Planning Policy Responses to the Challenge of Industrial Restructuring:
The Case of Vancouver B.C.

by

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ABSTRACT

Urban centres around the world are experiencing the transition to what has been described as the 'post-industrial' economy, marked by the shift from traditional modes of industrial organization and production to new forms of activity, such as services and high technology industries. The changing nature of capital accumulation, urban space, industrial activities, and modes of economic organization have placed existing systems of urban and regional planning, zoning, and land use in doubt. As the urban area experiences the transition to the post-industrial era, the requirements for industrial activity in the city change, placing pressures on existing industrial land. In the initial stages of city development, a high level of traditional industrial activity is essential to provide the goods and services required for growth. As time passes, the traditional industries appear less essential to the future growth of the city, and the emergent service oriented activities assume a more dominant role. This thesis will examine an alternative theoretical basis for planning theory and practice, and outline the current trends and patterns in industrial change through the examination of the restructuring responses in a 'second order' urban centre: Vancouver, British Columbia. Based on an examination of current theory regarding industrial change, a discussion of a series of zoning strategies suitable for planning industrial change will be presented.
# Table of Content

Abstract .................................................................................................................. ii
Table of Content ...................................................................................................... iii
List of Tables ........................................................................................................... iv
List of Figures ......................................................................................................... v
Acknowledgments ................................................................................................... vi
Chapter One- Introduction ...................................................................................... 1
Chapter Two- Industrial Restructuring in Vancouver ........................................... 9
Chapter Three- Evaluative Criteria ....................................................................... 43
Chapter Four- Zoning Strategies ........................................................................... 53
Chapter Five- Policy Implications of Re-Zoning Industrial Lands in Vancouver .... 85
Chapter Six - Conclusion ....................................................................................... 99
References ............................................................................................................ 106
LIST OF TABLES

Table One- Employment Change in Vancouver CMA by Sector: 1971, 1981, 1986.......22
Table Two- City of Vancouver - Value of Building Permits Issued 1983-1991.............24
Table Three - City of Vancouver - Number of Building Permits Issued 1983-1991.......26
Table Four - City of Vancouver - Business Licences Issued 1980-1991 .......................28
Table Five - Location Quotients, Vancouver CMA: 1986 ...........................................31
Table Six - Average Employment in Manufacturing Firms, Vancouver CMA: 1982-1986 .................................................................35
Table Seven - Employment Change and Value Added in Metal Fabrication Activity in the City of Vancouver, 1976-1986..........................36
LIST OF FIGURES

Figure One- Industrial Lands in Vancouver ................................................................. 6
Figure Two- Objectives of Rezoning Industrial Land ................................................... 56
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Chapter One - Introduction

PURPOSE

The purpose of this thesis is twofold. First, an alternative theoretical framework for policy planning and analysis founded on neo-Marxist theories of economic development is discussed and evaluated. Second, these theoretical constructs are utilized in order to arrive at a set of policy-based responses — zoning strategies — which can be used to plan for the continued change and restructuring of the Vancouver industrial economy. Through an examination of economic trends and changes in the City of Vancouver and the Greater Vancouver Regional District (GVRD), a series of zoning strategies for the industrial lands in the city will be presented. New policy approaches for industrial activities have become necessary to address the changing nature of economic activity in the region and the city, particularly as the land industrial activities currently occupy has recently come under pressure for conversion to other uses. The city and its economy have entered a 'post-industrial' period (Bell, 1973), where the traditional modes of industrial activity have begun to be supplanted by new forms of manufacturing activity such as the high technology sector and an increasingly dominant producer and higher-order services sector. Traditional responses to industrial land issues have been weak and fragmentary, given the wide range of activities that are influenced by and influence industrial activity in the city, resulting in ad hoc, case-by-case rezonings or land-use changes.

This thesis will undertake four tasks: first, an assessment of industrial and economic restructuring in the theoretical and Vancouver contexts; second, the development of evaluative criteria for industrial activities in the city to assess growth potential and sustainability of an activity in the Vancouver economy; third, a discussion of a set of broad, generic policy responses to industrial change, that is, zoning strategies; and finally, a recommended zoning strategy. This strategy recommendation presents only one of
many potential solutions to the industrial land issue, an issue of significant concern in the City of Vancouver for over fifteen years. While obviously problematic in the fact that this recommended strategy was developed in an academic setting — somewhat removed from the realities of planning practice — it is hoped that through the use of the theoretical context laid out in this thesis, and an awareness of the need for a flexible, robust, and adaptable policy response to industrial and economic change, the recommended strategy presented here can function as a platform on which to base future planning decisions. By utilizing the concepts of neo-Marxist economic analysis, with a focus on the contingent nature of the relationship between the social and the economic spheres — each plays a constructive and inter-dependent role in the formation of the other — and the criteria presented in Chapter Three, a sensitive policy for the planning of economic development may be achieved.

METHODOLOGY

This thesis is an attempt to gain an understanding of the Vancouver space economy and to subsequently derive a policy-based response — in the form of zoning strategies — to the changes occurring therein. For this purpose, Statistics Canada data on employment and industrial activity will be used at the Census Metropolitan Area (CMA) scale, along with Greater Vancouver Regional District (GVRD) data and employment estimates, as the Vancouver CMA and the GVRD are roughly coincident in geographic area. The use of Canada Census and GVRD data will be used to illustrate regional trends in economic activity, while statistics on building permits and business licenses issued by the City of Vancouver will be utilized to examine changes in the local economy. Comprising roughly 30 percent of the regional population, 40 percent of regional employment, and 30 percent of the light industrial floorspace in the region, the City of Vancouver retains a major role.

1The GVRD and the Vancouver CMA are coincident except for the following areas which are included in the CMA: Maple Ridge, Matsqui, Mission, and Pitt Meadows. Maple Ridge has emerged as a rapidly expanding bedroom suburb for the City of Vancouver, while Matsqui, Mission, and Pitt Meadows remain primarily rural areas. None of the four represents any significant level of industrial activity, and therefore the inclusion or omission of data for these areas has little effect on the analysis presented in this thesis.
in the industrial economy of the region. The use of data such as these, from two distinctly
different scales does present some methodological problems, particularly in terms of
comparative analyses. However, given time constraints, and the difficulties associated
with primary research, these data provide sufficient information and detail to attempt an
analysis of the economic changes occurring in the Vancouver economy. The use of these
data is an attempt to identify the nature of regional and local restructuring in industrial
activity, from which impacts and policy implications for the planning of industrial areas
in the City of Vancouver can assessed.

For this thesis, the research methodology will include an examination of theoretical
and empirical urban analyses directed towards an understanding of the changes experienced
in the industrial economies of North America and Europe. This will involve a literature
review of relevant research on the subject, focusing particularly on the work of the
regulation school of economic theory (Aglietta, 1979; Boyer, 1990) and Alan Scott's
(1988a) theory of new industrial spaces. The next stage of the research will see the
development of criteria which can be applied to industrial activities in the city, to assess
the nature of activity, the sustainability of that activity in the local economy, the economic
linkages to other firms or economic sectors, and the social and environmental impacts of
industrial activity. The latter criteria have been developed in an attempt to provide a
more balanced input to policy formation, and to provide a broader base of information on
which to derive and assess policy options. These criteria have been developed as an
attempt to operationalize the theory of economic regulation. As a theory which attempts
— through a Marxist historical materialist perspective — to articulate the economic in
terms of its impact on the social, and the importance of social relations in reinforcing the
economic, regulation theory very closely parallels the objectives of contemporary urban
planning. A series of three zoning strategies will then be developed and discussed. An
evaluation of the proposed zoning strategies for the industrial lands of the city will be
made, resulting in a recommended strategy for future planning in industrial areas.
OVERVIEW

The planning of economic change and growth is of increasing importance in urban areas. One example of this change can be seen in the evolving nature of industrial land use in major urban centres during the latter years of the twentieth century, a period marked by the economic restructuring and decline of industrial activity. This restructuring has been linked to several factors such as: the globalization of financial activity; the expansion of markets on an international scale (Wallace, 1991); and rapid and widespread technological change (Chapman and Humphrys, 1987). These factors have been expressed in a number of effects including: changes in the modes of production and accumulation (Scott, 1988a); changing demand for and availability of land in inner city areas (Adams, 1988); and changes in the employment structure of major urban centres (Gillespie, 1987).

The role of the dominant mode of industrial production and capital accumulation in influencing urban form is evident in major cities such as London, New York and Los Angeles (Savitch, 1988; Scott, 1988c). In many cases the decline of industrial activity due to an inability to compete in evolving international markets, coupled with an emerging and increasingly dominant service economy has seen a significant dislocation of employment and population. Instrumental in the evolution of urban form, the decline of traditional modes of production and industrial activity will thus play a major role in the restructuring and change of the urban area.

Vancouver, British Columbia finds itself, like the majority of urban areas, in such a period of economic adjustment and re-orientation. The economy of the City of Vancouver, and that of the Vancouver city-region, has been based not on primary or secondary manufacturing, as is the case of Toronto, Montreal, and London, but rather on the primary processing of the abundant natural resources of the province — largely forest products and minerals — service activity, and goods shipment. This history of economic development renders the local and regional economies problematic for analysis, as there
are few models of industrial activity and evolution derived from the analysis of, and applicable to, second or third-order cities such as Vancouver.

Despite the fundamental differences between Vancouver and locales with higher levels of established, primary industrial activity, some similarities can be found. One such concordance is the migration of traditional modes of economic activity away from inner city locales to suburban areas, where land costs are lower, and where these activities are able to service customers throughout the region and gain access to required inputs. Such a suburbanization of industrial activity requires a re-evaluation of planning for industrial activity in inner city areas, given the pressures on this land for residential, retail and commercial uses. In addition, the Canada - United States Free Trade Agreement and the growing Pacific Rim markets have significantly altered the nature and variety of goods produced in the region, changed the dominant mode of production (particularly in the forest sector) and shifted dependence away from the United States to other markets such as Japan and Europe (Barnes et al. 1990; Hayter, 1992; Webber and Tonkin, 1988). Proactive planning for the changing nature of industrial lands and the provision of land for future industrial use will promote a viable economic base and a healthy community for years to come.

The City of Vancouver currently has some 1,945 acres (4,162.3 hectares) of industrial land. The major portion of these lands are concentrated along the False Creek and East Side areas of the city, such as Mount Pleasant (see Figure One). Comprising 7 percent of the total land area of the city of Vancouver, the zoned industrial lands in Vancouver are home to 3,500 firms, ranging from autobody, painting and repairs, to foundries, refineries, and metal fabrication. Of the zoned industrial lands, 60 percent are under heavy industrial uses, 25 percent is used for light industrial purposes, and the remaining 15 percent is used by permitted non-industrial activities. As the economy of the City of Vancouver and of the region continue to evolve towards an increasingly dominant service sector, the industrial land in the city is placed under growing pressure for
Strategy for Industrial Lands (Adopted by City Council, July 26, 1990)

- Let go for new uses following further study to identify appropriate uses, development and zoning
- Keep for industrial uses until further study has identified priority areas to retain for long-term industrial use (Industrial Lands Review).

INDUSTRIAL LANDS IN VANCOUVER

Source: City of Vancouver, Planning Department
The growth of service activity in the Greater Vancouver Regional District has far exceeded that of all other activities. These activities are well suited to technological advances which are offered in urban centres, and offer higher levels of employment than traditional industrial activities, evidenced by the rapid expansion of service employment throughout the region, in comparison to the growth of the industrial workforce. The proliferation of this sector has placed the role of industry in the inner city in doubt, and poses key questions in the determination of the future of industrial land in the city:

What mechanism can be implemented to address the changing nature of economic activity in the City of Vancouver, and mitigate the increasing pressures on industrial land in the inner city? Is the evolution of the local economy to one dominated by service activities a problem in need of a solution, or a 'natural' process which requires management to ease the transition to new forms of activity?

Based on research in urban geography and planning, one potential response to address the changing need for industrial land is the implementation of innovative and comprehensive zoning strategies. Historical planning and policy responses have tended to focus on preserving some level of industrial activity in the inner city, and have included urban enterprise zones, tax concessions and/or land grants to developers and many others, the majority of which have proven unsuccessful (Heikkila and Hutton, 1986). This thesis will offer an analysis of the industrial lands in the city of Vancouver, and will present a series of zoning strategies which could be implemented in response to the changing nature of industrial activity in the city. Three potential policy responses will be considered:

1) A significant measure of industrial activity will be retained, and the existing mix of industrial activities be encouraged;
2) All industrial activity in the city will be encouraged to relocate to other locales in the metropolitan area — the burgeoning suburban communities (the source of
labour) — permitting the vacant industrial land to be used for residential purposes;

3) New zoning be implemented to encourage new, alternative, or innovative production oriented activities to locate in the city, which would be functionally integrated with a commercial/office and residential uses. This option presents the best chance for the development of 'new communities' within the city.

Each of these policy options will be presented and evaluated, and the impacts for planning in the city presented and discussed.
Chapter Two - Industrial Restructuring in Vancouver

This chapter outlines the theoretical and empirical framework for the evaluative criteria developed in Chapter Three, and for the zoning strategies discussed in Chapter Four. Building upon the concepts of the theory of economic regulation, flexible accumulation, and new industrial spaces, the nature of economic restructuring which has taken place in the Vancouver economy will be presented and discussed.

INTRODUCTION

Under the capitalist, free-enterprise system producers seek to maximize profits and minimize costs through whatever means possible. In the older industrial areas of the world, this has traditionally meant the adoption of mass production techniques or at the very least, a hierarchical division of labour in the manufacturing process. The development of these organizational, structural, and process related responses in older industrial areas during the inter-war period has been termed 'Fordist' — after the pioneering work of Henry Ford in the production of automobiles and other goods for mass consumption. For the purposes of this thesis, the theoretical framework I have utilized is that outlined by the regulation school of economic change, which is based on the analysis and critique of Fordist capital accumulation in the United States.

The regulation school of economic theory developed in the mid 1970s as a critique of perceived theoretical shortfalls associated with neoclassical economics, most specifically the "inability to express the social content of economic relations, and consequently to interpret the forces and conflicts at work in the economic process" (Aglietta, 1979: pp. 9). It is the attempt to closely articulate the social and the economic — an attempt to examine "...the relations between capital, labor, and the state in a crisis environment" (Moulaert and Swyngedouw, 1989) — which renders theories of economic regulation useful for planning practice. As Aglietta states in the introduction to A Theory of Capitalist Regulation: "Production is always the production of social relations as well..."
as material objects" (Aglietta, 1979, pp. 24). Referring the introduction, one objective of this thesis is to outline a robust and flexible framework for the planning of industrial activity. A theoretical basis such as regulation theory which examines the social and economic spheres in tandem and emphasizes the interdependence of these spheres can achieve this objective, and can improve the intellectual reputation and social relevance of planning theory and practice.

Regulation theory examines the crucial role the Fordist system has played in the evolution of production techniques, distribution of surplus profits, and relations between producers — the regime of accumulation — and the impact this regime has on the social lives and interactions of citizens — the mode of regulation — interactions which serve to reinforce and support the regime of accumulation in industrial nations (Aglietta, 1979; Brenner and Glick, 1991; Lipietz, 1986). The use of regulation theory is appropriate as a framework for the planning of economic development as it helps to capture and understand the dynamics of the economic system, and realize the nature of the tensions between theoretical and empirical approaches. The use of a purely theoretical approach becomes a totalizing project, where some general law or predetermination of the existing economic conditions is sought, while an excessively empirical approach may capture more detail regarding the contingent and circumstantial conditions, and yet may cloud the analysis of the overall economic patterns and trends (Moulaert and Swyngedouw, 1989).

The use of regulation theory as the theoretical framework for the planning of industrial change in the local economy, in this case Vancouver, is somewhat problematic based on some issues of scale. The theories of economic regulation have been developed around the analyses of national economies, and the implementation of the theory at a micro, city-specific scale does pose methodological difficulties. However, as one of the primary objectives of this thesis is to assess regulation theory as an alternative theoretical basis for planning, the methodology still has merit, particularly in its attention to the mutually constructive nature of the regime of accumulation and mode of regulation.
Some critics have questioned the assumed hegemonic role of Fordism in the global economic system and therefore the utility of theories of economic regulation, citing a lack of empirical work and a reliance on theory drawn from a limited range of industrial activities (Sayer, 1989). Sayer argues that the Fordist system has not assumed a hegemonic position in world manufacturing activity, based on research in the United Kingdom which found that only some 700,000 employees out of the total workforce of 20.4 million found employment on 'Fordist' production lines. Given the body of theoretical work which examines the nature of change in the organization of production — a crisis in the Fordist regime of accumulation — one purpose of this thesis is to derive zoning strategies which can account for change in the regime of accumulation and the mode of regulation — the way in which the economic relations of society influence social interactions and reproduction — to better plan for the present and continued change in the production systems of Vancouver.

Research by economic geographers (Milne, 1991; Pinch, et al., 1991; Scott and Storper, 1986; Storper, 1987) has identified a number of locales and industrial sectors which have clearly moved away from Fordist regimes of production and accumulation in favour of more flexible methods of production, corporate organization and labour inputs. As stated above, the lack of a strong body of empirical work is a stumbling block to theories of flexible accumulation, but it is hard to deny the changes occurring in industrial activity.

The nature of these changes as they have occurred on the global scale, and a discussion of the impacts on the Vancouver economy will be presented in this chapter.

**Fordism**

Fordism developed in the first half of this century as a means to organize the production of commodities and social life, as a response to the crisis tendencies of capitalism (Harvey and Scott, 1989c). These crisis tendencies are the short-term business
cycles and longer-term Kondratieff waves of economic activity inherent in the capitalist system. While controversial and often problematic to measure or quantify, the notion of these Kondratieff long waves is an attempt to interpret the cycles of growth and evolution of the global economic system (Wallace, 1990). In brief, these long waves attempt to identify the temporal unevenness and crisis tendencies of capitalism: recessionary periods occur as the profitability of production declines, and firms engage in successive rounds of over-investment in capital and stocks as they attempt to gain a wider market share and increase profits. Eventually, the under-utilized capacity of manufacturing systems embodied in high levels of fixed capital in the form of production facilities (Wallace, 1990; Harvey, 1989a, overproduction and under-consumption (Grubel and Walker, 1989) and high labour costs combine to force a number of firms out of the market. Those which survive are the structurally and economically resilient, and which are then able to take advantage of the lack of competition and high unemployment to achieve labour control and reduce the costs of production; and the upward phase of the business cycle begins again.

The recent development of industrial capacity in the so-called newly industrialized countries (NICs) has widened the industrial field, making markets much more competitive, forcing manufacturers to seek other forms of organization in order to remain competitive.

Of the crisis tendencies listed above, overproduction and under-consumption are the aspects of capitalism which Fordism seeks to redress. Aglietta (1979) describes Fordism as a close articulation between relations of production and consumption. The vision of Henry Ford was the mass production of consumer goods on a production line system, in tandem with mass consumption of those goods. As the Fordist regime of accumulation spread throughout the United States, Canada, and areas of Europe, the social problems inherent in such a profit oriented system became apparent, and Keynesian and welfare state policies were enacted to counter these inequities (Harvey, 1989a). These systems of social and economic support placed a large burden on the economies of industrialized nations,
one which was more easily borne during the heady economic times of the early post-war years, but which in the last twenty years has led to massive national debts throughout the developed world.

In addition to production line techniques, Fordist regimes of accumulation are characterized by marked rigidity or inflexibility. This rigidity is expressed through the inability of capital investment in infrastructure and production facilities to change and adapt to market forces; a failure to adjust labour inputs to the process; and the inability to rapidly develop new product lines or designs in response to consumer demand (Harvey, 1989a; Peet, 1991). The role of labour unions in the development of the present system of wages and benefits has also contributed to the apparent failure of Fordist accumulation. A characteristic of industrial restructuring in the 1980s and early 1990s has been a series of attempts to reduce the control of labour and unions and to implement alternative forms of work such as temporary, part-time and sub-contracted labour, in attempts to increase the profitability of the manufacturing process (Pinch, et al., 1991).

The global recession of the early 1970s — fueled in part by the oil embargo of 1973, and the huge burden of the welfare system on Western nations — led to a wave of economic, social and political restructuring as the social systems set in place to support the Fordist regime of accumulation were undercut. In order to re-assert their position in world markets, manufacturing interests in the older industrialized nations made attempts to restructure and rationalize production. The recession found many industrial complexes carrying excess capacity, in the form of under-utilized machinery, labour, and facilities (fixed capital). The capital and labour rigidities of the regime of Fordist accumulation, the world debt crisis, and the effects of internationalization of industrial processes placed increased pressures on the economic system of many nations, forcing firms to re-finance and re-tool their production facilities, leading to high debt loads in industrial sectors, from which a significant number of firms were unable to recover.
In response to the crisis tendencies of capitalism, the 1950s and 1960s evidenced a rapid expansion of industrial activity into areas of the world previously without a history of industrial activity. Led by the multinational corporations of Europe and North America, initial destinations of investment was South-East Asia, with large supplies of cheap labour, and governments receptive to high levels of foreign investment (Coffey and Bailly, 1990). This early stage of the 'internationalization' of production and labour was limited to those activities which did not require highly skilled labour force, or the supply and inventory systems employed in several sectors in the major industrial nations (Chisolm, 1990). Companies such as British Petroleum, Shell and Exxon relocated significant portions of their petrochemical sectors and associated manufacturing subsidiaries to these areas, taking advantage of inexpensive labour and favourable conditions for development. Harvey has referred to this expansionary response on the part of industrial and manufacturing activities to the rigidity of capital as the "spatial fix" (Harvey, 1982), a response which sees firms seek an expansion of geographical boundaries in an attempt to create new markets and increase profits. However, the recent development of industrial capacity by developing nations (newly industrialized countries or NICs) has eroded the ability of established industries in older manufacturing regions of Europe and North America, to utilize this spatial fix. The result has been the implementation of other strategies focused on innovative labour management and production processes in situ, rather than a geographic expansion.

As foreign investment in the lesser developed world continued, a new group of industrial nations emerged, particularly in South East Asia. These new industrial powers have been referred to as the 'little dragons' of South East Asia and include Korea, Singapore, Taiwan and Hong Kong. The rapid and extensive growth of these new industrial 'dragons' has forced many industries to "abandon the inflexible mass-production (Fordist) mode of operation and opt for more flexible systems so that responses to market signals can be quick and precise" (Chisolm, 1990).
The response of industrial complexes the world over has been extensive and varied. Industrialists are in the business of making money; therefore, unprofitable systems and processes are quickly abandoned and alternative modes adopted. The industrial powers of the world — Japan, the United States, Germany and France — have seen mixed results from attempts to develop more flexible systems of production and accumulation. Experience has shown (Scott, 1988c; Harvey, 1989b; Hudson, 1989) that older industrial areas are often less able to accommodate the new modes of production and accumulation, and so new locales of industrial activity develop. These new industrial areas have had little or no previous tradition of industrial activity (Scott, 1988c), and are characterized by highly flexible manufacturing, labour and organizational structures, with the resulting mode of production and social reproduction termed flexible accumulation (Scott, 1988a; Harvey, 1989a; Harvey, 1989b).

Scott's and Harvey's theorizations of flexible accumulation are useful, but prove difficult to apply a range of contexts. Scott has based his work on the historical and economic development of a number of exceptional locales — Silicon Valley, the Third Italy, and Los Angeles — which have developed as a result of specialized political and economic conditions; while Harvey's work has tended to focus on the cultural conditions arising from the changing nature of financial and economic relations. In both cases, there is little congruence with the development and change occurring in second or third-order cities such as Vancouver. What is required is a new body of theory — founded on extensive empirical research — which can account for economic and social changes in such cities. While such a task is beyond the scope of this thesis, the concept of flexible accumulation remains useful in the examination of the changing nature of production in an economy such as Vancouver.
FLEXIBLE ACCUMULATION

Initial attempts at the restructuring of industrial activity included: a rationalization of production, restructuring of both the corporate and workplace environments and attempts to increase control over the process of labour inputs through the implementation of innovative schedules, odd work weeks and the like, leading ultimately to a reduction of union control (Harvey, 1989a). These responses — intended to render the manufacturing firm more competitive in the face of increased foreign competition, rapidly shifting consumer demand, and high levels of fixed capital — are referred to as strategies of flexible accumulation.

The major technological change in this period of restructuring and reorganization has been the implementation of methods of automation (robotics) in production, the adoption of technologically-based flexible manufacturing systems (Jaikumar, 1986) and a realization of the economic necessity of producing smaller, more specialized production runs of an increased range of products. The implementation of such flexible strategies is an attempt to make up for the now limited 'spatial fix' as described by Harvey.

In addition to foreign locales, areas of the United States such as the 'Sunbelt' and the San Fernando Valley of California, the so-called 'Silicon Valley', began to experience the development of new industrial spaces (Scott, 1988a; 1988c). While the Sunbelt economy is characterized by more traditional, assembly-line production in contrast to the new forms of organization found in Silicon Valley, both locales represent new industrial spaces, as there was little tradition of industrial activity, low levels of labour organization, and civic governments and tax structures amenable to new industrial development.

The major focus of development in areas marked by these regimes of flexible accumulation has been high technology, taking advantage of the build-up of strategic arms in the United States during the 1970s and 1980s, rapidly evolving computer hardware and software technologies, and more recently, biotechnology. Regimes of flexible accumulation requires that firms be able to re-tool facilities to produce new products with
a minimum of down-time, and little re-training required for employees. The widespread use of robots and computer aided manufacturing (CAM) along with innovative input systems such as 'just-in-time' inventory systems have made the rapid conversion to different product lines simpler and more profitable. Examples of flexibility achieved through technological innovation can be seen in computer aided assembly lines in the automobile sector, and in the British Columbia context, laser-guided sawmilling operations in the forestry sector.

As the traditional industrial sectors restructure at the corporate level, economic rationalization also occurs through an alteration of the process of labour inputs. The move towards flexibility in the labour component of manufacturing has been broken down into two aspects: functional and numerical flexibility (Pinch, et al., 1991) based on Atkinson's model of labour flexibility. These classifications are as follows:

**Functional Flexibility:** Measurement of the functional flexibility of the firm is based on the ability of the firm to adjust and deploy the skills of employees to meet the changing tasks required for production (changing workloads, new technology, new products). This form of flexibility requires the removal of shop-floor demarcations and workplace divisions with workers moving between workgroups as their skills are required. This process is often referred to as the development of the multi-skilled worker.

**Numerical Flexibility:** This measure of the numerical flexibility of the firm is based on the ability of the firm to adjust or change the labour inputs to meet product demand and workload. This involves the following changes to shifts or work-time:

- Flex time
- Casual employees
- Part-time
- Overtime
- Sub-contracting

Of these forms of labour flexibility, the multi-skilling of employees carries with it significant re-training costs, and is typically harder to implement in larger manufacturing plants.
Scott (1988a) has examined the role of sub-contracting in regimes of flexible accumulation, citing the example of the printed circuit and computer component sectors in Los Angeles, where distinct agglomerations of major producers and sub-contractors have been established in several key locations within the city. The tendency to sub-contract components of the manufacturing process has been described as "vertical disintegration" (McFetridge and Smith, 1988) where industrial firms: "externalize selected functions in order to achieve economic viability" (Scott, 1988a). The result of this trend towards disintegration has been the rapid growth of the producer and other intermediate service activities. Producer services are typically defined as those functions of the firm which are sub-contracted to outside organizations, including advertising, business consultancy, data processing, legal services, management consultancy, financial services, accountancy, research and development and market research (Gillespie and Green, 1987; Ley and Hutton, 1987).

GROWTH IN THE SERVICE SECTOR

Where traditional industrial activity has declined in advanced economies, two major responses may be found. The economy may become de-industrialized, as seen in the case of London, where services are clearly the dominant activity, a locale in which little industrial activity remains. The second response is the emergence of regimes of flexible accumulation in industrial activity, with its associated changes in economic and social organization; or to use the language of theories of regulation: the regime of accumulation and the mode of regulation. The process of numerical flexibility within the manufacturing process also requires an increased availability and range of producer services. Several factors have been cited as instrumental in the rapid growth of service activities in the recent past including: higher levels of disposable income; the continued de-industrialization of advanced metropolitan economies through the advent of flexible accumulation; the growth of foreign-based manufacturing; increased demand for educational services; an expanding work force, led by the increasing participation of
women; the growth of the corporate complex of economic activity; and the tendencies towards increased vertical disintegration through sub-contracting (Grubel, 1989; Hutton, 1991; Ley and Hutton, 1991; McKenzie, 1987).

The impact of growth in the service sector has been a large-scale re-orientation of economic activity in a number of urban centres, especially those urban conglomerations which function as regional centres, such as Vancouver. These regional centres have proven well suited to the development of high order producer services, as these activities tend to cluster in areas which provide agglomeration economies (Moulaert and Swyngedouw, 1989).

As Scott (1988b) has outlined in his model of flexible accumulation, a strong network of vertically disintegrated service firms and strong transactional connections between firms are indicative of the restructuring process in contemporary capitalism. In the Vancouver case, business services such as Printing and Publishing (as a manufacturing activity), Legal Services, Data Processing, and Engineering and Consulting are local examples of service activities which have grown significantly in recent years, conforming to Scott's theory of industrial change.

The dominant engine of growth and change in the Vancouver metropolitan economy is the service sector, but the stability of industrial activity in the city indicates that rather than a wholesale abandonment of production-activity, many firms — such as those in the Printing and Publishing and the Wood Industries sectors — have adopted flexible production techniques such as the implementation of high-technology equipment or innovative labour management schemes in order to remain competitive in the rapidly changing Vancouver and Pacific Rim economies. These restructuring responses will be examined in the following section.
INDUSTRIAL RESTRUCTURING IN VANCOUVER

The examination of the emergence of new, flexible modes of economic organization has provided a theoretical framework for analyses of locales with traditions of extensive industrial activity, but these neo-Marxist theories (Harvey, 1989; Scott, 1988a; 1988b) have done little to shed light on the experiences in a wide range of economies, particularly in what might be termed second or third-order cities. An example of such an economy is Vancouver, British Columbia. While industry has played a role in the development of the city-region, Vancouver has predominantly been a raw materials processing and services centre, rather than a locale of manufacturing. This is not to say, however, that as a processing and service-based economy Vancouver has not also experienced significant restructuring and adjustment. The global restructuring of capital and economic activity — expressed in the emergence of the service sector as the dominant form of employment in Vancouver — has forced the various industrial and materials processing sectors to adapt to the changing nature of industrial organization and labour management.

ECONOMIC CHANGE IN VANCOUVER

To undertake the clarification of the nature of economic and industrial restructuring in Vancouver, this section presents a series of variables to illustrate these changes in the local economy. Barnes et al. (1992) have found clear evidence of the turn to flexibility in the British Columbia economy. Evidence of such changes includes the increase in vertical disintegration and subcontracting — exemplified by the increasing number of establishments in particular sectors; the rise in the total number of firms in tandem with a falling average employment by firm for both manufacturing and services; and the overall growth of employment in the service sector.

Several variables will be presented in this section: employment and manufacturing data from Statistics Canada, along with building permit and business licence data from
the City of Vancouver. While the employment data from Statistics Canada are presented for the Vancouver Census Metropolitan Area (CMA) the remaining two variables have been presented for the City of Vancouver only. This difference in scale represents the difficulty in gathering data from the seventeen distinct municipalities or districts included in the Vancouver CMA, and also attests to the quality of data collected by the City of Vancouver. As a crude 'first cut' at the nature of restructuring in the Vancouver economy, the variables presented here offer a useful entry point for analysis.

i) Employment Change

The majority of models and analyses of change in the manufacturing economy have examined the problem in the context of advanced, major centres of production, such as Buffalo, Chicago, Boston, and London. In these areas, massive declines in manufacturing and industrial activity have been matched by the shedding of employment on an equal scale. In many cases, new economic activity has been slow to replace the lost manufacturing firms, and in the small, single industry towns — such as the steel towns of Pennsylvania — there has yet to be any period of recovery, after more than a decade of high unemployment and shrinking world markets for their products.

The experience of Vancouver has been very different from that of these older industrial economies. Table One presents Census data for the changing nature of employment in manufacturing and services in the Vancouver CMA between 1971 and 1986. Data are presented for the years 1971 - 1986, as this effectively brackets the post-recessionary period since 1973, during which most of the restructuring responses discussed in this thesis have occurred.

While the Vancouver economy has had a measure of production activity since its earliest days — pulp, paper and wood products along the Fraser River, shipbuilding in Coal Harbour, and steel and iron foundries in False Creek — manufacturing has never been the dominant economic activity in the city. For example: in 1986, the Wood Products sector

<table>
<thead>
<tr>
<th>Sector</th>
<th>Employment</th>
<th>% change</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1971</td>
<td>1981</td>
</tr>
<tr>
<td>Services</td>
<td>280,380</td>
<td>464,280</td>
</tr>
<tr>
<td>Industry</td>
<td>134,389</td>
<td>170,615</td>
</tr>
</tbody>
</table>


and the Furniture and Fixtures sector accounted for combined employment of 12,230, or 19 percent of industrial employment in the Vancouver CMA, but only 1.7 percent of total employment in the Vancouver CMA. While it has long been a component of the local economy, the nature of production in this sector has tended to focus on low value added output such as rough dimension lumber, pulp and low grade (newsprint) paper production. In recent years, however, there has been a move towards higher value-added production such as an increasing range of plywood products, a greater range of dimensioned lumber products, and modest attempts to increase the volume of fine paper manufactured. The introduction of such diversity is an attempt to overcome the fundamental nature of British Columbia's forest sector: a sector reliant for decades upon less processed commodities and a history of higher debt-equity ratios than other forest product areas of the country (Hayter, 1987).

Unlike cities such as London, which lost some 389,000 manufacturing jobs between 1971 and 1981 (Savitch, 1988), manufacturing in the Vancouver context experienced only a slight decline during the recessionary period of 1981 - 1986, an interval when other industrial economies in Canada experienced large-scale contraction and decline. Hutton and Ley (1991) show an increase in industrial employment between 1984 and 1989 of 25,829 jobs, or an increase of 39 percent; an average growth in industrial and manufacturing occupations of 7.8 percent per year. This trend towards industrial growth is further
evidenced by the modest increases in business licences and building permits issued for industrial or manufacturing uses, presented in the following sections.

Social theorists such as Bell (1973) and Lyotard (1984) have discussed what they term the 'postindustrial' era, an era in which information processing activities — services — assume a dominant role. In many ways, the Vancouver economy conforms to the notion of the postindustrial urban economy, as the service and information technology sectors in Vancouver have shown high levels of growth during the past decade. With some 544,000 persons in the Vancouver CMA employed in the service sector (1986 Census of Canada) — a figure which will likely be closer to 750,000 after the 1991 Census of Canada is tabulated — the service sectors have very clearly become the dominant engine of economic growth and activity in the Vancouver regional economy.

ii) Building permits

As a second set of data to corroborate the analysis of the changing nature of the Vancouver economy, a summary of the value of building permits issued by the City of Vancouver is presented. The nature of building permit data is somewhat problematic for the analysis of industrial and economic change. For example, the database currently under preparation by the City of Vancouver has several major gaps, where no records are available, and there is no data on business closures, as businesses are not required to inform the city of their intention to close. Despite such inherent shortfalls as a data source, the value and number of building permits issued does serve as an indication — albeit crude — of the general business climate for certain activities, as well with an indication of the nature and intensity of economic trends in the local economy.

While not an exact corollary with the number of firms or employees in the city at any one time, permit data such as these represent a measure of investment in the local economy, evidencing investor confidence in Vancouver as a continued pole of regional growth and activity (Heikkila and Hutton, 1986). In Heikkila and Hutton's 1986 analysis
of building permits in Vancouver, they saw clear patterns of industrial decline in the City of Vancouver (based on data for the years 1979-1983). While no observable pattern in

Table Two. City of Vancouver - Value of Building Permits Issued ($ million) 1983-1991

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Residential</td>
<td>251.09</td>
<td>313.15</td>
<td>301.03</td>
<td>259.18</td>
<td>352.78</td>
<td>386.53</td>
<td>563.96</td>
<td>527.02</td>
<td>385.36</td>
</tr>
<tr>
<td>Services **</td>
<td>151.34</td>
<td>170.07</td>
<td>90.81</td>
<td>89.43</td>
<td>100.16</td>
<td>144.45</td>
<td>208.33</td>
<td>103.68</td>
<td>32.1</td>
</tr>
<tr>
<td>Industrial</td>
<td>23.74</td>
<td>39.23</td>
<td>27.37</td>
<td>22.77</td>
<td>40.44</td>
<td>100.15</td>
<td>49.77</td>
<td>76.56</td>
<td>15.41</td>
</tr>
<tr>
<td>Total</td>
<td>552.59</td>
<td>715.62</td>
<td>591.54</td>
<td>468.85</td>
<td>625.88</td>
<td>782.4</td>
<td>1011.93</td>
<td>866.73</td>
<td>470.72</td>
</tr>
</tbody>
</table>

*Includes permits for new construction and additions  
**Business and Personal services  
***As of June, 1991

Source: City of Vancouver, Permits and Licences Department

investment indicative of decline or growth is apparent in this table (illustrating the value of issued permits for the years 1983 to 1991), the level of investment in industrial uses was $23.74 million in 1983, and investment levels have been consistently (except for 1986) higher in subsequent years.

The value of building permits issued is one indication of the nature of the local business climate in the city, one of a number of key elements required for successful industrial restructuring outlined by Scott. In the Vancouver context, the trends in industrial business permits indicate a relatively buoyant industrial climate, one in which there remains a viable and healthy interest in industrial activity. From the building permit data presented above, it becomes apparent that residential building permits represent the majority of permits issued by value. In a property market such as Vancouver, residential applications reflect the dominant role pressure which re-development for housing plays in the local economy.
From the value of building permits issued between 1983 and 1991, both services and industrial permits show positive activity. While permits for construction oriented to the service sector are consistently higher than those for industrial buildings, there does remain a significant component of industrial applications. It is apparent from the data presented above that the value of permits for service activities typically far exceeds that of industrial permits. This is largely due to the rather coarse categories utilized by the Permits and Licence department of the city. The Services category encompasses banks, offices, beauty parlours, dry cleaners, radio stations and others. The high value of service permits issued likely comes from the bank and office components, as such structures are usually quite large and have higher requirements for amenities, safety features, and services such as high-speed communications lines and computer networks, and are therefore more expensive to construct. Referring again to Table Two, illustrating value of building permits issued, industrial building permits show a consistently lower value, reflecting the categorization used by the City of Vancouver. The industrial permits cover warehouses, manufacturing facilities, workshops, service stations and others. It is the warehousing and workshop component which reduces the value of industrial building permits issued, as such facilities are relatively inexpensive to build and require little specialized service provision. An examination of the average value of permits bears out these conclusions. For example, in 1989, the average value of permits issued for service construction was $5.20 million, and for industrial construction the average value was $672,000. While the value of building permits illustrate important trends in the Vancouver economy, the number of building permits issued for industrial and service construction which proves equally interesting for the purposes of this analysis, as shown in Table Three.

This table shows that while service and residential building permits comprise the majority of permits issued, there is still a significant, relatively stable number of industrial permits issued by the city. The number of industrial building permits issued includes both new construction and additions to existing facilities, as such construction has
been interpreted as an expansion of production capability, indicating the health of local manufacturing and industrial activity. Recent trends show that a number of industrial firms have relocated from the inner city to the outer suburban communities, but from the

Table Three. City of Vancouver - Number of Building Permits Issued 1983-1991*

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Residential</td>
<td>1747</td>
<td>1614</td>
<td>1553</td>
<td>1499</td>
<td>1941</td>
<td>1877</td>
<td>2206</td>
<td>1354</td>
<td>551</td>
</tr>
<tr>
<td>Services **</td>
<td>45</td>
<td>68</td>
<td>40</td>
<td>39</td>
<td>40</td>
<td>72</td>
<td>40</td>
<td>23</td>
<td>21</td>
</tr>
<tr>
<td>Industrial</td>
<td>51</td>
<td>69</td>
<td>75</td>
<td>82</td>
<td>103</td>
<td>99</td>
<td>74</td>
<td>53</td>
<td>28</td>
</tr>
</tbody>
</table>

* Includes permits for new construction and additions
** Producer and Personal services
*** As of June, 1991

Source: City of Vancouver, Permits and Licences Department

permit value data and the number of permits shown in Table Three, there appears no shortage of entrepreneurs to take their place in the inner city.

An important aspect of this analysis is that the climate for industrial activity in Vancouver remains attractive, with a significant level of investment occurring every year. Elements contributing to the support of the local industrial economy — that is, the reinforcing role of the mode of regulation — include: a well established service sector; several educational institutions in the local area such as the University of British Columbia, Simon Fraser University, the British Columbia Institute of Technology, and Vancouver Community College, all of which provide a well trained workforce for local industrial activities; several established agglomerations of industrial activity; and a high quality of life in the city and suburbs. As a final piece of evidence, business licences issued by the City of Vancouver will be presented.
iii)- Business Licences

The examination of business licences issued by the City of Vancouver is a third method by which to assess the level of economic activity and investment in manufacturing and services in the local economy. For the purposes of this thesis, data on business licences are interpreted as a crude measure of business starts in the local economy. The use of business licence information from the city of Vancouver permits a more detailed analysis of restructuring in the local context, which can prove somewhat difficult when dealing with the larger scale of the regional economy. It is hoped that the use of data for the city will reinforce the analysis of the impacts of economic and industrial restructuring in Greater Vancouver.

Examining the business licence data presented in Table Four, it is apparent that far from a decline in industrial activity, years such as 1989 and 1990 — with 130 and 154 manufacturing licences issued respectively — indicate that the manufacturing community continues to play a role in the local economy. Since 1985, there has been steady growth in the number of permits issued for industrial uses, which is interpreted as an increase in industrial business starts since 1985. As can be expected based on the evidence provided in earlier sections regarding the hegemonic role of service employment in the Vancouver economy, significantly more businesses licences for service activities have been issued in all years presented in this table. While the number of permits issued for manufacturing operations cannot be construed as a large-scale resurgence of traditional production-based economic activity in Vancouver — as the service industries so clearly dominate local economic activity — it does represent the buoyant manufacturing economy which characterizes the Vancouver economy. Referring to the percentage of total permits issued by sector, after a slight decline between 1985 and 1988, permits issued for manufacturing have remained stable. This is an indication that the mode of regulation in the Vancouver economy is effective in providing many of the locational requirements of industrial activity in the 1980s and 1990s. Recent data from Employment and Immigration Canada
appears to reinforce this assertion. Between 1988 and 1991, Vancouver added nearly 30 percent more employment in the manufacturing base, compared to Toronto which lost 2 percent of its manufacturing base, and Montreal which saw manufacturing employment fall by 3.5 percent over the same period (Employment and Immigration Canada, 1992).

Table Four. City of Vancouver, Business Licences Issued, 1983-1991

<table>
<thead>
<tr>
<th>Year</th>
<th>Manufacturing</th>
<th>Services</th>
<th>Residential</th>
<th>Total</th>
<th>% Manuf.</th>
<th>% Services</th>
</tr>
</thead>
<tbody>
<tr>
<td>1983</td>
<td>28</td>
<td>376</td>
<td>197</td>
<td>601</td>
<td>4.6</td>
<td>62.5</td>
</tr>
<tr>
<td>1984</td>
<td>42</td>
<td>469</td>
<td>140</td>
<td>651</td>
<td>6.4</td>
<td>72.0</td>
</tr>
<tr>
<td>1985</td>
<td>53</td>
<td>604</td>
<td>163</td>
<td>820</td>
<td>6.4</td>
<td>73.6</td>
</tr>
<tr>
<td>1986</td>
<td>60</td>
<td>849</td>
<td>207</td>
<td>1116</td>
<td>5.3</td>
<td>76.8</td>
</tr>
<tr>
<td>1987</td>
<td>82</td>
<td>1114</td>
<td>327</td>
<td>1523</td>
<td>5.4</td>
<td>73.1</td>
</tr>
<tr>
<td>1988</td>
<td>98</td>
<td>1671</td>
<td>647</td>
<td>2416</td>
<td>4.0</td>
<td>69.1</td>
</tr>
<tr>
<td>1989</td>
<td>130</td>
<td>2374</td>
<td>656</td>
<td>3160</td>
<td>4.1</td>
<td>75.1</td>
</tr>
<tr>
<td>1990</td>
<td>154</td>
<td>2492</td>
<td>513</td>
<td>3195</td>
<td>4.8</td>
<td>78.0</td>
</tr>
<tr>
<td>1991*</td>
<td>72</td>
<td>1235</td>
<td>325</td>
<td>1632</td>
<td>4.4</td>
<td>75.7</td>
</tr>
<tr>
<td>Active permits</td>
<td>921</td>
<td>5186</td>
<td>10398</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: City of Vancouver, Planning Department

In this section, I have tried to use several sources of economic information to illustrate the nature of change in the Vancouver economy. Of the data presented, the Statistics Canada information regarding employment change is the clearest evidence pointing to the emergence of service activity as the dominant economic engine in Vancouver. However, the building permit and business licence are also useful, as they indicate the number of firms seeking either to build new manufacturing facilities or open new production-oriented businesses. These data represent a measure of investor confidence in manufacturing activities in Vancouver, a fact which renders the local economy very different from traditional industrial economies, such as London, Toronto, or Montreal. To once again cast the developments in the local economy in the language of the regulation school, the local mode of regulation has proven resilient and efficient in the support of an industrial regime of accumulation. In this respect, the Vancouver economy stands clearly
apart from the established 'industrial heartland' areas of Canada such as Toronto and Montreal. In the following section, I will attempt to examine the local economy in more detail, through an examination of major industrial sectors, utilizing a process of location quotient analysis.

SECTORAL ANALYSIS OF THE VANCOUVER ECONOMY

Based on the model outlined by Scott (1988a), in which the sectoral make-up of the industrial base of the study area is examined through the use of location quotients, I have utilized a similar analytical framework for the Vancouver case study. Scott's analysis of the Third Italy highlights his perceptions of flexible accumulation, in particular: a rise in the total number of firms; a decline in average number of employees per firm; and the predominance of firms with low capital-output ratios. This sectoral analysis of the Vancouver economy will seek to identify similar characteristics in the Vancouver economy.

i) Location Quotients

Location quotient analyses are a statistical measure meant to convey an indication of the degree of representation of a particular group of people or industrial activity in the region of interest, a "measure of relative spatial incidence, normalized to unity" (Scott, 1988a). The equation utilized for the location quotient analysis is:

\[ Q_i = \frac{\pi_i}{\pi_i^*} \]

Where: \( \pi_i \) = the proportion of all workers in the local economy in sector \( i \); and
\( \pi_i^* \) = the proportion of workers in the whole country in the same sector
For the purposes of this analysis, under-representation is indicated by a location quotient of < 1.0, and over-representation by a value of > 1.0.

**ii) Results**

The data and results for the location quotient analysis are presented in Table Five. In Scott's model of flexible accumulation in the Third Italy, the resulting Qi values are assessed in relation to the capital-intensiveness of particular industries. In the Third Italy, Scott found that those industries under-represented were those which sought internal economies of scale and utilized capital-intensive mass-production technologies: what Scott refers to as Fordist firms (Scott, 1988a). Those activities which were over-represented exhibited tendencies towards vertical disintegration, labour-intensive production methods and external economies of scale: that is, flexible accumulation. In Vancouver, over-represented industries are Food, Wood Industries, Printing and Publishing and Metal Fabrication, industrial sectors which appear to have implemented capital intensive regimes of flexibility in response to economic change.

The Food sector — a combination of food processing and manufacturing, and beverage production — shows a location quotient result of 1.085, relatively high for the Vancouver metropolitan area, an interesting local example of the flexible industrial spaces and activities which Scott presents in his model. The food sector is noted for its high degree of material throughput, a significant degree of inter-firm transactional relationships, and large external economies of scale. Based upon these characteristics, the Food sector of Vancouver can be seen as an example of the flexible production. While food processing and manufacturing activities do require significant capital-intensity in production facilities, the rapid turnaround and range of product lines render this sector among the more flexible in the city's economy. It is theorized (a detailed examination is beyond the scope of this thesis) that the food sectors in Vancouver are likely locations of both labour input and production flexibility. The union representing the majority of food
workers (9,903 persons in 1986), the AFL-CIO, with over 160,000 members nationwide, and some 19,000 members in British Columbia (BC Ministry of Labour and Consumer Services, 1991), has in the recent past become more open to changes in the organization of work — the result of increasing competition from international markets — permitting management to develop more flexible methods of labour control.

Table Five. Location Quotients, Vancouver CMA, 1986

<table>
<thead>
<tr>
<th>SIC</th>
<th>Sector</th>
<th>Vancouver CMA Employment</th>
<th>Canada Employment</th>
<th>Vancouver Qi</th>
</tr>
</thead>
<tbody>
<tr>
<td>101-109</td>
<td>Food</td>
<td>9903</td>
<td>304340</td>
<td>1.085</td>
</tr>
<tr>
<td>151-153</td>
<td>Tobacco</td>
<td>105</td>
<td>7395</td>
<td>0.474</td>
</tr>
<tr>
<td>162-165</td>
<td>Rubber &amp; Plastic</td>
<td>1756</td>
<td>76625</td>
<td>0.764</td>
</tr>
<tr>
<td>172-179</td>
<td>Leather</td>
<td>225</td>
<td>26845</td>
<td>0.280</td>
</tr>
<tr>
<td>174</td>
<td>Shoes</td>
<td>55</td>
<td>18400</td>
<td>0.100</td>
</tr>
<tr>
<td>181-189</td>
<td>Textiles</td>
<td>805</td>
<td>69745</td>
<td>0.384</td>
</tr>
<tr>
<td>231-239</td>
<td>Knitting</td>
<td>0</td>
<td>16965</td>
<td>0.000</td>
</tr>
<tr>
<td>243-249</td>
<td>Clothing</td>
<td>3041</td>
<td>122085</td>
<td>0.831</td>
</tr>
<tr>
<td>251-259</td>
<td>Wood Industries</td>
<td>10525</td>
<td>137490</td>
<td>2.553</td>
</tr>
<tr>
<td>261-268</td>
<td>Furniture &amp; Fixtures</td>
<td>1705</td>
<td>75270</td>
<td>0.755</td>
</tr>
<tr>
<td>271-274</td>
<td>Paper &amp; Allied</td>
<td>3167</td>
<td>131390</td>
<td>0.804</td>
</tr>
<tr>
<td>286-289</td>
<td>Printing &amp; Publishing</td>
<td>6467</td>
<td>152855</td>
<td>1.411</td>
</tr>
<tr>
<td>291-298</td>
<td>Primary Metal Processing</td>
<td>2455</td>
<td>121335</td>
<td>0.675</td>
</tr>
<tr>
<td>301-309</td>
<td>Metal Fabrication</td>
<td>6226</td>
<td>167690</td>
<td>1.238</td>
</tr>
<tr>
<td>311-318</td>
<td>Machinery</td>
<td>3410</td>
<td>109365</td>
<td>1.040</td>
</tr>
<tr>
<td>321-329</td>
<td>Transportation Equipment</td>
<td>3485</td>
<td>221335</td>
<td>0.525</td>
</tr>
<tr>
<td>331-339</td>
<td>Electrical and Electronics</td>
<td>3991</td>
<td>131780</td>
<td>1.010</td>
</tr>
<tr>
<td>351-359</td>
<td>Non-metallic mineral prods.</td>
<td>1523</td>
<td>59915</td>
<td>0.848</td>
</tr>
<tr>
<td>372-379</td>
<td>Chemical</td>
<td>2610</td>
<td>101400</td>
<td>0.858</td>
</tr>
<tr>
<td>391</td>
<td>Scientific Equipment</td>
<td>460</td>
<td>31950</td>
<td>0.480</td>
</tr>
<tr>
<td>392-399</td>
<td>Miscellaneous</td>
<td>2475</td>
<td>63295</td>
<td>1.304</td>
</tr>
<tr>
<td>Totals</td>
<td></td>
<td>64387</td>
<td>2147470</td>
<td></td>
</tr>
</tbody>
</table>

*NB: for Qi, over-representation is indicated by a value of > 1.0, while under-representation is indicated by a value of < 1.0.

Source: Statistics Canada

Growth in the Food sector in Vancouver may also be the result of the nature of the economic activity in the Greater Vancouver region; the emergence in recent years of a
distinctly metropolitan, regional market for goods and services. The large regional population, efficient highway connections and ready access to markets has effectively integrated the regional Food economy into a cohesive, active sector. A second, but no less important factor in the relatively high location quotient results for this sector can be found in the service — convention and tourism — functions the city has in the regional economy. Vancouver and the surrounding region has become a major tourist destination, a role which requires a wide variety of foodstuffs and related products. In the case of the Food sector, the trend will likely be towards an increased level of so-called 'city-serving' food activities. Those firms with close ties and input/output relationships with a client base in the inner city will likely find the present concentration of activities in the Clark Drive area continues to serve them well. It is the food activities with a wider spatial arrangement of clients which may seek alternative locations as the Vancouver economy continues to evolve. An example of this relocation is Gray Beverage, the largest soft drink bottler in the region, which relocated to a suburban location to better serve its regional client base. This growing activity will in all likelihood continue, bolstering the economy of the city, and maintaining an active role for the Food sectors in the region.

The Wood Industries, Printing and Publishing and Metal Fabrication industries exhibit a tendency towards capital-intensive production technologies in the form of extensive, often high-technology milling, processing, and manufacturing equipment. On an initial examination of the location quotient results, these sectors do not appear to conform to the model of new, flexible industrial economies, with a large presence of firms with high capital-output ratios and labour costs in the form of capital intensive production processes. However, the sector most strongly represented in the Vancouver economy is the Wood Industries grouping, with a location quotient of 2.553 — the highest in the CMA — a sector which merits closer analysis.

The Wood Industries grouping is comprised of 8 SIC sectors ranging from shakes and shingles to doors and windows. The largest employment among these 8 activities is
found in the sawmill and planing industries (SIC 2512) with 5,685 employees in 1986, or 54.0 percent of employment in the wood industries in Vancouver; and the veneer and plywood sector (SIC 252) with 1,652 persons employed, or 15.7 percent of total employment in wood industries in the city. The wood industries of Canada — and British Columbia in particular — are characterized by high labour costs, with some 80 percent of annual expenses arising from wage bills (Webber and Tonkin, 1988). The sawmilling and planing, and the veneer and plywood sectors have implemented high-technology production facilities in the recent past, to reduce the high costs incurred through the 'labour bottleneck' experienced in these activities. Webber and Tonkin also examine the technical composition of capital, calculated as the "mass of constant capital in relation to the labour employed in production" (Ibid.: pp. 1629). In the wood industry, the technical composition of capital has shown an average annual growth rate of 4.1 percent between 1955 and 1980 (Webber and Tonkin, 1988). This compares with 1.7 percent in the furniture industries and 3.2 percent in the paper and allied sectors. This indicates a greater tendency towards high-technology capital accumulation in the wood industries. While the average increase in the technical composition of capital of 4.1 percent for the years 1950 to 1980, between 1979 and 1981 this increase was 9.6 percent per year, further attesting to the recent implementation of high-technology production facilities in this sector. Hayter (1987) has examined in detail the changing technological base within the Canadian forest products sectors, and his findings correlate with Webber's and Tonkin's results. Between 1971 and 1984, total expenditures on machinery and equipment in the forest sectors rose from $515 million to $1.38 billion (Hayter, 1987). In the wood processing industries such as the plywood and veneer, and sawmill and planing sectors, expenditures were $283.72 million in 1984, a significant increase from the $112.78 million spent in 1971 (Hayter, 1987). In a summary of his findings, Hayter writes "...technology in the form of plant and equipment has become increasingly important..." (Ibid.: pp. 84).
The Metal Fabrication industries (SIC 301-309) in Vancouver are an industrial grouping which has declined in the recent past, with a number of foundries and metallurgical facilities relocating to the suburban municipalities of the region. The relatively high location quotient of 1.238 for this sector however, indicates the historical role these activities have played in Vancouver, with even the residual metal fabrication industries showing a strong presence in the local economy. The metal fabrication sector can also be seen as an example of the rise of production flexibility in the Vancouver economy. As a number of industrial firms implement flexible modes of production and labour control, aspects of production formerly performed in-house are sub-contracted to reduce costs. Activities typically contracted out include machining and engineering tasks. These activities would include the casting of molds, die manufacture and other metal machining tasks. As evidence of the presence of flexibility and the impact on this sector, metal fabrication has seen an increase in the number of firms by an average of 1.4 percent between 1981 and 1986, while employment remained relatively stable (6,226 in 1986). The increased number of firms, in tandem with a steady workforce implies falling average employment per firm. Based on theories of flexibility and production change (Aglietta, 1979; Atkinson, 1986; Piore and Sabel, 1984) this pattern is partial evidence that the metal fabrication firms themselves are likely implementing innovative strategies of labour control such as work groups or team production methods. While these statements regarding the Metal Fabrication sector in Vancouver may be best seen as informed conjecture, there is evidence to indicate that changes such as those outlined here have occurred in this sector. Table Six presents the average employment in manufacturing firms in those sectors with location quotients which indicate over-representation in the Vancouver economy for the years 1982 to 1986.

Further proof of the changes occurring in this sector could be obtained through a detailed survey analysis of Metal Fabrication firms in the city, but such an analysis is beyond the scale and scope of this thesis. From the data in Table Six, it becomes apparent
that average employment in the Metal Fabrication sector is indeed declining. However, a portion of this decline can be attributed to the impacts of the recessionary period of the early 1980s. During a recession such as that experienced in the British Columbia economy, a degree of employment loss is to be expected.

As another measure of the changing nature of production, value added and value of goods shipped by sector can be examined. Statistics Canada performed a census of

*Table Six. Average Employment in Manufacturing Firms, Vancouver CMA: 1982-1986*

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Wood Industries</td>
<td>56</td>
<td>54</td>
<td>49</td>
<td>51</td>
<td>44</td>
</tr>
<tr>
<td>Food</td>
<td>48</td>
<td>65</td>
<td>58</td>
<td>59</td>
<td>54</td>
</tr>
<tr>
<td>Metal Fabrication</td>
<td>23</td>
<td>21</td>
<td>19</td>
<td>19</td>
<td>18</td>
</tr>
<tr>
<td>Paper and Allied</td>
<td>56</td>
<td>70</td>
<td>73</td>
<td>no data</td>
<td>81</td>
</tr>
<tr>
<td>Printing and Publishing</td>
<td>21</td>
<td>no data</td>
<td>17</td>
<td>17</td>
<td>16</td>
</tr>
<tr>
<td>Chemical</td>
<td>20</td>
<td>20</td>
<td>19</td>
<td>19</td>
<td>no data</td>
</tr>
<tr>
<td>Non-metallic minerals</td>
<td>41</td>
<td>35</td>
<td>33</td>
<td>no data</td>
<td>41</td>
</tr>
</tbody>
</table>

Source: Statistics Canada

manufacturers which gathered information on value of goods shipped, until 1986, when this survey stopped. Data on the value of goods shipped are presented in Table Seven, which does show an increase in the value of goods shipped in this sector. As with the data presented in Table Six, the figures included in Table Seven must also be considered in the light of the recession, and with considerations of inflation included in an assessment. For the years 1976 to 1980, value of shipments and revenues increased steadily, at a rate higher than national inflation rates for those same years. During the period 1980 to 1985 — the depth of the recessionary period in the local economy — value of shipments and revenues consistently (and as could be expected) declined. The increase in value from 1985 to
1986, however, was 9.6 percent, a figure which would indicate a small measure of recovery, or the adoption of strategies of flexible accumulation. The combination of reduced employment and increased value of goods are indicative of restructuring based on either on labour and input flexibility, or investment in high-technology production facilities, another strategy to achieve a measure of flexibility in production.

The Printing and Publishing sectors (SIC 286-289) also show a strong presence in the Vancouver economy, as indicated by the location quotient result of 1.411. The major trend indicated by the growth of these sectors is the rapid expansion of service activity in the Vancouver metropolitan area. Also, as a sector traditionally marked by capital-intensive and labour-intensive production processes, the printing and publishing trades have undergone a significant technological change in recent years, with new, computer-based and automated processes implemented, an example of flexible production methods implemented on a sectoral scale. The printing and publishing sectors continue to exhibit

Table Seven. Employment Change and Value Added in Metal Fabrication Activity in the City of Vancouver, 1976 - 1986

<table>
<thead>
<tr>
<th>Year</th>
<th># Firms</th>
<th>Production Employment</th>
<th>Value of Shipments and Revenues ($000s)</th>
<th>Value Added ($000's)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1976</td>
<td>102</td>
<td>2,039</td>
<td>147,418</td>
<td>64,740</td>
</tr>
<tr>
<td>1977</td>
<td>99</td>
<td>2,038</td>
<td>163,422</td>
<td>71,043</td>
</tr>
<tr>
<td>1978</td>
<td>106</td>
<td>2,040</td>
<td>182,596</td>
<td>83,267</td>
</tr>
<tr>
<td>1979</td>
<td>106</td>
<td>2,265</td>
<td>230,187</td>
<td>90,984</td>
</tr>
<tr>
<td>1980</td>
<td>103</td>
<td>2,137</td>
<td>271,051</td>
<td>107,988</td>
</tr>
<tr>
<td>1982</td>
<td>87</td>
<td>1,721</td>
<td>250,325</td>
<td>112,972</td>
</tr>
<tr>
<td>1983</td>
<td>83</td>
<td>1,458</td>
<td>239,737</td>
<td>109,175</td>
</tr>
<tr>
<td>1984</td>
<td>83</td>
<td>1,290</td>
<td>204,692</td>
<td>88,866</td>
</tr>
<tr>
<td>1985</td>
<td>82</td>
<td>1,357</td>
<td>188,941</td>
<td>80,245</td>
</tr>
<tr>
<td>1986</td>
<td>79</td>
<td>1,298</td>
<td>207,178</td>
<td>82,851</td>
</tr>
</tbody>
</table>

Source: Statistics Canada
tendencies towards relatively high levels of fixed capital, but typically this investment comes in the form of new high-technology equipment which permits extremely small production runs, while maintaining economic viability for operators. Perhaps more significantly — and particularly so for the Vancouver economy — is the rise of micro-computer-based desktop publishing systems. In 1986, 211 out of 406 (52 percent) of all publishing firms in Vancouver were dedicated to the commercial printing industry. Such micro-computer based publishing systems permit high productivity and quality output without relying on traditional high levels of capital investment or major labour costs associated with manual typesetting. The 1991 Census of Canada data are not yet available, but the trend towards small operators in this sector will likely continue.

Firms and corporations throughout the metropolitan Vancouver area have vertically disintegrated the printing and publishing tasks which they cannot perform in-house and maintain profitability. As such, the printing and publishing sectors are marked by high levels of inter-firm transactions, ranging from inputs such as paper and inks, to the inter-firm and inter-sectoral exchange of finished goods, characteristic of the turn towards flexible forms of corporate and economic organization.

The analysis of the Vancouver economy in this section is based primarily on 1986 Census data, as the results of the 1991 census are not yet available. However, the Greater Vancouver Regional District has produced a set of employment forecasts for sectoral employment in the coming decades, which show continued growth in the manufacturing sectors. These projections reinforce the earlier contention that the Vancouver economy shows few signs of the new industrial spaces outlined by Scott and other economic theorists: there is no macro indication that the overall employment in industrial activities is on the decline, as producers implement labour control and technologically-based responses to achieve flexibility. The manufacturing workforce (SIC 100-399) forecasted in the regional economy shows a projected increase of 22,000 employees with manufacturing workforce up from 76,000 in 1986 to 98,000 in 1991 (Baxter, 1992).
Overall industrial employment is expected to rise to 226,000 in 1991 from 165,000 in 1986. This would support the notion that the industrial and manufacturing employment will retain a significant role in the local and regional economies. The relationship between sectors as a percentage of total employment in the region is projected to remain relatively stable until 1996. Manufacturing employment in 1986 accounted for 12.7 percent of regional employment (CMA), in 1991 it is projected to be 13.0 percent, and in 1996 manufacturing is projected to employ 12.5 of the workforce in the Vancouver CMA. These projections reinforce the dominant role of the service sectors in the Vancouver economy, and their likely continued importance in the future, while forecasting a relatively stable level of industrial activity and employment.

THE VANCOUVER MODEL

Based the body of evidence presented in this chapter, the Vancouver economy has clearly experienced change in the recent past, but the process of change and restructuring has not featured the large-scale shedding of industrial employment, nor the abandonment of industrial areas of the city, as seen in other locales. The response of the Vancouver economy has been to adopt strategies of flexibility on a 'retro-fit' basis in existing facilities: the replacement of one machine at a time, and the re-training of production staff. In certain sectors such as the wood industries, the response has been to invest high levels of fixed capital in the form of computer controlled equipment and the implementation of new modes of work organization. As the union presence in the BC forest industries is so strong, there is often less ability to implement strategies of flexibility based upon labour management techniques, but such strategies have been implemented where possible (Barnes, 1991; Webber and Tonkin, 1988).

The Vancouver economy presents several anomalies and difficulties in relation to current theories of industrial change. First, what appears to be emerging are not new industrial spaces — to use the language of Scott — but the more familiar and traditional
industrial parks, in which operators attempt to incorporate increased flexibility into their production schemes. These 're-industrialized' areas utilize existing infrastructure and service provision from the city, as well as the transactional linkages which they have developed in the Vancouver economy over time. In addition, as new markets are opened to trade and commerce, the Pacific Rim economy has re-invigorated the industrial complex of Vancouver. In recent years a significant number of entrepreneur class immigrants have arrived from Hong Kong and bolstered the production base of the regional economy. Several high-technology parks have been developed, with Richmond a point of concentration of such activities (Employment and Immigration Canada, 1992). The development of such high-technology business parks more closely conforms to Scott's model of new industrial spaces than other industrial areas of the region, with a pro-development city council in favour of such operations, a dense network of transactional linkages between firms — a closely linked regime of accumulation focused on high technology — and the focus upon innovative products with high information and technology requirements.

Vancouver's rise as a centre of financial and trade services continues to play a major role in the development of the regional economy. City and municipal councils throughout the region see the encouragement of a strong, local service economy as the path to success and fortune. Such councils (particularly Vancouver) have adopted an indifferent position on industrial activity, apparently placing their confidence in the 'natural evolution' towards the service sectors as the dominant form of economic activity. Several authors have questioned the soundness of macro-level policies which would advocate the large-scale conversion of industrial land to higher order uses (Quinn and Gagnon, 1986). Policy-based commitment to services may pose difficulties in the future if the service boom turns to bust.

Traditional agglomerations of production and production-oriented activities remain important in the Vancouver economy, and will likely continue to be the dominant
mode of industrial organization in the regional economy. The forest product sectors, long a major component of the local industrial economy remain so, and have been among the leaders in adoption of innovative production techniques and work organization. The high-technology sectors such as electronics and computer software present interesting points of analysis, as the agglomeration tendencies and transactional linkages of such firms produce an intricate economic web.

CONCLUSION

This chapter has attempted to outline the fundamental changes which have taken place in the industrial sectors of advanced metropolitan economies. These areas have been forced through increased international competition from the newly industrialized countries, the changing nature of global finance, and the rise of national debts, to restructure and reorganize on the corporate and production line level. These changes have been described as a decline in Fordism, the dominant regime of accumulation in capitalist society.

As the Fordist regime declines, the response has been the introduction of new, flexible systems of production and capital accumulation, the growth of the services sector and subsequent re-orientation of urban economies. A concomitant development has been the emergence of new industrial spaces, in locales or regions which have had little prior history of significant industrial activity.

Some researchers have argued against two aspects of the material presented in this chapter: there is scepticism regarding the hegemonic position of Fordist manufacturing and capital accumulation; and doubt as to the extent and nature of restructuring and the emergence of flexible accumulation (Lovering, 1990; Sayer, 1989). These criticisms also focus on the nature of flexible accumulation: a return to draconian labour management techniques; increased pressures placed on the worker; a multiplicity of suppliers of inputs; and the close articulation with consumer demand. Such responses could be viewed as pre-
capitalist, a return to the form of economic organization of the 19th century. While such criticism may be applicable on a global scale, in North America, and in the larger cities of Europe, there have been marked changes in industrial activity.

The Vancouver regional economy is one characterized by a history of heartland-hinterland relationships, and processing-based activity. The major components of the regional economy have focused upon the primary processing or shipment of natural resource products from the rich hinterland of the province, and a network of financial and service functions. Industrial activity has not assumed a hegemonic role within the regional economy, as financial and service activity have been the major component of local economic activity for some time.

Nonetheless, the regional economy has shown signs of restructuring and change, with a number of local industrial sectors adopting regimes of flexible accumulation as a response to rapidly changing and highly competitive markets. This response has typically been the gradual integration of new machinery such as computer controlled devices, and new forms of work organization such as work teams and just-in-time inventory systems. Industrial employment in the Vancouver region has remained relatively stable during the past thirty years, a period when other dominantly industrial economies such as London and New York have experienced large-scale shedding of manufacturing employment.

The Vancouver context presents an exciting anomaly and contradiction to these models of industrial restructuring, which bears closer examination in the near future. This chapter has attempted, through a rudimentary analysis of location quotients, various socioeconomic variables and a survey of theorizations regarding the change in the regional economy, to begin such an examination. However, such theorization is always a gross simplification of reality, as Mann states: "...societies are much messier than our theories of them" (Mann, 1986: pp. 4). It is this messiness which I have attempted to address in this chapter, through a discussion of the theory of economic regulation — with the emphasis placed on the interdependence of the economic and social spheres — and an analysis of the
local economy which has hopefully illuminated the nature of economic restructuring in Vancouver and the surrounding region.
Chapter Three - Evaluative Criteria

INTRODUCTION

In planning for economic development and change, a detailed assessment of the current situation is required, before policy decisions can be made and programmes implemented to achieve desired goals. In many cases, a 'goal-oriented' approach to policy creation utilizes an ad hoc set of criteria to assess the present state of affairs. This chapter of the thesis is dedicated to deriving a set of criteria which can be applied in the early, evaluative stages of the planning process. These criteria are intended to operate at a basic level of assessment; rather than functioning as rigid categories into which industrial activities or land-uses must fit, they instead offer the planner a set of measures on which a flexible, responsive planning policy can be based.

The creation of a set of evaluative criteria must occur within a clearly defined analytical framework. In the case of the evaluative measures proposed here, this framework includes the nature of economic and industrial restructuring in the region, structural changes, and public and private sector responses to the evolving nature of industrial activity in the Greater Vancouver context.

STRUCTURAL CHANGE

Given the need to closely examine and plan for the changing nature of industrial lands in the City of Vancouver, a set of criteria are required which reflect the nature of Vancouver's changing economic base, population trends and structural changes occurring in the economy; criteria which evaluate both the regime of accumulation and subsequent changes in the mode of social regulation. These factors include: the growth of the service sector; an increasing population base throughout the region, with the subsequent traffic, congestion and ecological problems; and the continued growth in Pacific Rim trade and exports. The examination of the socio-economic and demographic changes, along with the
changing structure of economic activity is the embodiment of the objectives of the 
regulation school of economic development (Aglietta, 1979, Boyer, 1990). As described 
in Chapter Two, the regime of accumulation — the dominant mode of production, 
economic linkages, and relations between producers — exerts tremendous influence on the 
mode of regulation — the social relations which serve to reinforce the regime of 
accumulation — and is in turn influenced by these social relations. It is hoped that by 
utilizing and remaining cognizant of the theoretical foundation on which this thesis is 
based, a more sensitive approach to planning industrial change may emerge.

The response to the pressures placed on industrial land has been in the form of a 
variety of initiatives, both public and private.

PUBLIC SECTOR RESPONSE

Public sector response has been in the form of studies and inventories of industrial 
land by the planning department of the City of Vancouver. For planning purposes, the City 
of Vancouver has defined a series of activities which fall under its definition of 'industry'.

These are:
1- Manufacturing- goods production, including processing, fabrication and assembly 
2- Construction- contractors work/storage yards and work shops 
3- Warehousing- including storage buildings 
4- Transportation services- rail yards, truck and marine terminals 
5- Utilities and Communications- storage yards and works yards) 
6- Wholesaling activities

(City of Vancouver Planning Department, 1989)

These categories are outlined in the city's industrial zoning by-law, and are a coarse 
categorization of the over 60 land uses termed industrial. In addition to these categories 
there are a number of other activities which may occur in industrially zoned areas. These 
are primarily service oriented activities such as restaurants, coffee shops, small retail, and 
land uses which are not suitable for other commercial zones. The latter category includes
laundries, janitorial services, automotive repair and lumber yards. The ancillary activities which may take place in industrially zoned lands also includes research and development activity, a significant factor in the changing nature of industrial lands.

The policy response on the part of the city has been the establishment of the 'New Communities' programme as well as a new Industrial Land Strategy, both coming on stream in late 1990 and early 1991. The New Communities initiative identifies several industrial or mixed use areas in Vancouver which may be converted to provide "housing on surplus industrial lands" (City of Vancouver Planning Department, 1990). The areas identified for release from industrial use and potential conversion to residential purposes are: Burrard Slopes (South of Granville Island), Hudson Street, Joyce and Vanness, Cedar Cottage Industrial Area, Hudson Street industrial Area, Railway Street, West Powell, Dundas-Semlin, and the 12th and Arbutus area (City of Vancouver, 1992). In this Report to Council, some 667.1 hectares of industrial land are recommended for release from industrial zoning, with 457.1 hectares deemed suitable for residential use. The latter months of 1990 and 1991 saw considerable change in these areas, particularly in the Burrard Slopes area (between Broadway and 4th Avenue and Granville and Burrard Streets) and in the South of Granville Island areas, with several high density residential projects nearing completion. In addition, the 12th and Arbutus site, until recently the site of Labatt's brewery, has entered into the planning process to determine the nature and density of the residential activity which will replace the existing industrial buildings.

PRIVATE SECTOR RESPONSE

Private sector response to the pressure on industrial areas has been led by the speculative development industry, which has pressured council for individual rezonings of industrial areas on an ad hoc basis, seeking to convert these areas to high priced, up-market residential projects, as seen in the proposals for the former EXPO '86 lands along False Creek, currently under review by city planning officials and staff.
HOUSING NEEDS

Among the concerns expressed by residents of Vancouver, one of the most pressing is the call for affordable, quality housing. As the service or tertiary sectors of the local economy continue to grow, the workforce requirement of these activities also increases. It has been shown (Buck, 1988; Ley and Hutton, 1987) that while a growing portion of service employees are high income earners, the majority of those employed in the various activities find themselves at the lower ends of the pay scale, evincing a deep bifurcation of the service sector labour force. Restaurant and hospitality workers, business service employees such as computer service and repair, printing services and the dominantly female secretarial and support staff are all examples of these low income jobs. Housing in the inner city areas of Vancouver such as the West End and the Kitsilano areas is often priced beyond the reach of these workers, and they are forced to live in the suburban areas such as Burnaby, Surrey, Richmond and Delta. This work-residence displacement has seen a large scale increase in commuter traffic volumes during the morning and evening peak times.

With the recent publication of the Clouds of Change report (City of Vancouver, 1990) — accepted in principle only, and not yet operational policy for planning purposes or decision-making in the city — Vancouver appears to be concerned with addressing the ecological impacts of this work-residence split. The creative redevelopment of a portion of the currently zoned industrial lands could provide a significant opportunity to provide affordable, quality housing, in locations close to the downtown core, the primary centre of employment. The creation of new communities combining community services, nodes of employment and innovative forms of housing to achieve the densities required may well prove a more effective and equitable answer to local housing needs. The following proposed criteria are envisioned as aids to the planning process in the conservation of industrial land, or the conversion of those lands to higher uses.
To effectively plan for change in the local regime of accumulation and subsequent alteration of social relations and space, the city requires an extensive, comprehensive industrial strategy to deal with these areas, and the evaluative criteria suggested in this section of thesis, combined with the subsequent recommended zoning strategies could form a major component of such an industrial strategy.

EVALUATIVE CRITERIA

The criteria proposed and described in this section have been created with the intent that they be applied at a variety of scales. On the individual site or micro scale they could be used to examine a particular firm or industry in the city; on the macro scale, they could be utilized to evaluate industrial sectors or precincts in the city. The criteria have been developed to facilitate objective analyses of the industrial activity occurring in Vancouver and to provide a logical framework for the evaluation of the industrial base of an area or the city as a whole. With the economic restructuring which has occurred in the Vancouver economy, and the need for increased housing and livable communities in the city, the criteria may be used by planners to determine the nature and degree of change permitted in a specific industrial area. As with any proposed set of evaluative criteria, especially those set forth in an academic exercise such as this, these must be taken for what they are — merely a set of idealized, recommended indicators against which an industrial activity can be measured.

The criteria proposed in this section of the thesis can be divided into two broad categories: economic; and social and environmental. These measures are intended to be used in the collection of economic and social information regarding the industrial space economy of a metropolitan urban area. The economic criteria — such as an examination of the technological intensity of capital in production facilities — can assess the nature of the local regime of accumulation. If the proposed economic criteria find a high degree of capital investment (such as high-technology production facilities) in production, coupled
with high levels of value added and revenues, it is likely that the firm has adopted a scheme of flexible production. The social division of labour — the mode of regulation — will also likely show changes based on technological innovation in the regime of accumulation. These changes will likely show up in data regarding employment and salaries, and educational levels among the workforce, for example. These criteria therefore enable the planner to make decisions with a clear picture of both the economic and social elements which comprise the capitalist system of production and subsequent policy can achieve a high level of sensitivity to local and regional contexts.

While the basis of the analysis and the framework for this thesis lies in an understanding of the economic principles operating in the manufacturing process and industrial areas, there are other concerns which must be addressed. The proposed social and ecological measures are an attempt to address such issues. These two categories of criteria are attempts to evaluate the wide range of externalities which are associated with industrial activity, and their effects on the social and economic formations in which they occur. Information for the implementation of these measures will be gathered from sources such as city assessment rolls, provincial and federal taxation agencies, employment records and others. Determining the source of information, and the difficulty encountered in obtaining that data will likely be a significant obstacle to the successful implementation of such criteria. While these measures are an ideal set of criteria which could be utilized in the analysis and planning of industrial areas, costs associated with their implementation would be prohibitive. Thus, they should be assessed as an idealized list, from which the general idea or purpose could be extracted, and used for more financially realistic measures. The proposed measures are as follows:

*Economic:*

<table>
<thead>
<tr>
<th>Industrial Activity</th>
<th>Sustainability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Capital Intensity/Technological Innovation</td>
<td>Level/ Degree of Agglomeration</td>
</tr>
</tbody>
</table>
**Social/Environmental:**

- Residence of Employees
- Pollution/Environmental Impacts
- Potential for Conversion

**ECONOMIC CRITERIA**

The economic criteria have been selected primarily as measures of the growth potential and sustainability of the activity occurring in the industrial site or firm being examined; that is, the assessment of both the regime of accumulation and the mode of social regulation. Key aspects of evaluating the growth potential of a firm or an industrial sector include: examinations of past economic performance, growth records, and employment history.

**CRITERIA DESCRIPTION**

1. **Industrial activity** - This criterion will be used to examine the activity and the industrial sector (based on Standard Industrial Classification Codes -SIC) into which it is classified. This criterion will describe: the nature of the industrial activity; the relationship to other sectors operating in the city, that is, the nature of a sector’s role in the local and regional regimes of accumulation; the relative market strengths and weaknesses of the sector; and the recent performance of other similar activities in Vancouver.

2. **Sustainability** - This criterion is based on several factors regarding a particular industrial activity, including growth potential and market orientation, and levels and sustainability of employment. Growth potential would be derived using a combination of statistical information and forecasts regarding the vitality and economic strength of the industrial sector or firm, based on sectoral trends in sales, fluctuations in market prices for the product or service offered, and the impacts of changing international trade relations; market orientation will be used to evaluate the trade and economic linkages of the firm or industrial sector based on the study of shipping records, year end reports and direct surveys. This criterion examines both economic aspects — market orientation,
supply and distribution linkages — and social aspects — sustainability and equity of employment — of local industrial activity.

3- Capital Intensity/Technological Innovation- The evaluation of a firm or industrial sector based solely on employment can result in erroneous decision-making — as a declining employment base may mask a process of capital intensification and emergence of flexible specialization (Webber and Tonkin, 1988). This criterion will examine the mode of production in place in a particular firm or agglomeration of firms, and how that production technique fits into notions of sustainability of the regime of accumulation. A criterion designed to assess the nature and degree of capital intensity and technological innovation will evaluate, based on interviews and surveys of firms, the nature of change in the organization of production and work — the regime of accumulation — on a sectoral or firm-by-firm basis. This criterion could be used to evaluate existing firms, and companies seeking to locate in the Vancouver area.

4- Level of Agglomeration- The development of agglomeration economies, either through the evolution of an area or through municipal programmes is an important consideration in the examination of industrial areas (O'hUallachain, 1989). Agglomeration economies and inter-firm transactions are a fundamental aspect of the regime of flexible accumulation, indicative of the cohesiveness and therefore strength of the regime. If an activity is located in an informal 'business park' which has emerged over the span of several years, the activities taking place should be encouraged, and aided by local, regional, or provincial government where necessary. The opposite also holds true: for activities deemed inappropriate for inner city locales, those which fail to meet standards established by these criteria, redevelopment should be encouraged.

SOCIAL AND ENVIRONMENTAL CRITERIA

While somewhat less rigorous than the measures of economic activity, the social and environmental aspects of evaluating industrial lands and activities are nonetheless important. Planning aims to improve the quality of life for residents through the provision of sufficient opportunities for economic, cultural and social growth. By using such social and environmental criteria, the proposed changes in industrial areas can be directed to achieve a wide range of objectives. The proposed criteria are as follows:
1- Place of Residence of Employees- The dislocation of work and residence has been the subject of much recent research (Coffey and Polèse, 1988; Cervero, 1989; Gordon, et al., 1989). Chief among the concerns of researchers and planners is the lengthy commuting times and the subsequent ecological impacts of motor vehicle use, as natural and urban systems are subjected to increasing levels of stress. For this criterion, an examination of the residence patterns of employees and the commuting methods and routes used will be made. An examination of the place of residence in relation to place of employment is performed with the concept of the mode of regulation in mind. If employees are forced to commute long distances to work each day, their social lives are likely to be deeply disrupted. If this disruption is too great, employees may in turn impact on the regime of accumulation, in an attempt to regain control of the "politics of production" (Burawoy 1985). A dissatisfied workforce can slow production to a near crawl and increase costs to employers through breakage and 'created' technical difficulties. If these interruptions of production become too great, employers may wish seek an alternative location, one closer to the major source of their production workforce, and thus increase the spatial proximity between production and social spaces.

2- Pollution/Environmental Impacts- Of the many potential impacts of industrial activity, the environmental or ecological effects on the local area are among the most important. The underlying principles behind the zoning strategies which are suggested in Chapter Four include the provision of increased urban space for residential purposes, in response to the restructuring of industrial activity in the City of Vancouver. Continued industrial activity in the city, if it is environmentally unsound, will have the greatest impact on integrating housing into currently zoned industrial areas. The successful integration of residential and industrial activity requires non-toxic and non-polluting industries to be encouraged and developed in the city. Current industrial activities in specific areas would be examined and the level of pollution generated will be calculated (using SIC codes and standard engineering methods for projection of effluent discharge, both marine and atmospheric). The objective of this criterion is to identify those industries with the least offensive pollution patterns, and which may be easily integrated with residential uses.

3 - Potential for Conversion- The measure of conversion potential is based primarily on the costs associated with conversion. An example of the nature of costs associated with conversion of industrial lands can be seen in the recent experience of the EXPO '86 lands
in the False Creek area. The reclamation of these lands for residential uses has been faced with huge cleanup costs to remove contaminated soil. If a site proposed for conversion or re-development has significant cleanup and servicing requirements (water and sewage) the development proposal should be re-examined. Such a site may be more suitable for continued industrial use or new forms of industry, such as the high technology sector. A second component in evaluating the potential conversion is the likelihood of other types of industrial activity operating successfully in the area, or the encouragement of an activity which leads to the creation of a healthy community in the area.

CONCLUSION

These criteria form the basis for the generation and application of the zoning strategies for industrial lands described in Chapter Four. The intended use of these criteria is to aid planners and city decision makers in mapping out the areas of the city with potential for conversion from industrial to other uses, particularly residential, and suitable for the creation of a series of functionally integrated mixed-use zones. The criteria will hopefully provide a logical framework in which the planning process may operate. These measures have also been developed in an attempt to operationalize the theoretical context of this thesis: neo-Marxist theories of economic regulation. These theories of regulation attempt to articulate the relations and politics of production with the social network and support system which underlie and reinforce all economic activity. These criteria assess both aspects of this economic arrangement, and the resulting data and evaluation could be used to provide a sensitive, informed, and socially relevant basis on which to plan for future industrial activity.
Chapter Four- Zoning Strategies

INTRODUCTION

As outlined in Chapter Two, the economic base of Vancouver has emerged as one in which the producer and personal service sectors are dominant, paired with a relatively buoyant industrial community. The Vancouver economy has found itself well placed to take advantage of the growing Pacific Rim market, forging commercial ties to the 'mini-dragons' of East and South East Asia — Korea, Taiwan and Singapore — and building upon already established trade and commerce links with Japan and China. As outlined in Chapter Two, the changing nature of global capitalism and economic structures has led industrial activity in Vancouver to new, more 'flexible' modes of production. In the Vancouver context, the new forms of economic activity are based on innovative forms of industrial production — computer aided design and manufacturing, and alternate regimes of work organization — and increased service sector activity.

In response to the changing nature of economic activity in Vancouver, and the subsequent need for a flexible, comprehensive planning response to the evolving nature of land use in industrial areas, the evaluative criteria described in Chapter Three have been generated. The criteria have been suggested as measures of basic levels of economic and social change in the city — an attempt to operationalize theories of economic regulation — and aid in an initial analysis of industrial land use to determine the range of uses appropriate to that site, and the evolving economic structure of the city. In this chapter, three zoning strategies — policy responses which are more sensitive to the needs of the evolving Vancouver context, based on the criteria outlined in Chapter Three — are considered and evaluated. These zoning strategies are intended as possible policy-based responses to the changing nature of industrial activity in Vancouver, which could be employed by municipal governments to plan for change in industrial areas. While other planning responses to growth and development such as tax differentials or property tax
abatements can be used to direct economic activity in an urban area, for the purposes of this thesis, the strategies for managing land-use change suggested in this chapter focus solely upon zoning. Fiscal or tax-based policies lie outside the framework of this thesis, and research regarding the applicability and viability of such policies (Heikkila and Hutton, 1986; Wolkoff, 1983) has indicated that such policies are less effective at controlling growth and development than zoning instruments. In recent research, tax-based policies are deemed effective only when jurisdictions which use zoning to influence industrial location are excluded from studies (Charney, 1983). Fiscal policies, like zoning, are able to influence only one of many factors which act upon the locational decision of firms. Zoning controls themselves have significant limitations in the control of growth and economic development, most notably the nature of the zoning appeal and variance procedures in municipal law. Despite these weaknesses, an effective, carefully conceived zoning instrument permits a greater measure of flexibility in response to the changing economic activity in urban areas, when used in conjunction with appropriate and sensitively applied economic and social policies; for example, policies based on theories of economic regulation, as suggested in this thesis. Finally, the use of zoning policies embodies many of the prescriptive objectives of community and regional planning.

The use of zoning in planning, controlling and managing land-use change can best be conceptualized as a quantity intervention; a measure intended to provide a fixed amount of land for designated purposes within a specific jurisdiction. The majority of municipal zoning by-laws currently in use in the city of Vancouver are written as such, and typically have an exclusionary intent — to keep a zoned area 'pure' in land-use, and to prevent conflicting interests from gaining access to an area. As the supply of industrially-zoned lands in traditional inner city areas dwindles, and suburban municipalities realize the soundness of an economic strategy based on a diversified range of economic activities within their borders, the utility of zoning controls to maintain the duality of residential / other uses becomes ambiguous. The efficacy of zoning controls to limit and influence
urban growth and evolution cannot be dismissed, however, as such devices still prove effective — when utilized in a broad, sensitively applied framework — in the planning of industrial land.

The City of Vancouver designates land for commercial, single family residential, multi-unit residential, industrial, and mixed-use purposes. Similar to those by-laws written for residential uses, these zoning instruments are also exclusionary and preclude a satisfactory mix of uses which result in the formation of strong, diverse communities. In the case of mixed-use zoning, there appears to be a general reluctance to create the types of space which foster effective and healthy communities. The Dutch architect Jan Gehl has undertaken extensive studies of street and community life in Europe, and has found that a mixture of residential, commercial, and light industrial activities create healthy, vibrant communities (Gehl, 1987). Since the residential areas of Vancouver are — like most established residential areas — deeply resistant to changes along the lines of the zoning strategies suggested in this chapter, such policies will be more applicable to the conversion of declining industrial areas, rather than the orchestration of changes within homogeneously residential areas.

For the purposes of this thesis, three zoning strategies have been developed to achieve a number of objectives, as presented in Figure Two. The zoning policies proposed in this thesis are an attempt to redress the failure of imagination at the level of city planners and economic development staff. For too long the city has been planned on the basis of a dichotomous arrangement of residential and industrial land uses. The implementation of the theoretical framework established in this thesis — theories of economic regulation — which attempt a shift in the focus of analysis away from reductionist attempts to generalize the urban system to a single process, to the examination of the inter-connected nature of urban life, may short circuit the tendency towards this dichotomy.
**ZONING STRATEGIES**

As described above, zoning is a quantity intervention, in which a typically exclusionary framework is established. Of the three policies suggested in this section, two are exclusionary or 'quasi-exclusionary' zoning approaches; the first is a 'status-quo' strategy in which the current industrial zoning policies are maintained in which only industrial activities are permitted in those areas currently zoned for industrial use; while the second approach — a comprehensive development zoning — advocates a total conversion of industrial lands to other uses such as commercial and residential, achieving the exclusion of all forms of industrial activity from these areas. In light of the theoretical issues examined in this thesis, these exclusionary strategies can be viewed as embodiment of the neo-classical economic tendencies in contemporary planning. Both seek the reduction of alternatives to a single option, with no consideration given to a mixture of uses, and benefits which might be accrued. For the purposes of these zoning policies, I have chosen to utilize a dual meaning for the term 'exclusionary'. In the traditional zoning literature,

*Figure Two. Objectives of Rezoning Industrial Land.*

<table>
<thead>
<tr>
<th>Objective 1</th>
<th>Objective 2</th>
<th>Objective 3</th>
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<tr>
<td>The facilitation of the changing nature of economic activity in the city — particularly the emerging dominance of the service sector — through the provision of space for new service-oriented activities and housing for a growing workforce.</td>
<td>The encouragement of increased levels of development and investment in the high technology sectors. This will be achieved through the creation of a series of efficiently serviced and accessible industrial and mixed use precincts in the city.</td>
<td>The successful planning and development of a series of functionally integrated precincts which combine residential, industrial, and commercial uses.</td>
</tr>
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exclusionary zoning instruments are intended to prevent lower-order uses from establishing a presence in an area zoned for higher uses, a definition which is useful to the policies suggested in this thesis. I have also chosen to use the term exclusionary to refer to a strategy which would prohibit higher uses from gaining access to an industrial area. Based on this use of the term, the first proposed strategy of exclusionary zoning I envisage is a reversal of the traditional form — the higher-order activities such as residential or office developments are excluded from areas which are zoned for industry. As these exclusionary approaches offer somewhat extreme solutions to current land-use problems in the City of Vancouver, the third zoning strategy advocates a mixed-use approach — an attempt at 'compromise' land-use planning.

1- Status Quo Approach- This zoning strategy maintains the current uses in selected zoned industrial lands, seeking to conserve the present base of industrial activity in the city, but doing nothing to ameliorate the growing pressures for more commercial and or office space, nor the need for increased housing in the city. Based on the evaluative measures outlined in Chapter Three, important issues in the pressure to convert industrial lands include: a declining industrial employee base (sustainability of employment given a changing regime of accumulation); the rapid growth of service sector activity (increased inter and intra-sectoral linkages), which carries with it a significant space requirement, both for fixed capital investment in the form of buildings and facilities, and in the form of housing demand for a rapidly expanding workforce; and the increasing pressures for affordable, market housing (rather than subsidized rental housing) in the inner city. The proposed status quo zoning strategy rejects such pressures, a reflection of a traditional faith in the role of industrial and production activity in the urban economy.

Using the economic criteria proposed in Chapter Three, the level of agglomeration and technical intensity of capital in production are factors which could be used to assess the
current status of industrial activity in Vancouver. In the city, there are a number of agglomerations of industrial activity which have evolved over time. The location of food processing and distribution has concentrated in the Clark Drive area, along with a concomitant set of inter-firm transactions and linkages — activities such as packaging, shipping and inspection. The assessment of the level of agglomeration and transactional connections between firms would be a major factor in the decision to relocate similar firms to this area, creating a dense, well serviced agglomeration economy, centred around food activities. Similar assessment can be performed on the high technology and forest product sectors in the city, while remaining within certain historical and economic parameters, such as the requisite proximity to water transport for activities in the forest product sectors.

The status quo approach to industrial zoning also assumes that the secure tenure of well-serviced and accessible land is a critical determinant of industrial activity. As the Vancouver industrial economy exhibits few signs of the organization outlined by Scott (1988a) or Piore and Sabel (1984), traditional locational factors such as access to land, labour, and transportation systems remain important for industrial activities in the inner city areas.

Such an exclusionary zoning approach

attempts to preserve existing industry (and, simultaneously, encourage new capital investment in production) by prohibiting the encroachment of 'higher uses' such as commercial office or residential development (Heikkila and Hutton, 1986)

This form of exclusionary zoning for industrial lands in Vancouver — in which a significant portion, if not all of the present industrial base is preserved — is the zoning strategy favoured by local labour and manufacturing organizations, as it precludes large scale investment and costs to be borne by industry to relocate production facilities to some other location within the GVRD, with such costs likely borne by employees in the form of layoffs or plant closure. However, since this exclusionary strategy maintains the status quo,
the negative externalities (Goldberg et al., 1980) associated with industrial activities, such as pollution, traffic densities, and visual blight of the urban landscape are perpetuated.

Historically, exclusionary zoning policies for industrial areas in the City of Vancouver have had such an orientation: overt attempts to encourage new investment in the industrial community (Heikkila and Hutton, 1986) to promote and conserve industrial employment in the city. The city councils of the late 1980s and early 1990s have overall, been ambivalent towards the preservation of industrial activity, seeming to favour conversion of so-called 'marginal' or industrial lands. The conversion of industrial land in the city reflects the evolutionary trend in the Vancouver economy: the move towards producer and personal services.

The exclusionary strategy proposed and evaluated here builds upon the traditional forms of such zoning in Vancouver, but suggests the implementation of several key modifications: most significantly, the exclusion of manufacturing from selected traditional industrial areas in the city, and the densification of industrial activity in other areas, designated as receptor zones, which would function as a set of well serviced and efficiently connected nodes or precincts of industrial activity. Such a strategy would maintain current levels of industrial floorspace and employment in the local economy, but in spatially discrete, concentrated precincts.

The Vancouver economy, traditionally based upon primary processing and transportation of raw materials from the rich natural resource base in the hinterland of the province, has shown evidence of a fundamental change in its economic base (see Chapter Two). The emergence of tertiary activities and the relative decline of industrial employment in Vancouver have cast doubt upon existing land use patterns and zoning policies throughout the city. As the major proportion of employment in the city becomes service-oriented, the land-use pattern of low density, under-utilized industrial lands emerges as unsustainable in the face of such pressures. With increasing commuter traffic on local highways and rapidly rising housing prices in the established residential areas of the
city, the need for affordable, inner-city market housing clearly emerges. Given the
difficulty of implementing change in existing residential neighbourhoods — due to citizen
opposition to increased densities and difficulties in converting such areas to a mixture of
uses — the vacant and under-utilized industrial lands of the city present one potential
solution to these land-use and ecological pressures. To begin to address such changes an
exclusionary zoning strategy which advocates the conversion of selected industrial areas in
the city to higher uses, and the development of efficiently serviced and accessible
industrial precincts — maintaining industrial employment in the city — are one potential
solution: an attempt to influence the social relations of residents. This exclusionary policy
concentrates economic activities in dense agglomeration economies, guided by economic
planners, which represents a direct manipulation of the regime of accumulation by local
government.

Under this zoning strategy, the current industrial, shipping, warehousing and other
lower uses would be encouraged to vacate their current locations through a process of 'up-
zoning' of the land they occupy. These industrial firms would then be given the
opportunity and financial assistance to relocate to one of the following proposed industrial
precincts: False Creek Flats, the Grandview Cut area or the Clark Drive industrial strip.
Referring to the criteria proposed in Chapter Three, these sites have been selected as a
number of characteristics desirable for the development of such precincts is extant in these
areas. First, there exists a level of economic agglomeration which can be built upon and
incorporated into the precincts; second, there are a number of long-standing manufacturing
and industrial firms in the area, which would provide a core of established businesses to
attract customers and new tenants, thereby providing a measure of stability and
sustainability of activity. Second, the concentration of industrial activity in the eastern
portion of the City of Vancouver can address, to some degree, the workplace - residence
split: as a large proportion of industrial workers cannot afford housing in the city, they
commute from outlying municipalities, thus the creation of these precincts could alter the
commuting patterns of employees. Finally, these locations ensure access to clients and markets — in the CBD and the Port of Vancouver for example — and the existing diversity of uses in these areas, requiring only minor infrastructure and service upgrades to meet the needs of future industrial users.

Financial assistance could be in the form of direct cash subsidies for relocation expenses, or alternately, lower priced land or facilities on city owned property. The requirement of financial assistance in relocation is perhaps one of the more problematic factors associated with this proposed strategy. The provision of financial assistance to aid in the relocation of firms could only be successful through the cooperation of all levels of government in the Vancouver region. Municipal, regional, provincial, and federal governments would have to establish a collective policy of industrial development and a funding policy to orchestrate the future of manufacturing in the region.

In addition, these proposed precincts would require an increase in density to accommodate the influx of new industrial activities. Currently, light industrial uses in the city of Vancouver have a floor space ratio (FSR) of 0.33, compared with a residential density of 0.6 (Chu, 1992). While light industrial uses thus have an FSR one-half that of residential uses in Vancouver, the FSR of light industrial uses within the GVRD overall is 0.15, presenting significant opportunities for densification of industrial uses in the city. As an example, the False Creek Flats area (currently the Burlington Northern hoarding yard) is an extremely large, under-utilized area, one which if carefully planned and designed, could easily accommodate a densified (FSR of 0.6) industrial zone.

While somewhat draconian and likely difficult to implement, this strategy provides the opportunity to convert those lands vacated through the relocation policy to other uses, primarily residential. However, the process of implementing such a policy bears closer examination. The benefits to be accrued through the development of vacant industrial precincts and the subsequent conversion of industrial areas — the reduction in dispersed pollution sources, a significant reduction in commuter traffic and associated
environmental degradation, the opportunity for lower-paid service employees to own a home in the inner city (the location of the majority of service sector jobs), and the creation of mixed-use sustainable communities — must be weighed against the costs of such policies. These costs include: the loss of several thousand jobs (many of which are argued to be leaving the city already); the likelihood that a number of firms would choose suburban locations or close their doors, rather than relocate to an alternative inner city precinct; the costs of aiding in relocation of industrial activities; the financial burden of upgrading services and transportation linkages; and the significant risk that the current 'boom' in service industry will wane, leaving the city with vacant service-oriented precincts in tandem with a much reduced industrial community. The provision of funding, to reiterate the argument made above, is essential if firms are to be relocated and survive the transition. Upon an examination of recent (1986) Census data as shown in Chapter Two, the trends in service sector growth might begin to slow in the immediate future, but as Vancouver becomes more fully integrated with the Pacific Rim economy, continued growth of these activities in the local economy is the more likely outcome.

Evaluation of Strategy 1 - Status Quo Approach

The use of an exclusionary zoning approach — from an alternative conservation-oriented perspective — to plan for industrial activity in Vancouver may be justified by a number of interest groups in the city of Vancouver. Most vocal of these would be the labour organizations which play a significant role in local and provincial politics. However, upon consideration, the conservation of existing industrial areas emerges as a regressive, limited policy action.

Industrial activities such as foundries, chemical production, oil refineries, and pulp and paper are processes which are less aesthetically and culturally appropriate in the metropolitan economy of Vancouver. Cultural theorists such as Jameson (1984) and Lash (1989) describe an increasing 'economization' of the cultural, in which consumers seek those
goods which can provide a desired level of class and status distinction, so called 'positional consumption' (Lash, 1989). In the increasingly cosmopolitan landscape and economy of Vancouver, one such commodity of positional prestige is residential and to lesser degree, commercial space. While recent trends in architecture and design have attempted the integration of historical detail and content, this remains a surficial phenomena, as few citizens — be they corporate or private — would wish to reside in a converted warehouse next door to a functioning pulp and paper mill. The changing nature of industrial activity in Vancouver lends itself well to the notion of industrial precincts, as described above, freeing up both space for higher uses and an important source of historical architectural sites for conversion to higher uses.

The declining relative base of industrial employment in the Vancouver economy also constrains the economic viability of maintaining traditional industrial uses in the inner city areas. As shown in Chapter Two, industrial employment in Vancouver declined during the recessionary period of 1981-1986. The recent Census of Canada will likely indicate a slight rebound in industrial activity in the city, but when compared to the continued gains in service employment, the growth of manufacturing becomes very nearly insignificant. The wisdom of a policy aimed at the preservation of all industrial activity in the city is questionable, as it rejects the fact of evolutionary changes in capitalism. As outlined by Aglietta (1979), advanced capitalism is marked by a fundamental shift in the nature of regional and national economies, with a concomitant restructuring of industrial production. To adopt a regressive, conservation-oriented approach to industrial zoning is to ignore the fundamental changes occurring in the economy and to dwell on the past, not plan for the future.

The maintenance of high levels of industrial employment in the inner city areas of Vancouver reinforces the existing patterns of work-residence displacement which give rise to the traffic and pollution problems which currently plague the city. In a recent conversation with a local union official (Kirkpatrick, 1991), it was related that the
majority of industrial employees have found themselves priced out of housing in the traditional working class East Side neighbourhoods. Rather than a zoning strategy oriented towards conservation of industrial activity and employment, the city would better meet the economic and ecological needs of Vancouver and the region through a strategy of industrial relocation and concentration, and an emphasis on new forms of industrial activity. Such a policy frees space for housing, while maintaining a level of economic diversity in the local economy.

In a more positive light, the conservation of industrial land and activities maintains a healthy level of economic diversity in the city, a prescriptive measure against the potential impacts of the emerging trend of increased internationalization of service activities to the Asian countries of the Pacific Rim. The question must be asked: what would be the impacts of a potential decline in the short term localized and regional business cycles? A city-wide or regional commitment to service activities in the face of an unarguably unstable global financial community, and the ever-present 'threat' from the Pacific Rim must be carefully considered. In the light of recent economic crises, the pithy maxim of 'strength through diversity' becomes more cogent and consequential: a diversity of economic activity through the retention of industrial activity.

Employment is always an important political issue, and the conservation of a local industrial workforce may be less difficult in political circles than a policy which effectively forces the relocation of industrial activities within the regional context, and eliminates several thousand jobs from the city's economy. In light of such concerns, the preservation of industrial activity in the inner city areas of Vancouver becomes a more desirable strategy. With a strong, vocal, and politically active union presence in manufacturing in the city, planners and politicians would be well aware of the negative impacts a policy of conversion could have on the public image of those in power, while a conservation-oriented strategy would likely be viewed as a commitment to labour, and could yield significant political gains.
The conservation of industrial land could, in the proper policy and political environment, achieve some of the objectives of those groups calling for changes in the urban fabric of Vancouver. As mentioned above, the separation of work and home and of work and leisure can be eliminated through the creation of a series of industrial precincts, freeing inner city land for housing or commercial uses. There is growing pressure in Vancouver for increased affordable housing, demands which have contributed to the on-going conversion of the Downtown South neighbourhood to accommodate more residents close to the CBD. If industrial lands are to be conserved in an attempt to maintain a diversified local and regional economy, alternate sites must be found for housing in the city. Such a coordinated policy of industry and housing has proven difficult to achieve in the recent past, evidenced by the wholesale clearance of industrial activity from the Coal Harbour project on Burrard Inlet. The conservation of industrial lands could prove beneficial to the city and function as a successful economic policy only if an associated body of policy relating to housing and a variety of socioeconomic issues is implemented in tandem with industrial policies; only if policy responses to the changes in the regime of accumulation account for the changes which will also occur in the mode of social regulation.

Based on the concerns and potential costs raised in this discussion, this strategy of conservation of industrial activity offers few benefits, and the disadvantages of such a policy render it improbable for implementation in planning practice. The next section presents the second 'quasi-exclusionary' strategy — a comprehensive rezoning approach — the total conversion of industrial lands to higher uses.

2- Total Conversion- As mentioned in the introduction to this chapter, a zoning strategy of total conversion represents a comprehensive rezoning approach. A strategy oriented to the conversion of industrial lands — rather than the conservation-oriented policy described above — is predicated upon the recognition of the decline in industrial activity in the City of Vancouver, and the evolution of the local economy to service and
financial functions. This zoning strategy recommends the total conversion of industrial lands to other uses, specifically residential and commercial activities.

Similar to the status quo approach outlined in the previous section, the conversion of industrial lands to higher uses requires a series of zoning by-laws which upgrade the zoning of industrial land, forcing industrial tenants to relocate. Under such a strategy, there would be no industrially zoned lands remaining in the City of Vancouver, and those firms seeking to continue operation would be forced to look to the suburban areas of the region such as Coquitlam, Delta or Burnaby for new locations. Such a relocation policy — as with the status quo approach described earlier — would require significant municipal costs to aid in relocation, and regional cooperation in the designation of certain industrial areas in the outlying municipalities as 'receptor sites' for displaced inner city industrial activity. In addition to the political and social ramifications of forcing industry to relocate, the economic costs to the city could be significant. As described earlier, the provision of financial aid for relocating firms would be a collective action, requiring the cooperation of various levels of government in the region. The conversion of industrial lands to higher uses — as addressed by the criteria in Chapter Three such as the potential for conversion and ecological impacts — could carry major costs for cleanup and service upgrading to achieve suitability for residential and commercial uses.

However, the background for suggesting such an exclusionary, 'anti-industry' strategy can be seen in the changing nature of transportation, economic linkages, and location requirements in manufacturing and industrial activity (Chapman and Walker, 1991). Historically, Vancouver's industrial economy developed around those activities focused upon waterfront locations, such as shipping and transportation on the shores of Burrard Inlet, forest products along the Fraser River, and manufacturing on the False Creek shoreline. Manufacturing activity in the False Creek area relied initially on water based transport and then the rail system for goods movement. As the city has evolved, there is less reliance on these traditional modes of transport, as the use of truck carriers has
emerged as the dominant mode of goods and resource movement. Based on these changes, the current locations of a number of industries in the inner city could be questioned and relocation justified.

If firm A — a metal fabricator — originally located in the False Creek Flats area to take advantage of water based transport for shipment of raw materials required for production, and then shipped finished products to points East via rail, and in 1992 makes extensive use of truck transport, rather than water or rail, the firm's location can be considered sub-optimal. Further complicating such analyses is the relationship between customers and location. An example of such an activity is the burgeoning automotive repair, machining and fabricating complex along Clark Drive. These industries provide products and repair for both residents of the City of Vancouver, and for commuters who leave their vehicles for service in the morning, and retrieve them for the return to the suburbs in the evening. If the majority of customers live in the suburbs, it can be argued that a particular automotive firm, say, painting, should relocate to a suburban centre.

An ecologically-based argument can also be made for the total conversion of industrial lands to higher uses. The negative externalities of industrial activity such as atmospheric pollution, solid waste, and water borne wastes or effluent contribute significantly to the on-going environmental degradation of the city. While direct industrial emissions are an important externality of industrial activity, a far more damaging pollution source can be traced to emissions from private automobiles. A large proportion of the industrial employees in Vancouver commute to the city from the outer suburbs, as gentrification of the traditional working class neighbourhoods of the East Side has forced them to seek affordable housing elsewhere (Kirkpatrick, 1991). This issue is a corollary to the theoretical debates regarding the dislocation of the workplace and residence.

Vancouver is a good example of this debate, with high and increasing levels of commuter traffic from the outer suburban areas such as Delta, Surrey and Coquitlam to the
city as the place of employment, an indication of the spatial dislocation of work and residence. Ley (1985) has examined the locational impacts on employees based upon the relocation of the BC Telephone Company's head office from the downtown core to Burnaby. Ley's study found that a significant number of clerical and technical staff moved from homes and apartments on the West side of the city to locations on the East side or in Burnaby proper. An 'anti-industry' exclusionary zoning policy can be defended as a reversal of this locational pattern: if a significant number of workers in industrial firm B reside in Coquitlam, and the transportation and linkage needs of the firm can be met in Coquitlam, a rational argument can be made for the firm to relocate. The relocation of the firm, with a resulting closer geographic relationship to suppliers, customers and employees, minimizes costs due to employees faced with long commuting distances and increased work-related illnesses and injuries, while the reduction in commuter traffic from employees lessens the impact on the atmosphere by private automobile use. Such an exclusionary strategy would require the cooperation of all municipalities in the region, along with regional and provincial governments. This policy is reliant on the contingent factor of the residence location of employees, and would require significant work on the part of industrial firms and various levels of government — such as city planning staff — to determine a range of suitable locations for a firm. Again referring to the model of new industrial agglomerations discussed by Scott (1988a), a primary locational consideration for many new firms is quality of life, which is often maximized in suburban locations, as evidenced by the locational choices of firms with non-traditional locational requirements, such as computer technology and software firms.

Under a zoning strategy of total conversion, industrial lands would be freed for conversion to higher uses — residential in particular. In a best case scenario, the majority of these lands would be used for the creation of inner city residential communities, but in all likelihood the resulting developments would include a large component of office and commercial space. The conversion of industrial lands, coupled with innovative design and
higher than typical densities could provide a significant number of affordable market and rental housing units in the city, easing to some degree the residential pressures in Vancouver. Market forces in the Vancouver economy would in all likelihood bid up the price of vacant industrial land re-zoned for residential uses. This presents a vital role for city planning staff: the careful steering and orchestration of the nature of development in these areas. The responsibility falls to civic staff to ensure an equitable mix of housing types, through the use of a number of developers, rather than a single agency, as has been the case of late in the City of Vancouver (Coal Harbour and Pacific Place being two examples). The rezoning of industrial land presents opportunities for housing agencies such as Entré Nous Femmes or the Downtown East Side Residents Association (DERA) to continue their estimable work of creating affordable rental housing in the city.

**Evaluation of Strategy 2: Total Conversion**

As described above, the total conversion of industrial land to higher uses — residential, commercial and office functions — achieves a number of objectives currently sought in advanced capitalist societies. However, such benefits are not without some serious implications and negative impacts on the social and economic life of the city.

Viewed as a strategy for planning the future uses of industrial activity in Vancouver, this strategy poses several significant problems. The 'forced' relocation of industrial activity challenges prevalent and generally accepted notions of property rights of both individuals and corporations. As outlined in the description of this strategy, some form of incentive would likely be required to entice industrial interests to relocate to other areas. As Hutton and Heikkila (1986) and Mark and Goldberg (1981) have shown, fiscal policies such as tax differentials have proven less than effective in directing land-use. As tax-based policies are ineffective, direct financial aid such as relocation allowances, reduced servicing costs and the like will be the only remaining options. This would prove an
exceedingly expensive 'carrot' to dangle before industrial interests in Vancouver, and in all likelihood, not feasible.

The requirement of a coordinated response involving all levels of government in the region, especially between the municipal and provincial authorities, and amongst local governments is, realistically, the most significant barrier to such a policy of industrial conversion. The City of Vancouver operates under its own Charter, and land-use and planning decisions are not covered by the controls and legislation of the British Columbia Municipal Act. As the remainder of cities and towns in British Columbia are subject to this Act, the decisions of Vancouver Council may not legally be permitted in other areas. If a regional approach to industrial activity is to prove successful, these jurisdictional obstacles must be overcome.

The economic and social wisdom of a strategy of massive conversion of industrial lands in Vancouver must also be questioned. With some 2,000 acres of industrial land in the city, the conversion would see significant opportunity to increase residential and commercial space. However, given the on-going Coal Harbour redevelopment, which will see 2,980 residential units (3,500 residents) and 2.25 million square feet of commercial space constructed, the re-development of the Downtown South neighbourhood with some 11,000 new residents in 5,600 housing units created over the next fifteen years, and the development of Pacific Place on the former EXPO '86 site, with 7,650 residential units (13,300 residents) and 2.6 million square feet of commercial space, the need for total conversion of industrial land appears less urgent. These projects will create a total of 16,230 new residential units in the city, the majority of it market housing, which will in all likelihood meet much of the housing need in the near future. However, as these projects are completed, the need for housing and commercial space may be re-evaluated, and conversion of industrial areas implemented as required.

The re-development of these inner city areas for residential, office, and commercial uses pose difficulties for industrial and economic development in Vancouver.
The most serious of these problems is displacement effects experienced by industrial tenants, particularly in the Downtown South area. There are a number of light industrial firms in the Downtown South, typically those activities which are termed 'city-serving', such as Printing and Publishing. With the redevelopment of the area, locational problems would emerge for these firms if currently zoned-industrial lands in Vancouver are converted to higher uses, eliminating potential sites for these firms in close proximity to their clientele in the CBD. In all likelihood, these small city-serving firms could no longer remain economically viable if forced to relocate to a suburban location, or one of the proposed precincts.

In terms of the economic sense of total conversion to higher uses of the industrial areas of the city, growth trends in the service sectors in the regional economy must be examined. Chapter Two presents a demographic and locational analysis of the employment base in the Vancouver CMA. From these analyses, it is evident that the regional economy has experienced some degree of restructuring, with the city of Vancouver the focus of growth. However, the city's role as primary locus of activity may be altered over time, as the locational needs of firms continue to evolve. The case of the Sunbelt in the United States and the 'Cambridge phenomenon' in the United Kingdom (Massey et al., 1992) clearly illustrate the role non-traditional factors play in the location decisions of industrial capital. Greenfield sites and access to housing and amenities often appear more attractive to firms — particularly the high-technology sectors — than access to financial services and the like. The growing importance of suburban and exurban nodes of economic activity may have a large influence on the local and regional patterns of economic development. As such, the total conversion of industrial uses in the city, and the concomitant elimination of employment, could have serious impacts on the local economy, if a shift of service activities and new forms of manufacturing to the suburban areas of the region were to occur. The total conversion of industrial land in Vancouver also eliminates the incubator function the city plays in the regional economy. Inner city areas
have long been the locales of intensive agglomeration economies, sources of affordable industrial premises, and cheap labour (Fagg, 1980; Nijkamp et al., 1988). The loss of such industrial spaces could have serious repercussions throughout the regional economy.

While there are a number of negative impacts which can be foreseen as a result of the conversion of industrial sites, a range of benefits could also be expected. Growing expectations of, and pressures for, ecologically sustainable growth in the region can be partially met by the conversion of industrial land to higher uses. The ecological benefits of conversion of industrial areas are two-fold: first, direct pollution impacts could be significantly reduced by the elimination of industrial sources of emissions; and the conversion of industrial areas to residential uses provides housing in close proximity to the primary location of regional employment, reducing automobile traffic, as workers can more easily utilize alternative modes of transportation. However, the same benefits could be gained through regional policies aimed at diversification of the economic base of the suburban areas, through enhanced growth and development of tertiary activities in the regional centres, with substantially reduced costs to the City of Vancouver.

The conversion of industrial areas, if combined with innovative housing design and funding policies could provide a large number of affordable market and rental housing close to the Vancouver CBD, viable housing options for the large base of service sector employees in the region. As mentioned previously, the Coal Harbour, Downtown South, and Pacific Place projects may also meet these objectives, lessening the need for conversion of industrial lands.

As with the first exclusionary strategy, this option also has costs too great to be acceptable as an alternative for the planning of industrial areas in the City of Vancouver. The following proposed zoning strategy presents the third option for the development and planning of industrial areas in Vancouver: a mixed use approach to zoning industrial areas which retains a degree of industrial activity, functionally integrated with higher uses.
3- Mixed Use- Rather than an exclusionary approach as suggested in the previous sections, a mixed-use zoning strategy is a deliberate attempt to preserve a modicum of industrial activity while providing both residential space — to accommodate increased housing stock for the growing population of the city — and office space for service activities. The primary objective of such a mixed-use strategy is the creation of high density residential communities in the inner city, carefully integrated with clean, safe industrial activity. Such activities avoid the development of a monotonous residential landscape, while providing diversified employment opportunities for residents, thereby reducing the dependence on service sector activities. As a design issue, the integration of a variety of uses can provide the built form and economic attributes which combine to create a vital livable urban space. Such an integration can be examined in the context of the emerging postmodern social paradigm, which has been described to as a return to the social networks and built form of the mediaeval city: a paradigm founded on a strong sense of locality and the close articulation of work and leisure spaces (Lash, 1989).

Current examples of this integration are best seen in the French New Towns such as Cergy Pontoise, Evry, Lisle d'Abeau and Le Vaudreuil (Wilson, 1986). While many of the French new towns have been developed largely around a major component of public sector activity — such as the transferal of government ministries, or the creation of new universities — there has been significant job growth outside the public sector. In Cergy Pontoise, north-west of Paris, 26,400 new jobs were created between 1968 and 1980, with 14,000 jobs created outside the public sector (Dagnaud, 1983; Wilson, 1986). Of these 14,000 new positions, over 5,000 were in the industrial sectors, representative of the success of industrial employment generation in the new towns. The new towns of France are renowned for their design and amenities, along with the effective integration of work and living spaces. The functional integration of work and leisure (home) creates a sense of community currently lacking in suburbia and offers an interesting alternative to the current 'commuter-culture' in which our society is mired.
It is unlikely that traditional industrial activities in Vancouver such as wood products, pulp and paper, or foundry activity would be easily integrated into new mixed-use communities. The emergent high technology sector presents the best option for the successful combination of residential and industrial activity. Scott's (1988a) examination of the development of the Scientific City to the south-west of Paris is an example of the successful integration of new high-tech (primarily high-technology and biotechnology activities) with high quality residential spaces. The population of the Scientific city rose by 235,000 between 1975 and 1982, an increase of 25.2 percent. This population increase has been accommodated through innovative design and the integration of work and home. Recent developments in Vancouver such as the new Microsoft office and distribution centre in Gastown, and the growing numbers of computer and software engineering firms bode well for the future of such activities. While certain aspects of the high technology sector such as printed circuit boards and computer manufacture present serious negative externalities in the form of high pollution levels, there are an equal number of activities which could be successfully integrated with residential uses.

The integration of industrial and residential activities in mixed-use precincts presents an option which may achieve Recommendation 16 — Energy-Efficient Land Use Policies — from the Clouds of Change document published by the City of Vancouver. This recommendation advocates that the city "...integrate work, residence and shopping in mixed use development" (City of Vancouver, 1990), with the primary objective being the reduction of vehicle emissions by providing work and residence opportunities in the inner city. The presence of mixed-use zones in the inner city on vacant or declining industrial lands presents the opportunity to create innovative high density communities, further reducing the ecological impacts of a growing population.

A mixed-use approach to zoning industrial areas is based on a 'hybrid' policy approach: a limited amount of up-zoning of certain industrial areas; increased and improved servicing of proposed mixed-use areas of the city; and a set of clear well-
defined design guidelines for the integration of residential and industrial uses. Those areas subject to up-zoning would typically be locations of low density, environmentally unsound activities, and sites which would require significant clean-up and preparation prior to construction of residential or commercial/office facilities. As with the second zoning strategy suggested, the creation of mixed-use zones will require increased and more efficient levels of communication between all levels of government in the region. Regional policies of industrial relocation, identifying those municipalities which would act as the receptors of displaced industrial activity are essential to a mixed-use zoning strategy. Given the difficulty in achieving such cooperation, the coordination of policy between levels of government in the region will be significant obstacle to the successful implementation of such a policy. Improved site services would also be requisite to the successful integration of residential and industrial uses, a recognition of the specialized industrial or manufacturing processes which could be most successfully integrated with residential and commercial functions. The development and implementation of mixed-use zoning strategies would likely require increased servicing costs to be initially borne by the city. If high technology industry (and other forms of industry which could be easily integrated) are to find inner city locations attractive, high quality servicing and access routes will be required. In light of these requirements, the areas to the east of False Creek present a potential first site for such precincts. The Kingsway corridor provides easy access for truck transport to the area from points east of the city and into the Fraser Valley; the SkyTrain transit system provides access for workers and residents of new developments to the Downtown core and to other areas of the city; and the land is under-utilized, making conversion to other uses more likely. While such improvements on a large scale may pose frightening costs to city council, the benefits reaped from such mixed-use communities such as an increased residential tax base, improved quality of life, and reduced environmental degradation, would likely offset these initial costs.
The concentration of activities into well defined precincts is the realization of one of the key tenets of regulation theory: geographic changes in the space of production coincide with changes in the organization of production (Moulaert and Swyngedouw, 1989). As the regime of accumulation changes, the spatial arrangement of economic activity will also change. If such change was left to work itself through the system via the operation of market forces, a similar pattern would likely develop, but at significant costs to small business operators. When similar changes in the residential pattern of cities are left to market forces, social inequity is often the result. An industrial policy aimed at the concentration of activities into discrete zones can assist the process and ensure a measure of economic viability for small firms non-existent under free market conditions.

The implementation of a mixed-use zoning strategy also acknowledges a heretofore seldom mentioned potential crisis: the decline of certain subsections, industry groupings or particular occupations within the service sector. As an example of the latest development in advanced capitalism, the burgeoning services sector could potentially follow the pattern established by industrial capitalism and enter a period of contraction and decline, posing the difficult question of: what will then follow the service economy? Theorists such as Poster (1990) and Castells (1989) have described the nature of the 'information economy' as the current stage of capitalist development. It is Poster's position that contemporary society has been in this stage for a number of years, with the information economy operating as a mode of activity which places increasing pressure upon the infrastructure and built form of urban areas. Quinn and Gagnon (1986) have raised such a question regarding the wisdom of a deep economic and social commitment to a largely service based economy. Contingent factors such as the increasing global division of labour have also contributed to the restructuring of advanced metropolitan economies and the rise of tertiary activities (Peet, 1991; Wallace, 1990). It may well prove prudent to retain — as both pro-active and defensive planning measures — some industrial activity and
capacity for future growth of activities other than services in the inner city areas of Vancouver.

Evaluation of Strategy 3- Mixed-Use Approach

The implementation of a mixed-use strategy of land-use in areas of traditional industrial activity is a strategy which carries with it few negative—both economic or ecological—side effects.

While there are clear benefits to be expected from increasing housing stock through the conversion of industrial lands, there remains a distinct lack of courage and vision on City Council. The Arbutus industrial lands at 12th and Arbutus were slated for redevelopment with a Floor Space Ratio (FSR) of 1.5, compared to the FSR of 0.6 which the majority of housing surrounding the site has been built to. Rather than defending an innovative design and planning proposal which would create much needed housing space, Council surrendered to a vocal and well-funded local citizens group, and have sent the proposal back for re-design and planning. In the context of this thesis, the reality of civic politics and pressure tactics are brought to the fore. The implementation of zoning strategies such as that outlined here will require courage and foresight on the part of planners and politicians.

As has been shown (Scott, 1988b), high technology industries tend to exhibit non-traditional locational requirements. A new role for government must therefore emerge. Municipal, regional and provincial governments would be required to become involved in the deliberate creation of high-technology or industrial agglomeration economies. While direct government influence in economic activities—the regime of accumulation—may reek of statism or totalitarianism, the nature of economic crises in advanced metropolitan economies may well require such involvement. The tendency of capitalists to attempt the accumulation of profit at an increasing rate, often at the expense of natural or human resources and increased debt levels for producers, the tendency towards falling rates of
profit over time (Harvey, 1982), and the on-going exploitation of labour (Burawoy, 1985; Hartmann, 1981), are aspects of capitalist accumulation which can be redressed through government intervention.

The cooperation between civic government action — zoning strategies — and that of higher levels of government — social and macro-economic policies — is essential to the creation and implementation of policies which achieve balance and equity, and ensure a viable economic future for industrial activity. An increased level of government involvement in industrial policy in the local context— particularly at the regional and provincial level — resulting in considered and progressive decision-making could be advocated for the re-development of industrial lands. For example: the labour climate in a particular locale is a key factor in the development of new forms of industry and economic development. Scott illustrates how the lack of labour organization in Arizona resulted in a rapid expansion of high technology industry during the 1960s and 1970s. In order to create an amenable 'industrial environment', where labour disputes are minimized, thereby increasing the attractiveness of the local economy for development, direct government intervention — particularly on the part of the provincial government through the imposition of arbitration to resolve conflicts — may be required. In the local context, such government actions may well be necessary to counter the perception of Vancouver as a locale with a problematic labour climate. These government interventions may be necessary to foster the growth in industrial sectors which can be easily and functionally integrated with residential and service uses, such as high technology.

All levels of government in the Vancouver region, in particular the outlying areas such as Coquitlam, Surrey and Delta would likely need to be 'encouraged' to develop as regional centres of traditional industrial activity. That is, the requisite coordination of regional governance and policy coordination. A potential answer to such concerns may be found in the renewed call for a return of powers to the Greater Vancouver Regional District (GVRD). The restoration of planning powers may permit the GVRD to assume a role of
coordination in the restructuring of industrial and economic activity in the Vancouver metropolitan area. This is not an attempt to burden suburban municipalities with industrial activity and associated negative externalities to the benefit of the City of Vancouver, but rather an admission that the inner city areas have evolved beyond providing space for such activities, and a recognition of the growing attractiveness of both inner and outer suburban areas as potential locales for both traditional and new forms of production activity.

The development of functionally integrated mixed-use areas in the City of Vancouver could achieve a number of significant economic, social, and ecological benefits. The close integration of work and home offers the potential to reduce the sense of anomie residents of an urban area typically feel, through the creation of vital communities with a strong sense of place. The integration of industrial uses, service functions and residential space also presents a solution to the growing ecological problems in the Vancouver region. Reductions in automobile traffic would reduce emissions, improving the quality of life for the entire region.

The economic benefits of the creation of mixed-use precincts within the city stem from the notions of economic strength through diversity. As noted earlier, a number of theorists have begun to question the lifespan of the current service 'boom'. If services, like manufacturing, are characterized by a distinctive cycle or wave, a downturn can be expected at some time in the future. If planning for the economic development of Vancouver is based upon a commitment to residential and service/commercial uses only, if a potential downturn in the service sector business cycle does occur, the impacts on the city and regional economies could be significant. If the argument of business cycles is accepted, then the logic of this argument also holds that these cycles are eventually self-correcting. However, the wait for the return of economic health can be prolonged, with serious impacts for the local or regional economy. Without some diversity in the local economy — such as a measure of industrial activity — the city may well be faced with a
rather vulnerable economic future. The mixed-use strategy proposed in this section seeks to provide that diversity, achieving both economic and social benefits for the City of Vancouver.

**Strategy Recommendation:**

This chapter attempts to derive a series of zoning strategies which could be implemented for the planning of industrial land. While the three strategies discussed here present a limited range of options, these may be best viewed as generic, coarse zoning categories, which themselves could be utilized to derive a number of policies which could applied in specific economic, ecological, and social contexts. However, of the three strategies offered, one clearly emerges as the best option for the future of Vancouver's industrial areas.

The zoning strategy which incorporates the robustness and flexibility desired for the planning of the industrial lands of Vancouver is a mixed-use strategy: an approach which seeks to preserve a level industrial activity in the city, functionally integrated with commercial and residential uses. However, as a number of industrial activities which currently take place in Vancouver would not be easily integrated with higher uses, this strategy would feature the creation of a number of precincts of concentrated industrial activity. The conservation and preservation of a portion of industrial activity in a series of purely industrial precincts, in tandem with a number of separate, mixed-use zones offers the most potential for the future of the urban spaces of the City of Vancouver.

This 'hybrid' approach to zoning for industrial areas recognizes the pressing need for increased space for residential and commercial activity, while also acknowledging the need for a diversified economic base. Referring to Figure Three at the beginning of this chapter, Objectives of Rezoning in Industrial Areas, the hybrid zoning strategy proposed here achieves the following:
• **The facilitation of the changing nature of economic activity in Vancouver.** The provision of adequate space for service activities, along with land for housing, integrated with industrial activities could provide the type of policy-based response required to ensure the continued healthy and sustainable growth of the Vancouver economy, as the creation of a series of purely industrial and mixed-use precincts in the city creates significant opportunity for fostering diverse local and regional economic activity. This proposed mixed-use strategy acknowledges the connections and interdependence between the economic and social spheres of urban life in Vancouver: the regime of accumulation and mode of regulation described in regulation theory.

• **Increased investment in the high technology sectors.** In the context of this thesis, high technology activities include not only computer manufacture and assembly, but also software design and manufacture, research and development, and product distribution. It is theorized that the proposed mixed-use zones would present near 'greenfield' conditions for high technology firms, offering a mixture of access to markets and services, amenities, and a high quality of life for employees, factors which appear to be important locational requirements for such activities. By offering attractive locations, it is hoped that increased levels of investment and development can be generated.

• **Planning and development of functionally integrated mixed-use zones.** Perhaps most significant of the three objectives of rezoning industrial land, this is the cornerstone of the proposed forms of rezoning and development. These mixed-use zones are both an objective and outcome of the proposed hybrid zoning strategy described above. As objective, these zones represent a new, integration-oriented paradigm of zoning for industrial uses; and as outcome, the integrated zones are will achieve the desired reduction in atmospheric and water-borne pollution, reduce regional and local traffic congestion, and foster a strong, diverse local economy.
As presented here, a mixed-use strategy which integrates industrial activities with residential and service functions presents the zoning option which embodies the prescriptive nature of planning for urban areas. The mixed-use approach to industrial zoning for the City of Vancouver also attempts the operationalization of the objectives of the regulation school of economic theory. The notion of inter-dependent and connected spheres of economic and social activity, which serve to create and reinforce the other is easily incorporated into the practice of planning. The ideals embodied in the mixed-use strategy outlined in this thesis — the integration of uses, densified urban space and the like — share much with new streams in planning theory and practice: those oriented to sustainable development and design. The mixed-use strategy should not be viewed in opposition to these varieties of planning thought, as designers and ecologists do not have a monopoly on ideals of sustainability.

The suggested mixed-use strategy may appear in conflict with the traditional implementation of zoning instruments. The majority of such instruments have attempted — through the provision of a limited amount of certain land-use zones — to direct the process of capital accumulation. This should not be interpreted to mean that zoning has been used to limit this accumulation. On the contrary, zoning has been used to create spaces for industrial or other uses, to facilitate economic growth. The mixed-use strategy outlined here may seem to work against this historical tradition of zoning. However, as the theory of economic regulation attempts the integrated analysis of the economic and the social, there is no reason why a zoning strategy cannot attempt a similar project. While certain aspects of the proposed strategy are oriented towards economic growth and activity, there is equal attention given to social aspects of urban life in the post-industrial society. These objectives do not necessitate conflict, rather, these policy suggestions could be a pivotal point in the changing nature of urban space in the coming decades.
The limitations of examining only three potential strategies must be reiterated. As a crude, initial examination of the applicability of zoning policies as planning measures for industrial areas, these zoning strategies should be seen as 'first cuts' at the analysis of industrial land. They would be most appropriately utilized as preliminary analytical tools, followed by more case specific examinations of the needs and uses of a particular site. Despite such limitations, the use of zoning remains an efficient and promising tool in the planning of urban areas. As with all policies, the use of zoning is not without a range of implications, which will be presented in the following chapter.

CONCLUSION

In the zoning debate, the most strident opposition comes from those who feel that market forces should determine land use decisions and planning. In response to such criticisms of zoning-based approaches to land use decisions and policy, Heikkila and Hutton (1986) and Heikkila (1989), state that market forces do not always present socially equitable solutions to such problems. The 1986 paper states:

> it may be that zoning or other policies designed to influence the spatial outcome of industrial resource allocation, while bringing about market distortions or inefficiencies, may lead to improvements in overall welfare. (Heikkila and Hutton, 1986)

The argument proposed by Heikkila and Hutton that the use of exclusionary zoning to preserve industrial land 'prolongs the agony' of industrial change and decline, and serves to reinforce the appropriateness of a mixed-use zoning strategy. The exclusionary, conservation oriented zoning strategy weakens the overall economy by preventing necessary change, and can reduce the competitiveness of the city by maintaining old, dated forms of industrial activity. The authors show that the tax-based argument for preserving industrial land is an economically ignorant one: the preservation of industrial land would have a deleterious impact on the municipal tax base of Vancouver, that "significant tax base
effects could occur" — namely the reduction in revenues (Heikkila and Hutton, 1986). Municipal tax revenues decline because placing restrictive, exclusionary zoning by-laws on these areas and preserving them for industrial uses, de-values land in comparison to other land without such restrictive zoning. The implementation of a mixed-use strategy would provide a net increase of tax revenue for the city, while providing much needed residential space and the potential reduction of ecological damage due to high levels of commuter traffic and industrial pollution.

In summary, zoning should be implemented in a manner which avoids its perceived role as an obstacle to growth and change, as a policy-based guide to change in the urban environment. As a solution to the growing pressures and difficulties faced by the City of Vancouver, innovative zoning policies and strategies such as those recommended in this chapter offer significant potential.
Chapter Five - Policy Implications of Rezoning Industrial Lands in Vancouver

INTRODUCTION

In the rezoning or conversion of industrial lands, there are a number of important policy considerations emerge. This chapter presents a discussion of six implications associated with the recommended zoning strategy outlined in Chapter Four — a comprehensive approach to industrial zoning resulting in a series of mixed-use precincts. The majority of these impacts focus on: the perceived difficulties in coordinating policy between municipal, provincial, and federal government agencies whose involvement in the economic development process is required; the potential difficulties arising from the direct intervention by the various levels of government in the regime of accumulation, turning upon notions of property rights; and the implications of the proposed industrial policy on the nature and degree of local and regional taxation, as it influences both new firm formation and the attraction of adequate human resources to the region.

POLICY IMPLICATIONS

1. The Changing Nature of Capital and the Structure of Work

One of the most significant factors influencing industrial policy formation is the changing nature of capitalism and the subsequent recasting of structures of work. Among the implications associated with the changing nature of capitalism are increased capital mobility, an increasingly important non-traditional set of locational requirements and the use of various employment strategies to achieve flexibility in production and management. The changing nature of capital and the structures of work are perhaps the most significant implication of the recommended policy, as the interdependence of these elements of capital accumulation parallels the objectives of theories of economic regulation. As the Vancouver economy is evolving towards a set of specialized, functionally flexible industrial sectors (see Chapter Two)—illustrated by the changes in the food, wood
products, and the metal fabrication sectors — there are several restructuring responses which have been closely examined in the recent past which have bearing on the local context.

Scott (1988a) identifies a tendency towards increased capital investment in production facilities, in tandem with a reduced workforce and lower wage levels (through the use of temporary or part-time employees). If a policy of industrial conservation is undertaken, consideration must be given to the new — and likely higher — requirements for capital expenditure by manufacturers, and the impact that an increasingly part-time or peripheral workforce could have on the overall local and regional economies.

The policy implications of planning industrial change to adapt to the evolving nature of capitalism are many, but two merit discussion here. First, if a policy of industrial conservation is implemented — one in which only a few desired forms of industrial activity are encouraged and concentrated in small number of precincts — there may be difficulty in attracting a sufficient number of new firms to the city. The key difficulty arises from the need to establish selection criteria for the types of industry to be permitted in the city. While presenting only a handful of the many considerations associated with industrial location and development, the criteria proposed in Chapter Three provide a flexible base of analysis from which to plan.

The social and environmental criteria employed must address the objectives of the Clouds of Change report of 1990: the encouragement of clean, safe industry. These objectives would require new, aggressive environmental controls and legislation from all levels of government. There are high costs associated with reducing industrial effluent and atmospheric emissions typically borne by the industrial firm, costs which may lead manufacturers to seek alternate, less constrained locations.

Second, the nature of the new forms of production activity — an increase in fixed capital in the form of high technology, or computer aided manufacturing, a recomposition of tasks in production and flexibility in design and product variation — have two
significant impacts: increased debt levels for manufacturers as they implement new facilities in an attempt to increase profits, and a radically altered social division of labour, such as gender-based or ethnicity-based discrimination in the workplace (Hanson and Pratt, 1988; Nielsen, 1991). To achieve the desired degree of flexibility in production, manufacturers have a number of options, but the two most frequently adopted strategies focus upon the implementation of computer aided or automated production lines, or new forms of labour organization (Atkinson and Meager, 1986). In implementing computer aided manufacturing processes, new facilities are required at an increased cost, which constrains the financial ability of the firm. These debt burdens can lead to a high turnover rate of industrial interests in the competitive world of large-scale production. Such a turnover rate could have serious impacts on the local and regional economies if zoning and economic development strategies are oriented solely to new forms of manufacturing activity. Therefore, there remains a need for a measure of both traditional and 'new' forms of industrial activity in the local and regional contexts.

In relation to the changing nature of the social division of labour, the lower wages paid to employees of the 'flexible firm', and the requirement for a multi-skilled workforce can have major implications for the quality of life of the local industrial workforce.

The new methods of production no longer require the mass of semi-skilled machine-minders of Fordism, but a smaller multi-skilled core workforce capable, through quality circles and the like, of participating actively in the labour process (Callinicos, 1989).

As workers in the flexible firm are often required to perform a number of tasks, rather than the single role in the production process characteristic of Fordist, production-line techniques, there is increased pressure — albeit of a different nature than that of traditional industrial activity — placed on the worker. In addition to requiring a multi-skilled internal labour market (Gordon et al., 1982; Peck, 1989) flexible, or post-Fordist
production is marked by an increasing use of a part-time, temporary — and typically lower paid — peripheral or external labour market, allowing the manufacturer to adjust the labour inputs to the production process as required. The result of such labour practices is an increasing social division of labour, often reflecting a gender and ethnic bias on the part of employers (Hartmann, 1981; Marchak, 1987; Scott, 1988b), and the control of labour through the threat — veiled or unveiled — of high unemployment in urban areas, which can be utilized to easily replace workers who do not comply with new schemes of labour flexibility. In his analysis of the Orange County high technology complex, Scott found that on average, 37 percent of production workers were women (Scott, 1988b). Among production workers in Vancouver in 1986, 30 percent of production workers were female. In Los Angeles — so often of late the frightening case study for emerging trends in social relations — 200,000 immigrant workers have found low paid, exploitative employment in the new industrial community of the city, the majority in non-union or 'open' shops (Davis, 1987). For such workers, economic life assumes a cyclical pattern of hiring and firing, dictated by employer demand. As Aglietta (1979) says, new and automated production work is just as empty and spiritless as the woolen mills of the 1800s.

The implementation of a zoning policy of industrial conservation and concentration — focusing upon the high technology and information technology sectors — may create yet another marginalized group in our society, much the way that the growing body of part-time, low paid female employees in the service sector has resulted in what has been called the 'pink ghetto'. The spectre of a low-paid, peripheral industrial workforce is very real, evidenced by the rise of sweatshop labour in London, New York and Los Angeles (Scott, 1988b; Davis, 1990). To address these very real negative impacts of industrial and economic change in North America, a policy of industrial preservation and concentration — such as that outlined in this thesis — must be matched by one of economic incentive to firms to aid in their conversion to new modes of production, or to assist in their set-up
charges. This financial assistance may limit the extent to which workers and the quality of the workplace are compromised in order to achieve the desired levels of flexibility and profit. The provision of financial assistance represents direct government influence in the regime of accumulation, to lower the costs of capital to producers, which may result in higher wages paid to workers, resulting in a direct effect on the mode of social regulation in the local industrial economy.

There also emerges a clear need for a comprehensive, coordinated policy effort on the part of municipal, provincial, and federal governments to address the wide variety of social needs associated with economic restructuring in the North American context, such as access to affordable housing, employment equity (in terms of equality based on gender and ethnicity in new forms of industrial production), and issues of social justice such as the length of the work week and general conditions of labour. Legislation regarding the nature of work in the emergent industrial sectors is also required, as the pressures to perform at increasingly high productivity levels, the requirement of multiple skills and the resulting sense of anomie among workers may significantly impact on the quality of life among the industrial workforce of the city and the region.

The nature of the local industrial workforce may be seriously impacted by a policy of mixed-use development zones, focusing on the high technology sectors. The cost of labour is a critical factor in the success of industry, but as the organization and nature of work evolves, the quality of the worker also becomes increasingly important. If workers are to be integrated into a work structure which requires them to have direct design and product input, the capability of operating several machines or workstations during the course of the working day, and to effectively communicate with their employers regarding problems in production, a better educated worker is required. Barnes and Hayter (1992, forthcoming) have seen evidence of this in the nature of new employment in several forest product companies in British Columbia. Where it was once possible to find employment with less than a Grade 12 education, most employers now require a high school diploma
for production employees, and at least one university degree — preferably marketing — for management. These educational needs must be addressed through policy at the provincial and federal level, as the funding of education and job training is the responsibility of higher levels of government. During the 1980s, the Social Credit government undertook policy aimed at reducing the cost of labour to employers through regressive labour relations and privatization of the civil service. In the 1990s, if British Columbia (and Vancouver) are to remain competitive in manufacturing activity, policies and programmes must be aimed at increasing the quality of the workforce, to better meet the needs of new forms of manufacturing and economic activity.

In issues of quality in the workforce, the Japanese provide an interesting example to follow. Regional policies are based on the improvement of educational and research infrastructures and better communication links throughout the country (Freeman, 1987). These policies are direct attempts by the Japanese government to provide a sufficiently trained workforce in combination with efficient communications, two key inputs in the development of new forms of economic organization, such as the shift to regimes of flexible accumulation. Conversely, the Canadian system has focused on the reduction of labour costs through the labour policies of conservative provincial and federal governments of the 1980s. This has resulted in a less than easy transition to new modes of industrial organization and production, forcing employers to adopt strategies of flexible production based on labour management, rather than the creation of new products and production techniques. Without policies and structures similar to those offered by the Japanese established in the GVRD, and the resultant mode of regulation — characterized by a well trained and productive workforce — the nature of industrial production sought for the mixed-use precincts proposed in this thesis could prove difficult to attract.
2- Financial Costs to Manufacturers and Property Rights

In the above section, I have outlined some of the costs likely to be borne by manufacturers if the city decides high technology and associated forms of industrial activity are the forms of production most compatible with the future development of the city. Throughout this thesis, I have made reference to a set of hypothetical aid packages (relocation allowances and the like) which would be used to compensate for the financial difficulties encountered through civic, provincial, or federal policy oriented towards encouraging the development of such new forms of manufacturing in Vancouver, and the relocation of other forms of industry. There are, however, several implications of such a policy which should be considered.

Herod (1991) describes one the most controversial of such implications - the nature of community and private property rights. If the civic government — with the aid of the provincial and Federal governments — were to embark on a policy of providing cash subsidies and relocation allowances, reduced tax rates, and attractive servicing packages (overt attempts to encourage the desired forms of production activity within the city and the relocation those which are deemed inappropriate) does the nature of ownership of the firm begin to change? Herod describes the direct cash inputs and low interest government loans to prevent the closure of a glass plant in West Virginia. Given the amount of public money involved in the project, the question is posed regarding ownership: does a publicly financed project become community property? The nature of typical industrial incubation programmes involves the eventual relocation of firms, freeing up the advantageous inner city locations to new firms, but if Vancouver were to fund new forms of industrial activity, there could be a case for restrictive covenants to limit the mobility of industrial capital. While there are few examples of restrictive covenants implemented in such a manner, the use of 'iron-clad' lease or financing agreements could be used to prevent the flight of capital to other regions. This issue becomes increasingly important in areas such as the American South East, which were the recipient of a significant level of industrial activity
in the 1980s, as manufacturers took advantage of staggeringly high unemployment rates in the relocation of facilities from the 'Rust Belt' industrial concentrations. Now in the 1990s, these same firms are looking towards the trilateral free-trade agreement between the United States, Canada, and Mexico as an opportunity to further lower costs by relocating to Mexico. Such publicly financed firms would be forced to remain in the inner city to meet the objectives of the citizenry and council who provide financing and support. Notions of covenants to restrict the mobility of capital are problematic, but difficult times require innovative and radical methods to achieve new approaches to local and regional economic development.

The notion of property rights is two-fold: while there are concerns regarding community funded activity, there is an strong case to be made regarding private property rights. While the concerns of citizens and city council may be the retention of publicly financed activity, industrial interests are concerned with the right to both capital and personal mobility. The objective of capitalist activity remains the accumulation of profit, by whatever means possible and at the discretion of the individual manufacturer. The creation of a set of well serviced and accessible industrial precincts in the city to which industrial firms must relocate, can be seen to infringe upon existing social rights and freedoms. Public perception of the rights of citizens to acquire capital and profit may well stand in opposition to a policy aimed at the relocation and concentration of industrial activity in the precincts outlined in this thesis. This opposition would likely lead to increased costs being borne by the civic, provincial or federal governments, as relocation allowances and taxation exemptions would be required to encourage compliance with any such policy.

3- Local and Regional Taxation Policies

The attraction of industrial firms to urban areas has become a highly competitive activity. As Scott (1988a) has outlined, civic governments in a variety of locales have
promoted the unique features of their locale which they can offer industrial interests, such as local amenities, high quality schools, recreation spaces, and the lack of a strong union tradition in the local economy. While such aspects are increasingly important to new firm formation and subsequent growth, the local taxation system also plays a role — albeit only one among many constraining factors — in the attraction and repulsion of manufacturing activity. In a recent survey of information technology firms in Greater Vancouver undertaken by the Technical Service Council and the Vancouver Board of Trade (1992), 87.2 percent of the firms surveyed stated that taxation policies (federal and provincial) had a negative impact on their ability to compete globally. In addition, the survey found that 93.2 percent of those firms also viewed taxation policies as having a negative impact on their ability to attract and retain staff; and finally, 68 percent of information technology firms stated that taxes and taxation policies were the factor most likely to encourage relocation. While the firms surveyed responded only to questions regarding the nature and impact of taxation from federal and provincial governments, the rate of property taxes in the Greater Vancouver area — coupled with civic taxation burdens leveled on manufacturing firms — appear to exert negative pressures on firm formation and relocation within this sector. The responses of the firms surveyed reflect a self-serving attitude on the part of these companies, as taxation levels for emergent technologies are a familiar bone of contention. However, despite the degree of objectivity embodied in both the survey and the results, the survey does present an indication of the feeling of producers regarding the efficacy of locating and producing high technology products in the Vancouver context. While property taxes comprise only a small portion of the costs of doing business in the local economy, the combination of federal, provincial and local taxes do appear to have a negative impact on the industry's perception of the GVRD as a location for continued growth and production. In short, while Heikkila and Hutton (1986) found that fiscally-based policies such as tax differentials and the like were ineffective at retaining industrial activity, high levels of federal, provincial and local taxation can also
prove influential on the development of the urban area by raising the costs of capital, discouraging firms considering relocation in a particular locale.

In the context of the policy recommended in this thesis — a comprehensive approach based on the creation of a series of mixed-use precincts in the city — the impacts of taxation policies in the Vancouver area must be considered. If a policy of industrial conservation were adopted, it is likely that a concomitant policy of taxation relief through agreements with various levels of government would be required to attract sufficient levels of deemed 'appropriate' industrial activity.

4- Densification of Uses

In the proposed series of mixed-use precincts for currently zoned-industrial lands in the city, there is an implicit densification of activity. Such precincts could not be sustained without increased densities, particularly in residential and commercial uses. Recent debates in city council chambers and academic circles have focused on the efficacy of increased density with little agreement on the issue, but the precinct concept outlined here cannot succeed at current densities of use. At the present time, the density of light industrial activity in the city is quite low — 0.33 Floor Space Ratio (FSR), one-half that of residential areas in Vancouver (Chu, 1992). While it is unlikely that industrial activities can operate at a density equivalent to residential areas in the city, there is opportunity to effectively increase the density of industrial land use in Vancouver. The increase in density achieves a number of objectives: the opportunity to incorporate significant numbers of housing units in inner city areas; dense residential and commercial spaces permits a level of separation of industrial and other uses in the proposed precincts, while maintaining satisfactory degrees of integration of uses; and the dense development of commercial/office and residential uses may provide a municipal tax base large enough that industrial firms could be offered reduced civic taxation levels as relocation incentives,
thereby achieving the increased investment in appropriate industrial activity, as described earlier in this thesis.

As with several recent development proposals in Vancouver, such as the Arbutus Industrial Lands, the concept of a series of dense, mixed-use precincts would likely meet with negative public reaction, but as these precincts would be developed on lands presently zoned-industrial, there will likely be little opposition from a local residential population. The implementation of densified land uses in these conceptual precincts must be undertaken from the perspective of local, regional, and global responsibility for managing the changing nature of social and economic life today. The creation of densely developed mixed-use precincts can be seen as a civic attempt at 'thinking globally and acting locally'.

5- Regional Policy Coordination

The creation of a series of mixed-use precincts incorporating industrial, commercial and residential activities would require the coordination of policy at several levels of government. As suggested earlier, the desired industrial component of the proposed precincts is centred upon high technology and new modes of industrial production, with the reduction of traditional manufacturing activities in the inner city. If traditional heavy industry is 'zoned-out' of the city of Vancouver, the identification and planning of receptor sites for these activities presents a number of difficulties. If traditional activities are concentrated in one location in the region, say, Port Coquitlam, there will be a concomitant concentration of negative impacts such as pollution and increased vehicular (goods movement) traffic to and from those sites. In all likelihood, there will be a need for coordinated cost-sharing policies between municipalities in the region to deal with the ecological, social and economic impacts of these industrial concentrations. Cost-sharing policies such as these would prove extremely difficult to implement, and would significantly increase the costs of converting industrial lands in the city of Vancouver. Despite these increased costs, the benefits of a carefully planned
economic development policy which integrates industrial, commercial/office and residential spaces on the under-utilized industrial lands in Vancouver has significant benefits, as presented in this and earlier sections of the thesis.

The new role of government under such a policy is consistent with the theoretical context in which this thesis has been written. As outlined by Moulaert and Swyngedouw (1989), theories of economic regulation school are attempts to understand the dynamic between capital, labour, and the state. Under the Fordist regime of accumulation, the role of the state was primarily in providing a guarantee of cheap labour, as seen in industrial relations in British Columbia during the 1970s and 1980s. The intervention of the state during this time was in the form of policies geared to limiting the cost of labour to producers — a quantity intervention. What is required of the state under regimes of flexible accumulation, or post-Fordism, is a quality intervention. It has been argued that "...there is a mismatch between new technological developments (centred on information and communication technologies) and the institutional and social structures found in advanced countries" (Dunford, 1990). Policies such as those aimed at increasing educational attainment — the quality of the workforce — and improvements in the quality of life for labour — in the form of adequate housing and wage levels — which will shift the mode of regulation to one which can better support new regimes of accumulation. These policies could provide avenues to address the mismatch between technological and social evolution, thereby easing the transition to new regimes of accumulation in industrial economies.

6- Regional Marketing Policies

If the creation of mixed-use precincts including a significant level of high technology or information technology activities is to be successful, there is the need for a coordinated regional policy of marketing and client development. In the survey of information technology firms undertaken by the Vancouver Board of Trade (1992), 63
percent of firms surveyed stated that some form of government assistance in the
development of international exports was required, and 57 percent felt that an increased
governmental role in the development of offshore export markets — through trade
missions, trade shows and the like — was essential to the future viability of the industry.
Such concerns illustrate the complex economic structure of the emerging technological
industries, and the highly competitive nature of the high technology sectors. Traditional
marketing responses and product development schemes are no longer sufficient, and an
increased role for government becomes crucial. In the Vancouver context, programmes
such as that which established Vancouver as a global finance centre, with incentive
programmes for institutions who locate in Vancouver (Barnes et al., 1992) may prove
applicable to the development of new industrial activities in the regional economy.
Again, the difficulties associated with the creation and implementation of a regional
policy involving all levels of government may well prove insurmountable, but the success
of the global finance initiative should preclude government and public reticence and
resistance to the idea.

CONCLUSION

This chapter has been an attempt to identify and outline several of the policy
implications of implementing a strategy of industrial conservation in the City of
Vancouver through the creation of a series of mixed-use precincts in the city. As described
earlier, these precincts would include residential, commercial/office space, and a measure
of light industrial activity such as high technology or information technology activities.
The zoning strategy which would create such zones must explicitly delimit the type and
intensity of industrial activity permitted, as the goal of the policy is the functional
integration of uses, resulting in vital, livable mixed-use communities in Vancouver.

As mentioned, there are a number of potential difficulties associated with
restricting the nature of industrial activity to the high technology sectors, and other so-
called 'new' forms of industry. The fiscal impacts of local, provincial, and federal tax policies could preclude sufficient levels of development, leaving the city with a series of residential/commercial spaces with an under-utilized inventory of industrial floorspace. The social impacts of the new social division of labour arising from a dependence on firms which implement new forms of work organization and labour control could be significant in the local and regional contexts. Finally, the lack of a regional marketing board or strategy to ensure the place of Vancouver's emerging high technology and service functions in the Pacific Rim economy could leave both sectors out of the running in the highly competitive economy of the 1990s.

These and the other implications of rezoning industrial lands present some quite serious challenges to planners and politicians at all levels of government, particularly at the civic level. The economic wisdom of reliance upon a service dominated economy, without the provision of some capacity for industrial activity is doubtful, but without a comprehensive policy in place to ensure the conservation of manufacturing activities in the local and regional economy may find itself increasingly vulnerable to a volatile market and an uncertain financial future.
Chapter Six - Conclusion

This thesis has been an attempt, through an examination of the changing nature of economic and industrial activity in Vancouver — a study of the regime of accumulation — to arrive at policy-based responses to the evolving need for industrial land and activity in the city. In most advanced metropolitan economies, significant pressures are brought to bear on industrial areas for conversion to higher uses. Typically, industrial lands are converted for residential purposes, as illustrated by the City of Vancouver's Housing Strategies, which have outlined a set of policy responses to increase housing stock on what the city terms 'surplus industrial lands'. This thesis has proposed a set of evaluative criteria to determine which of the presently zoned industrial lands can be considered 'surplus', and a set of hypothetical policy options for rezoning those industrial areas for higher uses.

There have been a number of theoretical positions and analytical frameworks adopted in the recent past to analyze the changing nature of industrial activity, in both the national and global contexts of economic restructuring. One of the leading models of industrial change is that of Alan Scott and his work on new industrial spaces. Scott's model suggests that new industrial agglomerations have sprung up in a number of non-traditional locales, areas which have little tradition of prior industrial activity. Scott cites Silicon Valley in California, the Scientific City of Paris, and the Third Italy as examples of these new industrial agglomerations. At best, these case studies present a set of unique locales, with a number of fundamental similarities, but cannot be utilized in the type of 'grand theory' which Scott proposes. Scott's work is thus seen as a useful point of entry to urban industrial analysis, but the model is less applicable when applied to a metropolitan economy such as Vancouver.

The theoretical context of this thesis, regulation theory, attempts to closely articulate the economic with the social relations of society, a task which parallels the objectives of urban planning. While presenting some interesting challenges to the accepted
methodology of planning practice, the use of regulation theory proves difficult to implement at a micro scale. Aglietta bases his theory on the experience of the United States, while Scott — whose recent work is clearly influenced by theories of regulation — implements the theory on a macro-regional scale. In the local context, regulation theory could prove useful in a study of the GVRD, but is perhaps less appropriate for the examination of a city economy. Both Aglietta's and Scott's recent theories would benefit from application through empirical analysis of a wider range of economies, particularly second or third-order urban economies such as Vancouver, attempts to sensitize what is ultimately a useful theoretical basis for economic analysis to a wider range of contexts.

In assessing Vancouver in relation to the emergence of new industrial formations or new forms of work organization, what emerges in the Vancouver context is an economy which has apparently adopted a number of strategies to the changing nature of economic activity such as new labour control techniques, the introduction of new high technology equipment in existing facilities, and some formation of new industrial and business spaces. This restructuring proves quite different from the responses outlined by Scott, further illustrating the need for a new macro-level model, applicable to the vast range of second or third order metropolitan economies, such as Vancouver.

In response to the economic and structural changes outlined in this thesis, I have examined three possible strategies to plan for the future growth and development of industrial activity in the local and regional economies: a strategy of conservation and maintenance of the 'status quo' of industrial and other uses; a strategy of total conversion to residential and office/commercial uses; and a mixed-use strategy based on the functional integration of activities. Of these three proposed policies, the last emerges as the most sensible and likely option of the future growth of Vancouver. As outlined in the thesis, a mixed-use approach achieves a number of objectives:

1- The economic base of Vancouver retains a level of diversity and therefore stability through the retention of a measure of industrial activity;
2- Ecological benefits can be maximized as the close relationship between place of work and place of residence can be encouraged: workers in the growing service sector could find homes closer to the CBD — the centre of service employment in the region — reducing atmospheric emissions from automobiles;

3- A mixed-use approach to zoning industrial land provides increased space for residential uses, offering potential to meet the growing need for housing in the city and the region;

4- The creation of a series of mixed-use precincts which stipulate the type of industry permitted may lead to the increased development of, and investment in, the high technology and information technology sectors, two activities which can work in close union with the service sectors in Vancouver;

5- The development of a set of mixed-use precincts may achieve the type of urban space which has been sought by planners and civic government for a number of years. The close, functional integration of industrial, office and residential uses in well planned and efficiently designed precincts can create the vital, livable environment which the best urban areas offer.

These objectives illustrate the path to a sustainable, livable future in the city of Vancouver and the region, continuing and expanding Vancouver's role as a world class city.

As outlined earlier, the implementation of industrial policies based on the zoning of land to different or higher uses is not without risks. Even a comprehensive, mixed-use approach to industrial zoning — building upon the functional integration of uses — can be undermined by continued change and evolution in the local and regional economies. It is likely that Vancouver will remain a centre for service activity in the coming decades, but the growth of the other centres in the Pacific Rim could place the position of Vancouver's tertiary complex in jeopardy. The creation of series of mixed-use zones, built around a core of high technology or information technology industries may offer alternative modes
of economic activity, to offset any downturns in the service economy. The mixed-use zoning strategy recommended in this thesis presents just such a compromise approach to the changing nature of economic activity in Vancouver, providing a 'safety valve' to economic change in the form of the retention of a measure of industrial activity.

The implementation of the recommended comprehensive mixed-use strategy carries with it some implications which must be carefully weighed before adopting such a policy. As described previously, the coordination of policy between all levels of government presents a significant obstacle to the strategies described here. Economic, social, and legislative policy must be coordinated across a regional scale if innovative, progressive policies of industrial growth and change are to be successful. Aside from economic costs, perhaps the most problematic to such coordination at the present time is the different legislative acts which control development and planning in the region: Vancouver operates under a separate charter from the other municipalities in the region, which are subject to the legislative controls of the Municipal Act. As suggested earlier, the up-zoning of industrial lands in the city of Vancouver to create the mixed-use precincts recommended would also require a regional cost sharing policy to aid those municipalities who were receptor sites for relocating industries. Such a diversion and division of funds could potentially present serious problems for civic and regional governments.

Issues of property rights are also paramount in the discussion of the conversion or conservation of industrial land. Whether the rights of private citizens to locate where they please (to an extent allowed under existing zoning) in order to maximize profits and access to markets, or the rights of the public as they fund and subsidize economic activity, such issues merit consideration in the rezoning of industrial land.

This thesis has attempted to describe the changing nature of economic activity in the Vancouver regional economy, and the implications those changes have for the rezoning of industrial land in the city of Vancouver. As a second or third-order city, Vancouver has
not had the historical tradition of industrial activity found in cities such as London, New York or Toronto, and so industrial policy must adopt a different approach. Current models of industrial restructuring prove inappropriate for the examination of Vancouver, which does not show signs of large-scale industrial decline, nor the shedding of high numbers of industrial workers. The Vancouver economy rather shows a moderate increase in industrial activity for the years 1981 - 1986. The Vancouver economy shows signs of implementing some of the aspects of flexible accumulation outlined in this thesis, evidenced, for example, by the increasing numbers of firms in a range of industrial sectors, in tandem with a falling average employment in each firm.

The optimum policy response for industrial lands in Vancouver would be something akin to the comprehensive mixed-use policy described in this thesis, in which a mixture of uses are integrated in a series of precincts in the city. Such a policy provides opportunities to meet several city and regional economic, social and ecological objectives, while maintaining a level of diversity in the region sufficient to offset any potential fluctuations in the service economy.

There can be no 'quick-fix' approach to the planning of industrial change, however. Policies such as those suggested and discussed in this thesis should be implemented on a short-term, evaluative basis. Industrial lands should not be assessed and converted on an ad hoc, case-by-case basis, but neither should a policy be developed, permitting a 'rush' of conversions to higher uses. The social disruption and economic failures of the London Docklands debacle should stand as an example of poor industrial planning. The use of theories of economic regulation, such as that developed by Aglietta (1979) and Boyer (1990), lends itself well to an on-going, evaluative analysis of the policy implications of rezoning industrial land. The articulation of the economic and social inherent in regulation theory renders it extremely useful and applicable for planning industrial change.

In relation to regulation theory, recent work in cultural criticism regarding postmodernity is useful in reinforcing my use of this theory in a planning thesis. Scott
Lash, in his book *The Sociology of Postmodernism*, describes the postmodern as a process of de-differentiation of social and cultural life. This de-differentiation does not mean that there is no longer difference between social forms, but that there can be no autonomy between forms or social institutions. I interpret this to mean that there can be no imposed separation of the economic and the social, that each is essential to the form, and support of the other. It is this de-differentiation which I feel regulation theory attempts to accomplish.

The challenge theories such as the regulation school of economic theory and the type of zoning policies I suggest in my thesis pose to planning theory and practice is a re-composition of the discipline. It can be argued without much debate, I think, that the practice of planning is the product of the modern era. I would also argue that the Fordist division of labour (technical division of tasks, production-line techniques and the like) are also a product of the modern (albeit the late modern). If the changes in industrial production can be described as post-industrial, or post-Fordist, I feel that a concomitant 'post-Fordist planning' for industrial development is required. I suggest that contemporary planning is characterized by a technical division of labour and fragmentation of the process not unlike Fordist industrial production. Utilizing concepts form industrial organization, new forms of the division of planning tasks — such as work teams — could be implemented to approach such a post-Fordist version of the discipline. Work teams comprised of a number of planners would be assigned a project, which the team would see through to completion. Alternately, 'just-in-time' or what could be called 'kanban planning' could be implemented, relying on a cadre of well-trained sub-contracted planners or consultants, who could be brought on as needed. Finally, a return to ward-based, or local planning offices could be implemented. Planning projects would be undertaken by a cohesive unit of planning professionals and analysts within the confines of their geographically defined area. Again, this type of planning would be based on the notion of team-work as an integrated approach to planning decisions. Merely suggestions
of the direction planning in the 1990s could attempt, these ideas reflect the ideological position of this thesis, and the policies outlined herein.

The implementation of methodologies such as that offered by regulation theory, could result in a re-composition of planning tasks, with a more sensitive, appropriate planning practice the result.

Political ideologies aside, neo-Marxist theories of economic and social change offer robust, flexible tools which planners can use in their guidance of growth and change in urban areas. This thesis, the criteria developed, and the zoning strategies suggested, have been an attempt to operationalize regulation theory, and illustrate its applicability for planning practice.
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