

**Preparing for the Information Age:  
The Impact of Information Technology on Cities and Planners**

by

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To my mother and father, for helping me pursue my dreams.

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## **ABSTRACT**

This research involved the examination and prediction of the impacts of information technology on cities and the role of the planner. In developing the necessary results, a literature review of current technological trends and historical background was undertaken.

Using the information established through the background and technological trends, the land uses of office, retail and residential sectors were examined to determine potential future impacts caused by information technology. Various future planning issues were identified in conjunction with this land use analysis, and the future role of the urban planner was then evaluated.

The general findings suggested that the tools, processes and issues of urban land use planning will be modified in the information age, and that the professional planner will need to adapt to a emerging new role.

# 1.0 Introduction

For this is the dawn of the Powershift Era. We live at a moment when the entire structure of power that held the world together is now disintegrating. A radically different structure of power is taking form.

And this is happening at every level of human society (Toffler 1990: 3).

These are the foretelling words of the renowned futurist, Alvin Toffler, who has and continues to predict accurate reflections on the future of our society. He speaks of a coming third wave of society and economy, where information is the new key to power, where the governing powers are being transformed and economic and social relationships are being drastically modified.

However, this realization is not solely restricted to the realms of the futurists. Jim Carroll (1997), one of Canada's leading information age and internet writers, speaks of an age with unprecedented change and believes individuals must learn to adapt to this dynamic era. Government is slowly taking heed of these messages as well. In his 1998 Federal Budget Speech, the Minister of Finance concluded that Globalization and Information Technology are a "fact, not a religion", and the federal budget's dedication to technology and education reflected the increased understanding of the facets of the information age. In one of the first journals of its kind, the *Online Planning Journal*, Peter Hall comments that "a new geography of the information economy is emerging; in a world where most of the old spatial constraints have fallen away" (Hall 1997: 1), while William Mitchell speaks of a new "city of bits" which is supplementing and replacing the physical city (Mitchell 1995).

Increasingly in the popular, political and academic spheres we are coming to recognize that the world is undergoing a radical change in its social and economic structure, largely enabled by advances in information technology. Individuals are able to communicate instantly across the globe, participate in virtual communities, purchase services and

products online, and garner access to instant global information. The organization is undergoing major changes as advanced computing technologies have increased worker productivity, remote work and telecommuting have encouraged the decentralization of the office, and improvements in electronic commerce have affected the very medium of business. Indeed, much of this thesis was a part of the information age as work was conducted away from the home university through the technologies of e-mail, phone and fax, and research has benefited from instant access to current and global information through the internet. While people may not actively participate in some of these advanced methods of information access, they unknowingly benefit from the inter connectivity of their bank branches, or perhaps the global purchasing power of their local businesses. It is difficult to pick up a newspaper without seeing a reference to advanced technology having an impact on society and the economy.

As it seems to happen with substantial leaps in technology there is often a hindsight re-evaluation of the impacts such advances have had on our society, as if to suggest we have proceeded too quickly without considering all the repercussions beforehand. It is essentially at this stage that we find ourselves examining the impact of advanced technology on areas such as education, growing income gaps, accessibility to technology, environmental impacts and health care improvements. There is a series of ripple effects and spinoffs, both positive and negative, that affect these areas.

The information age will undoubtedly also have a key impact on an area that is of interest to this thesis, that of the impact on communities, city form, planning and planners, but is an impact that we only beginning to understand. Much of the emphasis in the planning field thus far has been on telecommuting and the relocation of work, home-based businesses and the importance of telecommunications infrastructure, but this is just one small part of a complex, multi-layered transformation. Little seems to address the more important consideration that the information age is beginning to challenge the basic framework that underlies modern planning. The enabling technologies have facilitating

the mobility of the worker, telecommunications and global competitiveness have reduced office floor space requirements and the rise of electronic shopping has modified the traditional business districts. Trends such as these will inevitably have some impact on the basic tenets of the city; traditional land uses and locations are likely to be seriously altered, eliminated and created. It is important that planners understand these impacts and trends, and adjust their attitudes and methods accordingly. As Manuel Castells (1991) simply states it “the world has changed: can planning change”.

This thesis will analyze and examine some of the key issues of how information technology will impact the city and the changes required for planning and planners as a result. It will be an examination of the role of planning in the rapidly changing society and economy, as well as the evolving nature of the urban planner. As a key component in examining the future is evaluating the past, a historical background on cities and technological change will first be discussed, followed by a look at computer and internet trends in order to assess the significance and pace of change in the information age. As this thesis is suggesting that technology is and will continue to play a key role in the shape of the city, it is important to have a basic understanding of the technology before proceeding to discuss specific technological impacts on the city. A analysis of each of the key land uses of office, retail and residential then proceeds, and specific technological impacts and details of their role in the information age is examined. After each of these specific components are examined the discussion brings the components together and examines the cities as a whole by providing some insight into planning issues, processes and tools that will be affected in the information age. One of the key parts of this thesis will be examined last; that of the continuing role of the planner and the part we will play in the information age, outlining some of the skills and changes in attitudes required as a result.

In examining the impact of information technology on planning it is necessary to isolate technology from a complex mesh of variables that are involved in the development of

urban spaces. The focus throughout this thesis is obviously the specific changes that information technology will induce, and will make only brief reference to societal and economic examples. However, this is not to suggest that information technology impacts occur in a vacuum; trends such as financial indicators, globalization, environmental degradation and a changing political structure concurrently play a role in city evolution. Throughout reading the thesis this bias towards a technological approach should be noted.

In producing this thesis it is hoped that it is viewed not necessarily as a planning “handbook” to be followed specifically, nor really as an accurate portrayal of future city scenarios, although it is necessary to explore many future directions of planning to illustrate new possibilities and new styles of thinking. It is intended more of a indicator of our current practices and approaches, and how these need to be adapted to accommodate the structure of the information age. Planner’s have been questioning the future of profession for many years, as a brief examination of the Canadian planning journal *Plan Canada* reveals. Dave Witty (1994) begins by “taking the pulse” of the profession, and suggests that “..planners have become agents of order rather than agents of change” (p. 157). Fielding and Coutre (1994) note that modern planners are challenged to demonstrate their utility in the face of fiscal cuts and an increasingly skeptical public. Much defensive debate has also ensued over the comments issued by Jane Jacobs that planners are “irrelevant and overblown relics from a past long ago” (Fielding and Couture 1994). In light of these concerns over the future of the profession, this thesis and the information age in general represents a timely look at a potential re-birth of the profession.

## **2.0 Historical Background**

### **2.1 The Information Age**

The first step in examining how this era is transforming society and the economy is to establish an understanding of what constitutes the information age. The information age is a term often attributed to Toffler (1990), and now used widely to describe the modern post-industrial phase, with an obvious reference to reliance on information technology. Information technology is associated with the use and processes for storing, retrieving and sending information, but it goes beyond a simple reference to technology. It refers not only to computer and telecommunications technology but to the actual role of information and the accompanying transformations in the public, corporate and personal worlds that information and the technology are bringing about (Blais 1996). It is about how that information is controlled, who controls and uses it, who has access to it, and the ramifications of each of these concerns. Information leads to knowledge, and in Toffler's vision, knowledge is a power far greater than force or wealth. It is these issues that the information age revolves around, and reveals that the revolution is more than a simple technological change, but an integrated and complex social and economic transformation as well.

### **2.2 The Third Wave**

It is easier to understand the information age when examined in context of the past revolutions and eras, and the processes and organizations that dominated these ages. As traditional planning is grounded in the industrial age, it is significant for planners to consider the transformation in perspective and to understand the past in order to prepare and plan for the future. A common, and rather simplistic, view of our human history is to divide the time line into three distinct periods, or in Alvin Toffler's lingo, waves: the agricultural revolution, the industrial revolution and the third wave, the information

revolution. These are revolutions not only in technology, but in the social, economic and political organizational structure; in short, a complete upheaval. The first wave is the agrarian age, spurred on by the agricultural revolution, the second wave is the industrial age, with its accompanying revolution, while the our current wave, the third wave, is typified by the transformation from industrial power to the power of information. The socioeconomic and technological characteristics of these eras are summarized below.

Table 1: The three waves of human history (Source: Toffler 1990)

	<b>First Wave</b>	<b>Second Wave</b>	<b>Third Wave</b>
<b>Power Base</b>	Force	Wealth	Knowledge
<b>Economic Means</b>	Agriculture	Industry	Information
<b>Political Institution</b>	Feudal	Democratic	?
<b>Work Regime</b>	Family	Industry	Self
<b>Wealth Form</b>	Gold	Paper	Symbolic

Each of these waves was greatly assisted by substantial leaps in technology, the agricultural revolution with advanced agricultural machines, mass production techniques in the industrial revolution, and advanced computer applications in the the information age. However, as table 1 illustrates, technology does not operate exclusively, but as part of an integrated social, economic and political environment. It will be interesting to see the political system that arises out of the information age, as Toffler suggests that if the economic form of production is shifting, so too will the political institutions that administer it. Perhaps the world may experience supranational syndicates that dominate large geographical areas. Wealth is becoming more symbolic and the work regime is transforming itself from ties to the organization to a reliance on the self. It is a new era where knowledge is power, and access and control of information will be the keys to economic success.

The information age represents an era where the basic structure and framework of producing wealth and controlling power are changing. Planners must realize that the industrial era structure which planning was formulated upon is changing, not only on the face but deep within the roots, and thus we must understand and adapt to these challenges.

## 2.3 Technology and the City

The city is a complex technological, political, economic and social system, and has generally evolved from constant decisions from governments, individuals and business entities. Current technological possibilities play a large role in these decisions, and the shape, structure, organization and function of cities often reflect the state of technology. The shift from an industrial-based system to a information-based system as well as the accompanying change in the technological base, will inevitably have a result on new city forms and functions (OTA 1995).

Technological innovations generally occur in clusters, and this non-linear form of development causes major transformations to occur in cities rather than a smooth evolution. For example, mass production techniques in industrial processes initiated a large-scale rural to urban migration in the industrial revolution, while the increase in automobile availability was a major catalyst in the growth of suburban North America. Technology affects the processes of city change and spatial distribution in a variety of ways. New physical infrastructure can change the locations of industries and business, advances in industrial processes can impact general employment levels and locations, industry change can spur different demands for input and outputs, resulting in a change in industrial location, and technologies can also produce changes in residential locations, causing firms to shift and develop appropriately in that location (OTA 1995). Information technology will generally include components of each of these technological



impacts on cities, such as telecommuting's impact on residential location, or the change to office locations as a result of communication technology. Specific technologies and how they potentially impact the city will be further discussed in Chapter Four.

## 2.4 Telecommunications Infrastructure

The new network of fibre-optics demanded by a burgeoning internet population is not the first time infrastructure has played a key role in telecommunications: it has played an important technological role since the beginning of the 19th century. Development of the global telecommunications network was initiated in the 1830's with the introduction of the telegraph, followed by the telephone in the 1870's. At the turn of the century, long-distance telecommunications networks had developed and wireless telegraphy was also emerging. An extensive analog telecommunications network was in place by the 1950s, which incorporated wire-cable and microwave links together with crossbar switching technology, while the 1960s saw a change from analog to digital infrastructure technology. Since that time the world has experienced an explosion in telecommunications infrastructure, largely due to the increased traffic and bandwidth requirements of the internet. Fibre-optic systems and ISDN (Integrated Services Digital Network), communication satellites, cable modems and high speed phone connections are leading the way towards a world-wide, broadband digital service (Mitchell 1995). The aging infrastructure first developed in the early 19th century forms the basis of today's new highway requirements, the impacts of which will be discussed in Chapter Four.

## 2.5 Technology and the North American City

In light of the ability to examine cities in a series of technological "surges", as discussed above, technological impacts on the North American City can be generally classified into four separate stages of technological change. The now defunct American Office of Technology Assessment (OTA 1995) offered a series of classifications which was

intended to address the development of American cities, but serves equally well in the Canadian context, as well as general technological impacts on cities.

The Artisan and Craft City (1820-1870) presented the slow beginnings of industrial age change. The predominantly rural society possessed a few large trade centres, mostly port cities, and were also walking cities, as the overall size of the city was restricted by limited transportation. The industrial and retail organization was largely small “home occupations”, decentralized from a central manufacturing facility, and there was little distinction between home and work. It is interesting to note that many of today’s telecommunications advances have allowed us to return to this model of live/work arrangements, despite a decentralized city and ability to commute far distances to work.

Manufacturing and industrial power was the key force behind the early industrial city (1870-1920), as the rural economy was transformed into centralized factories or commercial agricultural operations. Canals and railroads were a key transportation technology that had the impact of creating new centres based on transportation nodes, and allowed the existing centres to become more dispersed. New manufacturing processes and resource demands also created new town locations to optimize industrial proximity to raw materials and market bases. At this stage we also see the impact of the early communication technologies of the telegraph and the telephone, which assisted in the dispersal of human settlements. Building technology and sewer systems allowed higher urban densities to occur and early stages of suburbanization. The technology of the industrial revolution was shaping the city from its rural and mercantile roots into the classic core-oriented industrial city.

The mass-production metropolis (1920-1970) was affected by major changes in transportation technologies (aircraft and automobile) and infrastructure (electricity and water systems). Existing cities were pulled further out of the core areas into the suburbs by the automobile, and were connected more thoroughly by highways. Infrastructure

allowed greater mobility of industries and businesses, and moved them to cheaper non-core locations, and building technologies allowed the construction of the modern-day skyscrapers. The classic industrial core city was definitely transformed during the later part of this time period, as industries gradually moved into more inexpensive suburban, rural or even off-shore locations. The impact on the classic industrial city was significant, as large tracts of former industrial lands were left vacant and industrial factories abandoned, contributing to the deterioration of the city core. Lands and buildings previously used as industrial, or “brownfield” sites, were often difficult to redevelop because of both environmental contamination and restrictive planning regulations which retained these areas as solely industrial. It is only the last decade which planning has focussed more attention on the economic renewal and redevelopment of these areas.

The slow transformation from the industrial era into the post-industrial, or information age, leaves us struggling with a new series of technological changes that has, and will continue to affect the growth patterns of the city. We have seen in these past stages how critical technology has been in the growth and form of the city, ranging from transportation to industrial technology innovations. However, it will be information technologies which will play the most significant role in the information age; it will have similar effects on the city as previous stages, except that fibre optics will replace the railroads, the networked organizations will determine location instead of market access and raw materials, and quality of life will dictate residential location instead of proximity to work. The industrial core of the inner city will be replaced with uses appropriate to the information age, such as live/work studio units, or entertainment uses. It is this spatial reconstructing of cities caused by technological innovations that is of interest to this thesis, and upon which the individual sectors are analyzed further in chapters five to seven.

## 3.0 Demographics and Trends

### 3.1 A New Era?

Why does it matter? Why should we care about this new kind of architectural and urban design issue? It matters because the emerging civic structure and spatial arrangements of the digital era will profoundly affect our access to economic opportunities and public services, the character and content of public discourse, the forms of cultural activity, the enactment of power, and the experiences that force shape and texture to our daily routines. (Mitchell 1995: 5).

William Mitchell asks a question here which is important to consider before proceeding: is the information revolution something that is realistically significant, or is it the product of optimistic pro-technology advocates? To answer this a review of some the statistics and trends concerning global and national demographics, computer usage and internet is necessary. It is simply startling to examine the growth of computer and information technology and to view the changes in the computer industry and public usage of the computer and information technology. These trends provide some statistical evidence that change is occurring quickly in our society and economy, of the growth in technological acceptance by individuals and businesses, and a representation of the pace at which that change is occurring.

### 3.2 Internet and Computer Trends

The information age has seen a greater change in the acceptance of computers by individuals, which is critical to sustaining such a revolution. Prior to the introduction of the personal computer (largely credited to the Apple Macintosh in 1984), computers were associated only with computer experts and institutions. The opening of computers to the masses was a key part in the information age; for global communications to occur, price and usability of computing devices must have first decreased in line with the average

user.

Statistics Canada indicates that 1.5 million households in Canada, or about 13% were using the internet in 1997, which is up from 843,000 (7%) in 1996, representing a 6% change in one year of the amount of households having access from the home. Internet marketing firms also suggest that about 25% of Canadian adults are online, which includes those who access via the home and the workplace (Monitor 1998). These figures will become more significant in the future as information technology becomes increasingly dependent on the internet for its applications. For example, retail businesses will begin to offer more goods and services via the internet, requiring a greater internet market. 4.2 million people (36%) owned personal computers in the home in Canada in 1997, up from 3.6 million in 1996, and up from a mere 20% in 1992, as summarized in Table 2 (Statistics Canada 1998) Over a period of only five years, computer ownership has increased rapidly in Canada, which is again important because the computer will likely become the key technological device in the information age. Although these figures suggest only the ownership of such information technology and not necessarily the degree of usage, they give a rough indication that Canadian individuals are becoming more accepting of key computer and information technology.

**Table 2: Technology ownership in Canada (in percentage of households)**

	<b>1992</b>	<b>1995</b>	<b>1996</b>	<b>1997</b>
<b>Home Computers</b>	20	28.8	31.6	36.0
<b>Modem</b>		12.1	15.5	21.5
<b>Internet</b>			7.4	13.0
<b>Telephones (3 or more)</b>	33.4	37.5	38.1	37.3
<b>Cellular Phones</b>			14.1	18.6
<b>Compact Disc Players</b>	27.1	47.4	53.4	58.1

As expected, the people who use the internet in North America are mostly from the ages 18-34, with slightly more males using it than females. Statistics generally point towards

a young, educated and affluent internet user group which is an especially important fact for marketers (Nua Internet Surveys 1998).

Although there are many companies predicting the amount of online users, it is a difficult undertaking as there is much conflict as to proper definitions and methodology.

However, even approximate numbers illustrate the enormous growth. As Figure 1 shows, Nua Internet surveys estimates that about 112.75 million people are online world-wide, with over 60% of these located in Canada and the United States. Although the majority of internet users are located in North America, other countries will increase dramatically as technology takes hold, increasing the global nature of the internet.

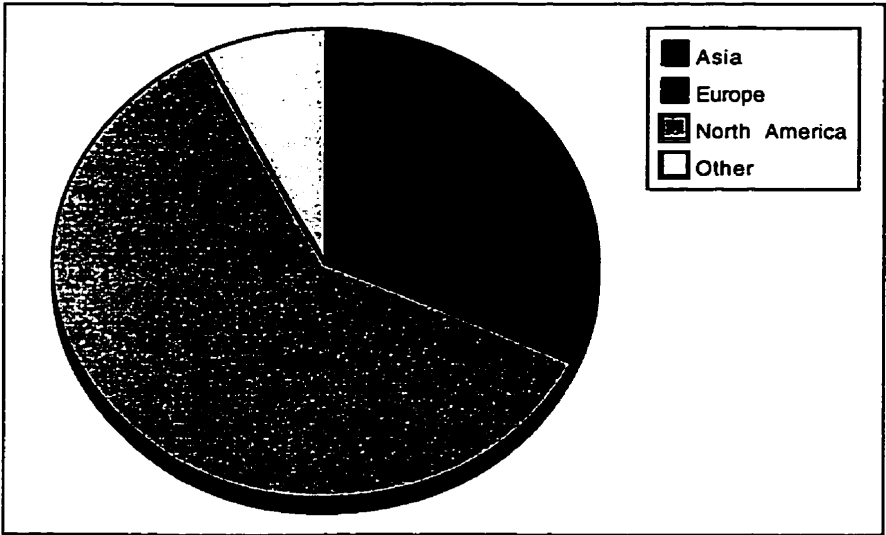


Figure 1: Number of people online by location (in number of people),  
Total: 115 million  
(Source: Nua Internet Surveys 1997)

The number of hosts accessing the internet, which can be considered as a rough equivalent of the number of total computers, has grown substantially as well, seen in figure 2. Predictions estimate that the amount of hosts will reach 100 million by January 2001, more than tripling the number existing today (Rutkowski 1997).

### Internet Domain Survey Host Count

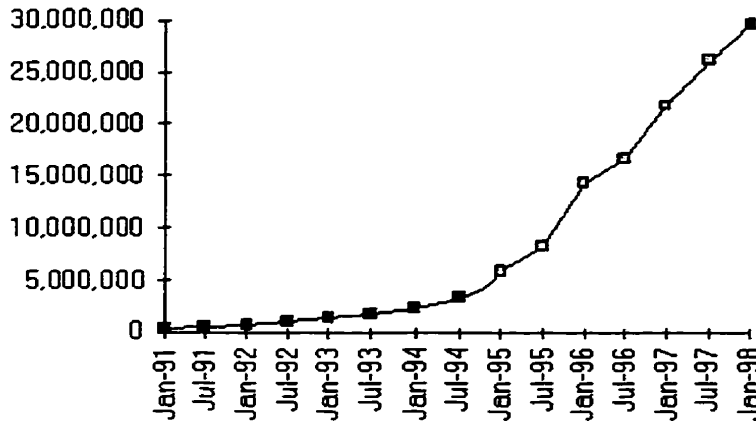


Figure 2: Internet Growth (in number of hosts)  
(Source: Rutkowski 1997)

Although there may be discrepancies in the numbers, they still point to a significant change in computer and internet usage and are an indicator that change is occurring in both our social and business lives. These numbers are especially significant when placed in the proper context: an individual has the ability to communicate with over 100 million people world-wide at any time during the day; or a business has a potential market area of

the same amount when advertising on the internet. These numbers also reveal that even if the attitudes of adapting to the information age aren't changing, the technology is certainly becoming more common. Overall, however, the numbers are fairly straightforward; the number of people accepting the new technology by obtaining computers and internet access is climbing at an extremely high rate, indicating a era where quick changes and access to information and communications are standard. These international statistics, of course only illustrate one broad view of changes that are occurring, and do not illustrate the detailed changes that are occurring in the industries and the individuals. However, it does signal a global information technology trend that warrants further investigation of both the technology and the impact on the city.

## 4.0 Technology

### 4.1 Introduction

Chapter two outlined how technology has played a key role in the development of North American cities throughout history and this chapter will review some of the key technologies of the information age that will affect cities in the future, much the same as the automobile or telegraph technologies that have had an impact on industrial age cities. The advances and improvements in technology in the past several years are quite significant, let alone the changes that have proceeded over the past several decades. Authors of popular and academic literature also like to reflect on how technological changes have impacted on their working and personal lives over the last several decades.

To understand what is going to happen, you don't need a lot of fancy new-age management buzzwords and business gurus to guide you. You simply need to understand how computers have been used to this point in the business world and how they will be used in the future.

(Carroll 1997:179).

Jim Carroll intended this note to address those in the business world in adapting to change, but it serves equally well in the planning capacity. While it is not essential to understand the technical specifications of the telecommunications industry, nor the inner workings of the computer industry (which are daunting tasks beyond the scope of this thesis) it is important to have a basic understanding of these technologies and their general impacts. Later in this thesis the relative importance of, for example, transmission technologies and access speeds to the internet for retail marketing will become apparent.

In light of chapter two's approach, the technology that is described in this chapter focuses on technologies that address three main areas; those that decrease the importance of



location, those that allow for greater communication opportunities, and those that allow for improved worker productivity. It is these areas that are most important to planning impacts, as will be illustrated in the following chapters. While it is impossible to outline all the individual technologies, a broad overview of the major categories can provide sufficient background to understand urban planning implications. In addition to these descriptions of the technologies, a background of the internet and a review of current infrastructure requirements are provided.

## 4.2 Technology Descriptions

### 4.2.1 Processing

Advances in computer processing speeds are one of the key identifiers of computer advancement, perhaps because it is so closely linked with overall speed of computers. A general industry rule of thumb suggests that processor chips are manufactured for only about a year before they are considered obsolescent, and the processor doubling time, i.e. the time it takes for today's fastest processor to be outperformed by tomorrow's lowest end processor, is approximately 18 months (Monitor 1998). Speeds are critical in sustaining some of the advanced requirements of many communication methods, such as teleconferencing.

Processing speeds are not the only important matter but the size of the processing unit itself is also significant. The transformation from semiconductor to microprocessor technology contains the advantages of both portability and enhanced performance, which allows devices to become smaller and more mobile (Tapscott 1996). The essential point is with processor sizes decreasing, it increases the portability of computers, and thus the mobility of the person and the organization. The decreasing sizes of laptops and notebook computers, and the introduction of the pocket-sized, personal digital assistants (PDAs) are a testament to this phenomenon.

### 4.2.2 Storage

William Mitchell (1996) explains the main impact of improvements in storage technology; that of asynchronous communication. Communication has essentially been relying upon face-to-face communication until the invention of writing, but storage technology allows the storage of voice, video and text, through the use of electronic and voice mail for retrieval by the recipient at a later time. The effect of this is to allow the improved transfer of information amongst businesses and individuals, allowing for greater time efficiencies and worker productivity. As the improvements in storage capacities allow for a large amount of information to be stored digitally; large file storage areas of companies can now be stored on computer hard drives. Online manuals, video references, financial information and digital images can be stored in a company database for access by workers world-wide. Advanced storage capabilities will be necessary to accommodate greater requirements of multimedia communications, including video and teleconferencing, for the reduction of large storage areas, and for increased access to information.

### 4.2.3 Multimedia

Multimedia, the offering of many media at once (text, graphics, video, audio), is now become the industry standard for any advanced computer applications, as well as any computer hardware packages. The consensus, among industry observers “is that we are on the verge of a multimedia explosion” (Monitor 1998:14). It was the introduction of multimedia into the internet through the world wide web five years ago that caused the massive surge of both business and individual interest in getting connected. The addition of pictures to a previously text- based format, as well as the newer video, audio, and live-video have increased the informational content of the internet, due to the visual nature of humans. Software has also been vastly improved with multimedia. Computer encyclopaedias for example, not only allow a textual entry on John F. Kennedy, but

provide pictures, a video of his assassination, an audio of his speeches and links to related information.

The introduction of multimedia into daily computer usage has vastly improved the accessibility to and use of information.. As well, without multimedia applications, electronic commerce will likely not exist due to the desire of the consumer to have a visual shopping experience.

#### 4.2.4 Transmission

The internet continues to hold much promise for the future of inter connectivity and remote communications. However, with the increase in quantity of material, as well as the offering of internet video, audio and videoconferencing online, one of major problems with the internet today is its slow speed combined with congested highways. For example, videoconferencing via the internet to another person (one of the most intensive uses) generally requires a high-end internet connection; phone modems will either limit quality of video or negate its use altogether (Ottawa Computes 1998). Advanced communications may certainly be possible with this technology, but there is a practical barrier put forth by current transmission technology.

Personal telecommunications is largely conducted via a modem, which utilizes ordinary phone lines to connect using a personal computer. On a practical level, older and slower speed modems are simply too slow to permit usage of the world wide web, while even the fastest modems available, which have been on the market less than a year, still cause delays in advanced communications. Large organizations, such as universities and government have had access to ISDN connections (also referred to as a direct connection), which use phone lines at rates up to ten times the speed of regular modems. Understanding this need for greater transmission speeds, competitors have produced a variety of successors to the modem and ISDN; phone companies have introduced new

ASDL connections which offer speeds up to 1000 times the regular modem speeds and cable companies have entered the market with cable modems. However, both of these new technologies are cost-prohibitive for the average user, and it will likely be sometime before the limitations of accessibility are reduced enough to provide instant high speed access to the internet (Kapor 1996).

In short, advances in transmission technology are key to sustaining the trends. For example, while real-time videoconferencing (a method where both parties may speak and see one another using personal computers) may be able to sustain remote workplaces, without better transmission technologies these advances will not have much of a real impact.

#### 4.2.5 Convergence

Convergence has long been discussed within the realms of the computer industry, and as its name suggests, it refers to the combination of modern media into digital formats, and in most cases into one device. Currently the mass medium technologies are generally analog, a technology which is inferior and requires individual devices for its production, i.e. VCRs, radios and TVs all require individual devices to control their function. Convergence will have the effect of combining these individual devices into digital form, thus enabling them to be controlled through one device, likely the personal computer. Information is no longer restricted to one device and can be interchanged amongst various formats; computers have the capability of becoming audio outlets and VCR playback and record devices, phone and fax capabilities, videoconferencing and video cameras (TCP 1998). Despite the potential for smart phones and internet TV (which is now available to the mass market) computers have the promise of becoming the future central one-device for all information access. Of course, the perfect convergence is not yet a reality, but as internet TV, computer video conferencing and smart phones illustrate, it is definitely improving. Telecommunications technology has the impact of reducing

the spatial gap between humans, from advances of the telephone and telegraph to modern e-mailing and videoconferencing capabilities.

#### 4.2.6 Mobility

Mobility addresses a whole range of information technology components that essentially allow for greater portability and enable the user to become more mobile. The obvious technology has been the introduction of the cellular phone which, with relatively inexpensive prices and more portable and efficient units, has produced an abundance of these units. The increase in popularity has also increased its infrastructure requirements, which has also arguably contributed to the visual deterioration of cities, especially cellular towers. There has been much focus on cellular phone infrastructure in planning literature. Generally, as cellular phones become more prevalent, they require more and larger cellular towers to improve quality, and various planning articles have discussed means with which to accommodate them while minimizing their negative impacts, especially their visual quality (Covington 1996; Gregory 1997; Roebuck 1992).

Cellular phones are certainly not the only mobile technology to have an impact; mobile computing has been greatly aided by the use of notebook computers. The size of mobile computing units is also gradually decreasing; the introduction of the personal digital assistants allow e-mailing, word-processing, fax capabilities, and scheduling from the convenience of a pocket-sized unit. Advanced units are proposed to allow cellular phone and page capabilities out of a flip-up wristwatch in the near future.

The net effect of these units is to diminish the importance of location as a worker is able to be as effective in the field as in an office environment and is also able to communicate effectively from any location, increasing the attractiveness of telecommuting alternatives.

### 4.3 Physical and Virtual Infrastructure

Today we are witnessing the early, turbulent days of a revolution as significant as any other in human history. A new Medium of human communications is emerging, one that may prove to surpass all previous revolutions - the printing press, the telephone, the television, the computer - in its impact on our economic and social life (Tapscott 1996).

In addition to the broader, enabling technologies discussed above, evolution of the physical infrastructure is valuable to understand, for it is this infrastructure that serves as the backbone, or perhaps more appropriately, the central nervous system of the information age.

An interesting reference point for telecommunications infrastructure that may be better understood by planners is the relationship of information technology to physical transportation infrastructure and economic development. The foundation of cities was often linked to the access to trade routes, generally located near major roads and rivers, while during the industrial era, lack of a railroad stop condemned many towns to a lingering death. Thirty years ago, interstate interchanges helped many communities to prosper, while those on the back roads stagnated (Fidelman 1994). Fibre-optic and other information technology infrastructures are now the railways and highways of the future, coining the popular term information superhighway. Fibre-optic is simply glass wiring that transmits light, but the advantage of this medium over older copper wiring is that it provides digital signals at very high speeds and possesses nearly limitless capacity (Saucedo 1997). Fibre optic infrastructure, the technology which enables high-speed transmission rates, will be critical in determining the potential for telecommuting to occur, or for economic development, for example. Municipalities will find themselves anxious to develop this infrastructure, and as discussed in Chapter Eight, developers are already investing in this infrastructure in their communities to increase market demand. Corporations which require intensive database management or constant communications through videoconferencing will be particularly attracted to areas with high-speed links.

However, government must also realize that a high-tech infrastructure is not only the only factor sufficient to attract growth, as education, transportation links, local labour market and cost of business will still be significant in business development. Unlike road infrastructure however, government is not responsible for the development of this new infrastructure but instead the private sector. The public sector can play a significant role in encouraging through policy or financing, the development of the infrastructure to create economic advantages. San Antonio, Texas is a city which has placed much emphasis on an advanced telecommunications infrastructure. San Antonio (through Bell Telephone) began placing a fibre-optic network in the early eighties to service its many telecommunications industries and military establishments, resulting in an infrastructure which permits high speeds transmission rates to occur. However, the city also recognized that telecommunications infrastructure wasn't sufficient alone to spur economic development, and assessed the strengths of the area, identifying such assets as quality of life and a bilingual and highly educated work force. The city marketed the area as a "telecity" in the 1980's in order to attract relocating and expanding businesses, with the results being the attraction of various high-tech firms requiring a high-speed network to support teleconferencing or information industries (Saucedo 1995). San Antonio is a prime example the dangers of promoting a telecommunications infrastructure exclusively: businesses rely upon various factors beyond telecommunications to develop in a community, such as quality of life, labour pool, education and transportation connections.

Although much emphasis is placed upon a fibre-optic network, there are other technologies which may become more prominent in the future. Cable modems, discussed above, require an advanced cable network (the same network that supplies cable television) instead of a fibre-optic network. Satellite dishes, today used mainly for television, are being slowly altered for telecommunications use and obviously don't require any in-ground wiring network. Thus, a battle is ensuing as each major player,

primarily the telephone and cable monopolies, are struggling to develop the cheapest and most effective network for future telecommunications with each also realizing that the survival of their business may depend upon it. For example, watching television may become easier and cheaper through the internet; likewise internet phone capability could eliminate the need for long-distance companies. It remains to be seen who will become the dominant technology but awareness is certainly important for infrastructure requirements. In any event, communications infrastructure is likely to become a key factor in the evolution of communities, and a major factor for economic development. This new revolution could well dwarf the earlier communications begotten by the telegraph, telephone, radio and television (Morino Institute 1994).

#### 4.4 Evolution of the Internet

As so much of the information age is dependent upon the internet it is important to give an introduction to the term which forms the backbone of today's and future telecommunications possibilities. The term internet is a rather loose term that generally refers the collection of computers and networks that form an world-wide, integrated network. Its common use generally refers to any application or use that require one to go online using this established network, such as the common uses of e-mail and the World Wide Web.

The internet had its humble beginnings as ARPANET, a project funded by ARPA, the Advanced Research Projects Agency of the US Federal government. It was intended for use by the military and computer scientists as a method of maintaining a nation-wide communication system in the event of nuclear war. Its main feature was that it possessed a heavily redundant network that could withstand destruction of large sections or nodes so that the system could automatically re-route and messages then get to the destination (Hart *et al* 1992). Fortunately, it was never put into this kind of practice but did capture the attention of educational institutions and major corporations as an effective means of extending communication and research possibilities. This was followed closely by the



main backbone system which connected regional networks, not unlike a highway linking local road networks, and it was about this time when the term “internet” was commonly used by the public (Mitchell 1995).

The growth of the internet also coincided with the introduction of the personal computer, and individuals were able to access a technology that was largely held by educational, corporate and government institutions. However, it was not until the late 1980s and early 1990s that the internet experienced a tremendous growth in popularity and usage, as it was not until this time that it incorporated graphical user interfaces (GUIs) to such a large degree, first with the program MOSAIC and now the ubiquitous World Wide Web.

As a result of this evolution the world is left with a global network where every bit of memory is able to be electronically linked to another. Its beginnings as a defence network have created a system of networks that has no central control or organization, and is resilient and virtually impossible to destroy. The durable internet is likely to remain the backbone of communications and the focus of the information age, and as many of the land use impacts discussed later in this thesis are dependent on the internet, it is a key component in considering the impacts of information technology upon planning.

## 4.5 Information Utopias

There are many who agree with Toffler’s view that every level of human society is experiencing change from information technology. Indeed, it is increasingly difficult to argue that major changes are occurring in all aspects of our lives. However, while it may be naive to believe that this new revolution will have no impact on society, it is likewise important to avoid unnecessarily high expectations of the solutions of technology in solving the world’s problems; it will undoubtedly assist society in solving problems but invariably will cause many as well. History is filled with examples of technological innovations that trigger excessive, unrealistic utopian expectations: Thomas Edison believed that the electrification of the home would eliminate the distinction between night

and day, elimination of sleep requirements and grant the ability to communicate with the dead (Marx 1996). Although electricity did achieve much for society and the economy, it certainly did not live up to its grandiose expectations. The 1960s were also a time when it was thought that artificial intelligence, virtual reality and advanced robots would virtually eliminate the need for humans to conduct work and free up large amounts of leisure time: we know today that these technologies have still not been achieved to their optimum extent (Carroll 1997). These samples carry us into the information age, where the predictions of information utopias, overly high expectations of our technological future, are commonplace.

Technology is not the only barrier to these high expectations, but social and economic considerations factor into the formula as well. Telecommuting, for example, may be technologically possible as improvements in computing and communications allow, but socially many workers are not willing to stray from the traditional nine-to-five schedule, or are simply unable to work from the home. The business world is still highly restricted by the human need for face-to-face communications, which advanced information technologies may never be able to replicate. Technological advances are certainly limited by the gap in which society must slowly close by adapting to change.

## 4.6 Technology and Planning

Why then is it important to discuss these technologies and how are they important to planning and this thesis? Firstly they provide a technological baseline for understanding some of the trends discussed further in this thesis. Secondly, they fulfil one of desires of this work; that of providing technological information for planners to become more familiar with the technology spurring the changes in the information age.

However, the main reason these technologies are illustrated is because combined, they are what could be called enabling technologies; they enable advances in many spheres to take place, such as extensive communication improvement among businesses, enable people

to work from remote locations, and allow for online retailing. The technologies thus allow for trends to occur that will inevitably have an impact on the cities, and thus it is important for the planner to understand their repercussions. Possessing an understanding of the technology allows the planner to predict some of the capabilities of the technology, which leads to a prediction of socioeconomic change, which further results in the impact on the city and its planning.

Much emphasis seems to be placed upon the computer's role in information technology but as Jim Carroll states it "the computer is the foundry of the information age, an invention that is responsible for fuelling a world-wide explosion of information" (1997: 176). General indicators in the computer industry suggest that the computer will become the central focus for the information age, as it is the device which can handle the future forms of digital technology.

It is also important to note that these varying technologies must be examined as a whole to determine the ultimate impact, as they are complementary. For example, multimedia trends could not occur without improved storage capacities and processing speeds and videoconferencing is difficult without high-end processing, storage, transmission and multimedia. Once the individual parts are harmonized and the capabilities and synchronised, then the industry will likely see the true powers of some of the advanced information technology trends.

Technology, particularly information technology, has the capabilities of providing great possibilities for providing a positive impact on our society, such as telemedicine initiatives in rural communities. However, if misunderstood and not prepared for, technology also has the capability to cause change to occur that has negative side effects, such as the decline in traditional commercial districts. A certain understanding of these changes is important to remain aware of the issues and the impacts.

## 5.0 Office

### 5.1 Introduction

Cyberspace strikes at the heart of commercial real estate by radically diminishing the value of location. The integration of computer hardware, software, and telecommunications represents a negative miracle for office building and shopping centers. (Borsuk 1996)

It has been demonstrated that the economy is undergoing a major transition from one which has been dominated by production in the industrial revolution, to a structure based on the creation and manipulation of knowledge, producing the information age. Indeed, the North American economy has long been undergoing a change away from the primary and secondary industries into a tertiary industry, which is essentially a transformation from manufacturing and resource-based industries to value-added service industries. As Mark Borsuk (1996) suggests, the impact of information technology on commercial real estate is a natural consequence of this transition. Chapter Two described the means by which technology has altered the city, while Chapter Four demonstrated some of the major technologies that will be at the heart of the information age. This Chapter will bring together these broad technological impacts and specific technologies in order to analyze some of the trends and predict the impact on information-based service industries. The main thrust of this impact is both a decreasing commercial demand for office space as well as a freedom in locational constraints for information industries. This comes as a result of the increasing ability of worker to conduct their daily affairs from a remote location, the improved efficiencies in organizations, and decreasing locational pulls of organizations to traditional offices. "Information-based" industries generally refer to those organizations which primarily rely upon information as the medium or product, such as the financial occupations or professional services, rather than those which rely upon offering a specific tangible product.

## 5.2 Office Trends

### 5.2.1 Information Technology and Communications

It is readily apparent that the business world, especially those in the information industries, must rely upon an excellent communication network, for it is this network that provides the information that is critical to their success. Employees must be in constant contact with their colleagues, with their associated firms and businesses, and with their clients. This has traditionally resulted in corporations locating in central business districts to be close to their contacts, as well as being located in one central office to ease communication in-house. However, the worker has experienced major changes in daily business communications, largely enabled through technological advances. Synchronous communications technologies, i.e. those that allow communication to simultaneously, have been present for some time in the business world in the form of phone, cellular phones and fax machines (Mitchell 1996), but recent innovations in videoconferencing and video mail have also allowed live conferences and virtual meetings to occur, which were previously restricted to face-to-face requirements. Asynchronous communications, those that don't require simultaneous behaviour, include voice mail and electronic mail, also provide the user with access to information on a 24 hour basis.

Technological innovations allow for collaborative work efforts to proceed without requiring all parties to be present on-site. Readily available software packages such as Microsoft Office and Lotus Notes allow workers to access similar databases and work on documents and projects simultaneously through a network. A typical collaboration amongst various users can allow workers to access and review a document simultaneously, communicate through text, voice or videoconferencing, illustrate ideas on a virtual whiteboard, and rapidly exchange files and information. For example, Dupont has developed an information network which allows outside firms to access a common database for research notes, filings and research documents, while Xerox has created

collaboratories that permit real-time interaction amongst its research divisions in the U.S., Britain and South America, to harness expertise for international projects (OTA 1995).

The computerization of communication has allowed the worker to access more and better quality information, which increases overall decision-making and time management. These issues allow the worker to become more mobile, increase information access and decrease ties to the central office, all of which may have impacts on the traditional office district.

### 5.2.2 Digitization of Information

The technological improvements in storage and transmission abilities discussed in Chapter Three have allowed companies to transfer a large portion of their files from paper to digital form, the result being a move towards the “paperless” office. Scanning technology has played a key role in converting existing files and documents to digital formats, while new file and database management technology allows firms to issue forms, permits, letters, applications and other forms of standardized documents in a digital form. Thus, in many areas lawyers can file court documents electronically, an accountant can access financial records without going through paper files, and insurance companies can process applications and claims through the computer, allowing global access to these records.

The impact of this digitization is significant for the information industries. Firstly, it reduces the amount of storage space that is required to hold the large amounts of paper records, and eliminates much of the overhead devoted towards the proper management of these files. This may reduce not only the storage requirements for the immediate office area, but the services of off-site file storage companies. Secondly, digitization of files allows for remote access, either internally or externally. Auditors can review financial records of large corporations online, facilitating work from remote location or home

office, for example. Insurance companies can file records on a computer network, providing consumer access by any of their employees across the world and freeing the requirement for an individual to work close to the records. Thirdly, digitization of records greatly increases the overall quality of the information, and provides many more options for its effective use. An auditing firm can allow its employees to conduct work in a remote location, forward the report to the manager, who can then make direct modifications and submit the final document to those who require it, without any paper being transacted. Financial institutions or insurance companies can use effective database management to search all the digital records, and provide instant information about any client, a process which would be time-consuming using a paper filing system. Law firms can also begin to access court documents digitally, which accelerates legal research, traditionally a very time-consuming activity (OTA 1995). Digitization of information greatly improves the overall quality of the information, and decreases the locational dependence of workers.

### 5.2.3 Improved Worker Productivity

The overall growth and improvement of access to information has the net effect of improving worker productivity and decision-making. Information Technology has generally allowed workers to access instant, accurate and global information. For example, lawyers can access searchable computer databases to research, rather than the traditional methods of consulting extensive law libraries. In 1986 7% of American attorneys had a computer on their desk, while 76% possessed one in 1993 (OTA 1995). Insurance companies and financial institutions can have instant access to customer records regardless of their location, which enables instant information to be conveyed and transactions to occur. Technology can generally replicate and automate routine “nonthinking” tasks, but is less effective at creative tasks requiring human input. However, even specialized tasks can benefit by shifting the routine tasks over to automation, allowing better appropriation of human labour. In the telecommunications

industry this becomes prominent in the administrative of a system: computer technology can monitor fibre-optic transmission lines and issue warnings while automatically re-routing around trouble spots (OTA 1995). Information technology also allows for office workers to “do more with less”, and the amount of office space that each worker now requires is significantly less: while personal workstations were previously allotted 100 square feet of space, this figure has dropped to only 50 square feet in some CBD offices (Davis 1995). Many corporations, realizing the value of this space, are downsizing this space, resulting in less office demand particularly for downtown areas.

The growth of internet and world-wide communications has also allowed organizations to improve access to specialists and experts. As Sprint CEO William Esrey suggests “telecommunications allows businesses to access the best minds for a particular problem - whether its the preeminent lawyer, financier, scientist - wherever they are in the world” (Esrey 1992: 1). He illustrates this statement by using the example of a knee surgeon based in Colorado, who previously would mail out MRI scans of patients to a California hospital but can now transmit them electronically, vastly improving speed and efficiency. As this was written in 1992, presumably the surgeon may be able to communicate via live videoconferencing to get instant advice on these scans as well.

Improved worker productivity through information technology has several spin-off effects which can indirectly affect planning, such as the reduced labour force required for tasks, the decreased office space (and subsequent decrease in demand for office space) required for each worker, and the increased mobility provided for each worker.

#### 5.2.4 Computerization of Interaction

Information technology is not only affecting the way in which information industries interact and communicate, but the way in which they offer their services. The information industry has introduced methods which facilitate customer service as well as



enable time and cost- savings to the organization. Financial institutions are prime examples of this phenomena. Retail banking has traditionally been considered as a local economic necessity, and the architectural association of the small- town bank was manifested in the classic brick and mortar, solid institution (OTA 1995). The automatic teller machine was the first of these technologies to change retail banking, through an automation of standard services. Internet banking and telephone banking were the next steps in this process, which allowed users to pay bills, access account information and conduct money transfers through an automated process. Talking to a financial customer service agent over the phone generally results in a transfer to a remote call centre, such as Canada Trust, which processes its calls out of New Brunswick. Today, there is little need for face-to-face communication with bank tellers. In addition to these basic services, mortgages and loans have been centralized away from the local branches , as have commercial lending offices. The results are significant for the financial industry. The Bank of America, for example, had closed 130 branches, drastically reduced the number of branches which could process consumer loans, consolidated its commercial lending to 46 offices, and in the process eliminated 9,000 retail jobs (OTA 1995). The experiences from Canadian financial institutions are similar. The main impacts of computerizing interaction is to reduce, decentralize and automate services, which in most cases improves customer service and reduces organization costs

### 5.2.5 Organization change and Office Demand

Don Tapscott (1996) suggests that the information technology is placing a powerful force on human interaction within organizations. Each phase of the economic progress possessed its own organizational and political dimension: the agricultural age was largely dominated by hierarchy and feudalism, bureaucracy and democracy in the industrial age, and networked organization and universal human rights in the information age. The information age suggests a networked organization capable of human networks, teams, serendipitous communications, ad hoc collaboration and brainstorming. This also leads

to the flattening of the organization as rapid and accurate information exchange eliminates the need for middle management.

For instance take Sprint's CEO William Esrey's opinion on how information technology has forced organizational shifts in Sprint; he claims that the pre-information organization relied on passing information down along the hierarchy, from president to the managers down to the expert, who subsequently answers the inquiry and forces it up again in the hierarchy, a process that may take weeks. Today, he claims, he's able to communicate via e-mail with the author of a report and receive an answer back in a relatively quick time period. "It has really broken down the paper- passing bureaucracy which is the plague of any big company" (Esrey 1997: 2)

Of course, the unfortunate impact of this organizational shift is often to eliminate the need for the individuals who previously acted as a liaison between upper-level management and the office workers. The reduction in the chain of command provides "efficiency" improvements and has enabled downsizing to occur. The vertically organized company of the industrial age has transformed itself into a flattened structure which is horizontally integrated. The net effect is relatively straightforward, to decrease the amount of workers required, and thus decrease demand for office space.

### 5.2.6 Telecommuting

At about the same time, I discovered - as did many others - that I no longer had to go to work. Not that I suddenly became idle it's just that the work now came to me (Mitchell 1995: 3).

Telecommuting is perhaps the most critical element that serves to affect the demands of office space and the work and home relationship and as such has seen much attention paid to it in academic and popular literature. This is generally where planners start when discussing the impacts of information technology on the city, yet despite this research it

stills remains a largely misunderstood and unrecognized for its potential impacts on future land use patterns and planning.

One of the difficulties with studying telecommuting is the lack of agreement as to what constitutes telecommuting. There have been many definitions proposed by individual authors with each often creating individualized meaning for a specific report or discussion. Telecommuting in this thesis will focus on a definition which involves an employee who works off-site from a central office or location and who uses communication technology to substitute for a regular vehicle commute. Thus telecommuting would not include those who are self-employed, or a worker who takes work home at night, but is intended to include those who are purposely and regularly conducting this type of work.

In light of the recent attention being paid to telecommuting in both the popular press and academic literature, it is important to recognize if telecommuting is a significant factor affecting Canadian society. Recent literature studying the prevalence of Canadian telecommuting would seem to indicate an high level of work occurring from the home, and also indicates that these trends are increasing. A recent Gallop Poll quoted in Gurstein (1995) indicated that 2.17 million Canadians work at home some of the time. The 1991 Canadian census estimates that 1.1 million people use the home as their usual place of work, although about one-quarter of these are farmers, and would include home businesses but exclude part-time telecommuters. A 1991 survey of work arrangement found that 600,000 people work from the home, but these are only full-time workers (Gurstein 1995). Although these studies report varying levels of telecommuting (generally due to differing definitions), these general figures suggest that telecommuting is a significant form of working relationship in Canada, and one that many Canadians will become more familiar with in the future, as corporate downsizing, information technology innovations, and social values gradually modify. However, while observers have noticed the increasing trends for telecommuting, residential design and land use

planning have not recognized the full impacts of a telecommuting workforce.

One of most recent and informative surveys has been conducted by KPMG management group in 1997, who surveyed over 300 companies to gather information relating to the use telecommuting within organizations. The respondents indicated that on average telecommuters account for 6% of the workforce, and the majority of respondents suggested that the practice has increased since 1993 and is projected to increase in the future. The survey indicated that telecommuting is dominated by workers who are employed in the information systems, sales, marketing, administration and finance and perform jobs in the professional, technical and middle management capacities. "On the other hand, many manual or trade workers will still need to be close to factories and manufacturing facilities. In many cases, their location decision will still be based on affordability and proximity to work" (Flehr and Cooper 1995: 2). One of the more significant findings of the KPMG study was that telecommuting was most often not initiated for business reasons but for employee-related factors. Although companies often benefit from reduced real-estate costs and minimized office spaces, they generally initiated programs to allow greater flexibility for employees. One of the advantages quoted by both employees and organizations was that telecommuting often increases effectiveness in time management, but employee benefits are not the only rationale for initiating these programs. The state of California, is well known for its severe traffic and air pollution problems, and has enacted legislation to combat these problems. The state thus promotes any initiatives or programs which reduce traffic and air pollution, and corporate telecommuting initiatives are encouraged through legislation primarily for environmental solutions to air quality problems.

One of the key drawbacks to telecommuting is the lack of face-to-face communication, and the majority of teleworkers are still required to come into the office on demand or on a weekly schedule for meetings. As a result, communications is one of the most important factors in managing telecommuters in order for the both the manager and the

worker to remain connected and aware of issues. This is significant because this either restricts the distance that a teleworker can locate away from the central facility or requires both the teleworker and the central office to ensure a communications infrastructure that is sufficient to replace this need for face-to-face communication (teleconferencing for example). Other than this issue, employers generally indicated no other management problems, and were pleased overall with the arrangements.

The success of individual telecommuting initiatives has led to broader organizational policies adapting telecommuting programs, and such organizations as Bell, IBM and the Canadian Federal Government have instituted varying degrees of telecommuting. 14% of the respondents in KPMG's survey indicated that were actively promoting telecommuting, while 20% of those have embarked on formal pilot programs. Telecommuting is slowly becoming accepted in the business world as a management technique which increases worker and organizational flexibility.

Telecommuting from the home is not the only option available for teleworkers, as a variety of housing and office options represent variants of this standard form. Of course, many sales staff have already been telecommuting for some time, using mobile offices with the help of cellular phones, laptops and other mobility devices, to locate near their various market areas. Hotelling, the offering of office space on a reservation basis (often in hotels) and telecentres, common office areas located away from the central office are other options for telecommuting. The information age may see a variety of telecommuting initiatives, as companies and individuals strive to achieve the optimum balance of work and home.

A typical example of a telecentre is located in Jefferson County, Virginia within commuting distance of Washington, and is advertised at [www.jctc.org](http://www.jctc.org). It is located in a historic 1920's garment factory which has been extensively renovated and an advanced telecommunications network established. They offer small workstations to rent, which

are the equivalent of a standard office, and include computers with up-to-date software, a network with high-speed internet access, phone lines and voicemail, cafeteria, a videoconferencing room, and a common fax machine, copier and shredder. A typical price is quoted at \$160am. per month for 40 hours (roughly 1 day per week), which is often covered by the employer. The benefits of this proposal is that it balances the flexibility and comfort of a smaller office with reduced commute times, while maintaining some of the organization and facilities of a traditional office. In the case of Jefferson County, where it is estimated that 5,000 people commute to Washington, which is a three to four hour daily commute that can be avoided at least some of the week, and represents an enormous time savings for the employee.

Hotelling is a derivation of the basic telecommuting model, but generally capitalizes on the fact that many workers need to spend little of their actual time working in the central office. Hotelling involves the use of non-designated offices that are used by workers who are off-site on a regular basis. In effect it is similar to workers sharing an office, but doesn't involve "office-mate" conflicts as offices are reserved on a demand basis. This location of these hotelling units can be in the central office, but also can be accommodated in a client office's, or actual hotels which provide the layout and telecommunications to support these uses. The impacts on office space can be tremendous. The American locations of Ernst & Young implemented a hotelling ratio of 3-4 consultants per office, and reduced office space by 2 million square feet (25%), and realizing cost savings of \$25 million. Anderson Consulting, recognizing that their manager's offices were occupied only 25% of the day, was able to reduce one floor of their Chicago office space at a savings of \$1 million per year. In 1995 Consulting and Audit Canada (CAC) launched a hotelling strategy with the aims of reducing costs and enhancing worker productivity. In response a CAC hotel was created, with small generic offices, an informal "brainstorming" room, personal storage spaces and an automated reservation system. As well, major hotel chains are beginning to market towards these demands and promoting office suites which integrate standard hotel rooms with office

areas and telecommunications facilities. Similar to telecommuting hotelling provides organizations with flexibility and will likely become more common in the information age industry.

Telecommuting does open an entire range of options, opportunities and problems for planning. It immediately challenges the work-home relationship that has traditionally been purposely separated by the planner into distinct districts. Standard approaches in planning often rely on placing residential areas in the suburbs, encouraging a centralized downtown office district, and developing a transportation infrastructure which effectively handles the traffic between the two nodes. This base assumption of modern planning may have to be modified to information age worker styles, whose commute to work may involve travelling down a set of stairs, or closing the door to their home office. The formula for developing a transportation infrastructure and planning for effective land use patterns, may not be as straightforward as traditional planning, and adaptable planning solutions are required to handle this specific cases.

Telecommuting is often discussed in the realms of transportation or environmental planning as it offers solutions for reducing traffic congestion and air pollution. In California for example, heavy emphasis is being placed on alternative transportation solutions to solve both of these problems. The impact of telecommuting on transportation infrastructure appears to be relatively straightforward on first analysis: a reduced number of home- to-office commutes results in overall trip reduction, which leads to declining traffic congestion. However, empirical evidence does not clearly indicate such a situation, and in some cases the number of trips actually increases. The relationship between travel demand and telecommuting is suggested as a complex one, but also a significant issue as it is associated with reduced energy consumption and environmental damage. An analysis of eight telecommuting case studies conducted by Mokhartarian, Handy and Salomon (1995), suggests that while commuting trips may decrease as telecommuters work from home, total travel may actually increase as

telecommuters make more non-commute trips, or that commuting travel will continue but occur at off-peak times. Furthermore, as telecommuting is generally still in its infancy, these case studies are often based on the “early adopters” and thus are not necessarily representative of future telecommuting possibilities. Clearly the relationship between telecommuting is actually not straightforward, and much of current research revolves around determining the impacts of transportation, environment and land use more accurately (e.g. Mokhartarian 1991, Handy and Mokhtarian 1995, and Mokhtarian 1995).

Although it was indicated that businesses often make telecommuting decisions for enhanced employee benefits, the organization experiences indirect benefits and challenges as well. The main thrust of these advantages is through reduced real estate costs through relocation away from high value areas or from decreased worker space requirements. The office itself is also likely to experience a redevelopment to accommodate to these changes. Already there is a rising demand for office buildings to be designed for specific clients and uses, often with a high- tech infrastructure (Colliers 1997). As well, there is growing demand for communities which incorporate a high- tech infrastructure and optional space for home offices, such as Cornell in Markham, Ontario (Warson 1995), or on the function and organization of office buildings themselves (Ferrara Contreras 1994). The implications for planning are serious, as if telecommuting experiences widespread popularity, the impact on both office space and residential neighbourhoods could be significant, ideas which are further discussed in Chapter Eight.

One essential note to consider is that telecommuting usually doesn't end the need for face-to-face communication, and thus requires the workers to maintain regular meetings and appointments, as well as attend conferences. Although workers have to ability to replicate this type of communication through advanced communication technologies such as teleconferencing and virtual meetings, there is still a human need to conduct face to face to communications. This is often suggested to ensure contact with the central office is maintained and the need for the manager to supervise employees, but also for certain



occupations to maintain contact with their clients, such as an accountant requiring access to their client's financial records. This effectively reduces the locational freedom granted to the worker and for example, forces many workers to maintain a closer residential location to work and hampers the move towards isolated rural locations. It also dispels much of popular literature's thoughts that telecommuting will completely decentralize all types of the workers and cause a mass urban to rural migration. These possibilities exist, but limited by the need for communication to occur in person..

The degree to which telecommuting will occur remains largely unknown, and much research is still required to find these solutions. Consequently, the resulting impact on planning, city location and city form remains speculative. The results thus far indicate the telecommuting does have great potential to alter some of the underlying assumptions of planning and is definitely one trend that planners should monitor in the future.

### 5.3 IBM's Flexiplace

An examination of IBM Canada's transformation from the industrial age into the information age is a good example of many of the office issues discussed in this chapter, including organizational shifts and the impacts of telecommuting. This transformation is documented online by McFaul (1995). For more than 50 years, IBM dominated the computer market, and was a name associated with international computing. However, the 1980's brought about a severe financial downturn as competitors such as Microsoft entered the market, and profits declined within this classic industrial organization. Pressure was placed upon IBM by its shareholders and customers to substantially change their way of doing business, and IBM Canada began the processes of an major organizational transformation and corporate re-engineering. Large-scale market analyses were undertaken and determined that clients were increasingly interested in a value-added industry, or high service component when purchasing products and services. IBM, like most computer or information-based industries, recognized this new way of business

and has since adopted the policy of “best value first time” and placed sales representatives in customer’s offices, for example. An internal examination of the corporate structure revealed that IBM’s two highest controllable expenses were people and real estate, and it is their approach to these two factors that is of interest to this thesis.

The central thrust behind this re-organization and attempts to reduce personnel and real estate costs was the implementation of the “flexiplace”, a working environment which provides flexibility in office locations (home, office, clients), office types and working times. Employees were able to work from a home environment by mutual consent between the manager and the employee, on a part or full-time basis. The necessary computer infrastructure required to operate from home, such as the computer, fax machine, furniture and filing cabinets, were provided by IBM, who also maintained ownership of these items. Sales staff were also encouraged to locate their offices directly with their clients, in order to minimize costs and place employees where they are most effective for a service-oriented climate. The traditional office was also modified, as office sizes were changed from six different sizes to only two, and office space requirements of each individual were also decreased. Workers who conducted the majority of their work off-site were assigned small “flexi-stations”, offices only about 4 m<sup>2</sup> in size which were also shared by multiple users.

The organizational structure of the corporation was also altered as staff managers were returned to the role of marketing representatives or other line functions to make them more operationally functional, eliminating many of the middle manager positions. Enablement and delegation allowed more employees to make key business decisions and reduce the layering of management from six levels to only three levels and the span of control went from 5-1 to 15-1, creating a more horizontal organization. Information technology provided individual workers with greater productivity enhancements, such as calendaring software for meetings, automated form systems and a complete use of digital documents in a paperless environment. This allowed IBM Canada to reduce the amount

of secretaries and administrative staff employed, as well as encouraging better communication between top-level managers and lower level workers.

The implementation of the home office component of the flexiplace strategy illustrated several points to IBM regarding the nature of the new living/working relationships. Workers were still creatures of habit as employees continued to keep regular hours, but the downtime that occurs during commuting was decreased. IBM also suggested that the home worker experienced increased productivity as a result of reduced time spent with social interaction in the traditional workplace, as well as increased morale from a sense of self-determination and achievement.

The results of the implementation of the flexiplace strategy are significant. IBM Canada cut its property holdings in half over two years, and its Ottawa office reduced its office space from three and half floors to only one floor of expensive downtown space. Personnel was reduced from 12,500 employees to 9,000, enabled through retirement incentives as well as standard downsizing through information technologies mentioned above. The financial and market indicators point towards substantial improvements: customer satisfaction went from 11.5% below the leading competitor to 2% above, morale went from 65% to 94%, and most importantly profitability has been greatly increased and allowed IBM to compete in a new competitive business world. Overall IBM Canada indicated that they saved \$35 million in costs as a result of these efforts. In examining only one corporation, most of the information technology issues discussed in the chapter have been illustrated, and the very survival of IBM today is representative of the cumulative impacts of these issues on the modern corporation and office building.

## 5.4 Nortel Brampton Centre

The Nortel (Northern Telecom) Brampton Centre is another example of the office

changes that are occurring as a result of information technology. Nortel is an international company widely recognized as one of the leaders in the telecommunications industry, and a business that is rapidly expanding throughout Canada and internationally. Nortel previously leased three downtown locations in Toronto, all of which commanded a high rent but lacked the necessary space for expansion. Their solution was to relocate and consolidate their operations away from Toronto into the Brampton area by renovating an existing surplus factory rather than building a new facility. The results were significant and representative of new innovative thinking required for the information office. The factory was renovated so that 3,000 workers could be placed into 600,000 sq ft of space, the equivalent of a 50 story building, an arrangement which provided limitless flexibility and large areas of space. Of course, the relocation was also anticipated at provided almost \$250 million in cost-savings over 10 years. However, the building also had to make up for amenities, views and daylight provided by conventional office space, as well as convince workers of the value of moving from a Class A office downtown location into a renovated factory. It is this unique approach that is most interesting.



Figure 3: Nortel Brampton Centre  
(Source: Stein 1997)

The architects chose to adapt a city planning metaphor, and broke this large amount of space into a series of streets and blocks (figure 6). The office possessed many of the characteristics typical of a city, including skylights, piazzas, streetfront retail shops, main street benches and retail nodes for fitness centres and coffee shops. Departments were identified by different materials, colours and signage, and could choose layouts ranging from the typical cubicle office spaces, or team-oriented work areas. Interestingly, Nortel even adopted a facility “zoning” code to accommodate the change required from a flexible type of layout. This example serves to illustrate the changing nature of business organization and demonstrate that planners need not also be looking for the traditional office tower models when examining cities and of the innovative thinking needed for information age planning.

## **5.5 The Future Office**

The effect of information technology on the organization is certainly going to cause an impact on land use planning, specifically those industries with a heavy reliance on information. There are essentially three main impacts that can be extrapolated from the above trends. Firstly, as greater mobility is afforded to key components of the information industry, decentralization has, and will continue to occur. Insurance companies and financial institutions, once the cornerstone of central business district office space, have retained only a token presence downtown with the bulk of their operations being conducted in suburban locations. The headquarters of Microsoft, one of the most powerful players in the computer industry, is located in Redmond, Washington, away from any large metropolitan area. Colliers International, in its 1997 market review, indicates that office market trends suggest that the majority of Canadian office growth is occurring in the suburban areas, with a definite lack of class A office space being built in the downtowns in Canada’s major cities. Furthermore, office space is becoming more “design to suit”; unique office buildings which are constructed for a specific client. This

occurs particularly in the high- tech industries, who desire suburban commercial/ industrial zones on which to place combined office/industrial centres for their facilities (Colliers 1997). In many cases the design to build solution is often the only efficient and economic means of achieving a corporation's real estate goals, particularly in the Canadian markets where there is a smaller availability of office space in the CBD (BOMA 1998). As information technology allows industries to function as effectively in non-central locations, information industries will move away from the historic downtown office space, and into cheaper office areas, often in a suburban location.

Secondly, combined with the decentralization of traditional office space, we are beginning to see a new form of office space arise in the form of home offices, and satellite and telecentres. Effects such as telecommuting and improved communications allow offices to change from the standard office towers to lower density and smaller-scale units from which to conduct work. This can range from workers conducting their operations from the home, to working from a local satellite or telecentres, essentially local mini- offices which can contain workers from several companies.. As home offices and telecentres are more applicable to residential and housing issues, they are explored more thoroughly in Chapter Seven and Chapter Eight.

Thirdly, the nature of the traditional office space is transforming as a result of the market demand created by information technology. Office buildings today need the flexibility to accommodate both technological innovations and new social and working habits required by corporations. For example, an office pilot project is being developed by Sandia National Laboratories in New Mexico, will create a building that provides movable walls to accommodate larger areas for team research, yet possess the ability to be adapted to cubicle partitions for individual work spaces as required. To accommodate technological innovations, the floor is raised to provide for fibre-optic cabling and air supply, as well as future wiring needs, which allows for many alternative office configurations. This is often referred to as increasing the building "intelligence" by making them more adaptable

to technological innovations (Murphy and Morison 1997). Commercial buildings are increasingly viewed as a corporate asset that helps businesses operate effectively, much the same as a computing system or human resources. The new alternative office will have important effects on the office market; corporations will be looking for new office space that provides them with flexibility and a high-tech infrastructure, and in many cases existing offices simply cannot be converted to accommodate these concerns, all to the detriment to the downtown.

As the telecommuting section suggested, the true impacts of telecommuting on office type and location are generally unknown at this time, and are generally insignificant in size today. This is a trend which will have a slower and longer-term impact than many have predicted; the transformation of traditional office to the live/work areas is likely to evolve gradually due to a slow social and economic acceptance. As well, information technology is only one component in a multi-faceted office market, and economic and market conditions play a heavy role in the development of office space. Office space, regardless of its downtown or suburban location, will definitely not be built if the market does not demand it and the developer cannot generate a profit. The surplus of office space and high vacancies rates in the late 1980's and early 90's is testament to that reality. Unfortunately, in analyzing the mix, location and types of office use in a city, it is often difficult to isolate the impact of information technology from current market and economic traditions.

Despite the ongoing innovations in communications technologies, many aspects of the business world still rely on face-to-face communications, which will require firms to concentrate in metropolitan areas. Professional services, such as architectural, law and engineering firms still need ready access to clients, including the common in-person delivery of their documents and services. The large American accounting firm of Ernst and Young still locates in metropolitan areas in order to visit clients and spend time

accessing financial records for auditing and tax work (OTA 1995). Law firms receive constant visitations from their clients, and are also closely linked to courthouses.

Although videoconferencing does much to affect this form of communication, the desire for human contact during communication will likely ensure that physical proximity of certain industries remains an important factor in business location.

Information technology has the impact of improving communications, interaction and the mobility of the organization and worker, all contributing towards decreased demand for traditional office space, increased decentralization (to the suburbs or rural locations), and the transformation of office space into smaller units. Many business institutions are re-evaluating traditional office space within the context of their overall goals and objectives. Market trends (Colliers 1997) and many real estate analysts, such as Mark Borsuk (1995), indicate that the traditional office district, particularly those in the downtown areas, will continue to decline in favour of telecommuting, satellite offices and specialized suburban office locations. However, this transformation of office space will not occur overnight and will likely be a slower evolution as the market gradually adjusts and it becomes more socially acceptable to conduct work from alternative locations. The repercussions of this decline in office space on the downtown and residential areas will be discussed further in Chapter Eight.



## 6.0 Retail

### 6.1 Web-Based Shopping

“We are at the crossroads in the way that the world of business uses computer technology”. (Carroll 1997)

As the brief statistical overview in chapter three revealed, the number of users on the internet is about 110 million, with about 1 million joining everyday. It is little surprise that commercial interests have turned to the internet to access this lucrative new market, which is largely comprised of a highly educated, affluent and technologically savvy younger group (Smith 1995).

One of the greatest new frontiers that the business world is currently focusing on is the future of internet-based commerce, ranging from web pages of “physical” companies to interactive web shopping of virtual companies. Jim Carroll and Rick Broadhead, some of the leading authors on the Canadian Internet, predict that up to 5% of the Gross Domestic Product of the top 25 economies will be based on Internet transactions by the year 2000. In 1993 online sales accounted for \$250 million in the American market, and is projected to be \$6.6 billion by year 2000. This is a small portion of a retail market of nearly \$3 trillion, but it is a high retail growth area, and one which will be affected by technological innovations and greater social acceptance of internet commerce (Schwartz 1997). These predictions suggest that web-based shopping and internet presence will have an impact upon traditional retailing, and as a result the traditional city commercial districts and the downtown. There is likely not going to be much newly generated sales from internet retailing, but rather the cannibalization of sales, i.e. the transfer of traditional retailing to internet sales. A Globe and Mail special report suggests that information technology is “becoming the very medium of business” (Huff 1997:1), a significant prediction coming from one of Canada’s leading business schools and national newspaper.

William Mitchell (1995) uses an interesting metaphor to describe the transformation of the physical commercial district to the virtual commercial area: the electronic agora. The agora was a city space in ancient Greece which was the centre of activity for citizens; a gathering and meeting place, a market area for the buying and selling of goods and the traditional heart of the city. He suggests that the new agora will now be located online and will be similar to that of the ancient concept, but social interaction will take place in the chat-rooms and newsgroups and market functions will be present through electronic commerce. Cyberspace enables a new electronic agora that will become one of the major focus of the information age for social, cultural, political and economic reasons.

The impact that electronic commerce is difficult to predict, as it is still in its developmental phase and has not been largely accepted by the general public. However, as the problematic issues are gradually dealt with, as online businesses provide improved web sites and service, and as the general public offers greater acceptability of purchasing online, traditional commercial districts may begin to be significantly affected by the new form of conducting business. Similar to the office impacts, digital commerce eliminates the advantages of location in business, striking down the old “location, location, location” adage.

Technology and socioeconomic concerns have always played a role in retail location, and transportation distance and technology have been especially important in determining the nature and location of retail operations. Retailing has also been sensitive to technological innovations, and the nature and location of retailing institutions has been constantly evolving in accordance with these impacts. An overview of previous socioeconomic and technological impacts is necessary to place the evolution of retailing in the proper context.

The first wave in retailing was the suburban shopping mall in the 1950's, which followed

the growing population who were able to live away from the city core, largely due to availability and ease of automobile access. The suburban mall has degenerated into a predictable and homogeneous mix of chain stores and offers a standardized format throughout North America. However, this form of retailing is still a popular and successful formula for the offering of consumer goods, but for a myriad of reasons, including locational and socioeconomic advantages, this has also contributed to the downfall of the traditional downtown shopping areas.

The second stage is considered to be the “discounters”, known more commonly as the warehouse or big-box retailers, who generally develop in either the suburban or industrial areas, both which are areas of cheaper land values than the central core. The advantages of these mammoth commercial spaces was substantial economies of scales which enabled cost-savings to the consumer. This overall price reduction in consumer goods has created even more problems for the downtown retailers, who are unable to compete with the lower prices.

The third wave is predicted to be the advent of the World Wide Web shopping, which will effectively limit the advantages of physical proximity to the market area. A business established solely on the premise of web-based shopping requires mostly a virtual presence; the physical presence is important for only distribution, warehousing and perhaps manufacturing of goods, all of which do not rely heavily on market proximity. Once again, this new form of retailing has provided yet another disadvantage to the traditional shopping areas, that of not requiring high costs to acquire prominent locations, such as the downtown. (Smith 1997).

In its simplest form, the world wide web is a graphical use interface (GUI) to the internet, essentially a computerization of pictures as the dominant form of communication (Batty 1997). A user is able to apply a “point and click” technique on images, text and icons to navigate through web pages, which are virtual representations of multimedia information.

This essentially results in an user-friendly interface that conveys far more information than the preceding text-based interface. However, what this also provides is the necessary medium for corporations and retailers, who are now able to convey vast amounts of virtually instantaneous multimedia information to millions of users world-wide, an exciting new frontier for business opportunity.

The world wide web is the backbone of retailer to consumer transactions and will likely remain that way for the near future. Like any traditional commercial operation the method in which businesses utilize, understand and manipulate this new medium varies widely. While some businesses have been relatively slow to grasp this opportunity and have not established a “web presence”, others have moved or set-up businesses entirely online. The relationships of businesses to the web can be generally described into three categories: presence-only, supplementers and sole-users.

Presence-only businesses form a large component of the businesses who are present on the web. This approach was the first opportunity to be seized by businesses who saw an opportunity for advertising. However, many firms have not progressed beyond putting a home page upon the web to advertise their products or services (Huff 1997). These users put forth a web page that is geared towards public relations, advertising and the establishment of a corporate presence.

These pages typically provide general information regarding the organization such as corporate history, organization and product information, but provide little in the way of consumer interaction. The critical element of this group is that they conduct little or no form of commercial interaction, other than perhaps advertising and presence marketing. This may be due to a lack of



Figure 4: Presence-Only  
(Source: www.sears.com)

company policy concerning on-line shopping or underestimation of online commerce, but also because some online products and services have little potential for being sold virtually. Business institutions may not have a specific product to be sold to the end consumer, but nonetheless provide corporate and product information via a web site. However, the potential of web-based commerce goes beyond simple advertising; if its importance were advertising the excitement of just another outlet would have died down by now (Huff 1997).

Supplementers typically utilize the internet to perform limited online sales to supplement their physical sales and is generally done through mail-order or simply to facilitate the ordering and sales process. Computer retailers are usually among this group, as are traditional mail-order companies. A process can involve online quoting systems, internet advertising specials and even ordering and payment can be conducted online, to the point of eliminating any need for physical present or speaking via the phone. However, most of the businesses still garner the majority of their revenue from physical sales, or in the case of mail-order, telephone sales. For example, Just Imagine computers conducts its national sales out of its relative inconspicuous physical location of Oromocto, New Brunswick (its virtual location is at [www.justimagine.ca](http://www.justimagine.ca)), and is supplementing its telephone mail-order with internet sales.

The site provides information on its product specials, corporate and contact information, and online quoting, ordering and purchase system, as well as informational links to the manufacturers of its components (Figure 5). Supplementers can be considered as the second stage of commercial use, those who have taken a step beyond advertisement and offer an interactive and information-rich

Component	Selected Option
Processor	Intel Pentium Processor CPU with MMX Technology
Memory	32MB Memory
Hard Drive	4.3GB EIDE, 1 Head Dual Drive
Adapter Card	AMD 3D SVGA Graphics
Monitor	15" 20 Color SVGA Monitor
Floppy Drive	1.44MB Floppy Drive
Modem	56K External V.90 Modem
CD-ROM	52X EIDE CD ROM
Sound Card	16-Bit Yamaha 3D Sound Card
Speakers	4 Watt Amplified Speakers
Software	Capacity Release 1.0 version of Microsoft Office 95
Disk	128K 3.5 Disk, 1 Double Disk
Case	Mid-Tower Case
Keyboard	104 Key WIN95 Keyboard

Figure 5: Supplementers  
(Source: [www.justimagine.com](http://www.justimagine.com))

alternative, as well as a heavier reliance on internet commerce. However, internet commerce for supplementers still represents only a small portion of their sales, due to a combination of technological, economic and social factors. Location is still of importance as these businesses continue to rely upon physical sales and proximity to market, but as the internet grows in popularity, so too will proportions of sales done virtually.

The sole-users of the web businesses are a new group of businesses that are capitalizing on the new potential of electronic commerce, and conduct the majority of their sales via the internet. These web pages possess an elaborate set-up which allows the use to browse products, communicate with customer service representatives, sample product and service offerings and order and pay for goods, all of which is online. It represents not only a shift from a physical version of shopping to a virtual one, but a complete change in the approach of the shopping experience. The sole-users of web-based shopping represent a new information-rich and virtually interactive form of shopping, one that provides the consumer with an easily accessible storefront from their own residence.

A classic example of this method of conducting new online business is through the company amazon.com, located at [www.amazon.com](http://www.amazon.com) (figure 6). A testament to their reliance upon the internet, this is a company whose name is a derivation of their virtual location, perhaps an indicator of future virtual businesses. The business claims to be the largest bookstore in the world, offering 2.5 million books, and sells several thousand books a day, the

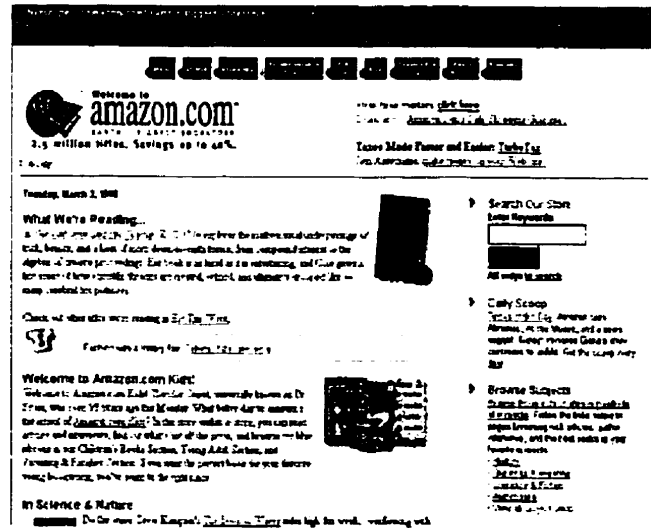


Figure 6: Sole-Users  
(Source: [www.amazon.com](http://www.amazon.com))

majority from online sales. Features of this site include a searchable database, bibliographic information, book synopses, chapter summaries, purchasing and shipping information, books of the day/books of the week suggestions, advertising specials, links to authors interviews and newspaper book reviews, help desks, a virtual shopping cart and even links which show what other books purchasers have obtained when buying this book. The site represents a shift from the traditional bookstore to the online store, which carries advantages in market size, locational requirements, cost overheads and stock availability.

Information technology certainly enables greater access to online shopping and opens possibilities for virtual transactions, however often overlooked is the social values inherent in shopping. The “cold” experience of shopping using a computer does not allow the user to interact with the inhabitants, touch merchandise, walk into stores, obtain lunch or otherwise take in the sights and sounds of the “shopping experience”. A trip to a virtual market is unlikely to ever capture the experience of participating in the fast-paced, active and loudness of the local market. The social and cultural values of shopping remains one of the main advantages that traditional commercial districts possess, be it the suburban shopping mall, the local market or the small town main street. Cultural and social values are definitely present when shopping, and technology may not ever be able to satisfy the human desire of the shopping experience.

One of the major issues hampering online shopping is concerns over security, particularly of financial information. As the internet allows for a user with highly advanced skills to “crack” into servers, consumers are reluctant to provide financial information, such as credit card numbers to complete the transaction. This is hampering the ability of online retailers to conduct business and forces many to relegate the purchasing process to the telephone contact or physical transactions. The online commerce community is gradually dealing with this issue, and providing improved online encryption techniques to battle this problem and satisfy customer trepidation, so much so that revealing a credit card

number online is likely more secure than a phone or physical transaction. Amazon.com for example, not only claims a secure server for financial transactions but will also refund any deductibles for credit card fraud. Clearly security issues, either perceived or real, must be dealt with before large-scale online transactions will occur.

The accessibility of an enormous market-base and near- anonymity of the internet has appealed to many pseudo- commercial interests who invade consumer and personal privacy. This has appeared most obviously in the form of “ spam ” or junk e-mail, which is generally unsolicited mass mailings of advertising, the content often being pornographic services, or money scam operations. The results of this is both the overloading of internet capacity, as well as an invasion of personal privacy, akin to telephone or facsimile transmissions. Already the Canadian Institute of Businesses is addressing this through a business ethics policy which provides guidelines for proper online usage, and the United States government is likely to establish law which bans junk e-mail (Huff 1997). The ethical behaviour of businesses online is certainly an issue that will become both more prominent and problematic as more businesses move to web-based commerce.

## 6.2 Traditional Retailing

There are of course those types of businesses offering goods and services which simply do not apply themselves well to a virtual type of business. The examples of this type are rather numerous; bringing the car into the local garage, going out to restaurant, cultural outings to the theatre, getting a haircut at the barbers, or making a late- night trip to the convenience store. These are types of businesses which seem unlikely to be modified by information technology, and represent a stable necessity in the communities commercial mix. However, information technology has the ability to provide many opportunities for businesses to improve and modify the offering of their goods and services. Video cassette rental outlets, for example, are a product which was initiated by the increased



ownership in video cassette recorders, and in many ways planning regulations were slow to accommodate them. However, with the improvements in multimedia, convergence, transmission and storage capacities discussed in chapter four, video rentals can gravitate towards the internet. By downloading videos directly onto the computer, exchanging money via secure transactions, and transferring this digital movie onto a television or computer screen, video rental stores will likely become outdated in the future. Similarly, while frequent trips to the grocery store are today a necessity, information technology may also play an important role in the future of these operations. Experimental offerings are already in place which allow the home user to access the product listing of a store, submit and pay for a virtual shopping cart of products, and have them delivered straight to one's home without the need for visiting a store. These examples are intended only to portray some of the possibilities that retailing is facing, and consequently the type of adaptable planning that is required to cope with these issues. Planners should be prepared for both a rise and fall of retailing mixes, as well as a change in the approach.

### 6.3 Technology and the Distribution System

The communications between consumer and retailer is not the only relationship that is being altered by information technology, but the relationship between manufacturer and suppliers, retailers and wholesalers and retailer to retailer are also being affected. In many ways company-to- company transactions has proceeded far quicker than consumer interactions, mostly because of the greater economic benefits of efficiency improvements within the organization.

Traditional inventory management of goods relied upon a slow and unresponsive relationship among the supply chain. Generally goods would be manufactured, moved to the various regional warehouses and distributed to retail outlets, thus requiring that orders be placed well in advance, and as a consequence less reliable orders must have been placed. The instant access of information distribution through these techniques has

allowed orders to be placed instantaneously through digital ordering and inventory management and "...many suppliers are giving customers direct, on-line access to their computerized ordering and inventory systems. The order may go directly from the customer to the shop floor, and even into the supplier's automated production equipment" (Carroll 1997: 180). This technology, known as electronic data interchange (EDI), combines with product management technology such as advanced barcoding and the automation of warehousing to provide greatly improved efficiencies in both time and cost. Just-in-Time inventory management techniques allow for goods when and where they are needed with a high degree of reliability. For example, the giant retailer K-Mart allows manufacturers access to their cash register data, which enables the manufacturer to adjust production in exact proportion to sales (OTA 1995). With this reduced inventory companies can reduce their storage space requirements, as well as reduce overall inventory costs, thus increasing competitiveness. (Blais 1996). The American branch of Canon has managed to consolidate five regional warehouses into one central warehouse in Memphis, while the international company of Nike was able to centralize 31 distribution centres to a central facility in Belgium.

Huff (1997) refers to this strategy as integrated chain supply management, whose main objective is to streamline the movement of manufactured goods to the final customer's hands. "In effect, the various firms making up the supply chain become members of a virtual community, functioning as a coordinated, extended team to improve the business processes across several co-operating organizations" (Huff 1997: C2). The American company of Dell computers is an example of this trend: they assemble computers on a consumer demand basis and use the internet effectively throughout the supply chain to manage a business that generates \$10 billion in sales annually. The net effect of this is to eliminate even more floor space requirements of retail shops and reduce the need for large-scale regional warehousing, further undermining the importance of traditional city floor space requirements.

The net effects of information technology on distribution systems are twofold; firstly they allow great reduction in the necessary amounts of warehousing space that is required, reducing the demand for these facilities and creating a surplus in city regions, as seen in the case of Nike and Canon. Secondly, due to increases in speed and efficiency, distribution centres are no longer geographically tied to their market areas, thus allowing companies to move to inexpensive peripheral and rural locations. The implications of these two effects will be further discussed in chapter eight.

## 6.4 Consequences of New Retailing

The investigation of various business and retailing trends brings us back to the impacts on the city and planning, and repercussions that electronic commerce possesses. The overall impact that Internet shopping will have on the traditional commercial districts, and more specifically the downtowns, is difficult to predict accurately as many internet initiatives are still largely in their experimental phases. Market analysis already reveals that traditional retailing is in decline in favour of power centres and big boxes, as well as strip malls located near new subdivisions (Colliers 1997); the additional loss of sales to the online businesses will likely have another negative impact, albeit a smaller one than that of the superstores. The success of businesses such as Amazon.Com may indicate that there is great potential for future internet retailing, but transferring this success to more location-dependent businesses such as grocery shopping may be problematic. However, there is definitely mixed opinion as to the impact that this shopping will have on the downtown, with some believing that the removal of commercial locational constraints will actually benefit the downtown, while others suggest that the cost-savings resulting from locational savings may further destroy the downtown. In any event there are two major impacts that the planner should be wary of. Economic decline of the entire retailing mix or individual sectors may proceed as businesses slowly gravitate towards the internet, or use information technology to facilitate their operations. Warehouses have already moved away from the cities, and as a example, smaller bookstores are being

negatively affected from the combined impact of big-box superstores and transnational internet book companies. Secondly, planners also need to be aware of changes in the way existing businesses offer their services, such as a withdrawal of grocery stores into more hidden locales, affected the character and requirements for commercial establishments. The possibilities for future downtown commercial mixes is explored further in chapter eight.

## **7.0 Residential**

### **7.1 Home-based businesses**

The idea of a home-based business, or conducting business from the home, is certainly not a new idea, but rather an idea that we are returning to from the pre-industrial age. The idea that a commercial area should remain distinct is certainly an concept that the industrial revolution began and remains with us today, as business operators of early European and American settlements would commonly live directly above their businesses (Celentano 1993). Of course, historical home businesses have never relied heavily on information technology, and the occupations who were generally conducting work from the home were those who didn't rely upon the need for information transfer. Thus, one may have seen the presence of the local barber who cut hair, or the local craftsman, or perhaps a construction contractor who used the home as base of operations. Today, information technology has enabled far more information- reliant occupations to work from the home while maintaining overall efficiency. An accountant, for example, would be able to use home computers and software, modern communications technologies and access to corporate networks to conduct their business in a manner similar to an office environment. We are seeing a proliferation of information workers entering the realms of home business, largely because they have the technology to compete effectively with their office counterparts in an climate which places them in charge in a socially pleasing atmosphere.

Canadian municipalities and mainstream planning have begun to focus more on the issue, likely because of increased prominence of home-based businesses (HBB), as well as pressure from the public, commercial interests and HBB operators. As indicated in Chapter Seven the numbers of people working from the home is certainly increasing in Canada, ranging from one to two million persons. It should also be noted that despite the similarities, telecommuting and home-based businesses are not equivalent.

Telecommuting generally implies work conducted for a central organization and using information technologies to communicate, while home-based businesses are small self-employed companies which conduct their work from the home. Clearly though, home-based businesses are becoming a significant component of our economy.

Municipalities are becoming aware that home-based businesses are not the undesirable uses they were once perceived to be: they provide employment opportunities, provide an stimulus for the local economy and can allow for business expansion through an incubator effect (Gurstein 1995, Celentano 1993) Despite the fear that business have negative impacts on residential neighbourhoods, home-based businesses are relatively inconspicuous and rarely generate problems for surrounding neighbourhoods. Municipal zoning by-laws have been generally restrictive of home-based businesses located in residential zones. Those that do permit them at all typically stipulate a restrictive amount of zoning regulations such as: maximum area size, maximum employees of one, no business parking permitted, no use of accessory buildings and restrictions on permitted occupations. The policies produce an environment that is certainly not conducive to home-based business development, yet these activities remain to grow.

The Town of Markham is another example of a municipality gradually adjusting to the needs of merging work and home. Recognizing this demand, as well as the potential nuisances that home businesses can create (noise, traffic, parking), they established a task force on home occupations to address the issue, in conjunction with the CMHC and the Affordability and Choice Today program, conducted by Ferrara Contreras Architects Inc. The purpose of this study was to investigate existing cause and effect of live/work environments; investigate existing regulations for live/work building types; research historical and contemporary examples of live/work buildings; develop affordable live/work building types and explore their regulatory requirements; and to establish a one-step approvals process for live/work uses (pg. 1). Generally, home occupations are regulated in a municipality through the Official or Master Plan, which outlines general policies for

their use, and the Zoning By-law, which establishes detailed controls on types, sizes and locations of businesses. Included in the study was a survey of many Canadian municipalities zoning by-laws, which revealed that there are a variety of approaches to regulating home occupations. Typically, most municipalities have a blanket zoning by-law which addresses home occupations through restrictive policies, such as:

- only one worker is permitted per home occupation
- one home occupation per home
- home occupation not permitted in garage
- maximum size is 25% of floor space
- no impact on traffic and parking can be created
- not create any external nuisances (noise, dust, smell etc)
- specific uses prohibited, such as escort services or taxi depots

Generally, the intent of the home occupation by-laws reviewed in this study is to permit these businesses provided they have no negative impacts on the neighbourhood, or any negative economic impacts on existing commercial areas. In many cases, municipal by-laws are extremely outdated, difficult to enforce, or ignorant of today's changing working world. The City of Vancouver, for example, relies upon a by-law dating back to 1956, and whose definition was intended for homecraft businesses. It was clear from this review of Canadian home occupation by-laws that municipalities are only slowly changing to the new realities of home businesses in the information age.

One of interesting suggestions of the report was the proposal of a different zoning strategy to accommodate home businesses. The report suggested that existing zoning is "single-use", which separates major land uses, and encourages monotony and fluctuations in occupancy throughout the day (figure 5). The authors suggested that a new zoning strategy, termed "Interface Zoning" be implemented, which would combine land uses on a single parcel of land in different combinations and proportions, as shown in figure 6. This method is indicated as providing savings in land utilization and travel time while

increasing social interaction and improving public spaces. Although this proposal isn't given much detail in the report, it is an indication that existing zoning schemes are not sufficient to accommodate home businesses in the information age.

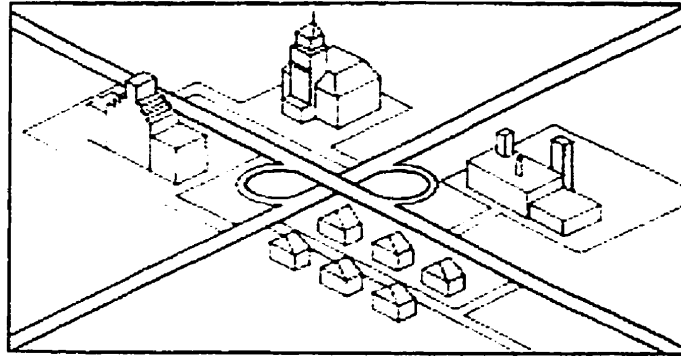


Figure 7: Single Use Zoning  
(Source: Ferrara Conteras 1994)

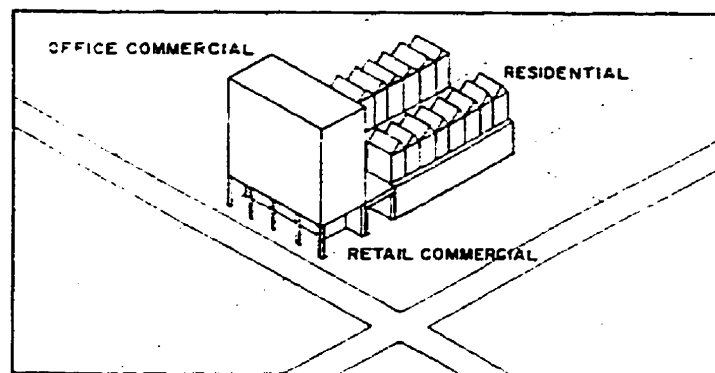


Figure 8: Interface Zoning  
(Source: Ferrara Conteras 1994)

The study recommended that municipalities interested in adapting home occupations regulations in Canada implement three main ideas. Firstly, to encourage a “one-step” approvals process, which would permit home businesses to occur as-of-right if they meet the prescribed criteria, avoiding time-consuming and expensive planning amendments. Secondly, that municipalities should incorporate into the Official Plan general policies which provide for home occupations to occur subject to the home occupation by-law.



Thirdly, municipalities should implement a home occupation by-law which is more proactive and permissive than most existing by-laws. This by-law is suggested to contain the following provisions:

- home occupation is a secondary use only
- conducted within an enclosed structure
- does not occupy more than 49% of the building
- shall provide all parking spaces on the lot
- shall not display or store goods on the exterior of the house
- shall not conduct retail sales
- maximum of two employees
- specified list of noxious which are not permitted

A home occupation by-law based on the above provisions was established by the Town of Markham in 1994, which provides the regulatory framework for allowing home occupations. However, it is the investigation into live/work scenarios that is of most importance to this thesis, and will be discussed in conjunction with housing changes in Chapter Eight.

The City of Kanata, a high-tech growth centre located near Ottawa, is also typical of some of the new zoning and policy approaches. Recent studies conducted by the City indicated that the majority of its residents were in favour of home businesses, and that approximately 1000 businesses were operating out of residential communities already, contributing \$44 million to the economy. In response to this study the city adopted zoning regulations that allow and even encourage home-based businesses to occur by allowing additional employees, expanded floor space sizes, permitting sales transactions, and permitting uses in adjacent buildings (City of Kanata 1997). This changes were similar in nature to the Town of Markham's change, but are more permissive, including greater sizes, parking allotments and number of employees. The city's economic

development strategy of encouraging high-tech development is also important in promoting home businesses, as high-tech entrepreneurs are perhaps most famous for starting out in a home environment.

There are many opportunities for planners to be proactive and capitalize on the opportunities that home businesses offer. The first step is to revise any archaic by-laws that unnecessarily restrict the presence of home businesses, or create a planning process where home businesses are discouraged from operating. The City of Kanata's and Town of Markham's initiatives are representative of one of the steps that can be taken in this approach, which essentially allows for greater expansion and freedom for the home business without compromising the residential character of the neighbourhood. However, municipalities have the opportunity to become more proactive and work with developers to develop environments that create an appropriate balance of businesses while maintaining the residential integrity of the neighbourhood. Chapter Eight discusses in more detail the accommodations that planners should adjust to regarding housing and community design.

We have already seen the increased corporate desire for downsizing, as well as an increased reliance on outsourcing, and home-based businesses are certainly one social response to this economic shift. If the information age is to modify the existing socioeconomic structure, then a likely response by workers is to create their own jobs, jobs which are most easily initiated (both financially and socially) from the home. Home-based businesses are one example of how planners should acknowledge the changing nature of the information age. Companies begin to lay off employees, workers search for employment opportunities and planners develop policies that adapt to changing circumstances. Of course this doesn't suggest that every home will possess a business, or that commercial uses should dominate over residential areas, but it certainly provides alternatives for individuals in the information age.

## **8.0 Planning Issues in the Information Age**

We have spent much time analyzing some of the major impact areas of information technology, which serves to provide sufficient background for the changing city, as well as being a primer for planners wishing to understand the trends and technology. It is now appropriate to assess how these phenomena are predicted to impact the physical form of the city as well as the planning process. Taking this approach, a few key forces of change are outlined below, intended to help planners and decision makers effectively identify and respond to change in their communities associated with the information revolution.

The growth of an internet-based economy will create a shift in patterns of location for businesses which traditionally locate in city regions. The ability to communicate effectively and access world markets via the internet will reduce the locational advantages of the city. In an internet economy location does not matter; areas which were once considered periphery will be able to compete on level playing field where geography is not a factor. As well these changes to the retail and office mixes and locations of cities have spin-off effects into residential location and styles. Planners will have to be prepared for a wide variety of changes to the city. Although these issues will not happen to every community, nor perhaps at all, it is a sampling of potential areas to monitor and the thinking required of the information age planner.

### **8.1 The Evolving Downtown**

This thesis has discussed much of how demand for office space will decline, how retailing will gradually change and how residents will merge work with home . This discussion leads to the inevitable question of what will happen to the downtown and traditional central core areas? The retail section discussed a series of waves that has had impact upon the downtown, from the suburban shopping mall, to the discount superstores, to the world wide web, with each having a detrimental impact on the city.

Locally owned businesses in the average American city gathered 90% of the local consumer retail dollars in 1945, while today this figure is less than 30% (Smith 1997). As mentioned in Chapter Five, many information age analysts predict that the demand for traditional downtown office space will also decline, having a further impact on its viability (Borsuk 1996). Colliers International, in their 1997 market review examines the Canadian retail, office and industrial trends for major Canadian cities. Overall they suggest that past trends indicate that office space has been growing, but the location of this new growth is in the suburbs, and in particular, high class office space in the downtown has not been in demand. Figures also indicate that more corporations are interested in “build to suit” offices, buildings specially designed to suit their needs, and these are generally located in the suburbs. Similarly, retail growth in all the major Canadian markets has been confined primarily to big-box retailing in suburban areas, and strip malls located in new subdivisions. However, traditional retailing, especially those located in the downtown, is in steady decline nationwide (Colliers 1997). These marketing trends generally suggest that the downtown areas of many Canadian cities are in trouble. There are of course, many reasons that can be attributed to the decline of downtown areas; increased crime, decreased quality of schools, lack of people living downtown and changes in living standards, but increased mobility achieved through advanced information technology has played a key role. The advent of the world wide web and increasing public acceptance of online shopping could be the proverbial last “nail in the coffin” for downtown areas, already reeling from the previous waves.

However, it is far more likely that the downtown will survive, but will make efforts to reinvent itself, and establish a new role and purpose in overall city. Traditional municipal planning suggests that the downtown is the heart of the city, containing office, retail, cultural and administrative functions. The predicted declines in these activities may leave the downtown struggling to achieve these goals. Already, municipalities are taking proactive steps in approaching these issues, with the most common being the resurgence of residential uses within the downtown cores, particularly through conversion of office

and industrial spaces. For example, in 1996 about 1% of Toronto's office buildings were converted to residential uses, and this conversion was projected to remain steady through the following years (Colliers 1997). Adaptability to changing circumstances will be key to successful downtown areas in the future.

The King Street area within the city of Toronto (figure 9) is one example of how municipalities are coping with the transformation from the industrial needs of yesterday. This area was once primarily an industrial area, but was in considerable decline with vacant buildings and large tracts of undeveloped land being commonplace. These traditional industrial areas also possessed new entertainment, fashion, media and graphics commercial uses, as well as small-scale residential development. Planning controls still viewed this area as an industrial zone, and mechanisms were in place to ensure minimal conflicts between neighbouring land uses. This was classic case where obsolete zoning controls and ad-hoc planning held back the potential for effective redevelopment in the era, primarily by clinging to the demands of the industrial age. Recognizing its potential for economic renewal, planners and politicians developed a flexible land use planning approach for the area. The city developed the "reinvestment area" zone, which permitted a broader range of commercial, residential and industrial uses for the area, while maintaining traditional planning control over existing residential areas. More attention

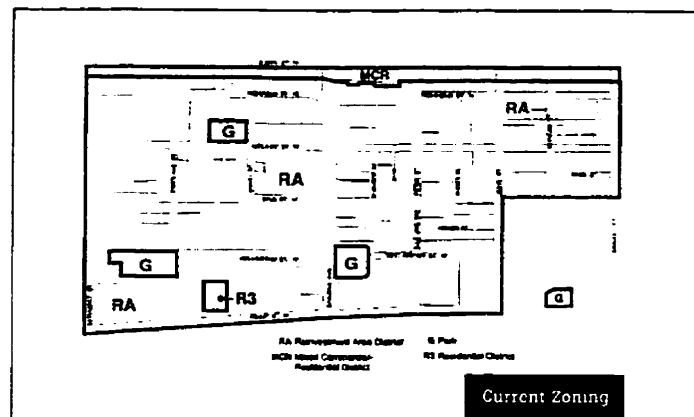


Figure 9: The Kings Area  
(Source: Bedford 1997)

was paid to the management of built form, and building controls were placed on setbacks and height to ensure an effective and aesthetic streetscape. The speed of the planning process was also improved, primarily by permitting more uses as-of-right. The new policy appears to be effective, as many development applications, ranging from cinemas to industrial conversion to live/work studios, were received by the city, accomplishing the goals of economic renewal in the area (Greenberg & Lewinberg 1996; Bedford 1997).

However, an important step in revitalization is self-evaluation, and this point is especially true in light of the impacts of information technology. One of the key mistakes that decision-makers and planner make during downtown revitalization efforts is to apply a generic “trendy” solution to a unique problem, rather than examining the big picture and unique characteristics of individual communities. Typically this involves developing “single-shot” ideas such as tourism attractors, focussing on specific retail sectors, and generally transplanting ideas which have worked well for other downtown areas, but are not appropriate for the individual community. Downtown revitalization most focus on ideas that are relevant and applicable to a given community, based on detailed studies, forecasting and community inventories. An over-reliance on encouraging high-tech infrastructure in attempts to spur economic development is a example of this phenomenon. Industries and businesses locate in a specific area, including the downtown, for a variety of reasons of which infrastructure is a key part, but also consider many other factors such as quality of life, transportation connections and educated labour pool. This is a critical point for planners to consider, as an emphasis on high-tech industries for downtown revitalization requires a necessary support structure that must be in place first: a proper assessment of individual communities characteristics is always prudent.

As the Kings area example demonstrates, traditional attempts at downtown or main street revitalization may have to be forgone for more innovative approaches to information age problems. This issue not only applies to the decline in industrial space; encouraging and

even subsidizing a strong retail mix in the downtown may have to be re-evaluated in light of the impacts of online shopping and replaced with a heavy emphasis towards residential, cultural and entertainment uses, for example. In any event, the downtown will be undergoing change in the information age and may find itself struggling to define its role in this evolution; the planner may have to assist this transition through a major policy re-evaluation fitting with the dynamics of the information era as well as the unique character of each community. Planning solutions need to be found that permit economic renewal of an area while minimizing impacts on existing land uses and encouraging good urban design.

## 8.2 Housing

There are really two significant issues affecting housing; the first is the merging of home and work, and the second is the decreasing locational ties of work and home.

As telecommuting becomes more prevalent and assuming that the regular commute to work is eliminated or reduced, workers no longer need to choose residential location based on proximity to work factors. The worker doesn't have to be geographically close to the workplace, nor be overly concerned with access to major highways and public transit routes. What factors will determine the new location for housing? Residential location decisions will likely become more focused on lifestyle choices, including neighbourhood character, safety, housing styles, and access to schools, shopping and recreational facilities. An individual desiring to locate in a large rural lot will largely be able to do so as proximity to office becomes less important; likewise, locating in downtown inner neighbourhoods is also possible. The implications for planners are significant. The relationship between residential location and office and retail locations are quite strong in traditional planning (based on commute to work distances and access to services), and the information age may have the effect of altering them significantly. Planners should be aware of the issues specific to their community, such as the move of neighbourhoods outside the commutershed of downtowns, or the rise of rural tele-

villages.

The change in residential choice is not the only factor affecting housing, but the inclusion of work in the home will also require changes in the homes and neighbourhoods themselves. One of the more significant conclusions from the home-based business and telecommuting studies is that home-workers desire physical changes to their home in order to accommodate their needs (Gurstein 1995). Privacy is a major concern and many workers need a separately contained office to conduct their work, in order to clearly define the line between work and home. Home offices need an environment similar to traditional offices, and the provision of adequate facilities to support a person working, i.e. lighting, wiring, carpeting, ventilation, sound buffering, is necessary. This will not only generate housing renovation activity, but requires changes to the way houses are designed, and innovative solutions are required to accommodate these new consumer trends. Already “smart houses” have been developed and encouraged by the development industry, which provide an extensive fibre-optic wiring throughout the house to enable high speed transmissions and an intrahouse network. The addition fibre-optic and tv cable are accessible via the electrical outlets throughout the house, at a cost of several thousand dollars (Larkin 1996). The conversion of industrial spaces to live/work studios is also becoming a common approach. One example is Artists Villas in

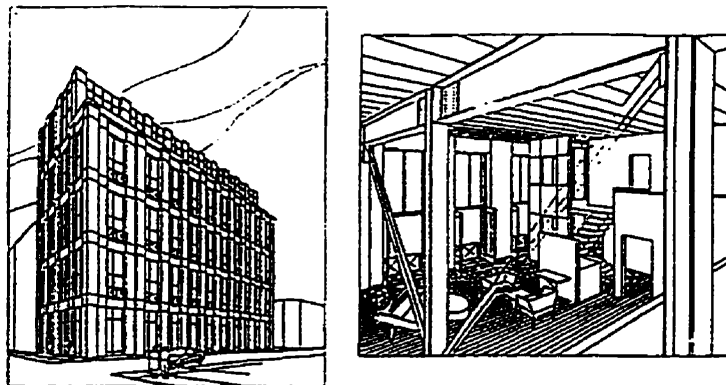


Figure 10: Artists Villa  
(Source Ferrara Contreras 1994)



Etobicoke (figure 10), which includes 2-storey unfinished units which will have the infrastructure to accommodate limited industrial/commercial units (Ferrara Contreras 1994).

Another intriguing idea is the offering of flexible “module” units within apartment buildings shown in figure 11, which can be purchased in series and combined into living/working combinations as required (Ferrara Contreras 1994). Subdivision developers are starting to become aware of these new needs as well: the Geranium home (figure 12), located in Morningside, Scarborough, is marketed specifically for those interested in home offices, and sets aside space for this purpose (Ferrara Contreras 1994). As these projects demonstrate, planners and developers need to offer housing choices which cater to new homeworker needs.

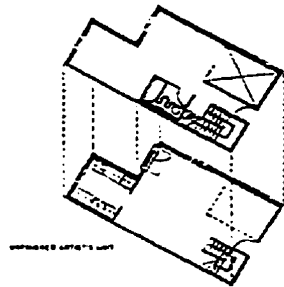
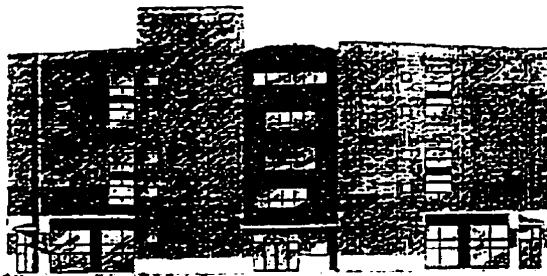


Figure 11: Flexible Module Home  
(Source: Ferrara Contreras 1994)

**Best New Home Deal in Years!**

Terrific Location at Morningside & Old  
- 22 Incredible New Designs - 2-Car Gar.  
- Much, Much More!

LOOK AT THIS STUNNING NEW PLAN... SEVERAL VERSIONS  
TO EMPLOYER'S OFFICE... OFFICE PLAN INCLUDING  
FOR BATH & WET BAR... Features Family Room with Bay  
and Gas Fireplace, Opened-Up Living and Dining, Open  
11' High Ceilings, Kitchen with Custom and Coloured Cab.  
See Our Complete Second Floor Plans!

SEMI-DETACHED/Linked Rows    FULLY DETACHED 36' LOTS    FULLY DETACHED 40' LOTS

**\$159<sup>880</sup>!**    **\$189<sup>880</sup>!**    **\$249<sup>888</sup>**

**GERANIUM HOMES**  
Building Southern Ontario

Figure 12: Geranium Home  
(Source: Ferrara Contreras 1994)

However, this does not stop at altering the location of the home office and live/work scenarios, but altering the housing design and surrounding residential structure to accommodate these needs. Innovative solutions which maintain a residential character while encouraging more commercial mixes are one possibility. Several options suggested by the architectural firm of Ferrara Contreras includes options which have homes and offices which face different streets (figure 13), homes which are located behind the office (figure 14) and a series of houses which surround a common office (figure 15).

As more home businesses and teleworking develops, consumers will be looking to purchase more flexible units such as these, which is encouraging planners to provide a more adaptable approach to the residential neighbourhood.

Aside from the direct changes in houses, the residential neighbourhood needs to be reconsidered if work is going to be conducted from it. Neighbourhoods have to continue to be designed based on the single-use of residential, however, if more home businesses and teleworkers are included in the residential mix, then a new infrastructure is required to support these changing needs (Gurstein 1995). Two examples of the new attention to telecommuting and home businesses is Montgomery Village in Orangeville, Ontario and Cornell in Markham, Ontario. The developers of these subdivisions have spent millions of dollars investing in a fibre-optic telecommunications network, which is critical to improving the transmission technologies discussed in Chapter Four. The heavy investment in telecommunications and networking services is intended to attract buyers who intend to work from the home, as well as the traditional home-buyers (Warson 1995). It is apparent that developers are taking heed of the new requirements of the information age, and planners should be wary of the changing face of neighbourhood design.

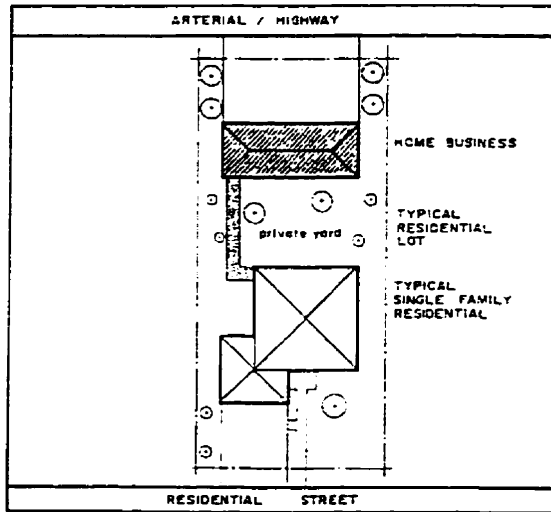


Figure 13: Rear-Facing HBB  
(Source: Ferrara Conteras 1994)

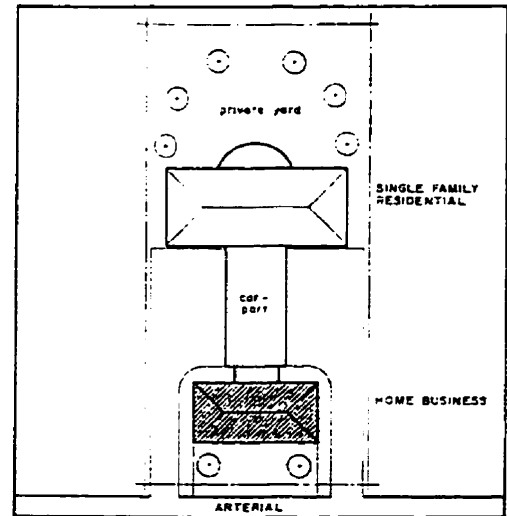


Figure 14: Front-Facing HBB  
(Source: Ferrara Conteras 1994)

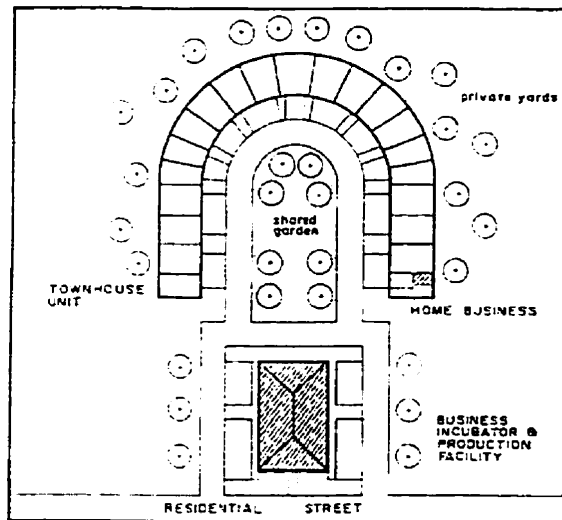


Figure 15: Central HBB  
(Source: Ferrara Conteras 1994)

The introduction of limited commercial uses requires a new set of design goals. Home businesses and teleworkers may require spin-off support businesses such as copy stores, coffee shops and meeting centres within walking distance, transportation infrastructure may be modified to accommodate visitor parking and delivery trucks, and even social and

recreational uses could be improved to meet the needs of workers who are in the neighbourhood on a daily basis. Not all of these changes will be required of all neighbourhoods, but the point is for planners to recognize that change is occurring to these neighbourhoods and accommodate and plan accordingly.

Telework and home-based employment are significant forms of work resulting from technological, economic and social change, and thus the housing sector will have to offer more choice to accommodate these changing relationships. The merging of working and living space is certainly possible, but modifications to homes and communities are definitely required to accommodate. This viewpoint is obviously suggesting that change will likely come to the venerable traditional neighbourhood, a neighbourhood often based on single-unit residences. A proactive approach by planners can ensure that this stage in the neighbourhood evolution proceeds properly and provides the maximum benefits while retaining a vibrant and livable neighbourhood.

### 8.3 Adaptive Re-Use

If the downtown areas are to experience a decline in demand for office space and retail, then planners will have to initiate adaptive regulations to accommodate these trends. If predictions are correct and the downtown becomes filled with increasing levels of vacant office towers and empty retail stores, then planners can offer solutions in the form of enhanced conversion regulations. Downtown office towers are the most obvious example of this trend, as many have already suggested that they be converted to residential.

However, it does go beyond simply residential conversion. Possibilities exist that shopping malls may lose their anchor tenants, and likewise, big box retailing could also be under-priced by online shopping, creating large areas of vacancies in the city. Some interesting ideas to illustrate the potential for adaptive re-use include a mall that could be converted into a “Church World”, where multi- denominational religions come together

under one roof, or a Necropolis, a mall which contains crematoriums, flower shops and funeral homes, as well as more conventional ideas such as theme parks and educational institutions. Wal-Mart has been experimenting with constructing locations reusable as apartments (Borsuk 1996).

The planner's response to the increased need for adaptable re-use scenarios may vary. Incentives need to be developed which encourage the re-use of brownfield sites or abandoned office towers and retail stores. There is a complicated mix of issues that affect the lack of redevelopment at any particular site. The American Office of Technology Assessment (1995) suggested many options to solve redevelopment efforts in the United States, but may have application to Canada as well: the restructuring of loan and economic aid for core areas, modification to tax structure for redevelopment, and the elimination of unnecessary environmental regulations. As mentioned previously in the Kings area of Toronto, planners also need to ensure regulations are not unnecessarily restricting redevelopment, or the process itself is not too cumbersome so as to discourage innovative proposals. Toronto mayor Barbara Hall suggests "Yes, there are risks to these new planning approaches, but there are greater risks to doing nothing" (Bedford 1997: 22). The key is to maintain flexibility and discover innovative solutions to adapt in the rapidly-changing information age. It may require some radical steps from conventional thinking, but it is certainly a step better than vacant stores and a "ghost" downtown, and should be viewed as another step in an evolving city.

## 8.4 Regulatory Approach

In light of the need for adaptive re-use, economic development, and downtown revitalization, as outlined above, planners need to re-evaluate the current regulations and methods for managing the proper growth of cities. Municipal zoning regulations are one of the major tools of planners that are being reconsidered as of late. Devised in the early part of this century, in the heart of the industrial age, zoning's original aim was to protect

high income residential areas through exclusionary zoning. They have evolved today into highly complex and detailed regulations which specify exact uses for all land within the municipal boundary. Among other rationale, they are intended to encourage stability in character and in property values. However, given the emphasis in the information age on adaptability, flexibility, quick-changes and fast-paced nature, zoning is likely to more hindrance than value, and may be too cumbersome to use effectively. Modern zoning simply does not allow the discretionary powers of the planners to be utilized to full effectiveness. For example, a specific home business may not be permitted under arcane zoning by-laws, despite having no negative effects on the neighbourhood and promoting economic development. Amendments to allow this type of use are generally too time-consuming and costly to pursue for the individual operator. Bob Lehman (1997) summarizes it well: "Our 50-year experiment in standardization is over. We know what neighbourhoods with identical homes in identical locations look like. We know that we can change streets into traffic sewers with reverse frontage lots. We have learned a great deal, it's time to put it to use" (p.27).

Solutions are slowly beginning to arise, as the profession begins to question the value of this restrictive regulation. Comprehensive Development (CD) zoning is one method which is being considered recently in the planning practice. CD zoning is essentially a broad regulation which permits customized regulations to be developed and applied on a site-specific case. A development can use CD zoning to address concerns such as environmental and heritage protection, specification of specific commercial units, traffic and pedestrian layouts, retention of vegetation, and can handle a range of other site-specific issues that would not be covered under traditional zoning. In short, "CD zoning allows a city to manage change over time, and to provide a zoning approach that responds to an increasingly complex urban context with an array of diverse and technically specialized considerations" (Ito 1997: 7). CD zoning is a method which does allow the planner to fully utilize the planing skills, without being restricted through planning regulations.

In any event, the planner should ask the question: are the current regulations sufficient to accommodate a changing socioeconomic structure brought on by the information age? Unfortunately for most municipalities, this answer is most likely no. Innovative “information” regulations will be difficult to achieve but may be the key to cities surviving in the information age.

## 8.5 “Long-Range” Planning

Throughout this thesis much emphasis has been placed upon both the amount and the rate at which change is occurring, a rate which is unprecedented in human history. The information age allows for instant and global communications to occur, which is spurring rapid decision-making in the business and personal worlds. In relatively short time frames, technological changes can virtually redefine approaches and attitudes.

In this era of dynamism another of the main tools of planning needs to be evaluated, the long range or “master” plan. If change is occurring at a fast pace, is there still value in producing a long-range vision for a short-range world? The growth of online commerce in a mere three or four years is an example of how quickly the retailing world can change. Transportation may undergo a major re-evaluation as telecommuting alters the methods and approaches to the necessity of major highways. Housing options may also need to be altered reflecting increased desires for home offices. Short-term planning is often needed to accommodate these quickly changing concerns, and the fixed and often outdated long-range plan may simply not be sufficient. The long-range plan was built upon the premise of long-term stability, which is rendered irrelevant in an age where fast changes are the norm.

The master subdivision plan is a long-range plan which establishes the detailed plans and regulations for often large-scale residential developments which are projected over 20+

year time frames. Friedman (1996) suggests that this approach is not sufficient to accommodate the flexibility required in the information age. An alternative approval and design process is required which permits adaptability to changing market, technological and social forces. This “flexible” planning strategy would replace the master plan with a master “vision”, ensuring adherence to overall goal and objectives are maintained without sacrificing flexibility. Master plans have been suggested as being unclear and undefined documents which cannot accommodate market changes quickly enough (Maloney 1996).

The long-range plan will always hold value, as decision-making needs to adhere short-term decisions to long-term goals and objectives. However, the information age plan needs to be a dynamic one using flexible planning approaches mentioned above, and accommodate the projection according to changing circumstances. The long-range plan must still adhere to overall goals and objectives, but constantly be re-evaluated on a periodic basis to ensure relevancy to a modified situation. The idea of a fixed plan suggests a permanency reflecting the structure of the industrial age; a dynamic plan is a better method for the information age, especially considering the greater availability to information and greater analytical tools open to the planner. Of course, this is suggesting a major change in one of the planner’s key tools, but it comes in a time where re-invention is becoming commonplace.



## 9.0 The Planner

### 9.1 The Traditional Planner

After illustrating the tremendous socioeconomic changes that we are undergoing, reviewing the technology and the trends that ensue, and examining the impact on issues relating to planning, we return to a question stated in the introduction: is there a role for the planner in the information age? In many senses the modern urban planner has been created through the industrial age, and thus is a by-product of it. Is the planner able to adapt to the changes required of a fast-paced information society and the social and economic planning repercussions that are associated with it?

This is a question that many planning institutions are now asking and university planning schools are re-evaluating themselves in light of this consideration. David Cadman and Simon Davoudi (1997) have conducted research to address these very concerns through a survey of leading practitioners and academics internationally. An underlying issue which is considered to be of major importance to urban development and land-use planning is the:

sense of the scale and pace of contemporary change and the impact that this is having upon habitat. This is a reality of great uncertainty which requires a quickness, flexibility, breadth and clarity of mind and an ability to be able to encompass and give expression to divergent and , at time, conflicting needs, interest and, above all, relationships, in this case relationships that are rooted in rural and, especially, urban land use and development

(Cadman and Davoudi 1997:2).

As stated previously in thesis, the information age is one of the most significant issues affected urban planning today, and will undoubtedly shape the planner of tomorrow. The core role of the planner was indicated in the survey as being the management and articulation of the planing system: regulation, processes and procedures. The focus of the

community planner however, has been constantly changing in the post-war period, from physical planning in the 50's and 60's, to social engineering in the 60's and 70's, to market facilitator in the 80's, to the environmental planner in the 90's

As we reach the end of the millennium, the focus of the planner is yet to be firmly established, but there is an increasing awareness that planners will not only change their focus, but the entire structure of thinking and background. "The reality is that we are in for an era of unprecedented change, and it will be those individuals who are willing to understand, appreciate and take advantage of the changing circumstances who will survive and prosper" (Carroll 1997: 17). Carroll's words are aimed at a general audience, but it is certainly apparent how planners especially fit into this suggestion, for the profession of planners, unlike engineers or architects, is based on the current thoughts, ideals and trends, and involves complex issues and interests to accommodate. In many ways, planners are products of a dynamic and complex system, yet generally respond through a reactive approach.

This evolving role or focus of the planner has left us at a crossroads, where the socioeconomic framework that previous planning was based on is changing, and thus planning may be undergoing a "rebirth". However, the new planner will be based on a multi-dimensional scale and incorporating the dynamics and understanding of relationships (Cadman and Davoudi 1997). The decline of traditional thinking in planning opens up a new approach and changing set of skills for the information age.

## 9.2 Evolving Skills of the Planner

If the planner is to retain a role in the information age, they must increasingly possess a set of skills that allow them to take a more prominent role, or even to retain their existing role. Certainly, the planner's skills can be of great demand in the information age. The reactive and the proactive roles of Canadian planners in the new climate must be

considered, whether responding to new trends in land use, or forecasting future visions.

### 9.2.1 Problem-Solving and Innovation

Much emphasis has been placed on the fast-paced and dynamism of the information age; the quick transfer of information enabled by information technology has allowed instant and rapid changes to occur in society and the economy. A dynamic and fast-changing social and economic system must rely on innovative and quick solutions to issues; a package of skills that planners can offer. Innovation and creativity will be important in finding solutions to new and old urban problems and ultimately requires that the planner not to be constrained by traditional approaches (Dykeman 1992). The City of Toronto example in Chapter Eight is a limited demonstration of this innovative thinking, as economic renewal of industrial areas were addressed without a heavy reliance on traditional planning regulations. Planners should be willing to take their skills and knowledge and step beyond the traditional planning regulations to find solutions appropriate for information age problems. The planner must possess problem-solving skills to identify the nature of problems, address these changes as they arise, including the flexibility to discover different solutions to complex problems. Cadman and Davoudi's survey responses indicate that the ability to "identify and understand that nature of a problem" is the highest scoring skill that a planner should possess.

### 9.2.2 The Generalist

If the issues involved in community planning were previously multi-faceted and complex, the information age has certainly added to this mix. The information revolution may be spurred on by technology, but as this thesis demonstrates it includes impacts relating to social, political, economic and environmental issues. The relationship of these subjects to technology is likely to be significant. For example, as technological innovations may enable telecommuting to occur this may have impacts on office space, and further impact

transportation planning and contribute to urban sprawl and environmental degradation. While this thesis deals mostly with technological impacts and avoids incorporating a vast amount of subject area and impacts, it is important to realize that knowledge of broader information is essential to making proper decisions. A proper knowledge base in a variety of subject areas, including the technological, environmental, social and political spheres will provide a better understanding of how information technology is transforming these relationships. For instance, the planner should recognize the importance of a fibre-optic infrastructure to economic development, or the potential restructuring necessity of neighbourhoods on account of teleworking and home-based businesses. In short, the profession must grasp an understanding of the relationships between, say technological innovation and environmental impacts. The planner's approach as a generalist will once again become important in the information age.

### 9.2.3 Information-Gathering

“Ask me about some hot new management trend, and in 24 hours I'll have made myself an expert on the topic by harnessing research and news reports from around the globe.” (Carroll 1997: 175-176).

As Carroll suggests it is also necessary for the new planner to participate in one of the key skills of the information age; having the ability to possess, understand, process and use information effectively. There is an inconceivable amount of information available in today's society, and it is important to be able to access and use this information to the planner's advantage. Despite its misconceived reputation as being a haven for illicit activities and poor information, the internet offers much for the planner. Information from municipal web pages, recent documentation of planning conferences and events, academic journals and periodicals, government planning acts and documents, access to expert opinions, and information of private sector projects are all available online. The planner can utilize this global, easily accessible and updated information to make well-

informed decisions, produce accurate reports, and keep up to date on recent planning trends and information. For example, a planner interested in discovering how other municipalities deal with home occupations can access municipal web pages, e-mail colleagues across the world or post a message on the usenet group of alt.planning.urban (the usenet is the internet equivalent of a world-wide bulletin board). Latest planning news can be obtained through regular e-mail mailing lists such as the Cd4urban out of the university of Washington. Planners writing plans for city trail systems or the placement of cellular towers can begin with the excellent link site at [www.cyburbia.org](http://www.cyburbia.org), run by the University of Buffalo. The planner has an excellent desktop information tool in the form of the office computer. A recent survey by the Canadian Institute of Planners indicated that two-thirds of Canadian planners have access to the internet while 60% use the internet for research; results which are promising but should be higher (CIP news 1997). As Jim Carroll (1997) points out, the ability to “harvest knowledge from information, often on very short notice” (p. 175), which seems to be constant requirement of planning. This ability to access information and transform into knowledge will be a key skill in the information age for any individual, including planners.

#### 9.2.4 Communications

The abundance of information that is available in the information age, as well as the presence of a complex multi-faceted issues will not only require an individual to understand and analyze these issues, but to be able to communicate them effectively. Cadman and Davoudi summarize this as the “set of skills that enable the planner to make effective connections between the diverse needs, interests and disciplines of land use and development; to work collaboratively; and to communicate” (1997: 5). Increasingly, the information age will require individuals who can understand and digest complex issues and communicate them effectively to people with diverse backgrounds and interests, such as the public, politicians and clients. It goes beyond a simple communication of the technology, but in “expressing the network of divergent needs, interests and relationships

that constitute the built environment” (Cadman and Davoudi 1997: 6). This transforms the planner from a technical expert to an educator, one who needs to bring together complex issues and propose them to council or the public in a way which clearly illustrates the agenda. Demonstrating the need for a fibre-optic network for community development, or the inclusion of home businesses in single unit neighbourhoods requires more communication and education skills than technical skills. The information age needs a spokesperson, and with their experience in communicating complex land use issues, planners already have an advantage.

### 9.3 Rebirth of the Planner

The question of the future role of the planner is one that will become more prevalent in a new era dominated by quick change and a dynamic socioeconomic system, a system in which traditional planners have often based their attitudes upon. Manuel Castells states that “above everything else, a new world requires a new understanding, and ultimately a new theory” (1990: 15) and further suggests that “it is in the interdisciplinary field of planning ... where some new intellectual sparks could light up the fire of a new theory aiming at understanding this new history”. Planners, like many other professionals, businesses and individuals, are in the midst of difficult and dynamic period which has the potential to reshape the definition of a planner.

In a time where planning is not well-understood by the public and where the profession is struggling to define itself and its role in the world, the information age represents an opportunity to bring planning to the forefront of this era rather than “being relegated to the back offices of the last ways of urban speculation” (Castells 1990: 16). Planners already possess many of the skills required of an “information worker” in the 21<sup>st</sup> century, communications and problem-solving among them. The profession needs to refine these skills and use them to adopt a new approach that will redefine planning and take it from the industrial age into the information age; in short, a “rebirth” of planning. It certainly represents a daunting task, but also a delicious opportunity.

## 10.0 Conclusion

We are in an era of unprecedented change, a time where drastic changes in our socioeconomic structure are occurring and are largely enabled through advances in information technology. Change has always occurred in the evolving city, but it is the rate of this change which makes the information age distinct in history. The basic unit of power is changing from the dominance of wealth in the industrial age, to the significance of knowledge in a super-symbolic economy. Change is inevitable in this new era, and it is shaping all aspects of our society, economy and political structure. The information revolution is also probably the most important force shaping communities today, and will cause major changes in the professional planner. The public is becoming more technologically literate and more educated, and today's youth are the first generation to grow up under the influence of computers. Computer usage and access to the internet by individuals and companies is vastly increasing, creating a large world-wide community with instant communications and billions of dollars being transacted electronically.

The primary land use patterns are changing as a result of information technology's impact on the various sectors. Organizations are experiencing the dynamic nature of the information technology through organizational shifts, telecommuting and enhanced communication and information systems, resulting in more mobile organizations, more mobile workers, increased efficiencies and decreasing demand for office space. The recent phenomenon of electronic commerce is geared towards major change in the way the retail business is conducted, and may transform consumer to business relationships permanently. Residential areas are receiving the spin-off effects of the office changes, generally through the merging of work and home and the increased freedom of worker mobility, which may spell end of the traditional "single-family" neighbourhood.

The combination of these issues and trends into a broad analysis of the impact of information technology on planning represents a new major challenge for planners, and

poses a new host of issues and problems to accommodate. Knowledge of information technology and its trends is significant for planners, as understanding how information technology is impacting the office, retail and residential sectors will be essential to learning how the city and planning will be transformed in the future. A study of the components and how they interact will create a better understanding of the whole. Information technology not only enables changes some of the basic planning issues, such as the evolution of the downtown or changes in housing, but planners may find themselves re-evaluating the planning process and planning tools that were so significant in the industrial age, and questioning their value for the dynamism of the information age.

The information age not only will have significant impacts basic planning issues, city form and land use, but on the basic structure and existence of the profession.. The complex and dynamic nature of the information age increasingly requires individual who can develop and communicate innovative solutions and the skills of the planner potentially place us in a position that will become more prominent in the constant flux representing the information age. The role of the planner is one that will find itself being re-evaluated in the near future.

In examining all these impacts, it should be noted that this thesis is not an attempt to predict the future or speculate which technologies are to become predominant in the future, nor is it even the purpose to identify key issues for the planner to be aware of. The main thrust is to suggest that the social and economic framework that planning was founded on is changing, and planners must become more adaptable to this change. It is not necessarily important to understand the technologies behind this transformation, but rather to develop an attitude shift which is adaptable, accepts inevitable change and can provide quick innovative solutions to new problems. The information age no longer relies on a fixed set of factors as was present in the industrial age, but on a state of constant flux. The critical message of this thesis is not the specific steps in facilitating, avoiding or stopping the influx of information technology and the changes it may bring,



but rather to be aware that changes will happen and planners should become knowledgeable of the technology and its impacts. However, in adapting to the information age planners should also attempt to examine four broad areas. Firstly, a re-evaluation of the community is necessary to determine its proper role in the information age. Secondly, an assessment of the planner's tools as discussed in Chapter Eight, for their value in dealing with the dynamic nature of the information age. Thirdly, a modification and updating of the planner's skills, as outlined in Chapter Nine. Lastly, and perhaps the most critical message of this thesis, is a modification of the planner's general attitude and approach to all aspects of the profession, keeping with the new "rules" laid out by the information age.

Cities and communities have been constantly evolving throughout history and the information age represents another significant step in this evolution. Planners need to be aware of the change to prosper and adapt in this transition period, a period which has slowly produced adaptations to the new climate. This may involve refining the entire planning profession and the processes and attitudes as a result, but change will be required of individuals and institutions. This is an excellent opportunity to bring the planning profession to the forefront of the 21st century, but it does require action, understanding, and adaptability to the forces that are changing our personal and professional lives.

## References

- Batty, Michael. 1997. Guest Editorial. *Online Planning*. August/September: 1-3.  
Internet Version: [www.casa.ucl.ca.uk/planning/articles1/mb.htm](http://www.casa.ucl.ca.uk/planning/articles1/mb.htm). Downloaded November 3, 1997.
- Bedford, Paul. 1997. When They Were Kings: Planning for Reinvestment. *Plan Canada*. July: 19-23.
- Blais, Pamela. 1996. How the Information Revolution is Shaping our Communities. *Planning Commissioners Journal*. Fall (24): 16. In *Shaping our Communities: The Impacts of Information Technology*. *Online Planning Commissioners Journal*.  
Internet Version: [www.lbl.gov/icsa/miles/index.html](http://www.lbl.gov/icsa/miles/index.html). Downloaded December 3, 1997.
- Borsuk, Mark. 1995. Commercial Real Estate: Roadkill on the Info Highway. *Microtimes*. October: 92. Internet version: [www.microtimes/realestate.html](http://www.microtimes/realestate.html).  
Downloaded January 4, 1998.
- Borsuk, Mark. 1996. What is the Impact of INFOTECH on Commercial Real Estate? Presentation to the Real Estate Round Table, Stanford Business School Alumni Association. Internet Version: [www.telecommute.org/borsuk3.html](http://www.telecommute.org/borsuk3.html).  
Downloaded January 4, 1997.
- BOMA International. 1998. Market Intelligence Report. Vol 1. Internet Version: [www.boma.org](http://www.boma.org). Downloaded March 16, 1998.
- Cadman, David and Simin Davoudi. 1997. Is There a Role For the Planner? *Online Planning*. August/September: 1-3. Internet Version: [www.casa.ucl.ca.uk/planning/articles1/mb.htm](http://www.casa.ucl.ca.uk/planning/articles1/mb.htm). Downloaded November 3, 1997.
- Carroll, Jim. 1997. *Surviving the Information Age*. Scarborough: Prentice Hall.
- Carroll, Jim and Rick Broadhead. *The Canadian Internet Handbook*. Scarborough: Prentice Hall.
- Castells, Manuel. 1991. The World Has Changed: Can Planning Change? Working Paper 030. Keynote Speech at the ACSP Annual Meeting, November.

- Celentano, Jeffrey. 1993. *Hard Time, High Tech & Home-based Businesses*. Plan Canada, November: 26-20.
- CIP News. 1997. *1996 Members Survey - Highlights*. Plan Canada. January: 3.
- City of Kanata. 1997. *Business and Economic Development*. Internet Version: [www.city.kanata.on.ca/business/homebase.htm](http://www.city.kanata.on.ca/business/homebase.htm). Downloaded January 28, 1998.
- Colliers International. 1997. *1997-1998 Canadian Real Estate Review*. Internet Version: [www.colliers.com](http://www.colliers.com). Downloaded March 28 1998.
- Covington, William. 1996. *Wireless World*. Planning. December: 8-12.
- Dykeman, Floyd. 1992. *Leadership and Community Renewal: Exploring the Planner's Role*. Plan Canada. September: 7-11.
- Esrey, William. 1992. *High-Tech Management*. Enterprise Magazine July. In *Shaping our Communities: The impacts of Information Technology*. Planning Commissioners Journal. Internet Version: [www.lbl.gov/icsa/miles/index.html](http://www.lbl.gov/icsa/miles/index.html). Downloaded December 3, 1997.
- Ferrara Contreras Architects Inc. 1994. *Home Occupation Scenarios: An Investigation of the Context for Live/Work environments and their regulatory requirements*. Report prepared for ACT (Affordability and Choice Today) Program.
- Fidelman, Miles R. 1994. *Life in the Fast Lane: a Municipal Roadmap for the Information Superhighway*. In *Shaping our Communities: The impacts of Information Technology*. Online Planning Commissioners Journal. Internet Version: [www.lbl.gov/icsa/miles/index.html](http://www.lbl.gov/icsa/miles/index.html). Downloaded January 23, 1998.
- Fielding, Jeff and Gerry Couture. 1994. *Reflections on the Profession*. Plan Canada. July: 148-152.
- Flehr, Mike and Malcolm Cooper. 1995. *Land Use Impacts of Telecommunications*. In *Shaping our Communities: The impacts of Information Technology*. Planning Commissioners Journal. Internet Version: [www.lbl.gov/icsa/miles/index.html](http://www.lbl.gov/icsa/miles/index.html). Downloaded December 3, 1997.
- Friedman, Avi. 1996. *Flexible Planning Strategies: The La Prairie Experiment*. Plan Canada March 1996: 33-42.

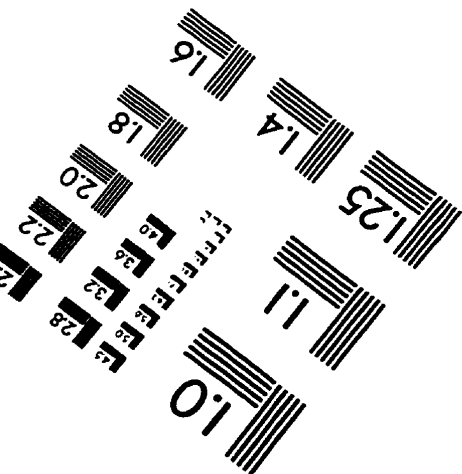
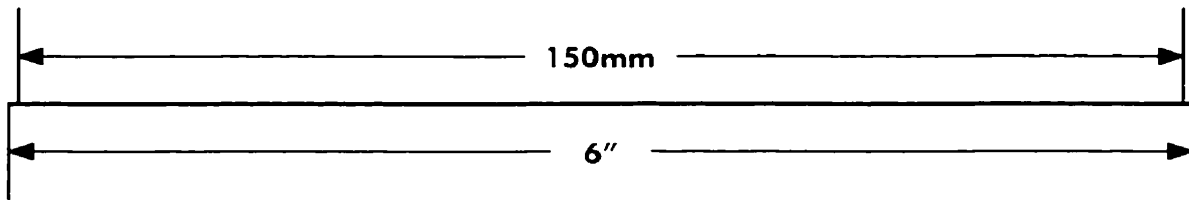
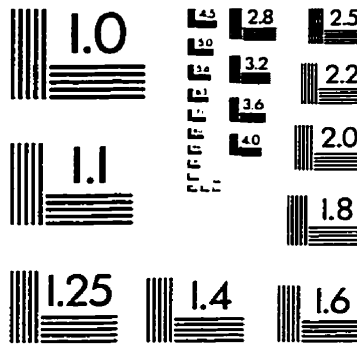
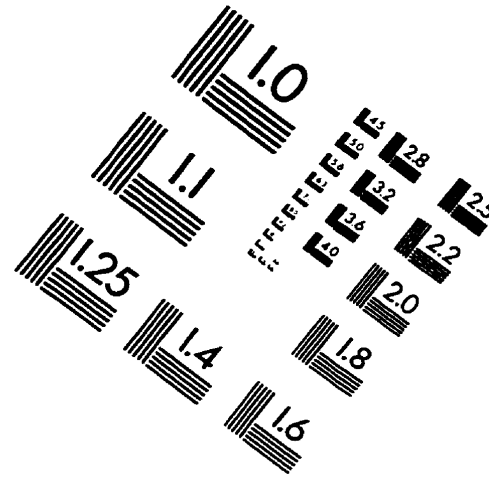
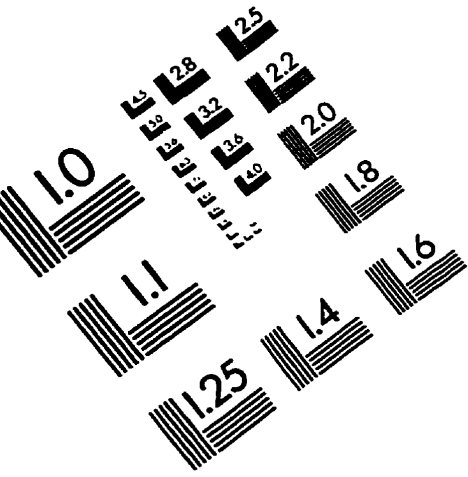
- Greenberg, Ken and Frank Lewinberg. 1996. Reinventing Planning in Toronto. Plan Canada. May: 26-27.
- Gregory, Michelle. 1997. Cell-Mania. Planning. July: 16-19.
- Gurstein, Penny. 1995. Planning for Telework and Home-based Employment. Report summary prepared for the CMHC.
- Hall, Peter. 1997. Comment on the Internet. Online Planning. August/September. Internet Version: [www.casa.ucl.ca.uk/planning/articles1/comment.htm](http://www.casa.ucl.ca.uk/planning/articles1/comment.htm). Downloaded November 3, 1997.
- Hall Peter. 1996. Changing Patterns of Cities and Low-Income Communities. Lecture given at the Colloquium on Advanced information Technology, Low-Income Communities and the City, Department of Urban Studies and Planning, MIT, February 6.
- Handy, Susan and Patricia Mokhtarian. 1995. Planning for Telecommuting: Measurement and Policy Issues. Journal of the American Planning Association. Vol 61 (1): 99-111.
- Hart, Jeffrey A, Robert R. Reed, and Francois Bar. 1992. The Building of the Internet. Telecommunication Policy. November: 666-89.
- Huff, Sid L. 1997. The Rise of Digital Business: Electronic Commerce is where the opportunities are. The Globe & Mail. Friday, November 14: 1-2. Special Supplement prepared by the Richard Ivey School of Business, University of Western Ontario.
- Ito, Kenji. 1997. Comprehensive Development Zoning: An Approach to Site-Specific Zoning. Plan Canada. July: 7-11.
- Kapor, Mitchell. 1997. Closing the Gaps between Computer-Haves and Have-nots. Lecture given at the Colloquium on Advanced information Technology, Low-Income Communities and the City, Department of Urban Studies and Planning, MIT, February 28 .
- KPMG. 1997. Telecommuting Survey. Internet Version: [www.kpmg.ca](http://www.kpmg.ca)
- Larkin, Bill. 1996. Home Systems. Urban Land. March. Vol 55(3): 41-45.
- Lehman, Robert. 1997. The Case of the Erroneous Zone. Plan Canada. July: 25-27.

- Maloney, Patricia. 1994. The Master Plan: How Much is Enough? *Plan Canada*.  
March: 35-37.
- Marshall, Alex. 1996. Technology Transforms the Places we Live. *Metropolis Magazine*. In *Shaping our Communities: The impacts of Information Technology*.  
Online Planning Commissioners Journal. Internet Version:  
[www.lbl.gov/icsa/miles/index.html](http://www.lbl.gov/icsa/miles/index.html). Downloaded January 25, 1998.
- Marx, Leo. 1997. The Critical and Historical Perspective. Lecture given at the  
Colloquium on Advanced information Technology, Low-Income Communities and  
the City, Department of Urban Studies and Planning, MIT, March 6.
- McFaul, Stephen. IBM's Flexiplace. *Innovations Canada*. Internet Version:  
[www.innovision.gc.ca](http://www.innovision.gc.ca). Downloaded April 16, 1998.
- Mitchell, William. 1995 . *City of Bits: Space, Place and the Infobahn*. U.S.A.:  
Massachusetts Institute of Technology.
- Mitchell, William. 1996. Information Technology and the way Communities Work.  
Lecture given at the Colloquium on Advanced information Technology, Low-  
Income Communities and the City, Department of Urban Studies and Planning,  
MIT, February 28.
- Mokhtarian, Patricia. 1991. Defining Telecommuting. *Transportation Research Record*.  
1035: 273-281.
- Mokhtarian, Patricia, Susan Handy and Ilan Salomon. 1995. Methodological Issues in the  
Estimation of The Travel, Energy and Air Quality Impacts of Telecommuting.  
*Transportation Research Record*. Vol 29A (4): 283-302.
- The Monitor. 1998. Netbytes. March: 94-99.
- Morino Institute. 1996. The Promise and Challenge of a New Communications Age.  
Internet Version: [www.mortino.org/publications/promise.html](http://www.mortino.org/publications/promise.html). Downloaded  
February 12, 1998.
- Murphy, Helene and Leslie Morison. 1997. Innovation in Building Design. *Urban Land*.  
December. Vol 56(12): 36-41.
- Myers, David. 1997. Office Build-to-Suit. *Urban Land*. May. vol. 56(2): 31-33.
- Negroponte, Nicholas. 1995. *Being Digital*. New York: Alfred A Knopf.

- Nua Internet Surveys. 1998. How many Online? Internet Version:  
[www.nua.ie/surveys](http://www.nua.ie/surveys). Downloaded March 28, 1998.
- Orser, Barbara and Mary Foster. 1992. Home Enterprise: Canadians and Home-based Work. Report prepared for the Home-Based Project Committee.
- OTA (Office of Technology Assessment). 1995. Technological Reshaping of Metropolitan America. OTA-ETI-643. Washington, D.C.
- Pearce, Michael R. 1997. Privacy: The Retail Consumer is Watching. *Globe & Mail*. Friday, November 14: 1-2. Special Supplement prepared by the Richard Ivey School of Business, University of Western Ontario.
- Pittas, Michael. 1994. A Virtual Reality. *Architecture California*. November: 58-61.
- Roebuck, Sandra. 1992. Confused Signals: Telecommunications and Planning. *The Planner*. April 3: 7-9.
- Rutkowski, Tony. 1997. Internet Hosts - Overall Trend. *General Magic*. Internet Version: [www.genmagic.com/internet/trends](http://www.genmagic.com/internet/trends). Downloaded March 29, 1998.
- Saucedo, Oscar. 1995. It Pays to Have Good Connections. *Urban Land*. April. Vol 54 (4): 58-61.
- Schwartz, Mary. 1997. The Impact of Nonstore Competition on Retail Stores. *Urban Land*. July. Vol 56 (7): 50-52.
- Smith, Kennedy Lawson. 1997. The Third Wave of Retailing. *Main Street news*. September/October. In *Shaping our Communities: The impacts of Information Technology*. *Planning Commissioners Journal*. Internet Version: [www.lbl.gov/icsa/miles/index.html](http://www.lbl.gov/icsa/miles/index.html). Downloaded November 28, 1998.
- Statistics Canada. 1997. Household Facilities and Equipment. Internet Version: [www.statcan.ca](http://www.statcan.ca). Downloaded February 14, 1998.
- Stein, Karen. 1997. Good Design is Good Business. *Architectural Record*. October: 54-57.
- Tapscott, Don. 1996. *The Digital Economy: Promise and Peril in the Age of Networked Intelligence*. New York: McGraw-Hill.
- Toffler, Alvin. 1990. *Power Shift: Knowledge, Wealth and Violence at the Edge of the 21st Century*. U.S.A: Bantam Books.

- Warson, Albert. 1995. Building Telecommunities. Urban Land. May: 37-39.
- Witty, David. 1994. Taking the Pulse of Canadian Planners: A Snapshot of the Profession. Plan Canada. July: 153-159.

# IMAGE EVALUATION TEST TARGET (QA-3)



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