Metro Vancouver Industrial Lands Report 2018
Industrial Lands and the Innovation Economy

June 8, 2018

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Metro Vancouver Industrial Lands Report 2018: The Innovation Economy

1. *Introduction*

The purpose of this report is to set out, within the context of competing demands for industrial / employment-based land use in Metro Vancouver, the emergence of the region's innovation economy. Specifically, the development and use of land of Metro Vancouver's innovation economy is compared to the experiences of other high-tech global metropolitan economies, especially its two North American West Coast comparators, Seattle and San Francisco.

Beginning sometime in the 1980s, the Metro Vancouver economy became increasingly configured towards high technology, with the pace of that change having only accelerated. There are now several distinct clusters of innovative industries within Metro Vancouver, notably within the City of Vancouver's central area and within inner suburban cities such as Burnaby, Richmond and North Vancouver. The continued growth of this component of Metro Vancouver's economy will require fuller regionalization, which in turn necessitates a strategic approach to the retention and management of employment-based lands within the region. Here it is important to note the significant land constraints operating on the Metro Vancouver economy because of its unusual geography, hemmed in as it is between mountains to the north, the US border to the south, and the Pacific Ocean and various inlets to the west. Consequently, land-use decisions need careful navigation, requiring measured responses and a keen sense of balance. This is also so because much existing traditional industrial land across the region is currently being used by an economically robust traditional industrial sector, which then adds pressures on land supply by making any repurposing of that land, say, for the innovation economy, difficult. For these reasons, while the land management policies and experiences of the most successful metropolitan innovation economies including the Seattle-Central Puget Sound region and San Francisco-Bay Area are instructive for Metro Vancouver, they must be set against Metro Vancouver's geographic context and the continuing vibrancy of its traditional industrial sector.

The report is divided into four sections. Following this introduction, we offer a historical review of the recent role played by industrial land in urban and regional economies. We explain why land is such a critical resource for economic development, how it has been managed, and how our own extended record of work on Metro Vancouver relates to the industrial land question. Drawing on the academic literature, we also highlight the importance of so-called industrial districts, their economic advantages, and their shifting forms, demands for urban land, and metropolitan locations. The third section presents two North American West Coast comparator cities – Seattle and San Francisco – each larger than Vancouver, but which over the last two decades have wrestled with the same issue: planning metropolitan land use to accommodate a changing form of industrial production increasingly resting on the innovation economy. The final section summarises and raises a series of issues for discussion about industrial land use policy and planning in Metro Vancouver.

2. *The history of industrial lands*

(i) Urban land and changing forms of industry: from manufacturing to the innovation economy

Industrial land has played several key roles in urban-regional economies. In North America it was perhaps most important during the immediate post-World War II period of Fordist mass-manufacturing. Then there was a distinctive intra-urban division of labour, where inner-city industries typically specialized in labour-intensive production, e.g., clothes manufacturing, while suburban industries specialized in capital-intensive goods, e.g., automobile manufacture (Scott 1988). As it played out in Metro Vancouver, inner-city manufacturing consisted of such activities as garment production and specialized metal work, while in suburban locations, such as along the Fraser River, the manufacturing was capital-intensive and land-extensive that included sawmills and pulp and paper production.

From the mid-1970s, however, this pattern of industrial land use became less important in many cities. Deindustrialization gripped manufacturing-based cities (the classic cases were Buffalo, Cleveland and Detroit in the United States), causing downsizing and abandonment in many locations, and driven by disinvestment, plant obsolescence and product cycle effects. The previous classic manufacturing activities were increasingly replaced at least in some of the cities by agglomerations of new high-margin service industries supporting highly-paid professional labour. Those high-margin industries varied from high-tech through to specialized business services to components of the financial sector. As a collective they were a propulsive force in advanced urban economies particularly within late-twentieth-century global cities, notably New York, London and Tokyo (Sassen (2001[1991]). But high-value services also formed the leading growth sectors of medium-size cities such as Vancouver and found in the expansion of the downtown office complex (Hutton and Ley 1987) and in Metro Vancouver's regional town centres (Davis and Hutton 1985).

The abandoned inner-city industrial spaces of the 1970s and 1980s subsequently have been deployed strategically to foster innovative economic districts of high-margin industries. In turn, advanced industries have been developed in those urban spaces by synergies of culture, creative labour, technology, institutions, and a distinctive material landscape. It is worth noting the broad outlines of the evolution of those spaces over the last thirty years of so since deindustrialization and restructuring first occurred. In the early 1990s sites such as the South of Market Area (SOMA) in San Francisco, Mid-Manhattan in New York, Chinatown in Singapore, and Yaletown in Vancouver hosted the initial wave of 'dot.coms': pioneering firms that combined art, design and early digital technologies in new products deployed (for example) in advertising, communications and marketing. The dot.coms suffered a crash in the early 2000s owing in part to inflated stock value, and the emergence of newer and more propulsive technologies, notably 'broadband 2.0'.

The dot.coms, though, initiated a 'cultural turn' in cities and urban economies. Formerly redundant old industrial spaces were mobilized as location sites for them and their associated institutions, and labour force. Popularised in Richard Florida's (2002) 'creative class' script, locating creative industries within former industrial inner-city spaces became a deliberate strategy enacted by many city governments, despite as Peck (2005) points out some serious

flaws. What has arisen over the last decade is a patchwork quilt of separate but linked districts. Some specialise in particular technologies or product lines. Others, though, and increasingly common, offer a mix of enterprises incorporating digital technologies, creative labour, artisanal consumption and complementary institutions, and forming a platform for 'innovation'. Examples include Shoreditch (London), HafenCity (Hamburg), Prenzlauer Berg (Berlin) and Liberty Village (Toronto). As sites of invention, dynamic enterprise and the pooling of talent, these 'innovation districts' are now the hallmarks of leading city-regions within the global economy. Video game design in Vancouver's Yaletown, or producing special-effects for the movie industry in Mount Pleasant, or artisanal design workshops in Railtown are all examples of these critical ecosystems of innovation in Vancouver.

It is against this context of a profound change in the use of urban industrial land and its users that we aim in this report to review both the academic literature and specific on-the-ground cases which can be used as exemplars for the Metro Vancouver region. Our arguments are derived from: (i) an appreciation of 'land' as a critical resource in the development of advanced economies; (ii) a review of the land use policies of other successful metropolitan economies, particularly reference cities on the west coast of North America; (iii) a review of the academic and practitioner literature about urban industrial land, its changing uses and users, and effective urban policy responses; and (iv) our own extended record of work on Metro Vancouver and its economy.

a) *An appreciation of the value of land*. In this report we identify three principal classes of land resources. First, the retention and safeguarding of the supply of land for Metro Vancouver's strategic gateway needs; second, land for city-serving industries and firms across the region; and third, managed land for the region's dynamic innovation economy. The 'gateway' role of Metro Vancouver's industrial lands is the subject of continued deliberations with the Vancouver Fraser Port Authority and other agencies and stakeholders. Those dialogues include an assessment of the land use implications of new transportation modalities and systems, and changes in demand and other market considerations. City-serving demand for industrial land is typically considered part of the local management of resources at the municipal level. Our focus is not on policies for aligning industrial land planning, management and marketing with urban-regional innovation. To maximize the development potential of Metro Vancouver's industrial lands will require identifying opportunities for intensifying land use through: new technologies and the kinds of businesses associated with them; mobilizing, integrating, and ensuring effective interaction of cultural, technological and human resources; and imaginative territorial branding and marketing designed to realise the development potential of specific industrial districts and sites.

b) *Other successful metropolitan economies*. In addition to Seattle and San Francisco, two principal Metro Vancouver comparators, this report also considers and draws on lessons from Portland, Los Angeles, and some European cases including London,

Barcelona and Berlin. Each of these cities has successfully redeployed formerly traditional manufacturing land for use by high-margin industries. In doing so they have successfully negotiated the right balance between accommodating structural processes of change while also adapting to locally contingent factors including development histories and residuals, connectivity with markets, stocks of human and social capital, labour, agglomeration and clustering, local values and needs, and local governance. Although these cities have quite different development histories, governance and policy records than Metro Vancouver, each has been caught up in the global innovation economy, responding with policy that is creative, imaginative, even daring. They potentially provide Metro Vancouver with models of effective practice. Although, of course, in making any comparison the distinctive nature of Metro Vancouver and its geography, governance and history of land use must be taken into account.

c) *Review of the academic literature*. Analyzing the role of land, its use, and making policy prescriptions for urban metropolitan economies has a long academic provenance of well over a hundred years. It has taken on renewed vigour over the last thirty years with the dramatic transformation of large cities in high-income countries. That transformation has produced sweeping urban geographical changes from the demise of the traditional manufacturing belt, now referred to as the 'rust belt', to the emergence of so-called 'new industrial spaces', the apogee of which is the Bay Area, home to Silicon Valley (n.b. the assets of the top 100 Silicon Valley firms top US$ 3 trillion, equivalent to one sixth of the GDP of the U.S.). The academic literature on this transformation, including consequent changing metropolitan land use patterns, and effective local forms of policy and governance, is now large and found in the areas of urban geography, economic geography and planning.

d) *Our record of work*. We recently completed a SSHRC-funded study comparing Metro Vancouver and Seattle. We were members of a strategic-level national project on innovations systems research (ISRN) in Canada, including collaboration with global experts on advanced metropolitan economies (Barnes and Hutton 2016). Barnes is a leading economic geographer, having published many books and papers, and influential edited volumes (see Barnes, Peck, Sheppard and Tickell 2003). Hutton has written about the evolution of the new economy (Hutton 2008), and co-edited a volume on cities and economic change (Paddison and Hutton 2015), has written several academic papers about the new industrial economy of San Francisco (e.g. Hutton 2008: Chapter 7), and co-edited a major study of Canadian urban economies for Oxford University Press (Bourne, Hutton and Shearmur 2011). Barnes and Hutton also participated in a major international project on Innovation Systems among advanced economies managed by Professors David Wolfe and Meric Gertler at the University of Toronto (Wolfe and Gertler 2016).

(ii) Industrial land, industrial districts and redevelopment

The 'industrial revolution' experienced initially in Britain in the late eighteenth century, and then extending to other advanced economies over the nineteenth century, produced the first specialized urban industrial land use, 'the industrial district'. It was defined as a tightly bounded area of small-scale industrial production close to the centre of the city. As manufacturing firms became larger over the course of the 19th century, and concomitant negative externalities worsened, industrial producers increasingly moved to the fringes of the central business district (CBD), forming new industrial districts. It was then around those districts that working-class residential areas formed. Historical examples included Manchester, Glasgow, Essen, Chicago, Detroit, and New York. Montreal, Toronto and later Hamilton emerged as Canada's most important industrial cities, enjoying the advantages of capital, labour and proximity to markets. It's precisely these old inner-city industrial districts that have recently found new life as sites of creative activity, artisanal-scale production and IT start-ups 150 years after their initial establishment as labour-intensive manufacturing sites.

The mid-twentieth-century was the high-point of manufacturing and processing in Western economies. Certain cities, notably Detroit (autos), Belfast and Glasgow (shipbuilding), and Lille (textiles) developed manufacturing based on a deep specialization, shaped by key industries and skilled labour, while London and New York each developed extensive and diverse industrial districts ranging from publishing to garment manufacture. As manufacturing industries matured and became infused with the latest technology, the most successful industrial districts were increasingly 'engineered' for higher productivity through the provision of advanced machine systems and utilities, intricate divisions of labour, and localized production networks, as Robert Lewis has demonstrated in the important case of Chicago (Lewis 2008).

Manufacturing and the formation of industrial districts expanded beyond core Western metropolitan areas to include first, Japanese cities, then later, the four 'little dragons' of South Korea, Taiwan, Hong Kong and Singapore, each of which experienced 'take-off' growth based on an export-oriented manufacturing economy. Termed the 'new international division of labour' (Fröbel et al. 1980), the four little dragons have been joined by China since the 1990s. China has emerged as the 'world's factory,' producing about a quarter of the world's manufactured goods. Its success has been the result of massive amounts of foreign direct investment by the world's largest global corporations, incentives given by the Chinese state to foreign firms to invest (such as the tax advantages from locating in Free Trade Zones), and an enormous supply of cheap labour. It is almost impossible for manufacturing firms based only in Western countries to compete against Chinese producers for the same product. The advantage for firms in Western countries must come from specialized production often involving new forms of technology and highly-trained labour.

From this brief sketch of industrial evolution and industrial districts there are a number of points relevant for the present period of globalization, technological innovation, competition, and new industry and labour formation:

- First, industrial production within high-income Western countries is based on significant specialization and competitive advantage brought about using advanced technology and highly-skilled labour. It is exemplified by Germany, other northern European economies, the U.S. 'new south' (notably North Carolina), California, and some East Asian states such as South Korea. Second, and related, lower-value industrial production found for example in standardised electronic products or component parts for cars has migrated to low-wage regions in South Asia, parts of South East Asia, and Central America, much of which is characterized by poor working conditions and the open exploitation of labour.

- Second, containerization, just-in-time delivery, and the increasing use of air transport for high-value industrial products has wrought major changes in port and distributional infrastructure and territory, freeing up significant land resources for new, high-value industry as well as competing uses.

- Third, an important residual of the industrial restructuring processes was a large inventory of now redundant industrial land resources, especially within the inner city and older inner suburban districts. There were important differences in experience from place-to-place because of the specific urban industrial economy, especially its scale and specialization. In the cases of London and New York, the collapse of industries specializing in consumer goods, such as clothing, textiles, furniture and electrical products, produced a massive loss of jobs. The major industrial cities of the Great Lakes region, such as Detroit, Buffalo and Cleveland, experienced not just 'Fordist' industrial collapse but deep social, economic and political crises. In the U.S., Mid-Western and East Coast manufacturing industries went off-shore, or to new 'industrial parks' in the Sunbelt states where unions were restricted because of right-to-work legislation, and where labour was cheaper and more pliable.

In Canada, Montreal and Toronto suffered a decline of traditional industries, although in Ontario there remained a significant auto industry associated with the system of production linkages shaped first by the Autopact (1965), and later FTA (1988) and NAFTA (1994). In Metro Vancouver, industrial decline took the form of obsolescent resource-processing and associated with the departure of large resource firms or the break-up of corporations that owned and managed such operations (e.g. MacMillan-Bloedel). As the old resource-based economy was breaking up during the 1990s, significant inventories of vacant or under-utilized industrial land became available particularly within the City of Vancouver. So far much of that land has been redeveloped for mixed-use or high-density housing.

Cities across the globe and at different developmental stages started to deploy land located in former industrial districts as a critical resource in high-value development programs. They took such forms as cultural districts, arts and exhibition space, innovation zones, artisanal production and consumption areas, and zones of specialized education and training institutions for the 'knowledge economy.' Key to the success of these transformations were the specific location of

such lands, their available services and amenities, and in many cases the 'imaginaries' of individuals and groups that formed what some termed 'local buzz;' that is, the resonances that certain places have for entrepreneurs, start-ups, talent and skilled labour. Innovative industries also thrived within dense clusters which incorporated both localised production systems (Breschi and Malerba 2005) and more extensive networks of suppliers and collaborators (Castells 1996). Initially, low-price points (rents and land values) were key to the industrial district regeneration process. In the last decade or so, though, that has changed with the accelerated upgrading and succession occurring at such sites. The appeal now is often in terms of aesthetic and environmental qualities, along with the proximity of amenities.

Some of the cities and constituent industrial districts that bore the brunt of industrial disinvestment and restructuring experienced regeneration through informed and dedicated planning and reprogramming of industrial lands. London's former industrial lands, the sites of devastating disinvestment and unemployment during the 1970s and 1980s, have performed as key sites of new industry formation, including cultural industries, IT firms, and high-value artisanal production and consumption. In Berlin, once a global leader in electrical industries, these spaces had been preserved for the arts and creative industries and are now key to the city's larger economic development program. In Barcelona, the former industrial district of Poblenou has been retrofitted for the new economy as the '22@ project', which includes the provision of new industrial buildings and infrastructure, and place-rebranding and marketing. Former industrial areas in Montreal (Mile End and the Plateau) and Chicago (Wicker Park; see Lloyd 2006) also have been regenerated through a series of creative industry programs (with municipal policy being a critical feature of the Montreal case in particular). Advantages of the Mile End and Plateau areas for attracting start-ups and younger entrepreneurs and workers include the low land costs and rents relative to similar districts in Toronto and Vancouver. In the Wicker Park case, the industrial history, tradition of craft production and heritage-built environment of the district have been mobilised in the production of place-identity and imaginaries, which appeal to younger workers especially. In Portland, planners imaginatively assembled a land base for the innovation economy from a diffuse pattern of existing industrial lands and redundant spaces, close to the Columbia River and within redundant warehousing districts. In each of these instructive cases, local governments have engaged with entrepreneurs, prospective businesses and communities.

It is Shanghai, however, that stands as perhaps the most remarkable example of using the arts as an instrument of regeneration in the metropolis's vast and now redundant industrial lands, particularly along Suzhou Creek (Zhong 2011). There are also many other examples such as the vibrant new industrial districts found in Munich, Chicago and Atlanta (Hatuka and Ben-Joseph 2014), but they all point to what is possible when former industrial land is converted into new uses through both policy and the market.

3. Seattle and San Francisco Case Studies

Threaded through our review of the academic literature of changing intra-metropolitan land use have been instructive examples and metropolitan comparators. The two most directly relevant cases for Metro Vancouver are: the Seattle-four county region aligned along the Interstate-5 highway from Tacoma to Everett, and the San Francisco-Bay Area. Both metropolitan areas perform as leading global regions of culture, information technology and the platform economy (Amazon and Microsoft are headquartered in Seattle), Alphabet (formerly Google), Apple and Facebook in the Bay Area. In both cases urban/regional government agencies have endeavoured to balance the industrial land supply needs of a gateway transportation infrastructure and city-serving industries with the requirements of the innovation economy, which has required an adroit regional land-use approach. Of course, Seattle and San Francisco have innovation economies orders of magnitude larger than Vancouver's, but we believe that the 'aspirational' is important. Another difference is that the land supply in Metro Vancouver is more constrained that either in Seattle or the Bay Area, both of which have large tracts of suburban and periurban land on which to draw. But there are also commonalities between and among Metro Vancouver and Seattle and San Francisco which means that the latter are potential exemplars for learning about industrial land and land use policy for an urban innovation economy.

(i) <u>Seattle: land, space and territory in the Puget Sound innovation corridor</u>

Seattle shares many commonalities with Vancouver, including an early economic development shaped by resource development, notably forestry, that included staples processing and export. Leading corporations in the first half of the twentieth-century included Weyerhaeuser, the world's largest integrated forestry company and, from the inter-World War period, Boeing which is now globally one of the biggest military and civilian aircraft design and manufacturing companies, and still the metro area's single biggest employer. Post-World War II Seattle saw a secular decline in resource processing, with large tracts of industrial lands abandoned. These extensive tracts of industrial land extended southwards along the Duwamish industrial district to Georgetown and Boeing Field, and included smaller districts such as Ballard and Fremont north of Seattle's Downtown. As we will see, it is in precisely in those former industrial lands that Seattle's more recent innovation economy has come to occupy.

From the 1980s that innovation economy was driven by propulsive multinational corporations such as Microsoft and Amazon. The planner Ann Markusen (1996) labels Seattle an exemplary 'sticky place' with the capacity to retain talent and skilled labour through the business cycle and deep downturns. She argues that 'stickiness' derives from supportive governance and development policies, including an economic milieu (enterprise base, markets, land resources and built environment) conducive to start-ups.

Seattle's remarkable success also has been shaped by a complex mélange of factors, including investments in human capital, efficient public services provision and a strategic approach to land use (Sommers and Carlson 2000). While some of its older industrial space was given over to the innovation economy, Seattle has also retained a large area of traditional manufacturing and

wholesaling activity (the Duwamish industrial district). It has constituted a key supply side factor in the Seattle region's record of development. As in the case of Metro Vancouver, there has also been pressure to rezone industrial land to high-value residential towers, especially within areas such as Ballard that are close to the central city and major employment centres. This pressure is associated with sustained demand for housing in a rapidly-growing metropolitan area, and with lobbying from developers who seek to realise greater profits from redevelopment. The City of Seattle, however, has repeatedly reconfirmed its support for the industrial zoning designation of such land, citing the clear link between industrial land supply and the retention and development of the region's innovation economy. This policy model has facilitated the development of complex innovation ecosystems. In South Lake Union, for example, there is the mammoth (and still-expanding) Amazon Corporation, but also many smaller enterprises such as nanoString, Calypso, Path, and numerous medical research firms and institutions. Note also that the City of Seattle (and many other American cities) generate more revenues from business taxes than do Canadian cities, and so have more of a vested interest in retaining industrial zoning.

(ii) <u>San Francisco and the Bay Area: land use policy in the global centre of the new economy</u>

The San Francisco Bay Area is widely acknowledged as the global leader in the innovation economy of the twenty-first-century. According to one study by Michael Storper (2015), the Bay Area has eclipsed Los Angeles. Storper suggests its success is the result of higher education, human capital, social dynamics of innovation, effective networks of sectors and industries, and collaborative regional governance.

The distinctive spatiality of the Bay area economy includes world-leading multi-national corporations imbued with deep technological capacity, entrepreneurship, and scientific labour. In a 2015 survey by *The Economist*, the Bay Area had 99 "unicorns", that is, high-tech start-ups each worth at least US$ 1b. Many were worth much more than 1 billion dollars, including, for example, Uber, worth US$ 70b, and more than the value of General Motors. The City and County of San Francisco also comprise key sites for innovation economy firms and industries, including local start-ups, and companies drawn to San Francisco by the abundance of talent (e.g., it has the world's greatest concentration of software engineers), a lively arts community, and key institutional supports. The origins of the hi-tech economy are in the far SE suburbs of the Bay Area, around Stanford University and the Santa Clara Valley. More recently, new economic activity is locating in the CBD and its fringe area, as well as in the South of Market Area (SOMA), the latter motivated in part by the cultural makeover of SOMA starting in the 1990s, including the Yerba Buena Gardens along with other amenities and institutions.

In addition to the land resource needs of San Francisco and the Bay Area's world-leading innovation economy, substantial land supply is required for the critical gateway installations of the Port of San Francisco and San Francisco International Airport, as well as the city-serving warehousing, wholesaling and distribution industries proximate to port facilities in the Cities of San Francisco and Oakland. Again, like the Seattle-Puget Sound regions, planners in the the Bay

Area have recognised the importance of striking a balance in terms of land-use allocation between its gateway and city-serving functions and its innovation economy.

Of course, San Francisco's innovation economy is critical, but traditional industry and its industrial land at the urban and regional levels continue to be essential too. This was confirmed by studies connected to a large-scale city planning project on industrial land in 1993 at the advent of the dot.com era. The result was first a municipal policy report (City of San Francisco 1997), followed by the implementation of a comprehensive industrial zoning and land use regime that strived to balance the need to preserve existing industries with emerging technology-intensive industries (City of San Francisco 1999). The larger regional scene was famously portrayed in AnnaLee Saxenian's influential study of the distinctive innovation culture of Silicon Valley (Saxenian 1994).

While land is expensive in the San Francisco-Bay Area, a recent report concluded that there is an 'abundant developable land supply' in the larger region, including the East Bay and South Bay areas (Cox 2017). Of course, this is different from Metro Vancouver. But in both San Francisco and Metro Vancouver, there are greater market pressures and land supply constraints closer to the central area than in the urban periphery.

Even accounting for important contrasts in the scale of the regional economies in general, and the innovation economy in particular, there are several key takeaways from the San Francisco-Bay Area for Metro Vancouver. First, there are important linkages and interdependencies between regional supply factors (i.e. land, talent, capital) and high-value economic development. These factors are potentiated by an effective regional economic governance regime in the Bay Area, and by a highly-networked industrial system (Storper 2015).

Second, in the San Francisco-Bay Area there is a complex industrial land-use ecology of the economy in general and the innovation economy in particular. The different kinds and amounts of industrial land available – in the urban periphery, outer suburbs, inner suburbs, central zone, downtown – each attracts and is suitable for different sectors, industries and firms.

Third, the record of the last quarter-century in the San Francisco-Bay Area discloses numerous episodes of industrial innovation, growth, restructuring, crashes and new sequences of innovation. For example, there was the early emergence of multimedia and dot.coms during the 1990s but followed by a collapse during the early 2000s. Since then there has been a 'New Economy 2.0' based on broadband innovations, and even more recently digital and internet-based industries.

In sum, from the experiences of Seattle and San Francisco, cities and regional governments must be patient. Innovation economies are often turbulent, characterised by frequent change involving growth, contraction and new phases of development. Those governments also need to be far-sighted in the provision of space for the 'next generation' of industrial innovation. The contrast here is with the more durable industrial agglomerations of the last century and reflected in zoning and land use regimes that remained unchanged over long periods of time. And finally, innovation economies must strike a balance with land use requirements of gateway, traditional

industry and city-serving functions. These different parts of the urban economy exist in a delicate relation one to another, each contributing to the wellbeing of the whole, and each requiring appropriate resources. If any are thrown out of balance, the larger ecology of the urban economy may itself be pushed off kilter. In that light, zoning and land use policy in Metro Vancouver should send a clear signal to the market about the region's commitment to conserving the land resources for traditional industrial, city-serving and gateway functions. Yet, it should also be sufficiently flexible in accommodating new forms of advanced activities associated with the innovation economy. There needs to be elasticity built into zoning and land-use regimes, allowing for rapid changes in the types of business permitted to locate on a given site when necessary.

4. Conclusions

Based on our findings we believe that to maintain a prosperous and growing Metro Vancouver region it is critical to retain and to manage the region's industrial land supply. Further, following our case studies of San Francisco and Seattle, it is clear that an appropriate balance of industrial land allocation is required to meet the needs of Metro Vancouver's gateway and city-serving functions, along with its increasingly important innovation economy.

Metro Vancouver's critical gateway functions, notably Port of Vancouver and Vancouver International Airport (YVR), requires continued industrial land to support its key regional, national and international roles. These gateway functions generate a large portion of Metro Vancouver's employment, revenues and incomes, and underpin the global connectivity facilitating circuits of trade and exchange characteristic of successful metro-regions. The precise nature (and location) of demand for industrial land will evolve as the mix and volumes of throughput associated with Port of Vancouver and YVR continue to experience growth and change.

City-serving activities, including local warehousing, wholesaling and distribution activities, also require on-going industrial land. Demand for land from this sector, and their specific location and configuration, is likely to change as the introduction of new technologies and systems of product transmission and delivery continues apace. Consequently, this sector will comprise for many municipalities an 'active file' with respect to policy formulation and implementation.

Determining the exact amount and locations of industrial land for Metro Vancouver's innovation economy is challenging given the frequent episodes of restructuring within that sector in terms of technologies, labour and outputs. Nevertheless, a successful calculation here has the potential to yield large payoffs. These include a catalytic effect on the generation of high-wage jobs consistent with our observations derived from study of the most successful regional economies. Our principal recommendation, based on a careful review of land management practices in the best cases, and on our understanding of the trajectory of Metro Vancouver's economy, is that strategic policy choice should favour *retention*. As noted, there is a significant innovation economy in the region. There are practical limits on its expansion, though, as industrial land base has been rezoned to residential use since 1990. There are also price pressures on the remaining land base as developers seek new opportunities for high-density housing and amenity.

The challenge for the innovation economy is its full regionalization within Metro Vancouver. We see this as a natural corollary to our study of the larger Seattle-Puget Sound and San Francisco-Bay Area cases, where there are significant clusters of innovative firms in each region. In both cases, there are dynamic clusters of innovative firms within the central and inner city, inner and outer suburbs, and (especially in the Bay Area case) regional periphery and exurban spaces. Recognising this diversity of spaces is potentially useful in developing Metro Vancouver's innovation economy. It suggests for Metro Vancouver a need for greater policy support for locational choice for enterprises in different sectors and industries, and at different scales and stages of development.

Our broad conclusion is that zoning and land use policy in Metro Vancouver send a clear signal to the market about the region's commitment to conserving its land resources for industry, so it is able to support a balanced distribution among its three principal employment-generating users. Doing so we believe can put Metro Vancouver closer to the leading edge of growth and change and alongside the world's most successful metropolitan economies.

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