

THE INFORMATIONAL CITY:
A NEW FRAMEWORK FOR SOCIAL CHANGE

Manuel Castells

Research Paper 184

The City in the 1990s Series
Lecture 3

Lecture delivered in the series
The City in the 1990s: Livable for Whom?
sponsored by
The Centre for Urban and Community Studies
Fall, 1989.

Edited for publication by
Barry Wellman and Judith Kjellberg Bell

Centre for Urban and Community Studies
University of Toronto
September 1991

ISSN: 0316-0068
ISBN: 0-7277-1357-X

THE INFORMATIONAL CITY:
A NEW FRAMEWORK FOR SOCIAL CHANGE

Manuel Castells

Research Paper 184

The City in the 1990s Series
Lecture 3

Lecture delivered in the series
The City in the 1990s: Livable for Whom?
sponsored by
The Centre for Urban and Community Studies
Fall, 1989.

Edited for publication by
Barry Wellman and Judith Kjellberg Bell

Centre for Urban and Community Studies
University of Toronto
September 1991

ISSN: 0316-0068
ISBN: 0-7277-1357-X

THE CITY IN THE 1990S: LIVABLE FOR WHOM?

Six lectures were given by internationally known scholars and experts in the Fall of 1989, to celebrate the 25th anniversary of the founding in 1964 of the Centre for Urban and Community Studies. These are now being published as Centre Research Papers, in a series entitled *The City in the 1990s*.

Peter Hall: *Reinventing the City* (Lecture 1)

John Sewell: *Prospects for Reform* (Lecture 2)

Manuel Castells: *The Informational City: A New Framework for Social Change* (Lecture 3)

Forthcoming:

- Jorge Hardoy: *Building and Managing Cities in a State of Permanent Economic Crisis*
- Birgit Krantz: *Increasing the Livability of Urban Architecture: Advances from Swedish Experience*
- Charles Tilly: *Immigrants and Cities in North America*

THE INFORMATIONAL CITY: A NEW FRAMEWORK FOR SOCIAL CHANGE

THE AUTHOR

A Spanish citizen, Manuel Castells is Professor of City and Regional Planning and Affiliated Professor of Sociology in the University of California at Berkeley, and Professor of Sociology and Director of the Instituto de Sociologia de Nuevas Tecnologias, Facultad de Ciencias Económicas, Universidad Autonoma de Madrid.

Dr. Castells holds his first degree in Public Law and Political Economy, his Masters degree and Doctorate in Sociology, all from the University of Paris, and a Doctorat d'Etat en sciences humaines from the Sorbonne. He taught sociology at the University of Paris and at the Ecole des hautes études en sciences sociales in Paris, until his move to California in 1979. He has held visiting professorships at universities around the world.

His publications include 17 books which have been translated into a dozen languages, and 60 articles in academic journals in Europe, Latin America and North America. His book *La Question urbaine*, published in Paris in 1972 and in English as *The Urban Question* in 1977, had a revolutionary impact on how we think about cities, showing how power structures affect their functions and the way people use them. *The City and the Grassroots*, published in Berkeley in 1983, analyzed the relationship of urban social change to other processes of social change. This book received the C. Wright Mills Award.

His latest book, *The Informational City*, was published by Basil Blackwell in 1989.

ABSTRACT

The informational city is the spatial expression of a new form of social organization that is made up of the interaction of new information technology, and social and cultural information. The paper examines the relationship of technological change to informational technology. It describes major processes of social and economic restructuring in our society, and the role of technology both in shaping these. It analyses the interaction of socioeconomic and spatial processes. An important social consequences of these spatial developments is the loss of control (and meaning) of place, as networks and spatial flows become dominant. Yet in a world economy, local governments may have more importance than national ones.

TABLE OF CONTENTS

Preface	iii
Introduction	1
The Process of Change in the Information Revolution.....	2
The Impact of the Information Revolution on Urban Structure	3
The Impact of the Information Revolution on Interpersonal Networks.....	4
How the Information Revolution is Shaping Society	6
The Emergence of an Information Economy	7
The Internationalization of the Information Economy.....	8
Fundamental Changes in the Organization of Production and Management.....	9
Spatial Processes	11
Restructuring of Organizational Control from Headquarters	11
Decentralization of Customized Service Activities	12
The New Industrial Space.....	14
Spatial Divisions of Labour.....	14
Milieux of Innovation.....	15
Decentralization of Production	16
Social Consequences of New Spatial Forms.....	17
The Loss of a Sense of Place.....	17
Community Attempts to Control the Space of Flows.....	18
Conclusion.....	20
Local Governments as Mediators Between Global and Interpersonal Networks	20
Community Information and Mobilization.....	21
Bibliography.....	23

PREFACE

To my mind Manuel Castells is a man who takes enormous risks—intellectual, personal and political. He fruitfully links praxis politics, substantive scholarship, theorizing, and policy research, and that without parallel in urban studies.

Manuel was born, and probably always will be, a Spanish citizen, but he first burst upon the scene in France where he had moved because of difficulties in Spain under Generalissimo Francisco Franco. Manuel published *La Question Urbaine* in French in 1972 (published in English as *The Urban Question*, 1977). This book re-defined the field of urban sociology, making the field less bloodless. All of a sudden we were talking about power blocs and the role of the state in constraining individual activities. Cities were no longer nice places where urban sociologists only had to worry about whether people live in concentric zones or in sectors. It was a formidable book, a masterpiece of French logic, buttressed by a number of examples, Manuel had seized the high ground, and very solidly so, in urban studies. That in itself would have been a notable career, but equally notable is the risky move that Manuel then made. He left the French scene where he had disciples and visibility, and moved to what was, in many ways, the exact opposite—North America. However, he did not suffer too much by moving to the University of California at Berkeley. There is always a whole lot of shaking happening in Berkeley.

Going from the French situation to the empiricist, American situation is a difficult and dangerous move. Manuel did it flourishingly. His study of social movements both in Latin America and in San Francisco was published as *The City in the Grassroots* (1983). His writing reflected his personal development, from thinking about social class to incorporating that into considering other forms of social organization and social position, such as gender and lifestyles, to examining the role of these in empowering social movements both in Latin America and in the United States.

Silicon Valley started booming in northern California in the 1980s. When I was in California in 1985, Manuel was becoming impressed by the potential of information technology to re-organize lives, from everyday lives with modems and VCRs to what he will be talking about today, the macro-economic, macro-sociological re-organization of regional and world economies. This fascination with information technology and its social constraints has been part of a current in western European thought, and is seen by all parties as a way of competing with North America. When French President Mitterand came to America in 1985, one of the high points of his agenda was his desire to go to Silicon Valley and see the kind of miracles that are happening there. More important, European socialist politicians have been thinking about some of the social implications. Lenin once said that socialism plus electricity equals communism. My sense is that the governing

French and Spanish socialist parties now are thinking that socialism and information technology equals social democracy.

One product of this work has been a book edited by Manuel in 1985, *High Technology: Space in Society*. It argues that technology can only be understood and implemented in the social framework: What is it going to do for people, institutions, locations? Who is going to control it? How does it fit within broader frameworks of social relations?

Manuel has been furiously active. He returned from Moscow where he organized a conference on workers' self-management, no less, in which such interesting groups as the anarchists participated. Manuel is now on leave (1989-1991) from Berkeley working with the Spanish government, where he has been doing three things: he is directly involved in a practical sense in the design and building of Science City, a high-technology oriented infrastructure, near the beautiful city of Seville; he has been advising the Madrid government on regional development policy and technology infrastructures; he has been working directly with the Spanish Prime Minister as a key adviser in high technology, how to educate the labour force, what kinds of telecommunications to put in, what kinds of industries to establish, where to locate them, how to control them, and how to deal with the stresses that new industrial policies might cause.

All these activities share common concerns: an appreciation for the socio-economic forces that drive them and the socio-economic consequences that may flow from them, and an interest in how state and corporate power mould individual choices and opportunities. This is a continuing, very Canadian concern, which our American neighbours find it hard to understand. All this and much more is contained in his new book, *The Informational City* (1989).

Barry Wellman
September 1991

INTRODUCTION

This paper explores the web of interactions between the process of technological change that we are now experiencing, the overall process of socio-economic restructuring which is taking place all over the world, and the new urban and regional processes that are emerging from the combined impact of informational technology, techno-economic and socio-economic restructuring. It will draw on my work of the last seven years, now published in *The Informational City* (Castells, 1989). My work relies on North American data, although it tries to address in a more analytical vein the general question about the production of this new spatial form, which I call "the informational city." The informational city is not so much the city as it relates directly to information technologies themselves, but the city that could parallel the industrial city as it developed from the industrial revolution. In the same way, the industrial city is not merely the city where industry is located, but the city which has the spatial and social form that corresponds to a number of social and techno-economic processes: processes which form a coherent ensemble of material and cultural structures that provide the basis for a new spatial form. In other words, my hypothesis is that the informational city is the spatial expression of a new form of social organization that is made up of technology, cultural information, and social information as well as their interaction.

I will first introduce some basic ideas about the characteristics of this process of technological change and of the mythological problems one finds when trying to address these questions directly rather than through the ideologies generally promoted in the media. Second, I will describe briefly the major structural processes that are shaping our economy and society, and try to show that technology is an important variable in these processes. Third, I will examine how these economic and social processes interact with the new spatial processes and how there is also an important technological variable in this interaction. Fourth, I will introduce the most important social consequences to flow from the development of these spatial forms, and finally, address some policy implications.

THE PROCESS OF CHANGE IN THE INFORMATION REVOLUTION

Two important features that characterize the processes of technological change should be kept in mind as I develop my analysis. First, although it seems obvious, it is important to remark that this technological revolution is based on information, just as the first industrial revolutions were based upon energy. Therefore, these processes of technological change directly affect information processing activities, the activities that are at the core of information and society. Also, because information has something to do with manipulation of symbols—and therefore with intelligence, and therefore with the human mind, and therefore with culture—the importance of this particular revolution is that for the first time productive forces and the cultural society have become directly tied and interdependent. Although intelligence and information were important in all technological revolutions, this is the first time in history in which the way we think becomes directly connected to the way we produce and the way we develop. The source of our material development and the structure of our way of thinking are intimately related. This is a major change from former technological revolutions such as the industrial revolution which were based more on energy than on information, even if there was always an informational component.

Second, as with all major technological revolutions, the information revolution is process-oriented rather than product-oriented. The difference lies less in the development of new products (there are of course new products but there are always new products) but in the focus of the technology on the process itself. For instance, a chip is not something that one uses directly but is something one uses to introduce into all kinds of processes. It was the same with the energy revolution and with all major technological revolutions throughout history; that is why they are revolutions and not simply technical innovations.

Being process-oriented, revolutionary effects are pervasive. They are not confined to one particular domain of the human experience. They are linked to the way we produce, consume, manage, live and die. The revolutionary change of the technological paradigm is intimately linked to the change in the material basis of our social structure.

The Impact of the Information Revolution on Urban Structure

With this understanding, it is easy to argue that there is a major impact of this information revolution on cities, regions, spatial forms and spatial processes. Indeed, it has often been generally proposed that cities and regions, spatial forms and spatial processes are directly affected and transformed by the technological impact of the information revolution. Expressed in vague terms this is an ideology. It takes the form of the prophecies that people such as Alvin Toffler or others in the media make, that information technologies and telecommunications will mean the end of cities as dense agglomerations. They prophesy that the telecommunication/transportation trade-off will mean that we will have undifferentiated agglomerations in which people will stay home and work through computers and telecommunications. This is the traditional "end of the city" ideology linked to the immediate extrapolation of the effects of information technology on spatial forms and processes.

In fact, one could propose that there is no direct relationship between the type of technology we use and the spatial forms and processes in which we live. Here are a couple of examples: one in terms of the productive processes, and another in terms of social relations. In terms of productive processes, it has sometimes been proposed that telecommunications are linked to the decentralization of offices and office jobs. Yet studies of New York City show that the main impact of the massive growth of telecommunications, teleports, and fibre-optic networks in New York has been to increase, not to decrease, the concentration of business transactions and therefore of office space used in central New York City and, in particular, Manhattan. Why? The high-level of concentration of corporate headquarters in New York means that there is demand for sophisticated telecommunications. Therefore the most sophisticated telecommunication facilities were set up in Manhattan, and to be on-line with the entire world you must be physically in central Manhattan.

So management capabilities can be decentralized, but first must be directly linked to a business network and to a cluster of business corporations located in that particular area. I will discuss in more detail how this process works, but one thing that can be stated is that telecommunications do not decentralize business transactions. At the same time, they both centralize and decentralize high level locations for business, such as New York, or Singapore or Hong Kong in Asia, or

Frankfurt or Zurich in Europe. At the world level, they increase the concentration of the business network in a few points.

The Impact of the Information Revolution on Interpersonal Networks

The same thing has happened in terms of social relations. Some pundits have proposed the idea that telematic systems would push people into their homes: people would stay home, communicating from there, looking at videos, watching television through satellite receiver devices. These pundits warned that this could lead to the development of a massive suburban world through the diffusion of homes throughout large metropolitan areas, and that the density and intensity of urban life would disappear.

We can examine this proposition through the example of Minitel, the French system in which the telephone company gives terminals to homes. It was originally intended to substitute for the Yellow Pages, but it also allows people to send messages and to contact services. Minitel is a big success; it is used in more than one million French homes for a variety of purposes, generally unintended. For instance, while no one seems to be very interested in being updated minute by minute about weather conditions in the Paris area, the most important use of Minitel is to exchange erotic messages. For one franc per three minutes, this is a national pastime.

It is also interesting to compare the effects of Minitel with some of the ideological statements from the left to the effect that these technocratic devices would kill social movements, since everybody would be playing "earth invader" games at home. Yet the reality is different. In 1986 when Minitel was first introduced, organizers of the first major student demonstrations in Paris forgot about pamphlets and used Minitel instead. They gave rendezvous points and passed on messages through Minitel, showing again, fortunately, the dominance of culture over technology. Although the technology was different, its use was framed, shaped, organized and dominated by culture.

In terms of relationship to spatial forms, consider what happened in Los Angeles, where private enterprise tried to introduce Minitel. Only 10,000 homes in the Los Angeles area were recruited for the experiment, and it was abandoned

after about two years because it was not profitable enough. If one compares the success of this telematic technology with the urban form, we see that Los Angeles without Minitel is still an endless suburb while Paris with Minitel is still an intense urban place with lots of street life and cafés and encounters in public places. But the opposite had been predicted in the pseudo-scientific literature.

The same can be said about all the elements forecast as inevitable social developments linked to new technology. The most obvious is telecommuting: working at home instead of going to work, being connected to the office through the computer and telephone line. In 1985 the Congressional Office of Technology Assessment surveyed how many people in the United States were actually working at home using telecommuting. They found only 30,000 people. As that was almost five years ago, recent estimates have put the number as high as 100,000. Yet 100,000 people over the entire American population is not very many. Other estimates are proposed by information technology companies trying to secure telephone lines, but these estimates include professionals working at home and relating to their office by telephone line, when this is exactly what European professionals have done all their lives. People always take work home for the evening or weekend, being in touch with the office or the university or the hospital by telephone.

It is clear that the pace of telecommuting development is slow. The obvious reason, besides the functional relationships within offices, is that people also have social relationships in offices which cannot easily be reconstructed outside the office through telephone and computer networks. Unions also resist hooking people to computers, although some women have been attracted or forced to the formula of working at home so that they can take care of their children at the same time.

The same thing has happened with video shopping. Five years ago pundits anticipated it to be one of the main elements of the new technologies. It would change cities. People could shop from home through the combination of television, computer and telephone line; shopping malls and retail streets would disappear. But look around your cities and see what is going on. All the studies show that shopping itself is only one of the reasons why people go shopping; the commercial act of shopping is the least important of all the social activities that take place in shopping centres or on retail streets. People go there to find some

pretext for social interaction, and functional shopping is relatively limited to daily or weekly trips for basic needs.

There is also talk about "wired cities." There are isolated instances of wired cities, for instance Palo Alto in northern California, but in fact this is also something limited and linked mainly to instrumental purposes, particularly management functions in high-level corporations. There has been a boom in what is called "smart buildings" and local area networks, but this is linked to the emergence of new forms of management that use information technology but do not shape technology. The spatial form is the new socio-economic organization using technology to build information networks where they are needed, that is, where businesses have to be connected together.

Transportation in large cities is getting worse. All the predictions for the United States are for traffic problems in the next fifteen years to continue to worsen. (Remember that things can always be worse, in all aspects; they can also be better, but there is no physical or social limit to worsening or improving the situation, that is the wonderful thing about life.) In the midst of a major telecommunication explosion lie increasing traffic jams. So much for the telecommunications/transportation trade-off.

One of my students at Berkeley measured the impact of the increase of telecommunication services on traffic in central Tokyo at a time when the Japanese are supposed to have mastered the telecommunication system. The impact is clear: it increases traffic. Telecommunications and telephone calls are used to set up meetings and then people go to these meetings. The more telecommunication traffic there is, the more automobile traffic.

HOW THE INFORMATION REVOLUTION IS SHAPING SOCIETY

This information revolution will be no different from any other technological revolution in the sense that we still have to understand how new social and spatial processes will take place. There is no single effect. Rather, the process has to be included in a broader analysis of economic and social change.

To understand the effects of what information technology is likely to produce, I shall discuss the major processes of transformation of power and socio-

economic organization. There are three main processes: the emergence of an information economy, the process of internationalization of the economy, and fundamental change in the organization of production and management in our societies. By referring to these three processes I point to probably the only way in which I remain a Marxist: I still believe that the way we work determines most of what happens in society. In that sense, work and the material conditions of work, and the social relations structured around work, production and management are crucial in determining everything else. They create the matrix in which processes of social change take place, and within which people think and behave.

The Emergence of an Information Economy

The emergence of an information economy is more important than was the change from manufacturing to services. We are not in a service economy, we are in an information economy—a great difference. It is not correct to speak about a service economy for two reasons. First, to say “services” is to say nothing. When financial analysts and a hamburger maker are put into the same analytical category, clearly that category is useless. Everything can be called service.

Second, it is not true that services are the dominant activity in the economy. If we look at actual processes in society rather than at statistically rigid categories, we can see that most service activity is dependent on the functions it performs for manufacturing, for agriculture, and for the production of symbols or goods. For instance, agricultural activity in the United States employs about 3% of the population. This 3% produce food for most American families, with an additional 50% of that amount for export. However, if all the people and industries involved in food distribution were to be included, then 25% of the people in the United States would be linked to agricultural production.

The same thing is true for services for manufacturing industries such as automobile production. If people who work in selling, designing, advertising, and thinking about automobiles were included, 27% of the working population would be involved. The automobile supports a much broader structure.

Under such conditions, it is useless to speak of a distinction between goods and services. The important thing, the real transformation, is that most of the

labour force increase in our societies is in information processing. It has taken place in manufacturing, in agriculture, and in all kinds of service activities. The manipulation of symbols, ideas and knowledge has become the core of our economy, and this is the fundamental difference in our relationship to other societies.

In the western world in 1960, about 40% of the workforce was involved in information activities. In 1970 this figure had climbed to 46%, in 1980 to 51%, and present estimates are about 60%. In the United States, of 16 million new non-farm jobs created between 1975 and 1980, 8 million were in information processing. In the 1980-1985 period, the proportion is even more overwhelming: out of 4 million new jobs created, 3.3 million have been in information processing activities.

Not only has information processing become a main activity, it has also become a strategic activity. It is the main source of productivity and profitability, therefore making all the difference in terms of competitiveness in the world economy. It is the use of information technologies that has made possible this increased productivity and profitability in information processing activities. In other words, the big stumbling block on which the process of economic growth had been stopped during the first, second and third industrial revolutions was precisely the fact that crucial information processing activities did not have adequate technology to parallel their increasing manufacturing productivity. It is the recent development of information technologies that has freed this massive amount of information productivity. Analyses of the development of an information economy must have recognition of the strategic role of information technologies in making activities more productive.

The Internationalization of the Information Economy

Another major process that is transforming our society is the internationalization of the economy. Economic processes at the world level have always taken place. However, the last decade has seen a new phenomenon, an economic system that works as a unit in real time. There are no longer national economies. Economies work in terms of capital, in terms of market, in terms of management, in terms of production, in terms of consumption, and in terms of labour. They

work as a unit across national boundaries. We have left the world in which some of us were brought up, the world of national economies that exchanged between themselves. There is no more national economy at this point; even such a self-contained continental economy as the United States is now dramatically internationalized. The acquisition of the Rockefeller Centre and Paramount Pictures by Japanese capital have been interesting symbols of what has changed in America.

This world economy is one of the most fundamental realities for the so-called socialist countries at this point, because one of the major reasons why Eastern European countries want to change their societies and reform their cities is to be able to connect themselves to the world economy, and they cannot do that unless they change their systems. It is not the other way around. They connect and then change; they must change to be able to integrate into the world economy.

This internationalization of the economy is only possible because of information technology. It is not information technology which pushes the process. There are fundamental forces, but it would be impossible to manage flows of capital every second in real time without the kinds of information technology that exist. Telecommunications are to the information of the world economy what the mail and telegraph were to the information of national markets in the 19th century. In that sense, the system of computers, telecommunications and all the microelectronics that go into it, is a fundamental material basis for this internationalization of the economy. It makes the speed and extent of the formation of the world economy possible.

Fundamental Changes in the Organization of Production and Management

Another dramatic, but less publicized, transformation is in the organizational forms of companies and institutions. This is happening in both the private and the public sector, but more strongly in the private sector. It is a shift from vertically-organized large corporations to cities of networks between organizations. It is not that we have no more large corporations. Large organizations continue to be the dominant form of our society, but the form that they adopt is much more as flexible networks. Organization and form are changing, but not economic or institutional power. Units and decentralized

management combine generally horizontal relationships with vertical structures, so that networks, not bureaucracy, become the predominant form in the new industrial organization. These networks develop on the basis that flexibility is absolutely central to play the competitive game in our economy; without flexibility, organizations cannot respond to the continuous process of change. So networks become central. These could be:

- Networks that take place within corporations with decentralization of management and greater autonomy being given to the lower levels of the corporations;
- Networks that relate large corporations and smaller businesses;
- Networks of small businesses that establish their own networks;
- Networks between corporations.

The latter form is different from the earlier conglomerates and oligopolies. It is called the new trend toward "strategic alliances" between the large corporations that dominate today's world economy. These strategic alliances of large corporations mean less that Phillips and Siemens get together and form a conglomerate to attack the world market (although they may do that in North America, battle each other in Europe and also have different partners with which to fight each other in southeast Asia), but that the geometry of the system is based on moving and changing networks which are more important than what one corporation does at one particular moment. Control over these networks and their changing shape is much more important than a specific alliance at any particular point. Computers and telecommunications are crucial for the functioning of these networks, particularly when they work with the world as their horizon.

Without new technologies, we cannot understand how small and medium companies in Hong Kong get into the world market. It is not multi-national companies that export from Hong Kong; 86% of Hong Kong exports are made by companies employing fewer than 50 people. Without these new technologies, phenomena such as the Benetton model would not exist. Benetton is an Italian family business that has spread all over the world but it is not a multi-national company. The way Benetton works is that it does not exist. It licenses ideas and establishes connections, and that is impossible without the new information

technology. So networks have become absolutely crucial in certain economic activities, including public sector activities.

SPATIAL PROCESSES

In addition to the three major processes that I have discussed, we have the crucial strategic role played by technology in the materializing of these three processes in the re-shaping of our society. What does this do to spatial forms and processes? I propose the idea that cities are still fundamentally shaped by workplaces. It is not that other elements of the city are unimportant, but that the ways in which workplaces are structured, structure the city. Let us see how the three major processes express themselves in spatial forms. Both office work and manufacturing are shaped by technology. Yet at the same time the ways they relate to space also uses technology as a medium. Technology is at the core of the three processes and it is a fundamental mediating variable in the relationship of these processes to the spatial forms they produce.

Restructuring of Organizational Control from Headquarters

I will present three different cases to illustrate the effect of service activities—what are called tertiary activities (basically office and commercial businesses)—on spatial forms and processes.

First, corporate headquarters. Most headquarters are still highly centralized in the central business districts (CBDs) of the largest metropolitan areas. In the United States, Matthew Drennan (1991) analyzed the spatial location of information-intensive businesses showing that these headquarters are disproportionately located in what are called global cities. Saskia Sassen, an innovative New York-based sociologist has written the first comparative analysis of London, Tokyo, and New York (Sassen, forthcoming, 1991). It shows the increasing concentration of high level headquarters in these three cities and in some areas of each city.

Together with the development of global cities we have the formation of nodal cities, cities that in particular regions of a few countries continue to concentrate the dominating, top management activities. But why is it that at the very moment when one could have a decentralization of activities through

technology, high-level functions are becoming more concentrated? At the same time that many corporations are decentralizing some activities to other cities and to the suburbs of cities, actual key decision-making units are increasingly concentrated in the centres of global and nodal cities.

I suggest to sociologists and open-minded economists that face-to-face interaction is a fundamental element of high command activities. It is a notion of milieu, that people need face-to-face contact to trust each other, so that to arrange operations that are on the edge of legality and account for a few million dollars it is better to talk to your friend in Central Park than trust some bureaucratic organization. Even if the decision-making process is perfectly legal, it still requires a high level of personal interaction and a local culture that expresses itself in restaurants, in places where you go together, in schools where your children go together, etc. The notion of social milieu at the high level of command in our societies is as important as ever.

Second, these commanding places need a cluster of services. Such clusters are highly complex and difficult to reproduce, from the copy houses to the financial analysis, computer services, and lawyers' offices which are the backbone of the entire system of decision-making.

Third, as I mentioned above in my example of New York, high-level telecommunication facilities make it possible to reach out globally, to reach out to the entire planet from a few blocks. But you may have to be in those few blocks to have the whole system set up. What the newest information systems do to this milieu is to transform micro-networks based on face-to-face interaction into macro-networks that are the global reach of these micro-networks. The macro-networks are automated through telecommunications, and the micro-networks are intimated through face-to-face interaction.

Decentralization of Customized Service Activities

Banking provides a good example of decentralized activities. It follows several logics. On one hand is the expensive concentration of high-level operations in some key financial centres in the world, while on the other hand are cost savings: the automation and decentralization of many operations. Machines

do this, and the banks concentrate on decentralizing the machines. Machines are everywhere, but this is not the real banking business. The real mass-market banking business is banking services, so branches are transforming the traditional tellers into sellers of services—from teller to seller.

There are three trends: functions of financial direction concentrated in the central business district; machines everywhere for automated services; and for selling services, decentralized local branches operating at much lower standards than in the past. The banks follow the population which is, of course, the market; the more spatially spread the population, the more there are decentralized retail services and customized commercial banking services.

In addition there are decentralized back offices in metropolitan areas especially, but also in non-metropolitan areas. Our studies at the Institute for Urban and Regional Development at Berkeley have shown the spatial pattern of new industry: re-centralization of headquarters, decentralization of services to the customers, and decentralized suburbanization of back offices for routine automated operations.

The suburbs provide cheaper space and cheap, educated labour often consisting of married women working part-time. The idea is that married women who want to go back to work but still want to take care of their families are highly educated, skilled workers ready to work for less money. One company carried out a demographic study to target an area where there was an abundance of married women of German descent whom they had decided were the hardest-working women who were socially acceptable to the company.

These activities are clearly not footloose, they cannot go just anywhere. The headquarters need classes of services, a business milieu, telecommunication facilities, and a transportation network. They need central areas, mainly the central business districts. Nor are the back offices footloose. They need transportation, telecommunications, proximity to an airport, and local labour markets; the latter point was emphasized again and again in our surveys of insurance companies.

The New Industrial Space

This complex pattern is at the same time centralizing and decentralizing. One cannot say that technology creates only the Manhattan phenomenon, or the suburban phenomenon, or the decentralization of Citicorp offices to Sioux Falls, South Dakota. It is more than that. It is a simultaneous, flexible process of centralizing and decentralizing activities. The key element is the ability to connect the functions of the organizations that are not footloose and to link them in one single unit through space. They need specific spatial locations which are not necessarily decentralized.

The important thing is the transformation of spatial constraint through a system of information flows. This is the formation of the space of flows. The space of flows are material spaces although they are more difficult to imagine than places. They have an architecture—the informational systems—but the space of flows is very different from the space of places that we have known traditionally.

What is the main difference between places and the space of flows? The space of flows can be abstract in social, cultural and historical terms, but places are also condensations of human history, culture and matter. The space of flows can be totally internal to the abstract logic of the computers and telecommunications architecture. Therefore they can be shaped, programmed and re-programmed according to the logic of the commanding organizations as well as the logic of the senders and receivers of the signals and the symbols that go through the space of flows. We are moving from a materially-constructed, historical space to a technologically deconstructed space based upon the ability to constantly re-program according to the interests of the different interactive elements in the process of flows.

Spatial Divisions of Labour

I can introduce a similar analysis to the location and functioning of manufacturing activities, the other major element of our working organizations. I have studied the locational patterns of high technology industries which are the leading edge of all industry penetrated by high technology. This pattern is characterized all over the world by three major spatial characteristics. First, a strict spatial division of labour exists between the different functions of a manufacturer.

To take one example, the most typical high technology industry—semi-conductor production—has processes with very different requirements. It is possible to separate the processes of research and design of the chips, fabrication, assembly, testing and final packaging. These operations are so distinct that they can be separated in time and space. Indeed they must be separated in time and space. Labour requirements are so distinct that you need different spaces for a labour market made up of PhDs and high level engineers on the one hand and chip assemblers on the other hand. PhDs and engineers require expensive urban facilities and space for themselves and for their children, while assembly of chips is one of the most unskilled operations. Therefore the two labour markets do not mix in either functional or social terms.

One might think that all industries have traditionally been that way, separating high-level engineers and unskilled workers. The big difference is that now the labour force split is 40% scientists and 40% unskilled workers, not the traditional ratio of 10%-70%. These industries are top heavy in that skilled labour is their crucial component. Their basis is in access to new information, new production and knowledge. What makes a chip, or the design of a particular automobile valuable is its design, not so much its actual production.

We have moved to a process in which innovation has a premium. Therefore, a concentration on the high-level functions of production is critical for location. A number of studies have shown that in Western countries, the more an industry is penetrated by high technology, the stricter is the separation of the different processes between spatial locations. So the functions can be separated, disjointed in a space and then re-integrated easily, because transportation costs are increasingly low and the ratio between value and waste is increasingly on the side of value. Thus a jumbo jet can be filled with chips and sent from Singapore to Silicon Valley, back and forth.

Milieux of Innovation

The second major spatial characteristic is the strategic importance of the milieu of innovation: the Silicon Valleys of the world. This is the idea that certain privileged places have a position in the new manufacturing processes in the same way that milieux in other activities have traditionally worked. In the

good old days, if you wanted to be a real painter, you had to go to Paris. Now, if you want to be a real writer, you have to go to New York; if you want to make it into the television or movie business, you have to go to Los Angeles or New York. This is not because of special conditions in those areas, but because a milieu was built and organized there for some historical reason. The ideas were there, the information, the contact with publishers or with the people able to finance an audacious movie. Similarly, high technology manufacturing does not replicate the locational pattern of traditional manufacturing but follows the locational pattern of information intensive activities. This phenomenon is linked to the basic argument that I have been developing, that the new productive forces are built upon information, the capability to generate new knowledge.

Decentralization of Production

The decentralization of production is different from the spatial division of labour. Entire units of production can be decentralized, whereas spatial division refers to a milieu for innovation in one place, skilled fabrication in another, assembly functions in another, and so on.

The decentralization of production means that new high technology companies have organized their production units in different places from the start. Electronic companies in Silicon Valley did not wait until the 1980s to decentralize to southeast Asia. It is a longstanding pattern; for example, Fairchild started production in Hong Kong in 1962. The new manufacturing activities have been built in a global factory. Even the automobile industry has changed, adopting the same strategy of a world production line.

Japanese manufacturing was a counter-example for a while. However, the Japanese are now doing what American companies have done. They have decentralized all over the world: producing in Thailand, the Philippines, and assembling close to the markets in Europe. The Koreans are an even more interesting example. They are decentralizing production to Thailand and the Philippines, and then assembling their production in Europe or the United States. So the same process occurs in manufacturing as in office work.

The crucial aspect of the new industrial space is not so much centralization in some areas or the global diffusion of activities, but that the system is built upon continuous interaction between very different spatial locations. Industrial space is spread all over this planet. It has therefore become a space of flows which supersedes the actual meaning of any particular place.

SOCIAL CONSEQUENCES OF NEW SPATIAL FORMS

The Loss of a Sense of Place

Information technologies are neither making cities disappear nor producing endless suburban sprawl. What is disappearing, however—and it is more serious—is the particular meaning of any place. The meaning of place in terms of new production management systems is lost in the series of interactions that take place along a network of instructions and commands. What happens to a particular community, even to such a dominating community as Silicon Valley, has nothing to do with what happens in that particular place. It has to do with an overall network of instructions, information, problems, management, and so on.

This network does not control itself. It is asymmetrical in relationships between nodes and it is not a powerless or an equal-powered network. However, no financier in Wall Street really controls what he or she is doing. They are linked to what happens in the architecture of the network, and very often these unseen codes and unseen signals are not really controlled by any centre of decision but by many centres of many decisions that have lost autonomy vis-à-vis the network. It is in this sense that places are becoming increasingly meaningless.

Fortunately, societies are not made up only of corporations and electronic factories. Societies, cities and regions are made up of people after all. What happens is that people are increasingly place-oriented and linked to their communities. This is the main conclusion of my twelve years of work on urban social movements, community organizations and citizen associations in cities around the world.

This conclusion is what led me to undertake the second part of the research, concentrating on the top of the system and not on the bottom. I knew that

something was happening in the formation of the world system and the macro-structure of abstract power. At the same time, people in their daily practices and interaction were increasingly local and not increasingly cosmopolitan. In part this is because if you cannot control the world, then you could control your neighbourhood. You get down to earth and say "If they want to control me, they have to come to my neighbourhood one day, so I'd rather control my neighbourhood, then I would have a grasp on my life." The more that power-holding organizations are connected and oriented toward the space of flows, the more people remain rooted at the level of the space of places. Communities do make sense in cultural and social terms for people, but they do not make sense in terms of the overall logic of the social organization.

There is a danger that such an analysis could end up here as an anthem to the beauty of people facing corporate monsters. However, the problem with such a position, which is easy and romantic to hold, is that it has nothing to do with how societies and history are constructed. All societies are made from the ability to articulate a process of development which increases the material bases of well-being—a process of development with a process of social control over this development.

Community Attempts to Control the Space of Flows

There is a dialectic between "I want to have a better life, and therefore I work and produce," and at the same time "I want to re-appropriate the result of this effort, and therefore I want?" Society wants, and people want at the same time to control development, but the process of development is not a process with an equal distribution of power.

In history, there has been connection between the spatial forms of the dominating groups in a society and the spatial world of the dominated. The most important consequence of what I observe now as an increase in this dysfunction, the schizophrenia between the spatial frame of reference of the dominant elite and the spatial experience of most people who are rooted in their communities. We live in a world economy, but at the same time in a communal society.

This disjunction is becoming dramatic because it breaks down communication patterns in society. Communication patterns do not mean everybody loving everybody; class struggle is a communication pattern, and so is social conflict. But at least the enemy can fight or be fought. For example, the European industrial bourgeoisie and industrial proletariat hated and killed each other, yet they could not live without each other.

But how can a flow be fought? How can a flow relate to a neighbourhood meeting or to the formation of culture in a playground? There is no relation, there is no communication. The process of disintegrating society starts at that point, because people are not enemies, but aliens—a quite different matter.

This sense of disconnection is reflected in popular novels such as Tom Wolfe's *Bonfire of the Vanities* which suggests that if you get out of your particular path and your particular flow, everything can happen to you. It happens to you because everything outside that flow is an uncontrolled space that is not integrated into the social experience and the social meaning of society. This novel does not so much present the traditional middle-class fear of people from inferior races as the ignorance of the outer world, of the flows beyond your space. In the opposite process lies an increasing integration of the world elite in protected hotels, protected airports, and protected business meeting rooms, all connected through telecommunications. Their elite community is made up of these abstract spatial flows and is unable to relate to all those other communal local spaces.

The situation is even worse for communal spaces. The life of local communities has lost its control and meaning over its basic conditions. If everything you ask of life is simply in the evening to be able to switch off the television set and look at the beautiful moon through your window, then people can still withdraw into miniature paradises. Poetry is the last thing to be lost. However, if by the meaning of life we understand our capacity to shape it, then this is slipping away simply because the local community cannot control a world-wide power flow.

CONCLUSION

Are there ways out of this dead end which our cities are approaching? My main hypothesis on the consequences of information technologies for cities is different from those stupid prophecies about the disappearance of cities. It is that in the context of the dramatic transformation in the socio-economic structures of our cities, information technologies are a powerful medium to fulfil uni-dimensionally the logic that leads to the space of flows as the instrumental space of power-holding organizations.

The response of people to this process has been either to withdraw individually or to withdraw through struggles which are only defensive community struggles. "Don't build this freeway here, don't destroy my neighbourhood, build in another neighbourhood. Let's stop growth, but at the same time I want my job. Let's try to find ways to change our school system, but in the meantime I send my child to private school," and so on and so on. This inability to grasp the real problems on the scale at which they exist is to some extent the powerlessness of our communities.

Local Governments as Mediators Between Global and Interpersonal Networks

Paradoxically, the current situation gives an increasing role to local governments as mediators between global forces and local experience. National government, not local government, is largely being bypassed by current processes. National governments are increasingly obsolete in a world economy and a local society. They are too far removed from the popular consensus to be truly representative. At the same time they are powerless in what they were always able to do, to take care of major economic issues and of war and peace. Probably the only states that are justified as states are those few imperial ones, and only because of their imperial function. However, even the function of the world of blocs is increasingly obsolete and is crumbling.

Local governments can act better as conditions change because of their increasing flexibility. National governments cannot control the national economy; a world government is not going to work for a long time. Although local governments also cannot control the world economy, they can negotiate the conditions under which the proceeds of the world economy land in a particular

territory. In history, all moments of expansion of the world economy are closely linked to the importance of city states. In the past were Venice and the Hanseatic League. Now we see the increasing role of such city states as Hong Kong and Singapore, extremely flexible units which can react to whatever happens in the world economy at any particular point.

Community Information and Mobilization

Active citizen participation is the only way to respond to communities' most urgent challenge, the challenge that some community groups in the United States translate into the words "Think globally, act locally." But you cannot think globally if you are not informed, and you cannot act locally if there is no process of citizen participation. So local governments can only be effective and active if they rely on informed and widespread citizen participation. All kinds of technological means can be used for other purposes than just sending billions of dollars through financial networks. Information technologies could be very powerful systems to control.

I am not talking about the breakdown of capitalism. I am thinking about issues of the social control of economic growth and management, and including the existence of interactive systems between communities and the people who are responsible to them. While the great promise of community-based media has been bypassed by commercial networks, some European local governments are now developing a world-wide database and information system that links them to other local governments and allows them to reinforce each other in their bargaining with multi-national corporations and other international institutions. A number of technologically advanced systems can be used to re-build the connection between the globality of the space flows and the locality and narrowness of the space of places.

The reconstruction of the social order and social control process in the informational city would require an urban social contract—between citizen groups, local governments and forces of local and regional societies—similar to the industrial-based social contract that in the 1930s and 1940s set up the basis for economic growth and social reform in Europe and North America. The creation of a new social contract leading to a new form of local welfare state could reinstate

the dialectics in the new informational society and the new informational economy. It would follow the connection between progress and order according to the maxim of Auguste Comte, the French founder of sociology, who understood society as the way to establish a fruitful connection between order and progress. As in past instances of structural transition, the process of social change frames the emergence of the informational city and ultimately determines the outcome of its historical promise.

BIBLIOGRAPHY

- Castells, Manuel. 1983. *The City and the Grassroots. A Cross-Cultural Theory of Urban Social Movements*. Berkeley, CA: University of California Press.
- Castells, Manuel. 1988. "The New Industrial Space. High Technology Manufacturing and Spatial Structure in the United States," in George Sternlieb and James Burchell (eds.) *America's New Market Geography*. Piscataway, NJ: Rutgers University Center for Urban Policy Research.
- Castells, Manuel. 1989. *The Informational City. Information Technology, Economic Restructuring, and the Urban-Regional Process*. Oxford: Basil Blackwell.
- Dowall, David and Marcia Salkin. 1986. "Office Automation and the Implications for Office Development," Institute of Urban and Regional Development, April. Berkeley, CA: University of California.
- Drennan, Matthew. 1991. "The New York Economy," in J. Mollenkopf and M. Castells (eds.) *Dual City: Restructuring New York*. New York, NY: Russell Sage.
- Glasmeier, Amy. 1986. "The Structure, Location, and Role of High Technology Industries in U.S. Regional Development," PhD Dissertation in City and Regional Planning. Berkeley, CA: University of California.
- Kling, Rob and Clark Turner. 1987. "The Structure of the Information Labor Force: Good Jobs and Bad Jobs," Department of Information and Computer Science, Public Policy Research Organization, November. Irvine, CA: University of California.
- Moss, Mitchell. 1986. "Telecommunications and the Future of Cities," *Land Development Studies*, 3: 33-44.
- Olson, Margrethe H. 1983. "Overview of Work-at-Home Trends in the United States," Center for Research on Information Systems. New York, NY: New York University Graduate School of Business Administration.
- Porat, Marc. 1977. "The Information Economy." Washington, DC: Department of Commerce, Office of Telecommunications.
- Sassen, Saskia. forthcoming, 1991. *The Global City: New York, London, Tokyo*. Princeton University Press.
- Scott, Allen. 1989. *New Industrial Spaces*. London: Pion.
- Wellman, Barry. 1988. "Structural Analysis," in B. Wellman and S.D., Berkowitz (eds.) *Social Structures: A Network Approach*. Cambridge: Cambridge University Press.

Recent Publications in this Series

Research Paper No. 174

DIFFERENT STROKES FROM DIFFERENT FOLKS:
WHICH TYPES OF TIES PROVIDE WHAT KIND OF SOCIAL SUPPORT?

•Barry Wellman

July 1989, 63 pp. \$4.50

Research Paper No. 175

ECONOMIC GROWTH STRATEGY AND URBANIZATION POLICIES IN CHINA, 1949-1982

•Kam Wing Chan

September 1989, 49 pp. \$4.50

Research Paper No. 176

THE PLACE OF KINFOLK IN PERSONAL COMMUNITY NETWORKS

•Barry Wellman

October 1989, 41 pp. \$4.50

Research Paper No. 177

TORONTO'S FIRST APARTMENT-HOUSE BOOM: AN HISTORICAL GEOGRAPHY, 1900-1920

•Richard Dennis

October 1989, 55 pp. \$4.50

Major Report No. 25

URBAN GROWTH TRENDS IN CANADA, 1981-86: A NEW GEOGRAPHY OF CHANGE

•J.W. Simmons and L.S. Bourne

December 1989, 70 pp. \$5.75

Research Paper No. 178

LOW INCOME HOUSING IN NAIROBI: AN ALTERNATIVE APPROACH

•Moses Bulli Ladu

December 1989, 55 pp. \$5.75

Research Paper No. 179

REINVENTING THE CITY

•Peter Hall

November 1990, 24 pp. \$4.50

Research Paper No. 180

PROSPECTS FOR REFORM

•John Sewell

January 1990, 29 pp. \$4.75

Research Paper No. 181

CONVERSIONS, CONDOMINIUMS AND CAPITAL GAINS:
CHANGES IN THE STRUCTURE OF THE ONTARIO RENTAL HOUSING MARKET

•Marion Steele

May 1991, 52 pp. \$5.00

Research Paper No. 182

COMMERCIAL STRUCTURE AND CHANGE IN TORONTO

•Jim Simmons

September 1991, 51 pp. \$5.00

Research Paper No. 183

HUMAN SETTLEMENTS IN THE U.S.: SUSTAINING UNEVEN DEVELOPMENT

•Willem van Vliet-

September 1991, 80 pp. \$6.00

SEND REQUESTS TO: CENTRE FOR URBAN AND COMMUNITY STUDIES
455 Spadina Avenue, Toronto, ON, M5S 2G8, CANADA