review revealed that there has been an ongoing jurisdictional debate between the federal and provincial governments on cost containment

in health care. New funding formulas have been introduced to manage spending in health care and to date have failed.

The lack of incentives in the federal-provincial shared cost agreements for provinces to contain costs was cited as a major cause of escalating costs. It was noted that several task forces and royal commissions have been given the mandate to find ways and means of controlling health care costs. Most recently, the federal and provincial governments are defining the terms of a federal re-investment in health care and an accountability mechanism in the form of a “provincial health report card” is being developed.

The historical consideration of health policy in Chapter I, next focussed on the emerging trends and system issues in health care. The importance of the “determinants of health”, community support programs and the aging population were identified as major system challenges to the current health system. It was demonstrated that the health system has had difficulty balancing the objectives of the medical-treatment model with the objectives of a model focussing on prevention and community support. There has been a disproportionate investment in the medical-treatment system in comparison to preventive and community-based health. It was identified that there is a lack of flexibility in the system to embrace new directions in terms of prevention and community based services.

An organizational analysis of the current health structures emphasized the “silo” and “stove pipe” nature of the health structure in the system. The resistance to change and rigidified nature of health organizations has resulted in a fragmentation of service,

when clients need to move from one service to the next. The silos exist as separate entities serving the same client. An appraisal of the current literature on health systems provided an understanding of model development directed at integrating health organizations and services. There are several different theories and models proposed for integrating health services. However, there is consensus that integrated health systems are evolutionary and the evolution is at the beginning stages. The definition of IHS put forth by Duncan Sinclair is the working definition utilized by this research:

“... the concept of integration as being a simple one which involves a group of health service providers joining together to provide or arrange for the provision of a complete continuum of care.”⁷⁹

The notion of strategic alliances and partnerships across health organizations was introduced as a form of integration relevant to this research.

The first chapter proposes that organizational change is occurring across the health system in instances where strategic alliances and partnerships have been formed to achieve computer connectivity. The notion is introduced that the rigidified and ossified health system is achieving higher levels of integration and efficiency as a result of joint or multi-partner connectivity and telecommunications projects. Technology is viewed as a catalyst to the integration process.

Chapter II examines the drivers and motivation for connectivity and telehealth projects, namely, the governmental policies and funding programs. The role of agencies such as CANARIE and Industry Canada in funding and stimulating the growth of the Health Information Highway over the last decade is presented. The unique partnered

funding approach between government, health stakeholders and the private sector technology companies is described. The project development approach for connectivity and telehealth projects has focussed initially on pilot projects. Over the past few years there has been a decided emphasis on developing a strategic vision and priorities for the health information highway.

The most recent key documents reviewed in this chapter were the *Canadian Health Infoway* released in 1999, by the Advisory Council on Health Infostructure and the *Health Information Roadmap* written by Health Canada, Statistics Canada and CIHI. Both of these reports provide a broad vision for health information sharing and connectivity in Canada. The strategic steps required to achieve the vision are also outlined and activities currently in progress are described.

The chapter on the health information highway is a significant contextual component of this research. The projects reviewed in this research need to be considered from the perspective of the national vision. As well, several of these projects would not have materialized if government funding through one of the grant programs such as CANARIE had not been provided.

The methodology for examining the research question is presented in Chapter III. This third chapter established the methodological framework through which the “dimensions of integration” of partnered health organizations on connectivity and telehealth projects can be tested. The introduction of connectivity/telehealth projects is viewed by this thesis as a catalyst creating stronger alliances/partnerships and

subsequently higher integration. In order to test this hypothesis, it was stated that a methodology would be adopted that provided two separate modes of evaluation.

The first aspect of the evaluation would involve a review of primary documents from each project and would be a content analysis. The content analysis for a sample of national projects would determine through the Zachman Framework the business case, organizational units involved, business processes, motivation and the objectives and scope of the project. The focus of the content analysis was at the executive management and senior operating management level of analysis in terms of the Zachman Framework.

The second mode of the evaluation was to determine the “dimensions of integration” resulting from the partnerships with respect to the connectivity projects. The strategic alliance effectiveness framework developed by Legatt and Leatt and based on Kaplan and Norton’s balanced scorecard was used. A survey interview guide was developed that was administered in each of the sites surveyed. The questions were designed to provide data on the “dimensions of integration” being analyzed in accordance with the Legatt and Leatt effectiveness model. The dimensions identified in the survey were categorized as customer perspective, financial perspective, innovation and learning and internal business. A survey interview guide was developed and administered in each of the sites in order to obtain the data required for the “dimensions of integration”.

The sample for the survey was seven sites selected from across Canada. The sites were categorized in terms of large/provincial or small/regional and two to four people were interviewed at each site. Sites were selected on the basis of fit related to a given “dimension” or “dimensions of integration”. As well, the sites had to be prepared to

share primary documents such as evaluation reports, budgets, annual reports and strategic plans.

Chapter IV provides a profile of each of the sites examined in the study and the results of the content analysis and the interviews. The findings illustrate the strong sense of vision and project activity supporting information sharing across the continuum. Each project reviewed provided a mission or a vision that represented a description of a more highly integrated system at either a functional or programmatic level or in some cases, both. Implicit in the project descriptions and the objectives was the motivation of the project. And, in every situation whether the vision was “one client–one record” or the “provision of remote education via video conferencing”, integration across organizations was evident. The technology plan provided the medium to transcend traditional organizational practices and create integrated approaches.

The magnitude of the scope of the vision varied from one project to the next and was often a function of whether the project was a single or multi-application initiative. The most significant comparison in terms of scope of mission/vision is recognized when comparing the large/provincial initiatives to the small/regional projects. The large/provincial projects in New Brunswick, British Columbia and Saskatchewan are “big picture” initiatives with a focus on standardization and the development of systems that support the regionalization and reform initiatives started in these provinces in the early 1990s. Concise and well developed strategic documents exist for each of these projects defining the steps required to build on their development and evolution to date. Seamless

information exchange providing provincial consistency of access to client information is emphasized.

The larger/provincial projects have also recognized the importance of governance and stakeholder buy-in to creating and implementing the provincial IT vision. The SHIN is a Crown Corporation while New Brunswick's HCIT committee has only recently become a formalized standing committee advising the province. B.C. also has an advisory committee. These committee's regional representatives and stakeholders provide the input to decisions required to plan systems across the continuum. These committees are becoming more formalized and influential in terms of establishing a more integrated approach to systems development at a regional level.

The smaller/regional projects also have project mission and vision statements that reflect a change in business process to achieve integration of information sharing across the system. Clearly, projects such as the Chatham-Kent Health Alliance and the Okanagan-Similikameem Mobile Document Project are examples of integrated systems in progress. The electronic client record is being standardized between the participating organizations and the access to information is becoming seamless across the system. These objectives are in congruity with the vision and mission of the projects.

The interviews and survey of the projects demonstrated that in terms of the Legatt and Leatt framework of evaluation the majority of the strategic alliances were effective. In terms of the "dimensions of integration" namely, customer perspective, financial perspective, innovation and learning, and internal business, chart 4 on the Dimensions of Integration in Chapter IV provided a summary of the individual and aggregate responses

to evaluation survey. The majority of projects provided examples of where the project had improved client outcomes, improved resourcing, created learning opportunities for the partners and staff, achieved goals of the individual organizations and the partnership, improved productivity, achieved a level of functional integration and created a shared decision-making process.

These aspects of the evaluation framework established by Legatt and Leatt are considered to be evidence of system integration in terms of Duncan Sinclair's definition. There is a reasonable conclusion in the projects examined that connectivity and telehealth projects are advancing the integrated health systems agenda. Health organizations, that have traditionally operated in silos are planning and developing shared projects that ignore organizational boundaries. And as demonstrated through the content analysis, evaluations of these projects are validating that the completion of the project objectives and the planning for the next steps to achieve higher levels of integration are occurring.

There is a difference in the magnitude of integration achieved from one project compared to another and is a function of a number of variables, such as project resourcing, leadership, organizational commitment and planning process. Projects such as the Manitoba Telehealth were successful in terms of evaluating the applied use of a single technology. However, compared to a project such as the Kelowna Mobile Document Project, there is a higher level of integration achieved in the Kelowna project as a result of the planning process and the nature of the project. This study did not measure the variability of integration achieved by the various projects. The research set out to establish that there is a correlation between IT connectivity and telehealth projects

to integrated health systems. The data collected and analyzed in this research supports this hypothesis and demonstrates the positive impact shared IT projects is creating in the health system.

CHAPTER VI

Conclusion

The hypothesis of this thesis predicted that computer connectivity and telehealth projects would serve as a catalyst for integration at a health system level. The use of the Zachman Framework for the content analysis and Legatt and Leatt's effectiveness model were useful in analyzing this research question. A sample of seven projects from across Canada was determined. The majority of projects both large/provincial and small/regional were deemed to be achieving higher levels of integration as a result of connectivity or telehealth projects. A "dimension of integration" summary based on the interview findings was used to illustrate this point.

This research project ends on a strong optimistic note for health services in Canada. There are emerging technical solutions being created at a provincial and federal level that are redefining the traditional health organizations function. Connectivity and telehealth projects are providing the tools and opportunities for front-line staff and their organizations to redefine their service, to achieve better client outcomes. Organizational boundaries, a long standing barrier to integration are becoming secondary in the world of telecommunications and connectivity.

The notion of virtually "integrated health systems" and "health teams" has become the subject of planning and discussions between health organizations. There is a recognition that traditional organizational systems need to be expanded to meet the new customer service expectations.

“Virtual integration indicates that there is no single organized health system but rather a network of health and social service organizations working together with a community or population, that adapts to achieve a desired effect.”⁸⁰

As noted in this research the development and planning of service support across several partnered organizations for the purpose of enhanced service to a single client is evident. Of particular note here, is the advanced planning in New Brunswick to develop a link between the Client Services Delivery System (CSDS), a system of predominantly social service and community providers with the hospital system. This “virtual system” when developed will provide a truly comprehensive health and social services network for the province. There will be multiple points of access to a wide array of health and social services for residents of New Brunswick. The fully evolved “virtual health system” will set in place a key component of the virtual integrated health systems model, namely:

“cover the full range of healthcare, health and social services across a broad range of settings ...”⁸¹

New Brunswick is well positioned to achieve this level of integration with their CSDS system.

There is also a clear focus by several of the projects in the sample in this thesis focussed on the “single electronic health record”. The foundation of a “virtually integrated health system” is believed to be the access and management of a single client record. Coffey, Fenner and Stogis present as follows on this matter.

“The obvious place to begin to merge information systems and processes is at the level of the patient. The continuity and coordination of care is but one of the important communications necessary within an integrated system.”⁸²

The goals/objectives and the outcomes achieved by the sample projects demonstrate the realization of key components of the foundation for “virtually integrated health systems.”

The continuation by the federal government on the development of the Health Information Highway and the national standards will support the move to a single electronic health record and the transition to a “virtual integrated health system”. Proper data monitoring and technological innovations will develop with this support. As well, CIHI and Statistics Canada need to continue to build the performance measures and performance standards that are relevant to decision-making in health care.

APPENDIX I

Interview Guide

CUSTOMER PERSPECTIVE

1. In what ways has this project improved client outcomes?
2. Could you please outline the specific performance measures implemented to measure improved client efficiency?

FINANCIAL PERSPECTIVE

1. In terms of costs could you please describe the current and previous resourcing situation for this project?
2. Are there any appreciable impacts that the alliance has effected in terms of resourcing, if yes, what are they?

INNOVATION AND LEARNING

1. Has there been any increase in the sharing of clinical knowledge and resources as a result of the alliance, i.e. joint education initiatives, number of consults.
2. What have been the benefits in terms of the individual organizations, as a result of the alliance?

INTERNAL BUSINESS

1. Has the alliance maintained or strengthened the mission and values of the project?

2. In your opinion has the project complied with regulatory requirements?
3. Have the goals of the alliance been met, if yes, what are the achieved goals, if no, what are the goals still to be achieved?
4. In what ways has the project results in improved productivity in service delivery?
5. Are the individual organizational goals related to this project being realized?
6. Is there a level of functional integration being achieved as a result of this project?
Please describe.
7. Is the project governance viewed by the individual members as one of equity, allowing for fair rates of exchange and reciprocity?

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APPENDIX III

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