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EVOLUTION OF THE INTERNET
AND
ITS IMPACT ON SOCIETY

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ABSTRACT

The Internet has emerged as a prominent medium of communication. Today, it has become the focus of enormous debate and evaluation. The objective of this study is to examine the evolution of its impact on society. In this regard, various interpretations of its societal impact are provided. First, the debate on the information society exhibits the widespread belief that society is transforming and a new type of society is emerging. Second, a chronological description of the evolution and development of the Internet displays its burgeoning growth and current utility and capacities. Third, optimistic and pessimistic perspectives elucidate opposite views of the potential it can have on society and humankind. Lastly, a synchronic analysis of media coverage, using *The Globe and Mail* as an illustration, demonstrates the present reporting of its impact. These various interpretations provide an understanding of the Internet's increasing significance and position within society.

RÉSUMÉ

L'Internet est devenu un outil de communication majeur, objet de nombreux débats et de nombreuses évaluations venant de multiples sources. Cette étude vise à en déterminer l'impact sur la société. À cet égard, plusieurs interprétations de ce phénomène sont prises en compte. Premièrement, le débat sur la *société de l'information* met en évidence la croyance très répandue selon laquelle la société se tranforme, faisant apparaître un monde nouveau. Deuxièmement, une étude chronologique de l'évolution et du développement d'Internet décrit sa croissance bourgeonnante, ses usages et son fonctionnement. Troisièmement, les perspectives optimistes et pessimistes éclairent des compréhensions opposées de l'impact potentiel qu'il peut avoir sur la société et sur l'humanité. Enfin, une analyse synchronique de la couverture médiatique, utilisant les articles publiés dans le *Globe and Mail* comme illustration, démontre la façon dont sont couramment rapportés ses impacts. Ces diverses interprétations procurent une compréhension de la portée et de la place croissantes qu'occupe l'Internet dans la société.

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INTRODUCTION

> Machine industry has made it possible to amass enormous quantities of information. The concern with the study of civilization in this century is probably a result of the character of our civilization. (Innis 1951, p.132)

The Internet, new information and communication technologies today are being entrenched into the fabric of our society at a very rapid rate. The Internet has emerged as an extraordinary prominent medium having a tremendous impact on and within society. Its remarkable attributes and rapid growth, and their profound influence within society have been the subject of enormous media coverage, scholarly publications, specialty magazines, and public discussion. Motivated by the intense and ever apparent impact of this new phenomenon, this thesis illuminates various interpretations of the Internet's influence and effect on society.

The thesis provides an analysis of the impact of the Internet, new information and communication technologies and their influence on society. The physical developments in these fields have had significant impact in the ability to communicate rapidly and efficiently around the world and in the functioning of society. The research provides a discussion of varying interpretations of the impact of the Internet on society: the information society, the origin and evolution of the Internet, technological utopian and dystopian perspectives and the coverage by media of its impact on society.

Chapter 1 discusses the notion of an 'information society'. The term 'information society' is widely used to characterize our current age illustrating the influence that new information and communication technologies have on society. An analysis of different interpretations of the information society highlights its complexity and illuminates its prevalence. In particular, Frank Webster's work elucidating different perspectives of the

information society is documented. His discussion of the technological, economic, occupational, spatial, and cultural perspectives of the information society displays the profound impact that new information and communication technologies have on society.

Chapter 2 describes the history and evolution of the Internet. It documents the origins of the Internet and important innovations and discoveries that contributed to its development. Beginning in the nineteenth century up to the present, a comprehensive account of the important dates, projects, people, and innovations are provided. It entails the chronological emergence of the Internet and World Wide Web demonstrating its development and transformation. Citing the initial steps towards an infrastructure facilitating and enabling today's Internet, it is shown how computer technology developed into a communications medium. The exponential growth of the Internet leading to its current version and capabilities is demonstrated. The historical perspective provides an understanding for much of the current discussion on the information society and on the impact of new information and communication technologies within society. It displays the rapid technological progress of the Internet clearly illustrating its rise and anticipated manner in which it will continue to evolve.

Chapter 3 provides opposite perspectives on technology, technological utopianism and dystopianism. These perspectives provide extreme viewpoints of how emerging technologies are often viewed, to the benefit or the detriment of society. Definitions, conceptual origins and theoretical examples of both perspectives are provided. The viewpoints focus on and emphasize the impact of technology within society. They provide a basis from which to analyze the coverage of the Internet and other new information and communication technologies in the media.

Chapter 4 examines coverage of the Internet in the media in communicating the development of various aspects of the information society as described by Frank Webster, and its real impact and influence on society in technological, economic, occupational, spatial, and cultural areas. It analyzes the coverage in relation to technological utopian and dystopian perspectives. A synchronic analysis of the media coverage is done to determine if the media represented the Internet, new information and communication technologies in a specific manner reflecting principles of technological utopianism and dystopianism. To further examine the impact by media, the most prominent Canadian daily newspaper, *The Globe and Mail*, is selected to critically review its contents and coverage of the Internet, new information and communication technologies. The work done reflects the methodology, results, and analysis of its contents in relation to the nature and degree of media impact on society.

Based on the research and findings in this thesis, certain conclusions are drawn as to the potential impact of the Internet on various societies in the future. These conclusions include the negative and positive impact on the way of living and its varying social, economic and cultural effects on different parts of the world depending on their current industrial, economic, social and political status.

CHAPTER 1
THE INFORMATION SOCIETY

> People started getting together and exploring the idea that there was going to be a revolution in technology which was going to change society so drastically. (Wosniak in Lyon 1995, p.54)

In recent years a new way of conceiving contemporary societies has emerged. An extensive amount of exposure – through books, articles, periodicals, and journals - has been devoted to the notion of an 'information society' and to the idea that we have entered into a new system characterized by the magnified presence and significance of information. Scholars, reporters, government officials, and corporate executives talk about information as a resource of paramount importance and as a defining feature of the modern world. Robins and Webster (1999) note that a united host of industrialists, politicians, and academics, are engaged in and devoted to informing people that the recent developments in information and communication technologies are having a major impact upon society and laying the foundations for a new era of wealth and abundance.

Much attention is focused on the 'informatisation' of social life, a term used to denote a progress of change leading to an information society, one that "alters the entire nervous system of social organizations" (Nora and Minc 1980 in Dordick and Wang 1993, p.13). It is constantly communicated that we have entered an 'information age', that a new 'mode of information' predominates, that an 'information revolution' is occurring, and that the world has moved into a 'global information economy' (Webster, 1995). Martin (in Webster 1995, p.2) suggests that information has "become so important today as to merit treatment as a symbol for the very age in which we live." Affirming this assertion Steinfeld and Salvaggio (1989, p.2) note that "Virtually all

scholars agree that information itself has taken on a greater importance in highly industrialized societies." However, this treatment and common reference to information as the characterizing feature of today's society is often used loosely with little or no operational definition (Steinfeld and Salvaggio, 1989). This Chapter outlines various interpretations of the information society illustrating the broad discussion and complexity of the concept. Frank Webster's work illuminating varying perspectives and methods of interpreting the information society is discussed.

Conceptual Origins

The emergence and widespread integration and utilization of new information and communication technologies in technologically advanced societies, has stimulated discussion on its impact and effect on society. Over the past two decades, there has been a pervading sense and widespread belief that a period of rapid and intense change is occurring. Dutton and Blumler (1989, p.63) remark that "the literature on the information society underscores the nearly universal nature of the implications flowing from technological change." Likewise Frederick Williams (1988, p.2) notes "The information society offers a general model for economic and social development of cities, states, or countries in the modern world." It has been debated frequently that the last quarter of the twentieth century is without precedent in the scale, scope and speed of societal transformation (Robins and Webster, 1999). Daniel Bell asserts,

> In the 1980s, more than 130 years after the creation of the first effective telecommunications device, telegraphy, we are on the threshold of a new development that, by consolidating all such devices and linking them to computers, earns the name of a "revolution" because of the various possibilities of communication that are now unfolding. (1989, p.90)

Further, Dizard (p.2, 1982) in *The Coming Information Age* claims information "resources are so pervasive and influential that it is now becoming clear the United States is moving into a new era – the information era." Messages abound that the only certainty for the future is that it will be much different than today and that the speed of change will happen more quickly than it ever has before. An enormity of coverage - vast array of articles, reports, and publications - advocate that we have entered an epochal moment in human history. These great transformations are projected to engulf all of society in which no-one's daily life will be immune from the anticipated upheaval and turmoil of change. The rise of an information society is attributed to such discussions.

Daniel Bell's, *The Coming of Post-Industrial Society*, is considered by many to be the trend-setting work in forming the idea that a new information society has replaced industrial society. He believed that contemporary society has emerged as a post-industrial society due to a large and growing service sector and an increase in informational activities. Bell argued that what counts in post-industrial society is not raw muscle power, or energy, but information. "Bell sees in the emergence of 'white collar society' (and hence information work) and the decline of industrial labour changes as profound as the end of class-based political conflict, communal consciousness, and the development of equality between the sexes" (Webster 1995, p.14). His work has stimulated debate on the impact of new information and communication technologies on society and their effect on the emergence of an information society. Bell explains the unique societal infrastructure of an information society:

> In an information society it is likely that there will be a major shift in the relative importance of the infrastructure: telecommunications will be the central infrastructure tying together a society. Such a network

> increases personal interaction and drastically reduces the costs of distance... More important, an information society enlarges the arenas in which social action takes place. (1989, p.93)

These are the principal ideas underscoring current debate and discussion of the information society.

In a more detailed manner, Yoneji Masuda (1985) takes Bell's analysis of post-industrial society further by comprehensively defining the differences between the past industrial society and his vision of an emerging information society (Appendix 1). Unlike the vague term 'post-industrial society' Masuda uses 'information society' to describe in concrete terms what he believes will be the characteristics and the structure of this new society. Masuda's detailed description of "The Overall Composition of the Information Society" (Appendix 1) is highly speculative and optimistic and is further discussed in Chapter 3 Technological Utopia vs Dystopia. It provides a detailed account of many of the relative differences, characteristics, and features of the industrial society and information society. He presents the overall composition of the information society based on a historical analogy from industrial society. His emphasis on new information and communication technologies in analyzing differences between the industrial society and an information society displays many of the specific qualities of an information society as commonly discussed in the information society debate.

Robins and Webster (1999) note that much of the discussion about the information society has taken a rapid succession of forms. Towards the end of the 1970s, the principal concern was with the silicon chips that allowed for the creation of the new technologies, and the talk was of the 'microelectronics revolution'. A little later around the turn of the decade, the focus shifted to the capability of new technologies and their

capacity to process and store information. Also, at this time, talk of the new information technology revolution first surfaced. Throughout the 1980's, interest turned to the communications function of new technologies and the revolution was said to be one in both information and communication technologies. This was followed, in the 1990's, by a growing interest in the Internet with the plans to inaugurate the 'information superhighway' with predictions of a global 'networked society'. Currently, in the dawn of the new millenium, new information and communication technologies are defined by creating a 'cyber-revolution' and as shaping a 'virtual society'. The prevalence and importance attributed to these changing analyses on technological and information innovations reflect the intensely changing technological environment over the last twenty years.

Definition

The communication of the effects – political, economic, social, and cultural – of information technology reads much like popular writing on diets, sex, and movie stars. It is contradictory and often marked by sharp controversies (Pal, 1997). Throughout the Twentieth century, it has been discussed that any time a new information and communication technology came along it would have a revolutionary impact. Every technology has been argued as being imperative to the emergence and existence of an information society. However, the term 'information society' is used in a number of ways to explain different phenomena. Therefore, it is necessary to present the information society elucidating how it is discussed, its different perspectives, and their meanings.

The term 'information society' has been used to reflect the effects of new information and communication technologies and to symbolize the changing nature of society, however, its use is not universal. Reference to the information society has many varying connotations and meanings. In fact, even scholars specializing in describing the nature of the information society argue about what it is and what it means for society, resulting in differing degrees of analysis.

David Lyon (1995) argues for two kinds of 'information society' theses, each of which makes two varieties of claims. He believes that the first is the view popularized by the mass media stressing the major social changes for the better that follow in the wake of information technology, and the second is advocated more by academics and professionals who are more cautious and open-ended. Even though Lyon is correct in identifying the difference between mass media accounts and academic interpretation of the information society his analysis is very general and does not fully capture the extent within which the term 'information society' is used.

Leslie Pal (1997) argues the 'information revolution' and 'information society' concepts are used in three distinct areas of analysis emphasizing different perspectives on its broad effects on society: economic, cultural, and technical. Although this account is much more comprehensive than Lyon's, stating that the information society has been discussed and analyzed from all three perspectives, it lacks in addressing a full account of the perspectives in which the information society as a meaningful concept is used.

A proficient and complete account in analyzing the discussion on the information society comes from Frank Webster (1995). Webster analyzes the different perspectives used in understanding the effects of new information and communication technologies

and informational trends and issues, which are brought into play by commentators and participants in the information society debates. Therefore, to fully encapsulate the different interpretations of the information society and to elucidate how it is understood and discussed, Webster's comprehensive description is chosen in this thesis as the primary source of information to explain the complexity and varying interpretations of the information society.

Webster's Definition

Webster (1995, p.6) believes it is important and "especially helpful to examine at the outset what those – and they are everywhere! - who refer to an 'information society' mean when they evoke the term." He believes that those who subscribe to this concept, and their confident assertion that our time is one marked by its novelty, cries out for analysis. His primary aim is to question what people mean when they refer to an information society and what criteria they offer to distinguish it from other societal eras. He states:

> "Before we can adequately appreciate different approaches to understanding informational trends and issues nowadays we need to pay attention to the definitions which are brought into play by participants in the debates" (1995, p.6).

In doing so, he distinguishes five perspectives of how the information society has been discussed, each of which presents different criteria for identifying current change and warranting the labeling of contemporary society as an information society.[1] The different perspectives he distinguishes are: technological, economic, occupational,

[1] Webster's objective was to critically analyze perspectives of the information society. He defines these five perspectives and analyzes the weaknesses and faults in each for characterizing contemporary society. To see Webster's concerns and critique of each of these perspectives see Ch. 1 (1995, p.6-29).

spatial, and cultural. The criteria he identifies in these perspectives are individually discussed in detail. These perspectives are not mutually exclusive and often overlap with one another displaying the complexity of the concept and accounting for its varying and unequivocal usage.

Technological

The technological perspective of the information society is the most common and is born out of and emphasizes technological innovation, perceiving technology as the major distinguishing feature of the new order (Webster, 1995). Steinfeld and Salvaggio (1989) add that this perspective emphasizes the technological infrastructure almost to the exclusion of other social, economic, and political attributes. Webster notes that it focuses on and accentuates technical breakthroughs and technological discovery. The key idea and focus stresses that innovations in information processing, storage and transmission have led to the application and potential utilization of information technologies in virtually all aspects of society. This has been facilitated by the cheap cost of computers, their dramatic increases in power, and their consequent application throughout all segments of society (Office of Technology Assessment, 1990 in Webster, 1995). It is advocated that these factors have created the potential for computers to exist in all types of products, such as cars, cookers, and watches, to name a few, which can potentially transform our lives and thrust us and society into a new era. Webster (1995, p.7) states "many books, magazine articles and TV presentations have encouraged the development of a distinct genre which offers this viewpoint: that the 'mighty micro' will usher in an entirely new 'silicon civilization'".

Technological approaches to the information society are very common and are often futuristic accounts of how society will take shape. Steinfeld and Salvaggio (1989, p.7) state "this literature is generally futuristic in perspective and invariably optimistic about the impact of technology." Similarly, Evans (in Webster, 1995) notes that there has been a plethora of gee-whiz writing propelled by the pace of technological change, communicating that the widespread use of computers will have an enormous impact, affecting every human being and every facet of their daily lives. Therefore, discussion of the technological perspective of the information society often holds a promise that from the new and emerging communication technologies great change will occur leaving a great impact upon all of society.

More comprehensive versions of the technological perspective of the information society concentrate on convergence and the potential of multimedia capabilities that exist due to the imbrication of telecommunications and computing. Debates on convergence often cite inexpensive information processing and storage technologies to have a major impact allowing for extensive distribution and market saturation. It is claimed due to convergence a new means of communicating and processing information exists, duly creating a networked society, marking a new phase in the information age and computer revolution (Tesler in Pal, 1997). These accounts claim the computerization of telecommunications makes it possible for computers to be linked to one another creating the potential of linking together all people to create a true information society.

Many note the scenario of networked computers is similar to that of electricity which took place during the industrial revolution. This communication network or 'information grid' is compared to the supply of electricity because it has become a

resource in which our society depends upon. "As the electricity grid links every home, office, factory and shop to provide energy, so the information grid offers information wherever it is needed" (Webster 1995). These communication and information networks have been referred to as the highways of our age, similar to the railways and roads of the industrial age. This analogy emphasizes that just as the railways and roads were of paramount significance to the Industrial Revolution because of the new means and ability to transport goods, the 'wired' or 'networked' society will provide the infrastructure necessary to transmit and access information throughout society to support an information society. Therefore, the emergence of computer networks and the Internet has given rise to sustained debate and is the very reason for discussion of this technological perspective of the information society.

Economic

Another prominent perspective coining contemporary society as an information society is concerned with the economics of information. The economic perspective of the information society emphasizes the rise of a knowledge economy, in which information is viewed as a new form of capital, consequently producing a new class of 'knowledge workers' who will be decisive players and wield power in the new economy. Fritz Machlup, considered by many to be the pioneering voice in assessing information industries, was the first to conduct an economic analysis of the production of knowledge. He has been a leader in establishing measures of the information society in economic terms setting certain parameters for many to follow in evaluating the economic significance of the information society. Peter Drucker (1994, p.64), also one of the initial

commentators on the economics of the information society notes that this emerging knowledge economy represents a "change in the human condition".

Much of the dialogue on the economics of the information society and on information industries is shown quantitatively in statistical terms. For example, in 1962, Machlup in *The Production and Distribution of Knowledge in the United States* distinguished five broad industry groups with which he could ascribe an economic value making it possible to trace their contributions to the Gross National Product (GNP). The industry categories he identified were education (schools, colleges and libraries), media of communication (radio, television, and advertising), information machines (computer equipment), information services (law, insurance, and medicine), and other information activities (research and development and non-profit activities) (in Webster 1995). He determined that twenty-nine per cent of the Gross National Product (GNP) of the United States came from these knowledge industries. Machlup stated:

> As an economy develops and as a society becomes more complex, efficient organization of production, trade, and government seems to require an increasing degree of division of labor between knowledge production and physical production. A quite remarkable increase in the division of labor between 'brain work' and largely physical performance has occurred in all sectors of our economic and social organization. (1962, p.6)

As this finding showed a significant contribution by information industries to the GNP, it garnered much attention setting the path for future economic forecasts for the information society.

Following in Machlup's footsteps Marc Porat in *The Information Economy: Definition and Measurements* (1977) concentrated on the extent to which the production, processing and distribution of information goods and services contributed to the GNP of

the United States. Although much of his work focused on occupations and the nature of work, Porat refined much of Machlup's work and "altered our thinking about economic activity to such an extent that the phrase 'information economy' has entered the literature as well as popular speech" (Schement and Curtis 1995, p.74)

In regard to the information economy, the current economic significance of Canada's information industries in the overall economy is illustrated by Statistics Canada (StatsCan).[2] StatsCan showed a consistent increase each year in the contribution of Communication industries to the Canadian Gross Domestic Product from 1995 to 1999 as demonstrated in Table 1.[3]

TABLE 1
Gross Domestic Product at Factor Cost – Communication Industries: Years 1995-1999

	1995	1996	1997	1998	1999
Total Communication Industries	**$20.641B**	**$21.084B**	**$21.885B**	**$23.392B**	**$26.833B**
Telecommunication Broadcasting Industries	$3.453B	$3.355B	$3.414B	$3.660B	$3.850B
Postal and Courier Service Industries	$3.797B	$3.948B	3.958B	$4.048B	$4.017B
Telecommunication Carriers Industries	$13.391B	$13.781B	$14.513B	$15.684B	$18.966B

In 1995, Communication industries contributed $20.641Billion(B) to the GDP, whereas in 1999 the contribution was $26.833B, a significant increase of over $6B indicating a

[2] Statistics Canada is the country's national statistical agency collecting, compiling, analyzing, abstracting, and publishing statistical information on virtually every aspect of Canadian society and economy.
[3] For information on the methods Statistics Canada used to calculate their figures see www.statscan.ca/english/about/info.htm.

growth of 30% over the period. During the same period the Telecommunication Carriers industry has grown from 13.391B to 18.996B, an increase of 5.575B indicating a growth of 41.6%. The contribution from Communication industries to the GDP, particularly in the Telecommunication Carriers industry has substantially increased year over year. It is clearly evident from these figures that most of the growth within the communication industries has taken place in the Telecommunication Carriers segment of the industry. Also of note was a minimal change of approximately 5.6% over the same period in the Postal and Courier Services industry traditionally being the representative form of communication of the industrial age and a reasonable growth of 11.5% in the Telecommunications Broadcasting industry.

These statistics affirm the general hypothesis of the aforementioned information society advocates in the economic perspective that new information and communication industries are growing and contributing significantly to the nation's economy. Particularly significant was the tremendous growth in the Telecommunication Carriers industry supporting the widespread belief of information society advocates that new information and communication technologies are spreading rapidly and having an astounding impact on society. Therefore, it has been accepted that information is a distinguishing and defining characteristic of today's society leading to a knowledge economy, being a prime creator of wealth.

Occupational

Another common measure for the emergence of an information society focuses on occupational change. This perspective contends that an information society exists

when a majority of occupations are found in work associated with information. Workers are considered information workers when information forms the focus of their labour. However, this has been very difficult for scholars to categorize resulting in studies with very different conceptions and definitions of information work. Schement and Curtis define the nature of informational occupations from an amalgamation of definitions in primary studies on the significance of information in occupations.[4]

> *Information work* occurs when the worker's main task involves information processing or manipulation in any form, such as information production, recycling, or maintenance. The consequence of information work is information, whether in the form of new knowledge or repackaging existing forms. Unlike the assembly line worker, an information worker - such as a telephone operator – processes and manipulates information as an end in itself. Information defines the task, the product, and the worker. (1995, p.76)

An information society in this perspective exists when occupations such as clerks, teachers, lawyers, and entertainers outnumber coalminers, steelworkers, dockers, and builders. (Webster 1995, p.13) For Machlup, occupations in these 'knowledge industries' include those of educators, physicians, governmental administrators, engineers, researchers, and jobs in the many areas of finance, communications and the information sciences (Williams, 1988). Stephen Reese (1988, p.216) states "The production and use of information and the technologies that facilitate that work, are said to occupy a central role in the 'knowledge industries' that are supplanting an industrial economy centered on the production of objects." The predominance of these occupations in society, in which information is central to the nature of work, is cited as the defining difference between a present information society and past industrial society.

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[4] Schement and Curtis offer a comprehensive inquiry into the definition and measurement of information work providing a descriptive analysis of both Porat's and Bell's work.

Discussion focusing on the occupational perspective of the information society is invariably related to the economic perspective. Commentators frequently discuss the magnitude of the information sector on the labour force. Marc Porat's *The Information Economy* is a pioneering work in the occupational perspective. It is a primary source of data for most analyses of occupations and work in the information society.[5]

Porat stressed the growth of numbers of information workers. He includes virtually any individual whose occupation touches on the manipulation of information. Williams (1988, p.27) states, "Porat's 'information society' is not so much a stress on intellectual technologies as it is a recognition that increasing numbers of people are employed in information-related industries." By the late 1960s he determined that the 'information sector' composed a little less than half of the entire labour force, showing that occupations with informational activities were becoming increasingly significant and rapidly expanding. In Porat's analysis information workers reached parity with industrial workers in 1955. Porat believed that information workers did not come into their own as the primary workforce group until the late 1950s. The timing of information workers becoming a dominant group in society coincided with the period when computers were proliferating in the late 1950s and 1960s. Porat interpreted the coincidence of these trends as reflecting the coming of an information society (Schement and Curtis, 1995). Reese concurs (1988, p.215), "Presumably, as an information society evolves, its citizens become more professionally and personally involved with information technologies." Therefore, the occupational perspective of the information society focuses on

[5] The following citations illustrate the influence and reliance on Porat's findings: Dizard, W. *The Coming of an Information Age: An overview of technology, economics, and politics*. 1982. New York:Longman. Nora, S. and Minc, A. *The Computerization of Society: A report to the President of France*. 1988. Cambidge, MA : MIT Press. Williams, F. *Measuring the Information Society*. 1988. Sage Publications.

information and the impact of information and communication technologies upon people's occupations and the overall changing nature of work and distribution of jobs.

More recently, Drucker (1994) specifically analyzed the information sector and estimated that more than one-third of the United States' workforce would be in the information sector by the year 2000. Similarly, and even more emphatic, Winograd and Buffa (1996) analyzing the nature of occupations involving information work argue that the industrial age is over. They conclude that less than fifteen per cent of American workers actually work in factories and that by 2000, 44 percent of workers, in one way or another will be involved with gathering, processing, retrieving, or analyzing information. These figures are argued to support the contention that information "has become the foundation for the modern economy" and support the rise of an information society (Drucker 1969, p.247). This particular view of the information society indicates the information industry is a growing and significant component of the overall economy.

Although StatsCan does not specifically study or examine the nature of information work and the number of people within society employed in such positions, such as specific studies like Porat's do, other measures and statistics are informative of the current role of information in occupations in society. In 1998, StatsCan evaluated employment in all industries specifically examining goods-producing and service-producing industries. These industries can also be phrased, as scholars such as Bell and Webster do, as industries of the industrial age and of the information society.

The industries categorized as goods-producing included logging and forestry, mining, manufacturing, and construction. These industries generally produce occupations dependent on physical labour involving minimal information work.

StatsCan reported 2.704M or 23% of the total 11.619M people employed in Canada worked in goods-producing industries. This statistic, despite not being an exact measurement, supports Winnograd and Buffa's findings showing that less than 15 percent of the United States' work force are employed in factories.

Service-producing industries, on the other hand, included transportation, storage, communications and other utilities, trade, finance, insurance, real estate, public administration and community, business and personal services. Bell and others have argued that occupations within the service industry are predominantly involved with work associated with information or 'brain work', therefore justifying this categorization to be an appropriate gauge of information work within contemporary society. These industries employed 8.772M or 75% of the entire labour force in Canada. This finding supports Porat's findings of the 1950's and 1960's demonstrating that industries and occupations involving information work has continued to grow and is the dominant type of work in the present economy and society. This demonstrates the continuing growth and predominance of information-oriented occupations supporting the occupational perspective of the information society.

Spatial

This perspective of the information society "has at its core the geographer's distinctive stress on space" (Webster 1995, p.18). The major emphasis is on computer, information, and communication networks, which connect locations and can cause dramatic effects on the organization of one's space and time. Many of the views in the technological perspective of the information society, the technical ability of computers

and new information and communications technologies to link people together, are also central to the spatial perspective. The analogy to the electricity grid referred to in the technological perspective is often referred to here. Webster describes the vision:

> as the electricity grid runs throughout an entire nation, extending down to the individual householder's ring main, so too we may envisage a 'wired society' operating at the national, international and global level to provide an 'information ring main' to each home, shop or office. (1995, p.19)

The theme is that all citizens are increasingly becoming connected to the network, which is growing and expanding its reach and capacities at an enormous pace. Discussion focuses on how information and communication technologies alleviate the restraint of physical space creating new modes of activity in a virtual space.

The salient idea of this information society perspective is that a networked society is emerging in which information circulates freely along electronic pathways where space is of no relevance or concern. Goddard and Richardson (1996, p.200) assert, "The successful implementation of telematics widens the 'locational repertoires' available to organizations." There is a considerable importance placed on the increase in the global distribution of information communicated through mass media. All advocates advance the view that there is a new reliance on the massive increase in transborder data flows, telecommunications facilities throughout the world, communications between computers from homes to transnational organizations, exchanges between stock markets and corporate segments, access to international data bases, and telex messages (Webster, 1995).

Much attention is focused on the impact of new information and communication technologies within industry. The Internet is offering new opportunities transforming the

nature of work in all industries. In this regard, Mulgan (1991, p.1) states, "the networks carry an unimaginable volume of messages, conversations, images, and commands" which can transform the nature of work and the way work is done. Much debate is on the impact and effectiveness of new information and communication technologies on work in different industries, such as telelearning, telemedicine, telework, and work at home. For example, commenting on telework, Nilles (1985, p.203) notes "The significant changes in work style made possible by telework, particularly telecommuting, are substantial." Similarly, discussing the effect of new information and communication technologies on the workplace in general, Goddard and Richardson state:

> As more and more work involves the processing and exchange of information, the fusing of telecommunications and computing into the networked 'telematics' characteristic of ICTs (information and communication technologies) means that this work can become more portable or mobile. With the global speed of telematics, the factors that confine the supply and demand of labour to one locality or nation-state no longer apply. While the adoption of ICT, within the workplace can reduce the demand for labour in one location, telematics can simultaneously increase its supply from elsewhere. (1996, p.198)

This concentration on the impact of the Internet on the nature of work is the current focus within the spatial perspective of the information society.

Scholars argue the volume and velocity of the flow of information changes the nature of activities in the traditional characteristics of space and time. Webster (1995, p.20) states "All things happen in particular places and at specific times, but the characteristics of space and time have been transformed with the advent of a 'network society'". Today, it is communicated that computerized communications technologies facilitate exchange of information in real-time and virtual space which can 'revolutionize' people's activities and the behaviour of society. In other words, the

notion of 'old' constraints of space and time is antiquated and has little effect and meaningful bearing on activities in this information society. Therefore, in the spatial perspective of the information society, new technologies are viewed as liberating mankind to opportunities beyond imagination with limitless horizons.

Cultural

The cultural dimension of the information society which Webster identifies as the final perspective is "perhaps the most easily acknowledged, yet the least measured" (Webster 1995, p.21). The cultural interpretation concentrates on the impact of information and communication technologies on human communications, community, and society in general. Advocates of the cultural perspective of the information society are less concerned with the economic and occupational concentrations and focus more on the effect new technologies have in creating new forms of social interaction. This view stresses that contemporary culture is manifestly more information laden than any of its predecessors, and that we live in a media-saturated environment, we interpret life and see it as having become quintessentially about symbolization, and about exchanging and receiving messages about ourselves and others (Webster 1995, p.22). It is in the acknowledgement of the explosion of various media outlets influencing commentators to believe that we have entered an information society.

Pal (1997) notes that the cultural approach to the information society has its roots in the work of Harold Innis and Marshall McLuhan. The central issue in this perspective, stemming from the work of Innis and McLuhan, is about the impact of the shifting of a society from one that developed and functioned around print to one organized around

electronic communications. Their emphasis on different communication and information technologies having powerful effects on the way human beings interact, consequently on the institutions that embody, reflect, and shape those interactions has defined this perspective of the information society, thus requiring a synopsis of their work and ideas.

Harold Innis has had a profound impact within the field of communications studying the significance of communication to the characteristics of earlier civilizations and of changes in the methods of communication (1951). His focus on forms and technologies of communication in different civilizations stimulated much research and study on the impact of communication technologies on culture. In *Empire and Communications* (1950) and *The Bias of Communication* (1951) he studied the nature and impact of methods of communication on particular civilizations or empires, ranging from Egypt to the Roman Empire to the age of the printing press. He notes:

> The use of a medium of communication over a long period will to some extent determine the character of knowledge to be communicated and suggest that its pervasive influence will eventually create a civilization in which life and flexibility will become exceedingly difficult to maintain and that the advantages of a new medium will become such as to lead to the emergence of a new civilization. (1951, p.34)

James Carey (1989, p.163) in a tribute to Harold Innis in *Communication as Culture* notes "Innis was everywhere intent on demonstrating the paradoxical nature of changes in the technology of communications." Carey remarks:

> Innis argued that changes in communication technology affected culture by altering the structure of interests (the things thought about), by changing the character of symbols (the things thought with) and by changing the nature of community (the arena in which we developed). (1989, p.160)

His work is highly valued and has influenced many current attempts within the cultural perspective of the information society to understand the present influence of electronic

information and communication technologies, particularly the Internet, on contemporary culture and society. He states:

> A medium of communication has an important influence on the dissemination of knowledge over space and over time and it becomes necessary to study its characteristics in order to appraise its influence in its cultural setting. (1951, p.34)[6]

Although Innis was not alive to witness the widespread diffusion of television and the recent emergence of the Internet which has led to the discussion of an information society, his vision of the future was compelling. Carey states it well:

> What Innis saw most clearly was that the main meaning of electronics was not in the provision of entertainment and information through radio and television. He recognized that the speed and distance of electronic communication enlarged the possible scale of social organization and greatly enhanced the possibilities of centralization and imperialism in matters of culture and politics. (1989, p.137)

Innis' focus on the precise nature and attributes of communication technologies provided a unique perspective to understand culture and civilization and are still very evident and of great influence to another predominant cultural communications theorist, Marshall McLuhan.

Marshall McLuhan has also been extremely influential in the cultural perspective of the information society. His work has traces of Innis throughout and is generally more acknowledged in the cultural perspective of the information society due to his focus on electronic media. McLuhan maintained that the method of communicating information, the distinct characteristics of the medium of communication, has more influence on the public than the content itself. He advocates that electronic media themselves have an

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[6] Innis theorized about the time-bias and space-bias of communication media. For further clarification see Ch. 6 in "Space, Time and Communications" in James Carey's *Communication as Culture* and Innis' *The Bias of Communication*.

impact far greater than that of the material they communicate. Referring to the work of Innis, Mcluhan in *Understanding Media: The Extensions of Man* (1964) notes, "the latest approach to media study considers not only the 'content' but the medium and the cultural matrix within which the particular medium operates" (p.11). McLuhan is widely considered to be a technological determinist in that he attributed an overwhelming power inherent in electronic media to shape or determine individuals and the nature of society. He states:

> It is the medium that shapes and controls the scale and form of human association and action. The content or uses of such media are as diverse as they are ineffectual in shaping the form of human association." (1964, p.11)

McLuhan is best known for his famous phrase "the medium is the message". He argued that in each cultural era the medium in which information is recorded and transmitted is decisive in determining the character of that culture. He remarks:

> "this is merely to say that the personal and social consequences of any medium – that is, of any extension of ourselves – result from the new scale that is introduced into our affairs by each extension of ourselves, or by new technology" (1964, p.7)[7]

He believed, before the advance of the Internet, that the linking of electronic information and communication media would inevitably create an interconnected "global village". His thoughts in analyzing culture can best be summarized by the following statement:

> Today, when we want to get our bearings in our own culture and have need to stand aside from the bias and pressure exerted by any technical form of human expression, we have only to visit a society where that particular form has not been felt, or a historical period in which it was unknown." (1964, p.19)

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[7] McLuhan discusses media as extensions of human sensory perceptions. For further understanding see *Understanding Media: The Extensions of Man* (1964).

Mcluhan's emphasis on the impact of electronic media on culture has greatly contributed to and underlies much of the current discussion in the cultural perspective of the information society.

The popular benign view of this cultural transformation is that it will create an information society, one where there is an unlimited access to a full store of human knowledge completely altering our ways of thinking and acting. The emergence of new modes of networked communication, such as the Internet, takes information and communication technology beyond computers and information and examines the effects and impact that this connectivity and capacity to participate in virtual worlds will have on individuals throughout society. Therefore, the cultural perspective of the information society focuses on the effect that new information and communication technologies have on people's lives, and how they affect a sense of community.

Outlining and examining Webster's dimensions of the information society demonstrate the many different interpretations that describe what actually constitutes an information society. Although the information society is discussed in varying ways common themes exist between some of the perspectives. For example, the technological and spatial perspectives are closely related with the common focus on the advent and capacity of the technology. Also, the economic and occupational perspectives overlap, both generally targeting the role information plays in both industry and work. While much of the discussion arising out of the cultural perspective does not obviously relate with any of the other perspectives it provides the fullest picture capturing significant elements from each perspective and synthesizing them into a broad and all-encompassing

viewpoint. All literature and coverage on the information society, regardless of the angle or ideological premise, argue that new information and communication technologies have made it possible for free and unobstructed exchange and widespread access to stores of information. They all infer contemporary society is inherently different from the past, primarily because of its remarkable ability for all people to access and retrieve various information influencing their activities, way of life, and society. With this knowledge and understanding of the debate on the nature of contemporary society as an information society it becomes important and necessary to examine the evolution and growth of the predominant aspect of new information and communication technologies, the Internet.

CHAPTER 2
EVOLUTION OF THE INTERNET

The incredible spread of computer networks throughout society and the rise of the Internet as a new means of accessing information and communicating has garnered much attention. To truly comprehend the impact of the Internet within society a description of its evolution marking its development and growth is necessary. This Chapter chronologically describes the development of the Internet from its emergence (birth) to its current stage (e-commerce), displaying its rapid growth, widespread diffusion and heightening impact within society.

Telegraphy

The Internet, as we know it today, emerged from a series of innovations that enabled communication and a transmission of data between computers at different locations. The origin of the Internet, a system allowing computers to communicate with one another, can be first traced back to the nineteenth century and the start of the industrial revolution. The first step towards modern communication networks and the computer was the telegraph and Samuel Morse's invention in 1844 of communication using electronic impulses, a unique code that deciphered the pulses to letters of the alphabet. Perhaps the first technical milestone of the Internet was in 1884 when the United States Congress paid Samuel Morse $30,000 to build a telegraph link between Baltimore and Washington, DC (Thompson in King, Grinter, and Pickering 1997, p.5). Although telegraphy was in no way a computer network it was a primitive form of

electronic mail (e-mail), operating in a network fashion, with human operators at each end.

In 1931, teletype emerged, a more recognizable form of e-mail, providing text output that was readable by someone other than a telegraph operator who did not have to interpret the code. In 1940, the first use of something resembling a computer, the Bell Laboratories Complex Number Calculator, was developed in New York where a teletype was received from Hanover, New Hampshire. This was the first dominant sign of what was to come in the form of computer networks and the Internet. These technological innovations dating back to Morse created new possibilities for people to communicate with one another and set the foundation for a communications infrastructure throughout the world for networks that today support the Internet.

Advanced Research Projects Agency (ARPA)

The modern emergence of the Internet was in 1957. At this time the Cold War was flourishing with the arms race between the United States and the USSR escalating. The USSR launched Sputnik 1 into the earth's orbit causing the United States to react immediately, creating the Advanced Research Projects Agency (ARPA) within the Ministry of Defense. ARPA's mission was to apply state-of-the-art technology to United States defense initiatives to avoid being surprised and possibly threatened by potentially harmful technological advances by the USSR in the future.

The Advanced Research Projects Agency became a technological think-tank for the American defense effort recruiting and hiring a large number of leading scientists and engineers for research. The initial focus of ARPA's activities were space, ballistic

missiles, and nuclear test monitoring, although its work changed later when it focused on advanced computing. However, one of the primary interests of ARPA from the beginning was to develop a system where all its researchers and scientists could share information and be linked with the department preferably through connections with its computers.

In 1962, ARPA initiated a computer research program. At this time they began thinking of ways to send information to different destinations. In 1966/67, they published a plan for a computer network system called ARPANET. Subsequently, they designed a system that allowed computers to send and receive messages and data known at the time as interface message processors (IMPs). In 1969, IMP's were installed in computers at UCLA and Stanford. The purpose behind this was to see if students at one university could access the computer at the other school. UCLA students were able to access Stanford's computer creating for the first time data and messages being successfully sent and retrieved from one computer to another. ARPANET proceeded to grow to four computers, to Santa Barbara and Utah, expanding the network. The network's initial success prompted scientists to develop new software to increase its efficiency and capabilities enabling its continued growth. As a result, at the end of 1971, ARPANET successfully linked 23 host computers to each other.

Networks and E-Mail

In 1972, at the International Conference on Computer Communications, ARPA scientists demonstrated the abilities of ARPANET linking computers together from 40 different locations. This demonstration displayed to the public that computers had the

ability to 'communicate' with one another consequently stimulating research in the scientific community throughout the Western world. Computer science as a discipline and field of study evolved from the potential demonstrated by ARPANET. As a result, other networks besides ARPA also began to develop. Later, a new program was implemented by ARPA facilitating messages to be sent over the network allowing for direct person-to-person communication, known today as e-mail. This fulfilled a primary goal of the ARPANET developers, to exchange information freely and to share resources. Griffiths states "almost as soon as terminals in different rooms could be linked to the same 'host' computer through 'time-share' operating systems, it became possible to leave messages for one another within the same system" (2000, p.1). This application became very popular, was heavily used amongst users and required little time and effort to convince people of its benefits.

The world's first e-mail was sent in 1971, adapting an existing and popular time-share internal mail program. The first e-mail was sent by Ray Tomlinson of ARPANET, who sent the message 'Testing 1-2-3' addressed to himself, from one computer to another. His second message was much more significant. He sent an e-mail to all ARPANET users explaining his discovery and the availability of 'electronic mail'. He provided instructions on how to address e-mail to different users – the users' log-in name @ the host computer name – the same way e-mail is sent today. This was the beginning of e-mail, a central function and component of today's Internet. However, the system was incredibly crude and not user-friendly. Griffiths states the difficult and tedious process of receiving electronic messages:

> The only way to know what was in a message was to open it in its entirety. The messages had to be read in the order they were received. They read as pieces of continuous text (rather like a teletext message today). The reading process and sending process took place via two completely separate programs. (2000, p.2)

The ARPANET developers, although were proud of their achievement, realized they needed to make the process less burdensome and more user-friendly. Innovations followed immediately correcting many of these problems making e-mail more efficient and an easier task to perform. Some of the innovations that developed were a listing of messages, indexed by subject and date; the ability to selectively delete messages; the ability to send and receive messages from the same program; the ability to forward messages, to automatically include the 'sender' address with the message; the ability to file and save messages; and a standard protocol to allow the exchange of messages between programs. All of these features are recognizable with present day e-mail.

E-mail did not take long to establish its own particular style. It was predominantly utilized for quick short messages rather than for long letters. It offered a high level of informality, a disregard for grammar and spelling, and a terse straight-to-the-point mode of expression (Griffiths 2000, p.2). This style of communicating reflected its novelty and unique nature, a primary reason for its widespread popularity, approval and success. Griffiths states, in the 1970s:

> the stiffness and hierarchy associated with society in the 1950s had already been swept away. The 'bluntness' of the medium was no longer seen as threatening but, instead conveyed a feeling of intimacy and immediacy. (2000, p.2)

In addition to the intimate feeling that e-mail created there were a number of other advantages that were unique and different than any other medium. For example, the costs of keeping the computer links open were carried by computing centres making it

much cheaper to use than the telephone; unlike the telephone, copies of the communication could be kept and stored; and asynchronous communication was achieved where the recipient did not have to be present to receive the message.

All these innovations and unique features popularized e-mail. Many discussion groups devoted to specific areas of interest and specialization developed, where mailing lists were created to receive correspondence on particular subjects. The most popular among the subjects of the early discussion groups were science fiction Human-nets. Much of this dialogue, which surfaced around 1975, was devoted to the social implications of the e-mail medium, speculating and creating stories about the impact that it could have on people and society. Although ARPA had intended communication via computers to be strictly professional and to enhance their systems, this dialogue that took place demonstrated that e-mail could also be used for personal and entertainment purposes. Ironically, however, as ARPANET scientists were beginning to philosophize and speculate about the impact it would have and imagined the new world that could emerge, they were the only ones using it. Only ARPANET users as a group of elite defense and communication scientists understood and were able to utilize the medium. By the end of the 1970s there were seventeen discussion groups in existence, all ARPA staff (Griffiths 2000, p.3).

Language and the Internet

In 1974, ARPA scientists worked with experts at Stanford and developed a common language allowing different networks to communicate with one another. This language was known as Transmission Control Protocol or Internet Protocol (TCP/IP) and

was the first time that the word 'Internet' was used. The development of TCP/IP was a crucial development in networking technology. Scientists who designed TCP/IP believed that the system should have an 'open architecture' (Griffiths 2000, p.7). Joseph Licklider, the first head of ARPA's computer research program, developed ideas of a 'Galactic Network' in his book with Wesley Clark *On-Line Computer Communication* asserting how to develop computer network technology consequently shaping TCP/IP programming. Licklider believed that each network should have the ability to work on its own, developing its own application without restraint and requiring no modification to participate in the Internet. He argued that within each network a 'gateway' should be created which could link it to content outside of the original network and into other networks. Licklider emphasized that gateway software should retain no information about the traffic passing through and that it would ultimately diminish the workload, speed up the traffic and remove all possible means of censorship and control. He stressed the need for efficient transmission and believed that packages should be routed through the fastest available route. If one computer was blocked or slow, he advocated that the packages could be rerouted through other computers and networks until they reached their destination in the fastest way. His vision was that the gateways between all networks would always be open and would route the traffic without discrimination and censorship and that operating principles in the network would be freely available and be able to access all networks. Licklider and Clark's 'Galactic Network' vision has been realized in today's Internet.

These ideas for constructing a network were based on freeing up information influencing many of the technical innovations and advances that followed. Griffiths

(2000, p.7) notes "it is worth remembering, at this stage, that we are still in a world where we are talking almost exclusively about large mainframe computers (owned only by large corporations, government institutions and universities)." Therefore, in its initial stages, the system was designed with the expectation that it would work through a small number of national networks. Although these developments in 1974 marked the rapid advancement towards today's Internet, it took several years of further innovation, modification, and redesign before it was universally adopted and easily accessible within society.

In 1975, the ARPANET was transferred to the Defense Communications Agency (now the Defense Information Systems Agency) as an operational network. Programming and new applications developed and computer networking continued to grow in many places other than the Defense Communications Agency. In 1974 Stanford opened up *Telenet* which became the first openly accessible public 'packet data service', a commercial version of ARPANET. Also, in the United States in the 1970s the Department of Energy created *MFENet* for scientists researching Magnetic Fusion Energy spawning another network *HEPNet* which was devoted to High Energy Physics. This development inspired NASA to establish *SPAN*, a network for space physicists. In 1976, AT&T labs developed a Unix-to-Unix protocol and delivered it to all Unix computer users. Unix was the main operating system used by universities opening up networking to the broader academic community allowing researchers to collaborate with one another throughout the country. In 1979, *Usenet* emerged establishing an open and free system of e-mail communication. In 1981, *Bitnet* was created, a cooperative network at the City University of New York linking university scientists using IBM

computers in the Eastern United States. City University's first outside connection was to Yale University. During the same year the National Science Foundation in the United States established *CSNet* facilitating communication for Computer Scientists in universities, industry and government. In 1982, the number of host computers surpassed 200 and a Unix network was established in Europe called *Eunet.* In 1983, the number of hosts surpassed 500, more than doubling in less than a year, and the Internet became a reality when the ARPANET adopted TCP/IP splitting into Military and Civilian sections.

Also in that same year computer networks were developing at an alarming rate creating a number of problems. Ironically, the problems were created due to the Internet's rapid advancement and own success. The rate of computer hosts rose much faster and the volume of traffic each host carried due to the popularity of e-mail was much larger than originally anticipated. As a result, the government of the United States initiated an Internet Activities Board (IAB), which created task forces to examine technological issues and problems that impeded the continued growth of computer networks and the Internet. Many of the problems created skepticism leading many scientists and technicians to believe that the Internet was simply a fad that would pass and that the entire system would eventually stop.

Internet Growth and Development

In 1984, 'Domain Name Servers' (DNS) developed providing a vital breakthrough for the Internet's continued success and quelled some of the skepticism that had developed. Until this time each host computer had a name assigned to it, which was added to a list of names and addresses (similar to a phone book) that could easily be

consulted. Griffiths (2000, p.8) explains the DNS system, "the new system introduced some tiering into US Internet addresses such as edu. (educational), com. (commercial), gov. (governmental) in addition to org. (organizational) and a series of country codes." These new codes organized host computers by industry and country and set the foundation for the growth of the Internet throughout society and the world.

In the mid-1980s the government of the United States in an effort to boost its infrastructure and secure its place in society encouraged the use of the Internet throughout the entire educational system. The government believed that the Internet could be used to generate ideas and enhance research. In 1984, England announced its development of JANET (Joint Academic Network), which prompted the US government and the National Science Foundation to establish *NSFNet*. The development of *NSFNet* involved a number of key decisions and strategy that were integral to the continued development of the Internet. The use of TCP/IP protocols were made mandatory for all participants in the program thereby creating a unified system and allowing for a universal widespread network to be established. Federal agencies shared the cost of establishing common infrastructures and gateways to information. Those involved with *NSFNet* collaborated with other scientific networks (including ARPANET) and signed agreements to share the cost of developing infrastructure. They contributed to the backbone for the US Internet service by providing five 'supercomputers' to service the expected rise of traffic. These developments expanded the Internet beyond traditional institutions and government creating the possibility for it to develop mass appeal. On the whole, *NSFNet* had a dramatic effect on the growth of the Internet through establishing a universal system and breaking the traditional inherent bottleneck.

Commercial users were not part of the initial development of the Internet, however their interests were not neglected. In 1985, the Internet Activities Board organized workshops targeted at the private sector discussing the potential of TCP/IP protocols. This initiated dialogue between the government and private sector and brought commercial interests into the picture changing the outlook of the Internet from a government initiative for defense to a medium that could be used in all sectors of society. In 1987, the number of Internet hosts surpassed 10,000 and the first subscription based commercial Internet company UUNET was founded. However, despite the significant rise by commercial users the Internet was still primitive by today's standards. At the time, it was very difficult to find desired information with most of the information accessible being highly scientific and not of interest to the lay person. The primary attraction for the commercial sector was e-mail, newsgroups, 'chat' facilities, and computer games.

Although commercial interests began to see the merit and capitalize on the Internet its growth and expansion was still driven by the government and academic communities. In 1988, use of the Internet started to spread globally in a wide manner. Jarkko Oikarinen of Finland wrote Internet Relay Chat and the first transatlantic fiber-optic cable linking North America and Europe, with the capacity to handle 40,000 telephone calls simultaneously, was completed. In 1989, the number of Internet hosts surpassed 100,000, the first gateways between private electronic mail carriers and the Internet were established and a Web Project proposal advocating a 'hypertext system' to aid in the sharing of information between teams of researchers in the High Energy Physics community was put forward.

During the late 1980s and early 1990s many significant developments took place. In 1990, ARPANET was terminated. With the rise in commercial interests and tremendous growth of users, ARPANET was no longer the leading program for network and Internet development (Griffiths 2000, p.10). The Internet had grown to a level where many entities were inventing new programs and developing new ideas, to the extent that a singular guiding force the government was not necessary. The first Internet search-engine, Archie, for finding and receiving computer files, was developed in 1990 at McGill University. This allowed users to search for required material on the Internet and eventually allowing it to become a research tool and portal to unlimited amounts of information. The Web Project proposal by the High Energy Physics Community promoting a 'hypertext system' led to the first World Wide Web software. In 1991, the number of Internet hosts surpassed 600,000. The National Science Foundation Network abolished restrictions on the commercial use of the *NSFNet* fully allowing commercial interests to enter and play a large role in further development of the Internet. The term 'information highway' was coined by Al Gore in 1988 labeling the emergence of the Internet. In 1991, he initiated the "information superhighway" project, a name given to popularize Gore's *High Performance Computing Act*, which funded further research into computing and improving the Internet infrastructure in the United States. At the end of the year the World Wide Web was released to the public.

World Wide Web (www)

The World Wide Web is a network of sites that can be searched and retrieved by a special protocol known as Hypertext Transfer Protocol (HTTP). This development

simplified the writing of addresses and upon instruction searched the Internet for the address indicated and retrieved the document for viewing. At this point there were over 1 million Internet hosts. Tim Berners-Lee who developed the Web Project proposal and designed the World Wide Web (www) explains the Internet and the World Wide Web:

> The Web is an abstract (imaginary) space of information. On the Net, you find computers – on the Web, you find document, sounds, videos,... information. On the net, the connections are cables between computers, on the Web, connections are hypertext links. The Web exists because of programs which communicate between computers on the Net. The Web could not be without the Net. The Web made the Net useful because people are really interested in information." (in Griffiths 2000, p.11)

In 1993, Marc Andreesen launched a program called *Mosaic X*. It was easy to use, substantially improved graphics capabilities, and included many features common in today's browsers used for 'surfing the net'. By 1994, Mosaic had been installed on thousands of computers throughout the world. Griffiths (2000, p.11) notes "the potential of HTML to create graphically attractive web-sites and the ease with which these sites could be accessed through the new generations of web-browsers opened the Web to whole new groups." Until that time, the World Wide Web had only served two main communities – the scientific community who used it to access on-line documentation and a wider community of people who used the service to access e-mail and newsgroup facilities. At this time, commercial web-sites proliferated throughout the Web, followed not long after by local school, club, and personal sites. These developments became more powerful as the cost of computers declined and became more accessible to the general public. In 1995, the Internet was generally acknowledged as having arrived within mainstream society, with *Newsweek* proclaiming it to be "the year of the Internet":

> Can you recall a day when there *wasn't* some gee-whiz Internet story in the newspapers? Was there ever a time when surfing was performed in a bathing suit, outdoors? When advertisements on buses did not emblazon a string of puzzling letters beginning with HTTP:// and getting wierder from there? When Java meant coffee, and showbiz insiders used the term Web to refer to a saurian entity known as a television network? When you didn't have to verbally articulate the @ sign? If you strain, perhaps you can remember such a time – 1994. (Stephen Levy Dec 1995/Jan1996, p.26)

It became clear that the Internet and World Wide Web had officially exploded throughout society in the mid 1990s.

Today, the rapid growth of users of the Internet and World Wide Web has continued in all sectors of society and throughout the world. ActivMedia Research states "as barriers to Web entry disintegrate and the means to access rises the Web is increasingly accessible to the mainstream, developed world population."[8] The Computer Industry Almanac projects that by the end of the year 2000, 25 countries will have over 10% of their populations using the Internet.[9] Cyberatlas documents the growth of the world's online population and projects the figures for the top 15 countries of Internet users by the end of 2000.[10] The above figures are shown in Table 2 (p. 43).

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[8] ActivMedia Research is an Internet research company. See www.activmediaresearch.com/body_ free_ newsroom.html

[9] The Computer Industry Almanac provides information on the Internet, PC and workstation industries – past, present and future. See www.c-i-a.com/

[10] Cyberatlas provides Internet statistics and market research for web marketers. See http://cyberatlas. internet.com/big_picture/geographics/ print/0,1323,5911_151151,00.html

TABLE 2
The Projected World's Online Populations – Top 15 Nations: Year 2000

Rank	Nation	Internet Users (millions)
1.	United States	135.7
2.	Japan	26.9
3.	Germany	19.1
4.	UK	17.9
5.	China	15.8
6.	Canada	15.2
7.	South Korea	14.8
8.	Italy	11.6
9.	Brazil	10.6
10.	France	9.0
11.	Australia	8.1
12.	Russia	6.6
13.	Taiwan	6.5
14.	Netherlands	5.4
15.	Spain	5.2
	World Wide Total	**374.9**

The projected 374.9M Internet users at the end of 2000 would be an increase of 115.9M from the 259M actual users at the end of 1999. This remarkable growth of 44.7% in Internet users in one year from 1999-2000 around the world is predicted to continue as the Computer Industry Almanac projects by the year 2002 the online population will reach 490M. Therefore, it is evident that the growth in Internet users throughout the world is continuing at a rapid rate.

E-Commerce

While the global online population is growing the Internet and World Wide Web is increasingly being used as a commercial medium for the buying and selling of products. ActivMedia Research states "The Web is increasingly a commercial transaction marketplace." They note that the online business population expanded by a third to 550, 000 substantial online businesses by mid 2000 and that online commerce activity for the year will swell to $132B more than doubling the $58B reported in 1999.

Canadian Industry

In Canada in 1999, StatsCan conducted the first national snapshot of electronic commerce and the use of information and communication technologies. It examined e-commerce and the impact of the Internet on businesses reporting that a majority of Canadian businesses have been using technologies such as e-mail and the Internet to various degrees.[11] Statistics of the use of e-mail and the Internet in Canadian industries in 1999 is shown below in Table 3.

TABLE 3
Use of e-mail and the Internet in Canadian Industry: Year 1999

	Percentage of enterprises that use e-mail	Percentage of enterprises that use the Internet
Forestry, logging and support activities	28.7	32.8
Mining, oil, gas extraction	59.6	60.6
Utilities	83.9	82.4
Manufacturing	63.4	63.7
Wholesale trade	65	63
Retail trade	39.7	40.5
Transport and warehousing	38.8	43.8

[11] For further information on StatsCan's methodology and analysis see www.statscan.ca/Daily/English/000810/dooo810a.htm

Information and cultural industries	90.3	89.1
Finance and insurance	75.5	65.9
Real estate and rental	46.4	46.3
Professional, scientific and technical services	78.9	77.5
Management of companies and enterprises	45.4	47
Administration and support, waste management and remediation services	52.4	55.4
Educational services (private sector)	78.3	74.5
Health care and social assistance (private sector)	46.4	46.2
Arts, entertainment and recreation	51.6	51
Accommodation and food services	29.1	32
Other services	42.6	44.5
All private sector	**52.6**	**52.8**
Educational services (public sector)	99.2	99.2
Health care and social assistance (public sector)	94.4	92.8
Public administration	99.5	98
All public sector	**96.6**	**95.4**

These statistics show the current prevalence of e-mail and the Internet in business operations in both private and public sectors. In the private sector over 50% of all enterprises use e-mail and the Internet and in the public sector over 95% of the total institutions use e-mail and the Internet. Therefore, it is clearly evident that the Internet and e-mail technologies have a significant ever growing influence in both the private and public sectors in Canadian industry.

Examining the use of the Internet in Canadian industry StatsCan found that 10% of private sector businesses and 14.5% of public sector institutions used the Internet as a

marketing medium to sell goods and services. The value of Internet sales in Canadian industries in 1999 is shown in Table 4.

TABLE 4
Value of Internet Sales in Canadian Industry:
Year 1999

	Internet Sales ($millions)	**Internet Sales as a percentage of total operating revenue**
Manufacturing	900.0	0.2
Retail trade	610.6	0.3
Information and cultural industries	552.7	1.0
Accommodation and food services	429.3	1.3
Professional, scientific and technical services	406.1	0.8
Finance and insurance	320.8	0.1
Transport and warehousing	164.3	0.3
Wholesale trade	156.3	0.1
Real estate and rental and leasing	114.8	0.3
Other services	27.4	0.1
Utilities	15.8	0.1
Mining and oil and gas extraction	15.0	0.0
Health care and social assistance (private sector)	10.0	0.1
Other industry sectors	456.6	0.4
All private sector	**4,179.7**	**0.2**
Educational services (public sector)	125.9	-
Health care and social assistance (public sector)	20.1	-
Public administration	98.6	-
All public sector	244.6	-
Total	**4,423.3**	-

While Internet Sales as Percentage of Total Operating Revenue was minimal in each industry, enormous sales and revenues were generated over the Internet with total sales

reaching 4.423B. Therefore, the Internet is evolving as a major tool for sales and generation of revenues in Canadian industries.

The web presence and use of the Internet to purchase and sell goods and services by enterprises in all industries, was also examined by StatsCan. The statistics for 1999 are shown below in Table 5.

TABLE 5
Web Presence and Use of the Internet to Purchase and Sell in Canadian Industry: Year 1999

	% of enterprises with a Web site	% of enterprises that use the Internet to purchase goods or services	% of economic activity attributable to enterprises that use the Internet to purchase	% of enterprises that use the Internet to sell goods or services	% of economic activity attributable to enterprises that use the Internet to sell
Forestry and logging	5.7	7.4	10.6	1.1	0.9
Mining, oil, and gas extraction	27.6	19.3	24.5	7.1	5.2
Utilities	27.3	24.7	37.7	9.2	9.8
Manufacturing	31.7	18.9	31.8	14.9	16.3
Wholesale trade	26.1	13.9	23.2	13.6	17.1
Retail trade	16.0	10.8	15.7	10.9	21.9
Transport and warehousing	17.6	10.7	27.8	10.1	21.1
Information and cultural industries	61.7	49.6	53.6	20.1	44.3
Finance and insurance	27.2	12.7	39.5	14.7	23.0
Real estate and rental	18.4	8.2	11.3	9.5	11.5
Professional, scientific and technical services	27.6	30.0	39.7	11.5	14.9
Management of enterprises	9.9	12.9	16.8	8.0	3.7

Administration support, waste management	29.5	13.4	17.7	17.3	23.3
Educational services (private sector)	44.0	27.2	35.3	17.3	22.2
Health care and social assistance (private sector)	10.0	9.5	14.4	3.1	6.3
Arts, entertainment and recreation	29.7	12.1	16.5	10.1	9.8
Accommodation and food services	17.4	3.9	8.5	7.9	16.3
Other services	19.3	6.5	10.3	3.7	5.0
All private sector	**21.7**	**13.8**	**25.1**	**10.1**	**17.0**
Educational services (public sector)	97.6	60.6	65.5	32.2	43.4
Health care and social assistance (public sector)	50.0	34.7	37.2	3.1	3.3
Public administration	87.8	50.7	59.8	24.7	28.2
All public sector	**69.2**	**44.2**	**52.0**	**14.5**	**23.1**

It is evident from these statistics that enterprises in every Canadian industry are utilizing the Internet as an electronic marketplace. The economic activity attributable to enterprises that use the Internet to buy or sell goods and services is demonstrably significant. This further shows that enterprises buying or selling on the Internet are economically active displaying the Internet as a successful medium as a marketplace.

The Internet has been continually evolving as a significant force within society impacting aspects of life such as communication and commerce. Its impact is increasing

daily as more and more users are accepting the merits and benefits of its capabilities. Due to its rapid growth and vast scope it's potential impact in the future has been a popular subject and the focus of much discussion. These discussions have been continually debated from optimistic (utopian) and pessimistic (dystopian) perspectives as to the nature and degree of the impact of new technologies on society.

CHAPTER 3
TECHNOLOGICAL PERSPECTIVES: UTOPIANISM VS. DYSTOPIANISM

> "We live in an age obsessed with the future. From econometricians to astrologers to TV evangelists to politicians on the stump, from learned journals to supermarket tabloids, what the future may bring is the subject of speculation." (Stahl 1999, p.35)

Discussion of new technologies and their potential impact on society has been present since the rise of science and onset of the age of exploration (Carey and Quirk, 1989). Every new technological innovation in modern history has inspired inquiry into the implications, positive and negative, on the future of society and mankind. Recently, the emergence of the Internet and new information and communication technologies has stimulated intensive speculation about its future effects on society. Commenting on the breadth of discussion on the development of the Internet and its impact for the future Silverstone (1996, p.218) states "apocalyptic and breathless rhetoric of revolution and crisis has been employed in describing such developments – a rhetoric of competing utopian or dystopian visions." This Chapter examines these two opposing, typically American, perspectives on the future influence of technology on society, technological utopianism and technological dystopianism.

Technological Utopianism

The recent intrigue with the information society and Internet has led to a resurgence in utopian rhetoric deliberating on the possibilities and potential for new information and communication technologies to transform society for the better. Carey and Quirk (1989, p.191) note, "Despite the manifest failure of technology to resolve

pressing social issues over the last century, contemporary intellectuals continue to see revolutionary potential in the latest technological gadgets". This is currently true of the Internet and new information and communication technologies with significant emphasis on its revolutionary potential to transform society for the better. Remarking on the speculation of the potential of new information and communication technologies, Carey and Quirk state:

> The revolutionary potential of these 'improvements' in communication does not derive from the prosaic facts about them – more information sent faster and farther with greater fidelity. Instead, their attraction resides in the supposed capacity to transform the commonplace into the extraordinary: to create novel forms of human community, new standards of efficiency and progress, newer and more democratic forms of politics, and finally to usher a 'new man' into history. (1989, p.190)

Therefore, much of the discussion on the impact of the Internet is not directly on its physical attributes and unique nature as a communication medium rather on its capacity to improve society – socially, politically, and culturally.

Today, experts on the future, futurologists have revisited these utopian ideals (Stahl 1999, p.35). Carey and Quirk (1989, p.197) state these people "tell us where we are going before we know it ourselves". They see the future in a utopian idealism as a "receding horizon to be chased, an endlessly revised, corrected, and never appearing zone outside history where the impurities of social life are bathed away in a social landscape" (Carey and Quirk 1989, p.198). New technologies are viewed by such people as having the potential to ameliorate undesirable societal conditions and to provide a harmonious full state of life. According to Carey and Quirk futurology generally enunciates the present in three ways:

> First, it speaks as an exhortation: 'keep the faith, lift your eyes from today's troubles, things are bad but the good old future is about to

> arrive and straighten things out.'... The second enunciation is the realization of the Future as prophecy. This is largely in written form, contained in forecasts, projections, science fiction and other imaginations of the future.... The third enunciation of the future is through a ritual of participation. In this mode the future is not something to which we have to be exhorted, lest we notice too much the disaster around us, nor is it an epiphany that will materialize before our eyes, but it is something to which we are invited as actual participants in its constitution. (1989, p.199)

Ultimately, this discipline critiques contemporary society with its most recent followers citing the rapid development of computers and related technologies as a solution to society's ills and leading to a utopia. The definition of technological utopianism, its conceptual origins and Yoneji Masuda's vision of 'Computopia' are discussed.

Definition

Utopia generally refers to a golden age, heaven on earth, or the perfect society. Technological utopianism is a perspective vaunting technology as the means of bringing about perfection and utopia (Segal 1985, p.10). Advocates of technological utopianism believe technological innovation to be a savior for society bringing to fruition longings such as immortality, participatory democracy, environmental protection and the global well being of mankind. Although the meaning of utopia is universal, Segal notes technological utopian visions and accounts of the future are often quite different from one another. He states technological utopianism is discussed primarily in two different manners. First, he notes that it is used to critique contemporary society outlining problems that exist and that can be corrected utilizing technology, and secondly as a fantasmo dreamy vision which technology will create. Segal labels these technological utopian perspectives respectively as 'genuine' and 'false' utopianism. For a complete

understanding of technological utopianism discussion, it is important to elaborate on and distinguish between these 'genuine' and 'false' utopian perspectives.

'Genuine' and 'false' utopians discuss and refer to technology differently. 'Genuine' utopians note that a radical improvement of conditions is needed for perfection in society and 'false' utopians provide a fantasy of a technological future where technology will inherently create utopian conditions.

In the 'genuine' perspective, utopia is viewed as a condition that is qualitatively different from contemporary, pre-utopian or non-utopian societies (Stahl 1985, p.11). Drastic change, which technology will bring, is always viewed to be necessary for utopia to be attained. It is acknowledged that considerable improvement in society and its citizens does not occur solely due to the technology. Technology is cited as a means for improving conditions if it is utilized and implemented effectively by the people within society.

For this to come to fruition 'genuine' technological utopians believe society and its citizens must become absolutely noble and genuine in their efforts, usually through the use of appropriate social arrangements: such as institutions, values, norms, habits, and activities. They believe perfection is not inherent in technology and technological progress, an inherent premise in 'false' technological utopian accounts. 'Genuine' technological utopians note humans are flawed by nature and require specific social structures and arrangements to improve societal conditions. These support mechanisms are advocated to help sustain utopia by maximizing human virtues and strengths and minimizing vices and weaknesses. From this perspective perfection can only be realized with particular objectives and specific means defined to attain them. As Segal (1985,

p.11) states "perfection, like beauty, is an empty word unless it is given specific contents."

'Genuine' and 'false' utopian accounts are also very different in their comprehensiveness. 'Genuine' utopianism is much more comprehensive, substantiated and realistic than 'false' utopianism. In the 'genuine' utopian perspective change is the primary focus sought in all aspects of society, whereas in the 'false' perspective change is assumed to inherently occur with the integration and utilization of technology. 'Genuine' utopian proponents are dissatisfied with social conditions and emphasize that specific measures need to be taken if change for the better is going to result. They believe technology has the capability and potential to lead to widespread reform bringing about a fundamental transformation in the human condition, however, they do not assume that it is the cause for the transformation. Technology, if it is properly and effectively utilized, is simply viewed as the vehicle to bring about utopia. On the other hand, 'false' utopian proponents assume change will naturally occur and envisage the change that technology will inevitably bring. They believe that the technology itself, without any human involvement will determine society and create a utopia.

Lastly, in explaining the differences between the 'genuine' and 'false' utopian perspectives, Segal (1985, p.11) notes that there is a "seriousness of purpose found in one but missing in the other". Segal elucidates that 'false' technological utopianism is usually seen playfully as fantasy and as an imaginary other-worldly existence. He notes that the frames and premise for false utopias originate deep in our folklore which envisage a special dream-world where all problems will magically be solved by technology. Bloch (in Segal, 1988) notes that these visions emphasize technology as

being the means, in itself, to a greater end thus fulfilling the social utopian principle of better life and justice, whereas 'genuine' technological utopianism is much more grounded, concerned first and foremost with the welfare of citizens and how technology can improve the general welfare of people and society. In short, 'false' utopians provide fantastic visions of what can be achieved and what is possible by means of technology minimally focusing on the needs of citizens and the general welfare of society, whereas 'genuine' utopians actively seek to make the world better looking for realistic solutions that can be applied where technology can lead to the betterment of mankind.

Conceptual Origins

Technological utopianism has been synonymous with technological progress advocating the potential of technology to better mankind. Howard Segal examines varying visions of technological utopia and notes that its appeal arises from and is popular because our society (referring to the United States) is "a society already attracted to technological solutions for social problems, of unprecedented technological progress as the panacea for unprecedented social problems" (1985, p.7-8). He stresses that as long as there is technological innovation and progress technological utopianism and visions of technology benefiting and bettering society will exist. Technological utopianism, as is evident in both 'genuine' and 'false' utopian accounts, has a faith in progress through technology, looks confidently to the future and to enrich society through technological development. Stahl notes the inherent tone in technological utopianism is that "people have always wished for a better life and have dreamed of magical implements to bring it about".

Technological utopianism is difficult to trace because it has never been an organized movement or a predominant school of thought in academic circles. However, even though it was not a significant branch of mainstream academia Segal notes many accounts emerged in the late nineteenth century due to the events and innovations that were taking place at that time, namely those of the industrial revolution. The rapid change in the late nineteenth century, due to vast and major technological innovations, spawned debate about its effects on society and the future it would bring. A number of prophets appeared during the heyday of the economic, social, and cultural transformations that took place in the industrial revolution establishing the currently common precedent of equating utopian ideals with technological innovation, change and progress (Segal 1985, p.2). In recent years such visions have resurfaced and are flourishing due to current technological innovations such as those in new information and communication technologies. Technological utopianism is evident in much of the current discussion on computers and related technologies painting them as positive and beneficial to society. One example of such a vision is Yoneji Masuda's 'Computopia'.

Masuda's Vision – Computopia

Masuda in *Computopia* envisions a utopian society emerging from the 'computer communications revolution'. His idea of a utopian society is derived from the work of Adam Smith in *The Wealth of Nations*, a universal opulent and affluent society in which there is plenty for the people. Masuda sees the rise of new information and communication technologies to provide tremendous possibilities for a universally opulent

society. He advocates that computer communications technology will create an information society that will ultimately create a universal society of plenty.

Masuda believes that this information society will,

> function around the axis of information values rather than material values... the information utility, the core organization for the production of information, will have the fundamental character of an infrastructure, and knowledge capital will predominate over material capital in the structure of the economy. (1985, p.626)

In expressing his vision and detailing the characteristics of this future society Masuda pinpoints the differences between the past industrial society to characteristics of an emerging utopian information society (Appendix 1). He asserts that if the industrial society is a society where people have affluent material consumption, the information society will be a society where the cognitive creativity of individuals flourishes. He notes that if the highest stage of industrial society is the high mass consumption society, then the highest stage of the information society will be what he calls the *global futurization society*. He states:

> This global futurization society will be a society in which everyone pursues the possibilities of his or her own future, actualizing his or her own self-futurization needs by acting in a goal-oriented way. It will be global, in which multi-centered voluntary communities of citizens participating voluntarily in shared goals and ideas flourish simultaneously throughout the world. (1985, p.626)

Masuda believes that through computer communication individuals will have access to unlimited information which will stimulate their creativity and ultimately lead all citizens to voluntary participation in common productive goals for the betterment of society.

Masuda envisions a number of unique characteristics unfolding in this computopia. Firstly, he claims that the pursuit and realization of time value by all individuals will be paramount in the new functioning of society. He believes that there

will be a shift in human values from a desire for rapid economic growth and individual prosperity to a stable growth where society places the most importance on human worth, social welfare and communal prosperity. He argues that self-realization in all individuals, realizing the value of time to actively contribute to the betterment of society will replace individual aspirations, desires characteristic of industrial society. He notes that self-fulfillment will come from actively contributing to the improvement of society, where individuals will work in mini-groups, local societies and functional communities. Ultimately, Masuda envisions the emergence of a communal consciousness whereby the primary focus within society is on improving the living standard and bettering society.

Another unique characteristic Masuda claims will exist in computopia is the freedom of decision and equality of opportunity. He believes that the information society will offer new concepts of freedom and equality. He states, "In this type of society the freedom that an individual will want most will be freedom to determine voluntarily the direction of time value realization in the use of available future time" (1985, p.627). Masuda argues that this 'freedom of decision' will result in a freedom in decision-making for goal-oriented action, where each individual will have the inherent right to determine voluntarily how to use future time in achieving aspired goals. He also believes that equality of opportunity and justness for all individuals will be a defining feature of society in the future. He states "Guaranteed equality of opportunity will, for the first time, assure that the people will share equally the maximum opportunities for realizing time value" (1985, p.628). Masuda attests that these will be the most fundamental human rights in the future information society.

Masuda also envisions society in the future to be composed of highly educated people with a strong sense of community. He claims that the rapid growth of information-productive power built around the computer will bring an enhanced independence for the individual allowing him/her to pursue goals that will strengthen their community. He states:

> The development of information-productive power will liberate people by reducing dependence on subsistence labour, with rapidly increasing material productive power as the result of automation, thus increasing the amount of free time one can use. There will also be an expanded ability to solve problems and pursue new possibilities, and then to bring possibilities into reality; that is to say, it will expand one's ability for futurization. (1985, p.628)

Masuda argues that the future information society will ensure more active voluntary communities because humans will have more time to contribute positively to society. He believes people with common goals will form the new voluntary communities, communities that will always be carried on by voluntary activity and the creative participation of individuals. Masuda envisions that in the mature information society of the future, nature communities, non-smoking communities, energy conservation communities, and many other types of proactive voluntary communities will prosper side by side.

Another defining characteristic in Masuda's computopia is that society of the future will be an interdependent synergistic society. He believes this synergistic society will be one that develops as individuals and groups cooperate in complementary efforts to achieve the common goals set by the society as a whole. Masuda states,

> In the future information society, information utilities, whose structure of production is characterized by self-multiplication and synergy, will take the place of the present large factories and become the societal symbol of the information society. (1985, p.629)

He notes that unlike material goods information does not disappear by being consumed and that the value of information can be amplified by constant additions of new information to the existing information. Masuda advocates that the most effective way to increase the production and utilization of information will be for people to work together to make and share societal information. As a result, Masuda argues that this information sharing will give birth to universal socioeconomic values which will ultimately improve society.

Overall, Masuda envisions a society in which computers will be used for the creation of knowledge. He believes that a high mass-knowledge creation society will exist where all human beings are socially conscious and work towards improving societal conditions. Ultimately, Masuda envisions the existence of a Computopia on earth where a rich symbiosis between god and man will be created by the voluntary cooperation of the citizens to put into practice their common socially responsible global aims.

Technological Dystopianism

The definition of technological dystopianism, its conceptual origins and the work of Jacques Ellul, a staunch technological pessimist, are discussed.

Definition

Dystopia is "an imaginary place which is depressingly wretched and whose people lead a fearful existence" (Webster's dictionary 1987, p.391). It is often referred to as anti-utopia, a society where conditions are less than perfect, where suffering and unrest are the predominant characteristics. Technological dystopianism attributes

technology as the prime reason for disasters in society and humanity's problems. It cites technology as having an all- encompassing effect on society and as an autonomous force with an overwhelming social and political impact. Technology is viewed as an agent of control determining the actions of people creating negative and destructive forces. Often it is seen as an overwhelming force in which mankind is a slave and can not escape. Technology is seen to create new possibilities of wreaking havoc in the world and causing chaos and a total social breakdown ultimately jeopardizing human security. These views have been especially prevalent recently, as the turn of the century gave rise to an escalation of apocalyptic consciousness.

Conceptual Origins

While the technological utopian or optimistic view was borne out of the scientific and industrial revolutions, the technological pessimist view has only truly emerged in the last fifty years. Only recently has technology been portrayed as a menace to society and as a force which produces negative effects for society and its citizens. While discussion on technological utopianism can be seen throughout society - in academia, the private industry and in advertisements - discussion on technological pessimism is less frequent and is found primarily within academia and science fiction. Wilford (in Ezrahi, Mendelsohn, and Segal 1993, p.1) notes that technological pessimism has been "fed by growing doubts about society's ability to rein in the seemingly runaway forces of technology", although most pessimists believe that technology is more the symbol than the solution to the problem.

Technological pessimism provides an opposite viewpoint than that of technological utopianism. Howard Segal citing a symposium on technology and pessimism puts it eloquently. Technological utopianism has,

> a faith in the powers of knowledge and technology to ameliorate human life and solve the basic problems of modern society'... and until recently 'the massive application of rational knowledge and technical skills' was generally deemed the panacea to bring about qualitatively superior societies. (1993, p.5)

Whereas, the underlying assumption of technological pessimism is that,

> the triumphs of science and technology that once generated almost universal praise increasingly generate distrust or at best ambivalence on the part of the public. The prospect of autonomous technology, of technology without human control, has become a paramount public concern. (1993, p.5)

Technological pessimism "refers to that sense of disappointment, anxiety, even menace, that the idea of technology arouses in many people" (Marx 1993, p.11). Discussion of technological pessimism flourished well into the Twentieth century when people began to evaluate the impact of technology on society and determined that it was not producing the promises that it was thought to create. Jeffrey Herf states:

> Technological pessimists have argued that the entire project of the domination of nature and the vision of a good society resting on the growth of scientific and technological theory and practice are flawed at their very core. (1993, p.115)

The idea of technological progress as leading to utopian ideals created an expectation for new technologies that, when not met, spawned its polar opposite, negative and dystopian views of technology. Therefore, technological dystopianism was reactionary and arose relative to the hype and false promises of optimistic forecasts, when it was evident that they were not being realized, of technology and society.

David Lyon (1997, interview) notes that technological pessimism or high-tech paranoia "is generated within a general culture that overestimates the ability of technology to solve human problems and appears as a fear that is the mirror image of technological optimism." Critics started to lose faith in the promise that technology could enhance people's ability to engineer their fate and improve their lives. Instead of looking at what technology could provide which prevailed in the Enlightenment and Industrial ages, a period of vast technological innovation and scientific discovery which were singled out as primary agents of progress, they analyzed some of the outcomes that those promising technologies were actually having on society.

A period of excitement and faith in technology to liberate society from its drudgery gave way to a period of evaluation of the consequences of the technology. Technology at this time was entrenched into society and was no longer viewed as something new and unique as it was when it first surfaced. "As the visible effects of technology became more dubious... people found the romance less and less appealing" (Marx 1993, p.22). Medhurst notes:

> Something happened on the way to paradise: automation/ unemployment; industrialization/air pollution; fluorocarbons/ozone depletion; synthetics/Love canal; lasers/Star Wars; nuclear power/Three mile Island; atomic fission/Hiroshima. The problem is not that our technologies fail to work, but that they work too well, with consequences that outpace even the most farsighted amongst us. (1990, p.xi)

Technology was seen as a problem and as a major cause to some of the world's most pressing problems and great disasters. Even though the technical achievements of modernity were fully accredited and praised, their seemingly destructive social and ecological consequences or side effects have been sufficiently conspicuous to account for

much of today's technological pessimism (Marx 1994, p.11). Industrialized society's dominant belief system turned on the idea of technical innovation as a primary agent of progress. As a result, the progressive agenda of the Enlightenment tradition, with its promise of limitless growth and a continuing improvement in the conditions of life for everyone, has not been realized dashing many long-held hopes. Therefore, a different way of thinking about technology surfaced and proliferated, with its roots based in the Romantic tradition, that it compounded our problems rather than dissolving them. The work of Jacques Ellul providing staunch criticism and a glaringly pessimistic and disheartening view of technology's impact on society is discussed.

Ellul's vision – The Technological Society

In his seminal work *The Technological Society* (1964) Ellul describes what he believes to be the new driving and predominant force of the modern world. Ellul defines the technological society of tomorrow as a world driven by what he calls 'techniques' or what is commonly referred to as technology. He sees a world that is dominated by technique, "the totality of methods rationally arrived at and having absolute efficiency in every field of human activity" (1964, p.xxv). His view of modern society is one where there is no escape from modern technology's overwhelming and relentless grasp. He argues man is defined by this technological society. In *The Technological System* (1980) he crystallizes his view on technology's impact, stating man is:

> always within the technological framework and toward the progression of technology... His elements will always bear upon secondary elements and never on the overall phenomenon. His judgements will always ultimately be defined by the technological criteria... He can never get out of it at any time, and the intellectual systems he

> constructs are ultimately expressions or justifications of technology. (p.325)

Ellul emphasized the decline of morals that these techniques and being immersed in the technological society creates, and discusses the consequences of the invasion of technology on society. Ellul provides a comprehensive analysis focusing on the relationship between techniques and the economy, the state, and humans.

Ellul believed that the goals and ways of thinking in traditional societies and contemporary society are very different. He believes the goal of traditional societies was to satisfy the human need whereas in the technological society the goal is that of efficiency and perfection. He aspires to go back in time and live in a society where human values and morals are important and motivate human action. The major change in these societies for Ellul was when "the close link between scientific research and technical invention appears to be a new factor in the 19th century" (1964, p.65). At this time, he states technique appeared as "a means of apprehending reality, of acting on the world, which allows us to neglect all individual differences, all subjectivity." He sees this as the great travesty of modern society, that technology has made us immune to qualities of humanity. In modern society he notes the "relationship between scientific research and technical invention resulted in the enslavement of science to technology" (1964, p.45). This sums Ellul's contempt for technology precisely that human beings are a product and slave to the unstoppable and insurmountable technological machine that is our society.

Ellul argues that only technical criteria are relevant and important in the modern age. He states that "the multiplicity of means is reduced to one: the most efficient" (1964, p.21). Today's way of life is dominated by ideologies of what is achievable and

how efficient products and outcomes can become. Efficiency is seen as good and important characterizing our belief systems, actions, and aspirations. Ellul muses "there is no doubt that the norms of our civilization have changed" (1964, p.333). He asserts that "the power and autonomy of technique are so well secured that it, in its turn, has become the judge of what is moral, the creator of a new morality" (1964, p.134). Ultimately, Ellul sees technique as having created a new reality, one that is independent of the individual, in which all choices, decisions, and actions reflect the institutional framework of this reality. Nothing can exist outside of this framework because the practical and philosophical underpinnings of technique have shaped us and compose who we are.

He believes that the technological society has some dominant and inescapable characteristics. Rationality is no longer predicated on moral and ethical standards instead on mechanization, quantitative results, and standardization. The world in the technological society is an artificial world where the natural world is displaced and replaced by machinery and automation. Technology is so pervasive in the technological society that it takes its own direction. People are so obsessed with 'bigger and better' that technique grows into its own autonomous force where people have no choice but to adapt to it. Ellul states:

> The technical phenomenon cannot be broken down in such a way as to retain the good and reject the bad. It has a mass which renders it monistic... All these techniques combine to form a whole, each part supporting and reinforcing the others. (1964, p.111)

He suggests that the result of technique pervading into and enveloping all spheres of life will have terrible consequences for our future and will extend and magnify the pitfalls of the technological society.

Ellul elucidates that in an age where scientific discovery and technological innovation reign, there is little prospect for improvement. In this world "everything which is technique is necessarily used as soon as it is available without distinction of good and evil. This is the principal law of our age" (1964, p.31). He believes technical progress is irreversible and moves in an exponential progression, with every invention and innovation creating and spurring new possibilities for further innovations. As one solution or innovation emerges a plethora of new problems requiring new innovations are created propelling the technological cycle. This spiral effect quickens the pace of life destroying the human ability to reflect on situations. Instead, there is a constant pressure and need to adapt and keep up with technical progress. Ellul states:

> There is no longer respite for reflecting or choosing or adapting oneself, or for acting or wishing or pulling oneself together. The rule of life is, no sooner said than done. Life has become a racecourse... a succession of objective events which drag us along and lead us astray without anything affording us the possibility of standing apart, taking stock, and ceasing to act. (1964, p.330)

This pace and race towards efficiency does not allow people to think and then act. People are forced to constantly adjust and change pushing them behind and forcing them to catch up. The consequences of new technologies have limited or no evaluation prior to implementation and widespread utilization. People in the technological society must act first and think later perpetuating things further and negating any hope of breaking the cycle.

> The interval which traditionally separates a scientific discovery and its application in everyday life has been progressively shortened... The discovery enters the public domain before anyone has had a chance to recognize all the consequences or to recognize its full impact. (1964, p.10)

Ellul notes that technique has spread throughout the world. "In the past, different civilizations took different paths; today all people follow the same road and the same impulse" (1964, p.117). This has been attributed to the growth in information and communication technologies and the growth of capitalism as the dominant world system. Ellul believes that all governments strive to achieve technological superiority as fast as possible. Technique in the technological society leads to wealth and power making it valuable and something to be desired. Therefore, technique is viewed in the technological society as a good productive force rather than something destroying the innocence of humanity.

Ellul believes advertising and propaganda is an integral component of the technological society. He notes the purpose of advertising technique is to create a certain way of life and to convince the individual that the way of life propagated is beneficial. He states:

> The way of life offered by advertising is all the more compelling in that it corresponds to certain easy and simple tendencies of man and refers to a world in which there are no spiritual values to form and inform life. When men feel and respond to the needs advertising creates, they are adhering to its ideal of life. (1964, p.331)

The advertising construct directly coincides with Ellul's belief that "every technique makes a fundamental appeal to the unconscious" (1964, p.403). In the technological society desires for material products divert human values. He notes that only in a society such as this, where the individual is a servant of technique can he be completely unconscious of himself (1964, p.138).

Ellul argues that technique also destroys the natural world. He states "we are rapidly approaching the time when there will no longer be any natural environment at

all" (1964, p.79). He believes this is inevitable because of technique's artificiality. Eventually people will become completely unaware of their natural environment and incredulously consumed by technique, even more so than today, that they will cease to care or relate to nature. He states:

> ...the human race is beginning confusedly to understand at last that it is living in a new and unfamiliar universe. The new order was meant to be a buffer between man and nature. Unfortunately, it has evolved autonomously in such a way that man has lost all contact with his natural framework and has to do only with the organized technical intermediary which sustains relations both with the world and with the world of brute matter. Enclosed within this artificial creation, man finds that there is "no exit"; that he cannot pierce the shell of technology to find again the ancient milieu to which he was adapted for hundreds of thousands of years. (1964, p.34)

He observes, that the old environment has not totally disappeared in that man cannot live without basic necessities such as air and water. However, he eludes once man inhabited a natural environment where technical instruments were used to get along better in it, whereas now man lives in a technological environment where the old natural world provides only his space and raw materials. Ellul is convinced that the technological environment will at some stage replace all aspects of the natural environment, performing all of its functions (1980, p.46).

The technological society is one consumed by electronic gadgetry and entertainment. People find joy and pleasure through media programming and electronic interfaces rather than face to face interaction. Ellul identifies machines as being the cause for a deterioration of dialogue. He believes men have become so accustomed to listening to, talking to, and working with machines that they do not even notice or miss dialogue (1964, p.379). Ellul believes television to be a true evil in society preoccupying individuals time and displacing them from reality. He states:

> Television, because of its power of fascination and its capacity of visual and auditory penetration, is probably the technical instrument which is most destructive of personality and of human relations. What man seeks is evidently an absolute distraction... and the simultaneous fusion of his consciousness with an omnipresent technical diversion. (1964, p.378)

This elucidates Ellul's impression of information and communication technologies. He sees them as perpetuating the technical order and as contributing to the acceleration of human life and destruction of moral virtue.

Ellul also notes that the technological society has even corrupted the arena for objective critical dialogue, education. He attributes technical progress and innovation to the findings of thousands of educators, which he believes ceaselessly encourages and nourishes the improvement of technique. He affirms "education no longer has a humanist end or any value in itself; it has only one goal; to create technicians" (1964, p.248). He continues stating "what looks like the apex of humanism is in fact the pinnacle of human submission: children are educated to become precisely what society expects of them" (1964, p.348). The technical order therefore, for Eliul, restricts creativity in society's most precious resource and best opportunity to break the technological society, children.

Lastly, Ellul equates the technological society to the end of individualism and to a totalitarian society. He believes the conformity of the technological society and all-pervading influence and impact of technique on people and natural order has similar ends, albeit completely different means, to a totalitarian regime. He states:

> When a society becomes increasingly totalitarian... it requires its citizens to be conformist in the same degree. Thus, technique becomes all the more necessary. I have no doubt that it makes men better balanced and 'happier'. And there is the danger. It makes men happy

> in a milieu which normally would have made them unhappy." (1964, p.348)

His analogy to a totalitarian regime shows how pervasive, all-embracing, and detrimental he believes technique and the technological society to be to mankind. He notes that technique cannot be anything else but totalitarian because everything is its concern. Acknowledging the two societies are very similar in the attitudes of the people, he notes that in a technological society "the individual participates only to the degree that he is subordinate for efficiency, to the degree that he resists all the currents today considered secondary, such as aesthetics, ethics, fantasy" (1964, p.74).

Overall, Ellul believes the aims of technology have gradually disappeared from view. He argues that humanity has forgotten what the purpose of technique was when it first emerged and has become lost in the shuffle without an understanding of the greater purpose that it was intended to have. The goals of mankind he attests have been translated into an abstraction. Ellul's next statement crystallizes his grim outlook:

> Comprehending that the proliferation of means brings about the disappearance of the ends, we have become preoccupied with rediscovering a purpose or goal. Some optimists of good will assert that they have rediscovered a Humanism to which the technical movement is subordinated. The orientation of this Humanism may be Communist or non-Communist, but it hardly makes any difference. In both cases it is merely a pious hope with no chance whatsoever of influencing technical evolution. The further we advance, the more the purpose of our techniques fades out of sight. Even things which not long ago seemed to be immediate objectives – rising living standards, hygiene, comfort – no longer seem to have that character, possibly because man finds the endless adaptation to new circumstances disagreeable. (1980, p.314)

In the debate of the impact of technology on society, the extreme viewpoints of both technological utopianism and technological dystopianism are prevalent. While

technological utopianism advocates the positive aspects of technology viewing it as a means to improve society and in Masuda's vision to stimulate social awareness, technological dystopianism upholds that technology is the cause of many societal problems, is a source of control, and causes society to digress as Ellul advocates. Upon review, merits in each perspective can be identified, however the extremism within each outlook and each author are evident and need to be reconfigured to provide a more "realistic" position between the two extremes. Masuda's vision of the potential that the Internet offers places inordinate faith in mankind, assuming humanity will willingly take advantage of it for good use to actively better society. Ellul, warning that contemporary society falls victim to technology where creativity and the human senses are dulled, places no faith in technology to be of benefit. Both Masuda and Ellul are extreme in that they do not adopt a balanced viewpoint in examining the potential impact of the Internet and technology on society. A more "realistic" position would warn of the two extremes and note that the ultimate impact that the Internet will have will depend on how each individual and mankind in general chooses to utilize it.

These differing accounts of technology generally surface when new technologies emerge and become integrated within society. Since the emergence of the Internet, both technological utopian and dystopian views have been noticeable. These accounts of the potential impact and effects of the Internet on society have flooded all media outlets. The following chapter with the Globe and Mail as an illustration will examine the nature of the coverage of the Internet in the media, the degree to which it has been reported as optimistic and beneficial or pessimistic and detrimental to society.

CHAPTER 4
MEDIA ANALYSIS:
THE GLOBE AND MAIL

The rapid emergence of the Internet in society, its efficient diffusion and expanding utilization, garners excessive attention in the media. News on its maturing influence in all aspects of society including economic, occupational, political and cultural, are reported frequently in various media. This chapter examines the nature of the media's coverage of the Internet and its burgeoning impact throughout society.

Methodology

The objective of this chapter is to examine the nature of current coverage of the Internet by the media. However, due to the breadth and diversity of media outlets and enormity of their coverage it is difficult to examine in its entirety. In order to meaningfully examine Internet coverage in the media it is appropriate to choose one specific medium and reputable source of information. Therefore, as an illustration *The Globe and Mail* is examined for its coverage of the Internet.[12]

The Globe and Mail is a nationally reputed Canadian newspaper with a strong emphasis on news relating to the Internet and new information and communication technologies. This study is a synchronic analysis examining a snapshot of articles published between March and June 2000 on the Internet in *The Globe and Mail*. An examination in this manner illustrates the nature of coverage of the Internet at this point in time, to its current development and impact within society.

[12] To see all articles reviewed in *The Globe and Mail* see Appendix 3.

The fast moving development and vast utilization of the Internet has created phenomenal interest and a seemingly positive attitude within the media. The following two content categories - *positive* and *negative* - are used to effectively determine the meaning and message of the coverage:

> *Positive* - Emphasizes the unique ability of the Internet and new information and communication technologies. Displays it to be of benefit for people and society. Portrays its capabilities positively. Stresses the future that new, innovative, and better things are to come.
>
> *Negative* - Emphasizes the adverse conditions existing within and due to the Internet and new information and communication technologies. Exhibits problems that exist with the technology. Focuses on undesirable issues, events, and situations that have emerged as a result.

Analysis using these categories, through a systematic examination of the adjectives, displays how stories on the Internet are reported in the media – positively or negatively.

It is necessary and beneficial to examine the coverage, *positive* and *negative*, within the context of the information society (Chapter 1), evolution of the Internet (Chapter 2) and utopian and dystopian views (Chapter 3). Specifically, Webster's five subject categories in the information society debate – technological, economic, occupational, spatial, and cultural – are used as parameters to identify different subjects in *The Globe and Mail's* coverage of the Internet. These subject categories provide a descriptive picture of the prominence of each subject in the coverage and their nature, as *positive* or *negative*.

Webster's definitions of the different characteristics of the information society cannot be necessarily used in the exact manner in specifying characteristics in *The Globe and Mail's* coverage. He analyzes entirely different views arguing that the present age is an information age, whereas this study examines *The Globe and Mail's* coverage on the

present day development of the Internet and its sociological and economic impact on society. The coverage in *The Globe and Mail* has been examined primarily in light of Webster's categories as identified below:

> *Technological* – Specifically relating to Internet technology. Coverage pertaining to the technical capabilities of the Internet – hardware, software, technical innovation, and new programs.
>
> *Economic* – The Internet's economic impact on society and individuals. Focusing on the monetary impact of the Internet. Coverage associated with the Internet's micro-economic effect on corporations and individuals (revenues, income, etc.) and macro-economic effect (GDP, GNP, etc.) on society.
>
> *Occupational* – The Internet's impact on industry and people's occupations. Focusing on how the Internet is affecting and influencing people's work.
>
> *Spatial* – The impact of the Internet and new information and communication technology on people's activities. Specifically emphasizing the technology's impact on space.
>
> *Cultural* – Emphasis on the Internet's impact on society and its culture. Elucidates the Internet's influences and affects on our culture.
>
> *Others* – Articles that do not fall under any of the aforementioned Webster's categories, however meaningful and useful within the context of the examination of the impact of the Internet on society.

The articles within the coverage have been classified into these categories, the contents of which are further examined and analyzed for their suitability and their respective impact on society.[13]

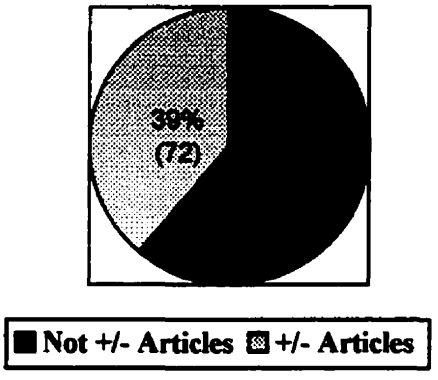
[13] The *Others* category was not referred to by Webster, however, is referred throughout this Chapter as part of Webster's categories.

Results

The Globe and Mail significantly covers the Internet and new information and communication technologies. A *Technology* section exclusively dedicated to Internet news is released weekly and specialty technology sections are released occasionally. Specialty technology sections included issues such as *E-business Services*, *Portable Technology*, *Telecom*, and *Project Management in an Information Age*. These *Technology* sections devoted to news of the Internet compose most of the articles reviewed in this analysis.

There were many articles in *The Globe and Mail* on the Internet and other new information and communication technologies from March to June 2000. As illustrated in Chart 1, 72 of the 185 articles reviewed on the Internet and other new information and communication technologies, reported either in a *positive* or *negative* light.

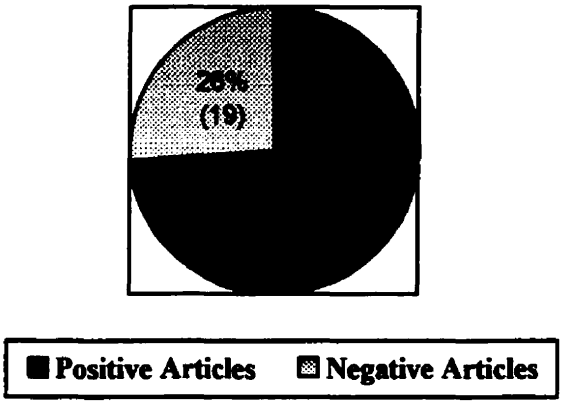
Chart 1: *The Globe and Mail*:
Total Internet Articles
Total Articles = 185



A significant majority of the 72 articles, as illustrated in Chart 2, were *positive*. 53 or 74% reported the Internet positively whilst only 19 or 26% of the articles reported it negatively. Approximately three *positive* articles to every *negative* article were

published. Therefore, the articles in *The Globe and Mail* on the Internet and other new information and communication technologies clearly cover the positive beneficial aspects of the Internet more so than the negative detrimental ones.

Chart 2: The Globe and Mail
Total Articles: *Positive* vs. *Negative*
Total Articles = 72



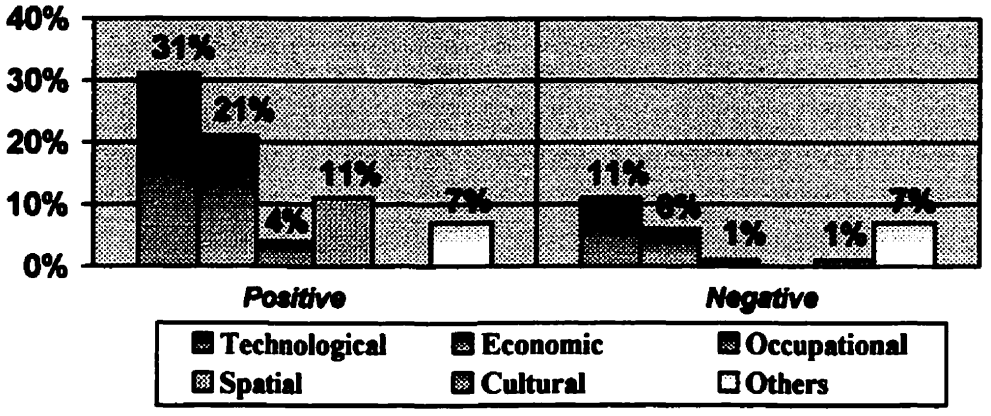
Naturally, given the above results, *positive* articles clearly outnumbered the *negative* articles in virtually every Webster's category. Table 6 displays the *positive* and *negative* articles in each of Webster's categories:

TABLE 6
***The Globe and Mail* - *Positive* and *Negative* Articles**

Webster's Categories	*Positive* Articles		*Negative* Articles	
	%	# of Articles	%	# of Articles
Technological	31%	22	11%	8
Economic	21%	15	6%	4
Occupational	4%	3	1%	1
Spatial	11%	8	0%	0
Cultural	0%	0	1%	1
Others	7%	5	7%	5
TOTAL	74%	53	26%	19

These statistics display the total percentage of *positive* and *negative* articles within each subject category (See Chart 3). In the technology category, the number of *positive* articles (22) accounted for 31%, nearly one third of all articles, whereas articles on negative technological characteristics (8) accounted for 11% of all articles. In the *Economics* category, articles of the positive economic aspects of the Internet (15) accounted for 21% while the *negative* economic articles (4) composed only 6% of the total. In the *Occupational* category, the number of articles represented a small percentage of the total. *Positive* articles (3) accounted for 4% while only 1% (1) reported on the negative impact and effects of the Internet on work and occupations. In the *Spatial* category, 11% (8) of all articles focused on beneficial aspects of the Internet and other new information and communication technologies, whereas no *negative* articles (0) were evident. The *Cultural* category had very little significance in the overall coverage. 1% (1) focused on the cultural impact of the Internet. This article was *negative* representing the only anomaly in Webster's categories where *negative* articles outnumbered *positive* articles. In articles in the *Others* category both *positive* and *negative* articles were equally represented (5) with 7% each of the total. This was the only category with substantial representation where a significant presence of *negative* articles was equal to the *positive* articles. These findings show that the subjects in *The Globe and Mail* in all Webster's categories composing the majority of coverage (*Technological, Economic* and *Spatial*) were more *positive* than *negative*.

Chart 3: *The Globe and Mail*
March - June 2000
Overall Analysis



Analysis of the total *positive* articles, as illustrated in Table 7, displays the frequency that *positive* articles in each of Webster's categories, in relation to the total *positive* articles, appeared in the coverage (See Chart 4).

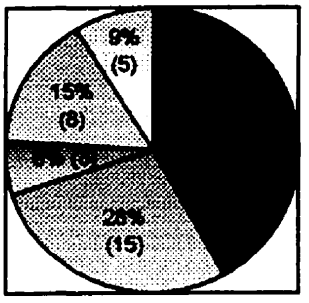
TABLE 7
***The Globe and Mail* – Analysis by Category of *Positive* Articles**

Webster's Categories	Number of Articles	Percentage
Technological	22	42%
Economic	15	28%
Occupational	3	6%
Spatial	8	15%
Cultural	0	0%
Others	5	9%
TOTAL	53	100%

Of the 53 *positive* articles 42% (22) focused on technological issues. Technology articles were the most prevalent subject matter of Webster's categories comprising nearly half of the total *positive* articles. The second highest concentration of *positive* articles of the Internet were on economic issues. 28% (15) of the articles reported on the positive

economic relationship, impact, and effect of the Internet on people and society. The third largest concentration of *positive* articles were in the *Spatial* category. 15% (8) of articles reported on the spatial aspect of the Internet and new information and communication technologies. The fourth highest concentration of *positive* articles were in the *Others* category with 9% (5) of the total coverage. Coverage on the Internet's beneficial impact and effect on occupations was the fifth highest concentration with 6% (3) of the total. The *Cultural* category had the lowest concentration among Webster's categories having no (0) representation of the total.

Chart 4: *The Globe and Mail*
***Positive* Articles**
Total Articles = 53



■ Technological ▨ Economic ▨ Occupational
▨ Spatial ▨ Cultural □ Others

A breakdown of the total articles on *negative* issues of the Internet, as illustrated in Table 8, shows their percentage frequency in each of Webster's categories, in relation to the total *negative* articles (See Chart 5).

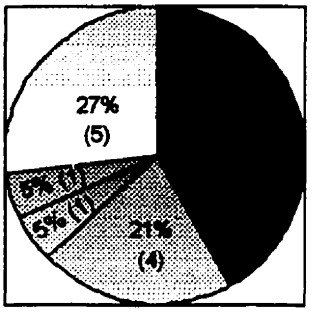
TABLE 8
Globe and Mail – Analysis by Category of *Negative* Articles

Content Categories	Number of Articles	Percentage
Technological	8	42%
Economic	4	21%
Occupational	1	5%
Spatial	0	0%
Cultural	1	5%
Not Applicable	5	27%
Total	19	100%

Of the 19 *negative* articles 42% (8) were on technology. Although there were fewer *negative* articles on technology than *positive* both composed exactly 42% of the respective *positive* and *negative* coverage. Articles on economic issues of the Internet showed similar results. 21% (4) of all *negative* articles were on economic issues. There were less *negative* economic articles than *positive* ones, however, the respective percentages are similar. 28% of all *positive* articles were on economic issues very similar to the 21% of all *negative* economic articles. Coverage on the Internet and occupations followed the same trend. The *negative* article on occupations comprised 5% (1) of the total *negative* coverage, similar to the 6% of *positive* articles on work and occupations. As a result, the percentage of articles on occupations appeared with virtually the same consistency in both the total *positive* and *negative* coverage. Articles on the spatial dynamics of the Internet and new information and communication technologies were an anomaly. No articles (0) focused on the *negative* aspects of the spatial dynamics of the Internet and new technologies whereas, 11% of all *positive* coverage did focus. The *Globe and Mail's* coverage clearly emphasized the benefits of the Internet pertaining to space while no detriments were reported. Articles on the Internet's cultural impact were similar to the majority of findings. 5% (1) of all *negative*

articles emphasized the *negative* impact of the Internet and new information and communication technologies while no articles emphasized the *positive* cultural impact of the Internet. These results simply display the minimal coverage on the cultural impact of the Internet. As a result, there is no credible discrepancy between the *positive* and *negative* findings. 27% (5) of the *negative* articles were in the *Others* category not identified in the examined categories, whereas only 9% of the *positive* articles were on other issues. *Negative* issues of the Internet were more likely to surface in other categories not identified in this analysis.

Chart 5: *The Globe and Mail*:
March - June 2000
***Negative* Articles**
Total Articles = 19



■ Technological ▨ Economic ▨ Occupational
▨ Spatial ▨ Cultural □ N/A

The results of this study of the coverage in *The Globe and Mail* makes evident, at this point in time, that articles emphasizing benefits of the Internet are much more prevalent than articles stressing detriments of the Internet. Coverage emphasizes the *positive* aspects of the Internet more frequently in most of Webster's categories, especially the more prominent ones such as *Technological* and *Economic* representing

the bulk of the coverage. The *Spatial* subject category was the only category that composed significantly more of the overall *positive* coverage compared to the overall *negative* coverage. All other subject categories had very similar percentages of both the total *positive* and *negative* coverage.

In observing all current issues on the Internet and other new information and communication technologies in *The Globe and Mail's* coverage, one other subject category not addressed by Webster was prominent and would be useful in further studies. Legal issues and the Internet were a common topic and had a significant amount of coverage. A Legal category would offer another subject for interpretation and provide a more complete analysis and understanding of the issues in the current impact of the Internet on society and the frequency it appears as a topic of importance in the media.

Analysis

The results displayed that *The Globe and Mail* reported more on the *positive* development and benefits of the Internet and new information and communication technologies than negative impact. This section analyzes the coverage in *The Globe and Mail* elucidating the theme and nature with examples of articles in each subject category – *Technological, Economic, Occupational, Spatial,* and *Cultural.* Analysis of the articles in relation to Masuda's technological utopian and Ellul's technological dystopian visions are discussed. In addition, analysis of the *positive* articles representing characteristics of 'false' or 'genuine' technological utopianism is provided.

Prior to analyzing the articles in the individual categories, it is necessary to review how technological utopian and dystopian perspectives are examined in the

coverage. Articles emphasizing improvement and benefits through technological progress reflect principles of technological utopianism. Technological utopianism is evident where the capacity of the Internet and new information and communication technologies are shown to alter and positively transform life, akin to the work of Masuda. Principles of technological dystopianism, on the other hand, existed in articles where problematic issues with the Internet and new information and communication technologies were highlighted. Ellul's critique and pessimistic view of a technological society, where technology pervades and is championed in mainstream society to improve conditions and increase efficiency is examined. It is analyzed if his view is evident in *The Globe and Mail's* coverage. On the whole, the focus of this analysis is on the theme in *The Globe and Mail's* coverage of technology, if it champions the beneficial impact of technology like Masuda or believes it to be detrimental to society, like Ellul.

Technological Articles

These articles emphasized technical features of the Internet and new information and communication technologies. The articles varied in content from new technology products to technical innovations and potential. Articles mostly discussed new innovations and emerging products where advocates such as owners, creators and developers were frequently interviewed in articles either positively championing their products or commented on issues of negative concern.

All technological articles emphasizing *positive* attributes of technology (22) had technological utopian undertones. Much of the emphasis was on new technologies and technical innovation allowing people to be more efficient in their activities, improving

their lives. Table 9 displays 5 of the *positive* articles analyzed illuminating the nature of the coverage:

TABLE 9
***The Globe and Mail - Positive* Technological Articles**

***The Globe and Mail - Positive* Technological Articles**
Touch technology takes off
Palm wins hands down
Palm keyboard is road-ready
Metamail makes over e-mail
Surfing the Net via cellphone just ahead in 3G world

In these articles progress, improvement and efficiency are communicated - all primary characteristics of technological utopianism.

In the article *Touch technology takes off* a future scenario is provided, "imagine being able to check in to the busiest airport in the country in 15 seconds.[14] Thanks to touching screen technology some customers can do that". This article illustrates the benefits of touch technology stating its benefits, how it increases efficiency, improves current situations, and solves many of the present problems. Phrases such as "the future is pretty endless for this" and "the sky is the limit" reflect technological utopian principles displaying that technology will improve our lives.

This article expresses the same tone of Masuda that technology can and will improve our lives. However, the article clearly conveys principles of 'false' technological utopianism, a sensational vision of the future as opposed to a clear description of how the technology can ameliorate problems, central to 'genuine' utopian thought. This article celebrates the enhanced efficiency that touch technology is claimed

[14] Written by Catherine Mulroney, March 31, 2000. Section E15.

to provide supporting Ellul's assertion that mainstream society encourages technological progress and opposite of his belief that technology is harmful to society and the human spirit.

The article *Palm wins hands down* also displays technological utopian rhetoric.[15] The article commences, "I own a Palm Pilot and would probably be lost without it because it's the only way to keep track of things". This article explains the necessity for owning this device and emphasizes its 'revolutionary' impact. The Palm Pilot is shown to increase efficiency and improve work. The message is how much more efficient one can become with this technology ultimately leading to the improvement of one's life. This article is a combination of 'false' and 'genuine' technological utopianism. The emphasis of the article is on how the Palm Pilot can improve the organization of one's activities thus solving problems of disorganization. However, it is portrayed in a dreamy vision emphasizing its positive characteristics without much deeper analysis on how it will improve society. The article supports Ellul's description of a technological society where technological innovation is sought by society and advocates a message contrary to his argument that technology is the cause of moral and ethical deterioration.

The article *Palm keyboard is road-ready* discusses the benefits of a palm size keyboard.[16] "Finally, there's a portable keyboard for Palm handheld computers that really is portable", the articles notes. "Thanks to this new keyboard it's no longer necessary to use the Palm's frustrating handwriting recognition technology", the article continues. The article again correlates technological innovation with efficiency, which is reported to assist people in their activities. This article is similar to the other articles

[15] Written by Mark Evans, April 27, 2000. Section T6.
[16] Written by Murray Soupkoff, May 11, 2000. Section T8.

where the beneficial attributes of the technology are displayed. The technology is argued to improve people's activities conveying the opposite message of Ellul that technology is detrimental to human welfare.

Metamail makes over e-mail advocates a similar message.[17] This article is on new software that will improve e-mail. The article commences posing the question "Is there more to e-mail than plain old boring text?" This displays the general positive sentiment for technological innovation and how it can improve current technology and result in a more pleasurable experience for people. 'False' technological utopian ideals are prevalent in this article with its positive outlook towards technological innovation emphasizing a fantasy. Technological innovation is conveyed as positive for society opposing Ellul's belief that it creates hazardous conditions where the focus of individuals and society is on perfection rather than spiritual discovery.

The article *Surfing the Net via cellphone just ahead in 3G world* also emphasizes the future that new information and communication technologies can provide.[18] It provides a futuristic scenario showing this innovation will be of aid, "Can you imagine walking into a hotel with your 3G phone on? As you reach the lobby, your phone screen shows that you've been registered". This article elucidates that technology will positively influence our lives. Again, the premise of the article, like all of the others, is on efficiency explaining technology to enhance our lives. The positive rhetoric of Masuda is evident while the outlook completely opposes Ellul's assertion that technology is detrimental to the human condition.

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[17] Written by Tyler Hamilton, May 18, 2000. Section T3.
[18] Written by Kevin Marron, May 26, 2000. Section C2.

These 5 articles are an accurate reflection of all articles emphasizing the *positive* technological attributes of the Internet and new information communication technology. It is astoundingly evident in the articles analyzed in *The Globe and Mail* that technological innovation and new products are reported on as a means to improve our lives. All the articles advocate characteristics inherent in technological utopianism with most of the content being from the 'false' perspective, the sensational future that technology will inevitably provide.

Articles on the *negative* technological aspects of the Internet and new information and communication technologies (8) were very similar to the findings in the *positive* technological articles. Although the articles were on problematic issues of the Internet, such as Internet crime and security, they held the same presumption that technology is important and will benefit society and humankind. Articles focused on the impediments existing in specific Internet and new information and communication technologies emphasizing that improvement and innovation is necessary for them to be utilized effectively and ultimately benefit society.

For example, the article *Voice-over IP proves to be imperfect solution* discusses that the merits of current voice-over information processing technology are unclear because it has yet to provide a solution for people.[19] Although the message focuses on problems with the technology it eludes that further innovation is needed for it to be useful. The general message is that technology is useful opposing Ellul's sentiment that technology is the root of all evils in society. The article *'Love Bug' hits world's e-mail*

[19] Written by Keith Irish, May 26, 2000. Section C16.

displays a similar message.[20] This article focused on the "Love Bug" e-mail virus noting the damage and problems it created throughout the world. These articles that focus on *negative* issues of the Internet do not necessarily emphasize technology as detrimental to the human condition. The outlook towards technology and its impact on society is not viewed as detrimental, rather that individual technological impediments exist creating problems and preventing unobstructed advancement and efficiency in people's daily lives. Therefore, the general theme of the *negative* articles were not on the dark nature of technology prevalent in Ellul's work, rather on the problems that exist with specific technologies and the measures needed to be taken to ameliorate them.

Economic Articles

Articles on the economic impact and effects of the Internet and new information and communication technologies produced similar findings to the coverage on technological issues. However, this category was more difficult to relate to technological utopian and dystopian perspectives due to the focus and emphasis on economic issues and less focus on technology.

Articles emphasizing the positive economic impact of the Internet stressed the inherent technical advantages and efficiency of the medium to create wealth. For example, the article *Arctic shopper buys and saves on the Internet* emphasizes the technology's ability to provide economic benefits for all people.[21] While the coverage was not as utopian as the technological articles, the underlying assumption was that economic benefits can be reaped from the Internet. The focus of all *positive* economic

[20] Written by Keith McCarthur, May 11, 2000. Section T7.
[21] Written by Kevin Marron, April 27, 2000. Section T4.

coverage (15) centered on the technology to provide opportunity for economic prosperity. The efficiency of the Internet to provide economic advantages was the central theme of the coverage. As a result, Ellul's argument that technology creates negative effects for society was not evident.

Similar to the *negative* technology articles the *negative* economic articles simply outlined specific problems that existed with no discussion of it as a detriment to society as advocated in technological dystopianism. In the *negative* articles emphasis was on the economic pitfalls within the technology and not on the drawbacks of the technology for society. For example, the article *Investors lose faith in on-line marketplaces* reported problematic issues with the technology but does not show the technology itself as detrimental to society.[22] In articles addressing adverse economic issues of the coverage the overall premise was that the technology is beneficial even though problems are evident. In summary, the capability and efficiency of the Internet to be economically beneficial was stressed supporting views of technological utopianism contrary to Ellul's technological pessimism.

Occupational Articles

Technological utopianism is also clearly evident in the *positive* articles (3) on the effects of the Internet and new information and communication technologies on occupations. The few articles in *The Globe and Mail* emphasizing the benefits of the Internet for occupations demonstrated its ability to provide greater opportunities in work. These articles reported the Internet to offer new opportunities for people in the workplace

[22] Written by Julia Angwin, April 20, 2000. Section T6.

highlighting that the technology provides access to virtually unlimited information. The *negative* article *Web age threatens livelihood of travel agents* illustrates that the Internet is detrimental to the travel agency industry.[23] This article elucidates that the Internet is harming the livelihood of an entire industry. This was the only article where the Internet was shown as disadvantageous for people. However, the Internet was reported as a threat because people have new opportunities availed by the Internet which eliminated the manual work done by the travel agency. The technology itself was shown to create change and not shown to be harmful. Therefore, the common view celebrates the Internet as beneficial for both individuals and society.

Spatial Articles

Articles on the spatial dynamics of the Internet and new information and communication technologies decisively reflected technological utopianism. All of the articles on spatial issues were *positive* (8) emphasizing the virtues of not being confined to a specific space to conduct activities. Many articles discussed the impact of wireless technology and the Internet. The articles often emphasized the freedom of the technology to create new possibilities to perform activities more efficiently. For example, the article *House hunters prowl on Internet from comfort of home* emphasized that people did not have to physically visit the property in order to appreciate its value.[24] The article *Buying or selling a home? A virtual tour can help* shows the Internet as a tool in aiding people buying a home.[25] Technology is reported to be of benefit illuminating

[23] Written by Jason Tanz, May 4, 2000. Section T6.
[24] Written by Jayson Blair, May 4, 2000. Section T10.
[25] Written by Grant Buckler, March 31, 2000. Section E9.

its potential to increase human efficiency in daily activities. Articles emphasized the future and visions of a technological haven akin to 'false' technological utopianism. The coverage overwhelmingly advocates that technological innovation and progress is beneficial to people. Therefore, technology again is portrayed to be a positive development for society opposing Ellul's conviction.

Cultural Articles

Very little can be induced from the one article emphasizing the Internet's impact on culture. The article showed that the Internet and other new information and communication technologies have a profound effect on culture. Similar to Ellul's analysis, the article noted that the Internet and new technologies are speeding up the pace of life forcing humans to react to events rather than act on events. The quickening pace of life was shown to occur due to the instantaneous access and real-time flow of information created by the Internet. This was the only article that emphasized aspects of Ellul's work. However, although this article brought attention to these effects of the Internet it did not overtly specify it to harmful for society. The message simply was that the Internet and instantaneous communication influenced culture not in a morally corruptive way as Ellul predicts.

In summary, it is evident that the coverage in *The Globe and Mail* overwhelmingly stressed the *positive* attributes of the Internet and new information and communication technologies. In particular, its focus was mainly on the technological and economic impact on society. The capabilities and potential of technology throughout

society was a prominent issue in its coverage. The Internet and its continuing and further evolution as reported in *The Globe and Mail* was portrayed positively with views inherent in 'false' technological utopianism. The coverage often expressed characteristics of technological utopianism, that technology is beneficial to people and society accentuating progress and improvement while insignificant attention was given to technological dystopian views. While *The Globe and Mail's* coverage reported the Internet as a positive development in society emphasizing the capabilities it can provide for individuals and society, it is fair to assume that similar views are communicated by other agents of media.

CONCLUSION

The Internet has decisively emerged within society. The research done in this study elucidates that the emergence of the Internet has a profound impact on various segments of society. Discussion on the debate that a new society is emerging, the evolution and growth of the Internet, utopian and dystopian views of its future impact and analysis of media coverage communicating its present day impact to society all demonstrate the incredible influence and attention the Internet has in contemporary society.

In the debate of the information society discussed in Chapter 1 it was shown that in the latter part of the Twentieth century the term 'information society' has been widely used to characterize the changing way of life – technological, economic, occupational, spatial, and cultural – in contemporary society. Information in all perspectives has been labeled as the defining feature of this new information society. The ability to retrieve vast stores of information easily has been accepted to greatly affect one's activities, way of life and society, ultimately differentiating this society from its predecessors. New information and communication technologies are acknowledged as making information available to all people and altering the fundamental nature of society.

With the acknowledgement that new information and communication technologies have been instrumental in bringing about an information society Chapter 2 described the origins and evolution of the current component of these new technologies, the Internet. The emergence and development of the Internet and its significant impact on today's society was outlined. Recent statistics demonstrated its widespread growth throughout the world at an astonishing rate. The remarkable growth in the number of

users of the Internet was evident in current statistics with, projections showing that the on-line population would continue to expand at a profound rate. The Internet's dynamic nature was exhibited with its recent utilization as an on-line marketplace for commercial transactions and its anticipated growth in transforming the world of commerce. A current snapshot of Canadian society and industry illuminated the Internet's detailed utilization and impact. The Internet's increasing global acceptance, rapid growth in number of users and utility as a medium of communication and channel for commerce has stimulated enormous discussion on its future impact on the nature of society.

Presenting views of the potential impact of the Internet in the future, Chapter 3 outlined the perspectives of technological utopianism and technological dystopianism. The rapid emergence of the Internet within society has lead to the debate on the positive and negative effects on society at present and in the future. Utopian and dystopian perspectives were discussed demonstrating the different visions emphasizing the positive impact it could have on society, such as Masuda's, and the detrimental consequences, such as Ellul's. With such debate particularly in view of new innovations especially as significant as the Internet, visions and views representing these two different and opposite perspectives will always be present.

Chapter 4 examined and analyzed the characterization of society as an information society, the evolution of the Internet and discussion on its impact in the future and how it is communicated through the present day media. Results from a synchronic analysis of how the media, using *The Globe and Mail* as an illustration, reported news on the impact of the Internet on society were discussed. It was abundantly clear that coverage of the Internet in *The Globe and Mail* was very positive emphasizing

its potential for the future as it continues to evolve. The results demonstrated that reports in *The Globe and Mail* exhibited views inherent in technological utopianism, that the Internet and technological innovation were positive developments for society and that they offered new possibilities and greater opportunities for the future. The results were clearly indicative of the positive progressive reports predominating in the media at this point in time.

Although the technological development, *evolution*, of the Internet and its *impact* to date on Canadian and American *society* has been discussed in this thesis, it is further important and necessary to discuss its general and overall impact worldwide and on society at large in view of different industrial, social, economic and political status and conditions prevailing in various parts of the world. As an example, in contrast to the evolution and rapid impact of the Internet on highly politically and industrially matured societies, such as Canada and the United States, the real impact on societies such as China, India and Africa is undeniably slow due to impediments peculiar to their environments. Highlights of the prevailing impediments in these societies include: 1.China – political doctrines, lack of freedom of speech, vast rural population, unfamiliarity of the English language and inadequate infrastructure; 2.India – vast rural population, inadequate infrastructure and illiteracy; and 3.Africa – political instability, poor industrial base, high rate of illiteracy, significant lack of infrastructure and communication facilities and vast rural population. As the population of China, India and Africa alone constitutes approximately 50% of the total population of the world, viewing other parts of the world with similar impediments it is apparent that a vast majority of the world population, *society*, suffers from their inability to capitalize on the

benefits of the Internet, *impact*, to the same degree and rapidity as the industrialized world.

Based on the findings in this study of the significant impact of the Internet on society it is conceivable to believe that its impact will continue to evolve in an exponential manner. As the debate on the information society continues and develops, discussion may focus on the differences and benefits realized by 'informatized' and 'uninformatized' countries, similar to the present discussion of industrialized and developing countries. As more countries develop the infrastructure to access the Internet and other information technologies and as more of the world's population goes on-line, McLuhan's grand vision of a 'global village', linked through electronic communication media, could indeed become a reality. It is apparent that various technological innovations in converging media and transmission methods that the Internet will continue to transform into a more sophisticated medium with significantly larger capabilities. As a result, the Internet will continue to have a decisive impact on society where it is up to humankind to chart its course for the benevolent betterment of society.

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APPENDIX 1

THE OVERALL COMPOSITION OF THE INFORMATION SOCIETY

Masuda (1985, p.621-625)

1. The prime innovative technology at the core of development in industrial society was the steam engine, and its major function was to substitute for and amplify the physical labour of man. In the information society, 'computer technology' will be the innovational technology that will constitute the developmental core, and its fundamental function will be to *substitute for and amplify the mental labour of man.*

2. In industrial society, the motive power revolution resulting from the invention of the steam engine rapidly increased material productive power, and made possible the mass production of goods and services and the rapid transportation of goods. In the information society, 'an information revolution' resulting form the development of the computer will rapidly expand information productive power, and make possible *the mass production of cognitive, systematized information, technology, and knowledge.*

3. In industrial society, the modern factory, consisting of machines and equipment, became the societal symbol and was the production center for goods. In the information society the *information utility* (a computer-based public infrastructure) consisting of information networks and data banks will replace the factory as the *societal symbol*, and become the production and distribution center for information goods.

4. Markets in industrial society expanded as a result of the discovery of new continents and the acquisition of colonies. The increase in consumption purchasing power was the main factor in expansion of the market. In the information society, 'the knowledge frontier' *will become the potential market*, and the increase in the possibilities of problem-solving and the development of opportunities in a society that is constantly and dynamically developing will be the primary factor behind the expansion of the information market.

5. In industrial society, the leading industries in economic development are machinery and chemicals, and the total structure comprises primary, secondary, and tertiary industries. In the information society the leading industries will be the *intellectual industries*, the core of which will be the knowledge industries. *Information-related industries* will be newly added as *the quartenary group* to the industrial structure of primary, secondary, and tertiary. This structure will consist of a matrix of information-related industries on the vertical axis, and health, housing, and similar industries on the horizontal axis.

6. The economic structure of industrial society is characterized by (1) a sales-oriented commodity economy; (2) specialization of production-utilizing divisions of labour; (3) complete division of production and consumption between enterprise and household. In the information society (1) information, the axis of the socioeconomic development, will be produced by the information utility; (2) self-production of information by users will increase; information will accumulate; (3) this accumulated information will expand through synergetic production and shared utilization; and (4) the economy will change structurally from an exchange economy to a *synergetic economy*.

7. In industrial society the law of price, the universal socioeconomic principle, is the invisible hand that maintains the equilibrium of supply and demand, and the economy and society as a whole develop within this economic order. In the information society the *goal principle* (a goal and means principle) will be the fundamental principle of society, and the synergetic feedforward, which apportions functions in order to achieve a common goal, will work to maintain the order of society.

8. In industrial society, the most important subject of social activity is the enterprise, the economic group, and a third sector of government ownership and private management. In the information society the most important subject of social activity will be the *voluntary community*, a socioeconomic group that can be broadly divided into local communities and informational communities.

9. In industrial society the socioeconomic system is a system of private enterprise characterized by private ownership of capital, free competition, and the maximization of profits. In the information society, the socioeconomic system will be a voluntary civil society characterized by the superiority of its infrastructure, as a type of both public capital and knowledge-oriented human capital, and by a fundamental framework that embodies the *principle of synergy and social benefit*.

10. Industrial society is a society of centralized power and hierarchical classes. The information society, however, will be a multi-centered and complementary voluntary society. It will be horizontally functional, maintaining social order by *autonomous and complementary functions of a voluntary civil society*.

11. The goal of industrial society is to establish Gross National Welfare Society, aiming to become a cradle-to-grave high welfare society. The information society will aim for the *realization of time value* (value that designs and actualizes future time) for each human being. The goal of society will be for everyone to enjoy a worthwhile life in the pursuit of greater future possibilities.

12. The political system of industrial society is a parliamentary system and majority rule. In the information society the political system will become a *participatory democracy*. It will be the politics of participation by citizens; the politics of autonomous management by citizens, based on agreement, participation, and synergy that take in the opinions of minorities.

13. In industrial society, labour unions exist as a force for social change, and labour movements expand by the use of labour disputes as their weapon. In the information society, *citizen movements* will be the force behind social change; their weapons will be litigation and participatory movements.

14. In industrial society there are three main types of social problems: recession-induced unemployment, wars resulting from international conflict, and the dictatorship of fascism. The problems of the information society will be future shocks caused by the inability of people to respond smoothly to rapid societal transformation, acts of individual and group terrorists such as hijackings, *invasions of individual privacy*, and the crisis of a *controlled society*.

15. The most advanced stage of industrial society is a high mass-consumption stage, centering on durable goods, as evidenced by motorization (the diffusion of the automobile). The most advanced stage of the information society will be the *high mass knowledge creation society* in which computerization will make it possible for each person to create knowledge and to go on to self-fulfillment.

16. In industrial society, the materialistic values of satisfying physiological and physical needs are the universal standards of social values; but in the information society, seeking the *satisfaction of achieved goals* will become the universal standard of values.

17. Finally, the spirit of industrial society has been the renaissance spirit of human liberation, which ethically means respect for fundamental rights and emphasis on the dignity of the individualism and a spirit of brotherly love to rectify inequalities. The spirit of the information society will be the *spirit of globalism*, a symbiosis in which man and nature can live together in harmony, consisting ethically of *strict self-discipline and social contribution*.

APPENDIX 2
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APPENDIX 3

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