



Final Report

An Analysis of Industrial Clusters in Burnaby

2004 December 23

Prepared for:
the City of Burnaby

Prepared by:
J. Adam Holbrook,
Centre for Policy Research on Science and Technology,
Simon Fraser University



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AN ANALYSIS OF INDUSTRIAL CLUSTERS IN BURNABY

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1. INTRODUCTION

The City of Burnaby is undertaking a process to update their 1990 Economic Development Strategy (EDS). This process was designed to recast a progressive future vision of Burnaby 10 years from now which is consistent with the environmental and social aspiration of the community. Two research assignments - a trend analysis and a cluster analysis - were undertaken by Simon Fraser University in support of the EDS Update process under a joint agreement with the City of Burnaby. This report presents the findings of the analysis of industrial clusters in Burnaby. The report provides an overview of cluster theory, provides an analysis of clusters within Burnaby, and draws conclusions based on this analysis.

2. BACKGROUND

The federal government's *Innovation Strategy* states that among the aims of its innovation policy lies the creation and nurturing of knowledge-based industrial clusters. One useful definition of a "cluster" is:

"...a geographic concentration of interconnected companies, specialized suppliers, service providers, firms in related industries, and associated institutions (e.g. universities, standards agencies, trade associations) in a particular field that compete but also cooperate."¹

The elements that make an economy vibrant and prosperous today are fundamentally different from those of the past. There is growing recognition that local and regional clusters are a key to economic development. At the same time, in most economies, including BC, there is an ongoing transition from an economy based primarily on resources or manufacturing to one based on commercialization of services and intellectual property. In this new economy, concepts such as patents, copyrights, customer relationships, brand value, unique institutional designs, the value of future products and services and their structural capital (culture, systems and processes) are critically important to businesses in a region. Economic performance is determined by how effectively a region uses its comparative advantages to create and expand knowledge assets and convert them into economic value.

These new "economics of place" are driven by the ability to attract, retain and expand human capital and infrastructure and leverage them for economic and social development. In practical terms this means the ways that these assets, usually located in

¹ "Location, Competition, and Economic Development: Local Clusters in a Global Economy," M. Porter Economic Development Quarterly **14(1)**, 15-34 (2000)

urban areas in the region, are mobilized and how knowledge which is created (often in universities) is transferred from the laboratory to the commercial sector. While there is no agreement among policy researchers that R&D activity is essential for the viability of clusters, studies at SFU suggest that, at least in Canada, public sector investment in relevant science and technology is a prerequisite for the creation and maintenance of viable high-tech industrial clusters.²

I. REGIONAL CLUSTERS

There are four propositions that link clusters to regional economies. They are:

- regions are the fundamental units of the world economy (not nation-states)
- industrial clusters shape the economies of regions
- input advantages specific to a region are the basis of competitiveness of its clusters
- a collaborative culture creates economic advantage

Within these general statements there are several corollaries reflecting the relationships between regions and clusters. A region can be a subset of a nation-state or a municipality: it is merely a matter of scale. Each region has a portfolio of clusters – they need not be directly related to each other. The clusters have a life cycle, from birth through growth, decay and finally disappearance. Finally, although it may seem obvious, clusters are driven by technology. Generalized technologies like the Internet enable them to be more flexible and competitive and support specific technologies that are unique to particular industrial sectors in that region.

II. LIFE CYCLE OF CLUSTERS

It is possible to generalize the evolution of clusters within a specific geographic region: There are four categories:

Seed: There are only a few firms, each with specialized competencies, and a potential for growth.

Emerging: There is a pattern of growth from few to many firms. There is fast growth, but few links among the firms.

Expanding: New firms form in the cluster and attract other firms to the cluster. There are many linkages among the firms; specialized suppliers providing inputs and services to these firms appear to be growing in size and number.

Transforming: These clusters are in the process of transforming themselves into something different (not necessarily disappearing) with most of their growth occurring

² Porter does not suggest the presence of a large public sector research institution is a necessary condition for the existence of a cluster.

outside the region. There may be spin-offs within the region which start next-generation clusters (this is the real test of the continuity of a cluster).

Table 1 summarizes how these stages, which can be thought of as a linear process, also link to each other in terms of economic potential and size.

Table 1
Stages of Cluster Lifecycles

	Low potential	High potential
Have critical mass	Transforming	Expanding
Do not have critical mass	Seed	Emerging

Part of the challenge for understanding clusters in Burnaby is to understand how each cluster fits into this life cycle.

3. THE BC EXPERIENCE

The results of academic research on clusters in BC suggest that innovation policy must not only focus on public support for the development of knowledge-intensive industries but also seek to support the development of other industries such as those based on BC's natural resources. This includes factors such as venture capital financing, human capital development and the factors that influence the quality of life in a city. Simply wanting to have, for example, a biotech cluster establish itself, or survive in the long run, is not enough. There are necessary and sufficient conditions for the establishment of any industrial cluster in a community, and these conditions probably differ from one industrial sector to another.

Cluster size is important, and there are critical factors, below which cluster activity will not ignite and be self-sustaining, such as population, regional domestic product, access to human resources from outside the region, transportation and communications infrastructure.

It is tempting to suggest that it is possible for an economy, such as BC, to evolve from being a resource-based economy to a service-based knowledge economy without having to pass through the intermediate stage of being an industrialized manufacturing-based economy. There are several high wage-rate, high educational attainment economies based on resource extraction. These economies are constantly being threatened by competition from lower wage rate (and usually lower educational attainment) resource-based economies. This is certainly the situation in BC, as exemplified by the forest products sector.

New knowledge-based clusters need not only be based on the manufacture and marketing of specific, physical products, but also on the development of intellectual property. Intellectual property is often first created in a public sector institution, before it is

transferred to the private sector through the licencing of the base technologies to a start-up company. These companies develop intellectual property and bring it to the level where it is ready for production.

This process does not fit the traditional cluster model constructed by Michael Porter. The Porter model has two features which narrows the scope of the concept to a large manufacturing-based economy with domestically-based multinational companies. Porter's model defines a cluster to be a vertically-integrated agglomeration of enterprises that have a strong domestic market and a significant competitive advantage in the global market. Research on knowledge-based clusters in BC suggests the cluster need not be a vertically-integrated agglomeration, but can be a loose horizontal association of enterprises that do not compete for market share. Given that the BC economy is in transition from a resource-based economy to a knowledge-based service economy, the revised model may be the successful model for our specific set of economic circumstances.

I. ANALYSIS OF STATCAN DATA

Analysis of Statistics Canada 2001 data provides a broad brush view of the industrial clusters that exist in Burnaby, with comparisons to the GVRD and Canada as a whole. The 2001 Census collected information that allows the determination of place of employment, by industrial category and by occupation. For the most part, the data are at a high level of aggregation, and thus do not focus on specific industrial clusters. However the data do provide information about areas where Burnaby has a relative advantage, as evidenced by a higher than average level of employment, and those areas where employment in Burnaby is below the average for the labour force of Canada as a whole.

Specifically, Sheet 1 and Figure 1 show both the ratio of GVRD employment compared to Canada as a whole and Burnaby compared to Canada. The Y-axis value on Figure 1 is the ratio of the percentage of employees employment within a specific industrial category. for the GVRD or Burnaby compared to the national average³.

Not all industrial codes are shown: the figures show, as expected, that the GVRD and Burnaby have much smaller than average labour forces in agriculture and mining, and smaller than average employment in manufacturing and public administration. Figure 1 shows the ratio of employment compared to Canada in selected two digit NAICS codes. If either the GVRD or Burnaby has a ratio greater than one, it indicates that it has some competitive advantage compared to Canada as a whole.

³ The report by Dr. Jock Munro of SFU will examine the relative advantages of Burnaby compared to the GVRD as a whole based on these data. The data used here are merely included to highlight a few areas, both sectoral and occupational where Burnaby appears to have an advantage when measured against the rest of Canada. It may also share some of these advantages with the rest of the GVRD.

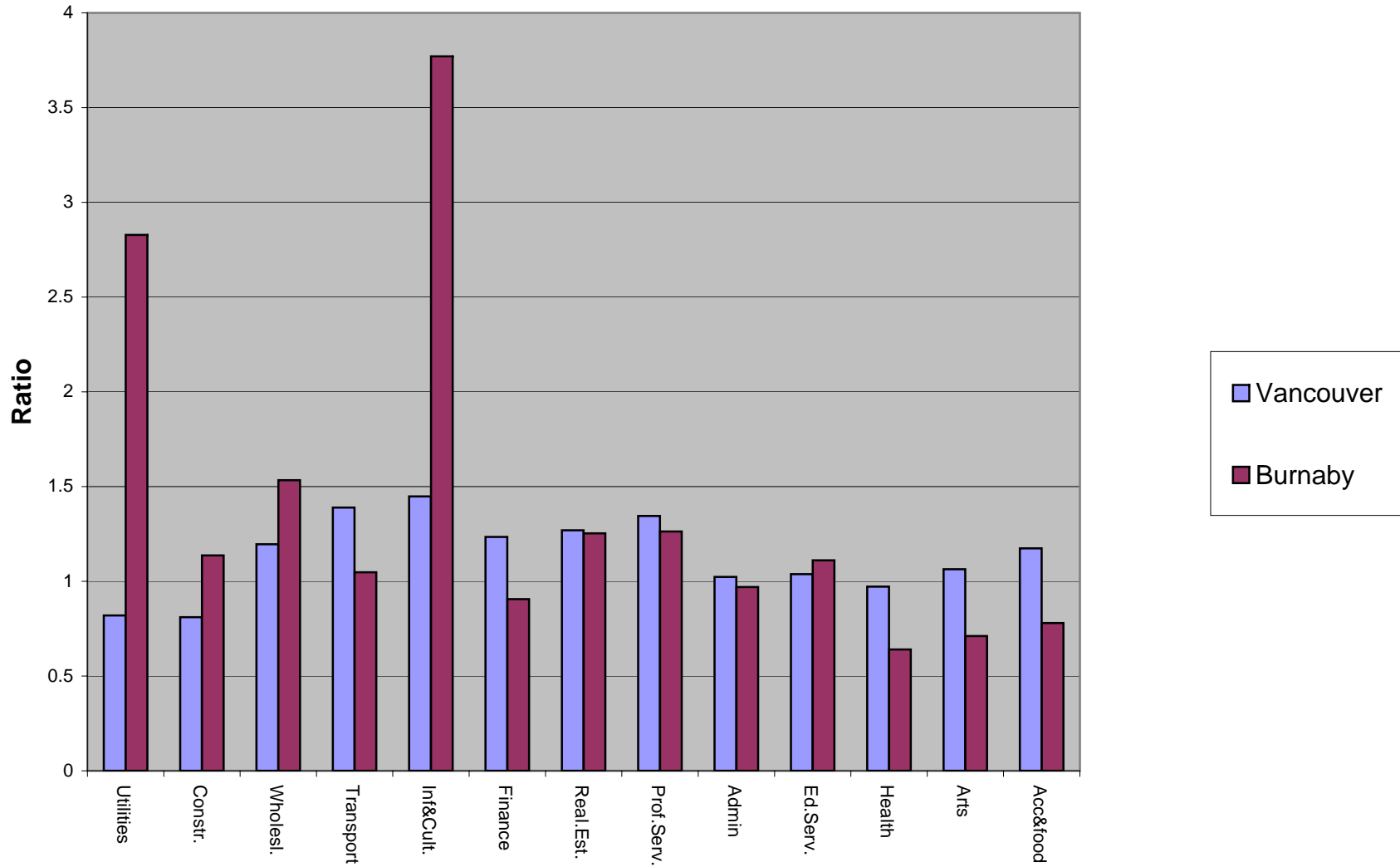
SHEET 1

Ratio of GVRD Employment in Burnaby by Industry Codes

	11 Ag, fish for	21 mining	22 utilities	23 constr	31 - 33 mfg	41 wholesl	44 - 45 retail	48 - 49 trans	51 inf & cult	52 finance	53 real est	54 prof & sci	55 mgt	56 admin & sp	61 ed serv	62 health	71 arts	72 acc&food	81 other	91 publ adm	TOTAL
Canada	162,860	118,560	105,705	358,605	1,913,930	562,630	1,545,400	534,280	337,920	565,495	192,805	696,905	11,560	377,905	899,170	1,288,035	211,840	910,485	577,195	806,315	12,177,600
GVRD	7,125	1,600	5,850	19,625	87,995	45,410	101,865	50,080	33,015	47,090	16,500	63,245	580	26,085	62,985	84,495	15,200	72,085	40,775	39,895	821,500
BBY	220	65	2,500	3,410	11,440	7,215	13,030	4,680	10,655	4,285	2,020	7,360	20	3,065	8,355	6,890	1,260	5,940	5,435	3,985	101,830
GVRD/Cda	0.044	0.013	0.055	0.055	0.046	0.081	0.066	0.094	0.098	0.083	0.086	0.091	0.050	0.069	0.070	0.066	0.072	0.079	0.071	0.049	0.067
GVRDspec	0.649	0.200	0.820	0.811	0.682	1.196	0.977	1.389	1.448	1.234	1.269	1.345	0.744	1.023	1.038	0.972	1.064	1.174	1.047	0.733	1.000
Bby/Cda	0.001	0.001	0.024	0.010	0.006	0.013	0.008	0.009	0.032	0.008	0.010	0.011	0.002	0.008	0.009	0.005	0.006	0.007	0.009	0.005	0.008362
BByspec	0.162	0.066	2.828	1.137	0.715	1.534	1.008	1.048	3.771	0.906	1.253	1.263	0.207	0.970	1.111	0.640	0.711	0.780	1.126	0.591	1.000
Bby locad	0.249	0.328	3.448	1.402	1.049	1.282	1.032	0.754	2.604	0.734	0.988	0.939	0.278	0.948	1.070	0.658	0.669	0.665	1.075	0.806	1.000

	Vancouver	Burnaby
Utilities	0.82	2.828
Constr.	0.811	1.137
Wholesl.	1.196	1.534
Transport	1.389	1.048
Inf&Cult.	1.448	3.771
Finance	1.234	0.906
Real.Est.	1.269	1.253
Prof.Serv.	1.345	1.263
Admin	1.023	0.97
Ed.Serv.	1.038	1.111
Health	0.972	0.64
Arts	1.064	0.711
Acc&food	1.174	0.78

Figure 1
Ratio of GVRD Employment in Burnaby by Industrial Codes



What is perhaps more important is to look at those areas where Burnaby has a distinct advantage over the rest of the GVRD. This removes most of the macro-economic and macro-geographic considerations, and provides information as to where Burnaby has a demonstrated advantage in the GVRD. There are four such areas: utilities, construction, wholesale and information and culture. Of these, the higher than average ratio for construction might be a reflection of transient construction projects, but the other three can be clearly tied to specific industries and even companies (e.g. utilities and Telus).

A similar type of analysis can be done by occupational codes. Sheet 2 and Figure 2 shows the ratios of the percentages of total employment in the GVRD and Burnaby in a particular aggregation of occupational codes compared to Canada. Again there are no surprises. Neither Burnaby nor the GVRD have higher than average numbers of workers in primary and manufacturing occupations. The GVRD overall has average numbers of individuals in health occupations and education, but Burnaby falls behind the GVRD (probably due to the preponderance of health and educational facilities outside Burnaby).

Burnaby does have a clear advantage in S&T occupations, and slight advantages in management and business. While it does not have as great an advantage in the arts as does the GVRD as a whole, its advantage over the rest of Canada is still significant, and bears further study.

II. CLUSTERS IN BURNABY

Burnaby enjoys the benefits of region-wide infrastructure investments. These include the international airport, a safe harbour, transcontinental rail and highway links, a light rail transit system, world-class universities and hospitals. It also enjoys, along with the rest of the Lower Mainland and Vancouver Island a temperate climate and stunning scenery. Of specific competitive advantage to Burnaby is the fact that it sits astride the transcontinental highway and railways. Burnaby should also benefit from the investments associated with the 2010 Olympics. But Burnaby is an artificial geographic construct. Some (not all) of its boundaries are quite arbitrary, and economic and social activities spill over these boundaries. Thus it has to be viewed a subset within the GVRD economic community.

Industrial clusters, while they may have a region-wide economic significance, are often concentrated in very small geographic areas. At a first glance, Burnaby has a number of industrial clusters of varying sizes that have been established over the years (Table 2).

SHEET 2
Ratio of GVRD Employment in Burnaby by Occupation Codes

	OO	O1-O9	Mgt	11	12	14	bus	21	22	S&T	31	32	34	Health	41	42	educ	51	52	arts	62	64	66	sales	72-73	74	76	trades	82	84	86	primary	92	94-95	96	Mfg
	sr mgt	mid mgt		prof bus	sk admin	clerical		prof sci	tech sci		prof health	tech hl	hl spcl		prof edgovt	para ed		prof arts	arts spcl		skl sales	int sales	et sales		trades	int trd	trd help		skl prim	int prim	lab prim		mfg sup	mfg op	mfg lab	
Canada	169,385	1,188,425	1,357,810	304,405	761,710	1,281,520	2,347,635	445,185	367,455	812,640	382,190	171,045	189,470	742,705	793,200	221,845	1,015,045	104,725	164,785	269,510	651,065	1,212,080	1,141,430	3,004,575	861,600	527,435	71,860	1,460,895	79,435	73,055	66,450	218,940	107,360	598,350	241,945	947,655
GVRD	12,970	89,480	102,450	25,505	54,185	93,835	173,525	33,140	24,685	57,825	26,220	12,195	12,005	50,420	54,415	14,940	69,355	8,595	13,945	22,540	46,625	93,575	72,805	213,005	45,125	33,510	3,275	81,910	2,460	3,375	3,315	9,150	3,760	24,950	12,595	41,305
BBY	1,505	11,950	13,455	2,725	6,075	13,955	22,755	7,620	5,035	12,655	1,800	1,040	1,195	4,035	6,475	1,420	7,895	995	1,725	2,720	4,855	10,195	7,695	22,745	5,735	4,255	355	10,345	205	125	225	555	395	3,030	1,225	4,650
GVRD/Cda	0.077	0.075	0.075	0.084	0.071	0.073	0.074	0.074	0.067	0.071	0.069	0.071	0.063	0.068	0.069	0.067	0.068	0.082	0.085	0.084	0.072	0.077	0.064	0.071	0.052	0.064	0.046	0.056	0.031	0.046	0.050	0.042	0.035	0.042	0.052	0.044
GVRD/spec	1.135	1.116	1.118	1.242	1.054	1.085	1.096	1.103	0.996	1.055	1.017	1.057	0.939	1.006	1.017	0.998	1.013	1.217	1.254	1.240	1.062	1.144	0.946	1.051	0.776	0.942	0.676	0.831	0.459	0.685	0.740	0.620	0.519	0.618	0.772	0.646
Bby/Cda	0.009	0.010	0.010	0.009	0.008	0.011	0.010	0.017	0.014	0.016	0.005	0.006	0.006	0.005	0.008	0.006	0.008	0.010	0.010	0.010	0.007	0.008	0.007	0.008	0.007	0.008	0.005	0.007	0.003	0.002	0.003	0.003	0.004	0.005	0.005	0.005
Bbyspec	1.029	1.165	1.148	1.037	0.924	1.262	1.123	1.983	1.588	1.804	0.546	0.704	0.731	0.629	0.946	0.742	0.901	1.101	1.213	1.169	0.864	0.975	0.781	0.877	0.771	0.935	0.572	0.820	0.299	0.198	0.392	0.294	0.426	0.587	0.587	0.569
Bbylocad	0.907	1.044	1.026	0.835	0.876	1.162	1.025	1.797	1.594	1.711	0.537	0.667	0.778	0.625	0.930	0.743	0.890	0.905	0.967	0.943	0.814	0.852	0.826	0.835	0.993	0.992	0.847	0.987	0.651	0.289	0.530	0.474	0.821	0.949	0.760	0.880

	Vancouver	Burnaby
Mgt.	1.116	1.146
Business	1.096	1.123
S&T	1.055	1.804
Health	1.006	0.629
Education	1.013	0.901
Arts	1.24	1.169
Sales	1.051	0.877
Trades	0.831	0.82
Prim. ind.	0.62	0.294
Mfg.	0.646	0.569

Figure 2
Ratio of GVRD Employment in Burnaby by Occupational Codes

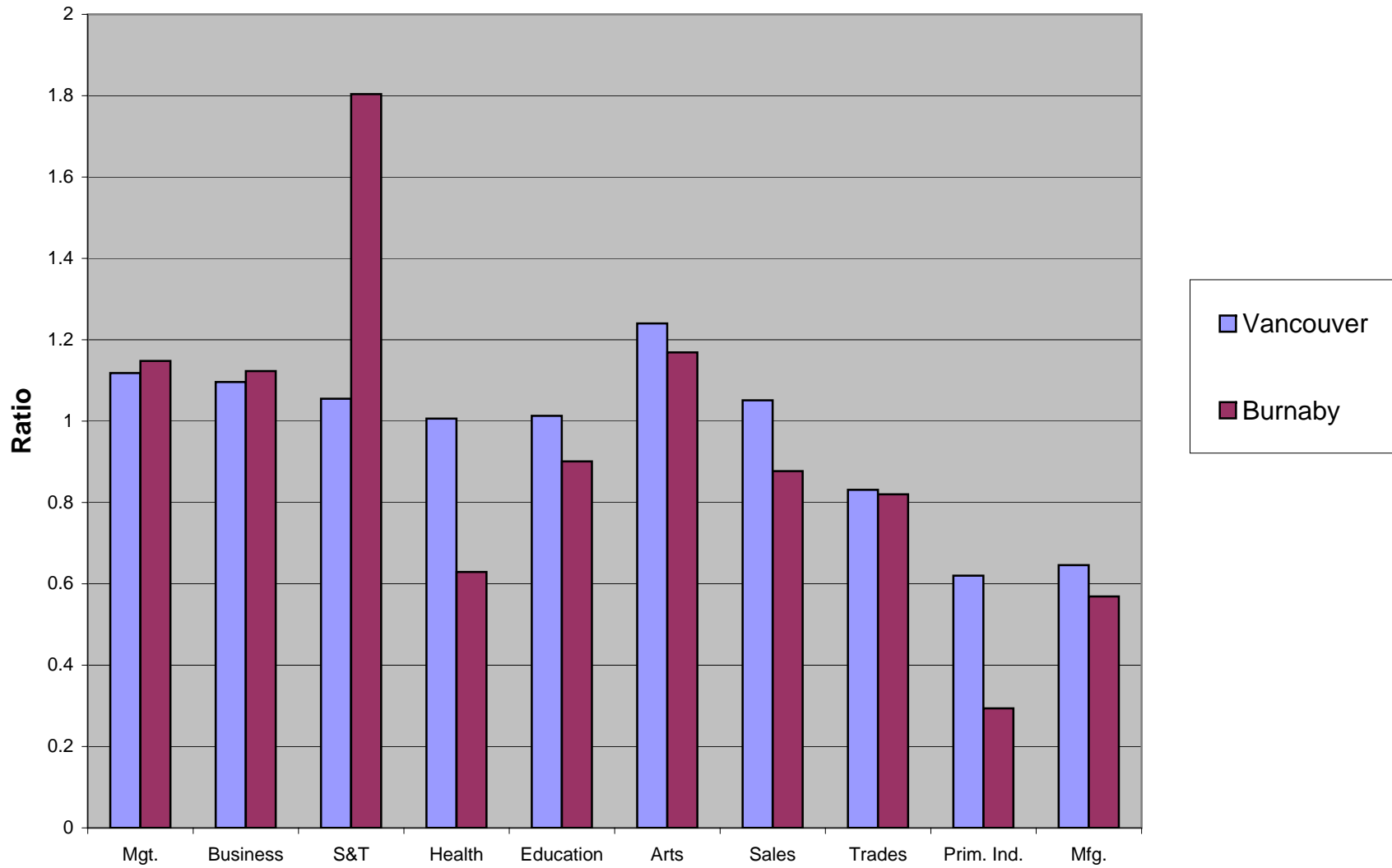


Table 2
Clusters in Burnaby

Heavy industry	
-	Saw mills and primary wood processing
-	Oil refining
Logistics	
-	Bulk intermodal transfer
-	Warehousing and wholesale for the GVRD
Knowledge-based	
-	Film production
-	Multimedia
-	Wireless and associated ICT
-	Biotechnology
-	Fuel cells
-	Alternative clean power generation
-	Post-secondary education
-	Environmentally sustainable technologies
Consumer-based	
-	Sports and tournaments
-	Tourism
-	Light manufacturing
-	Retail
Office services	
-	Finance, insurance and real estate and
-	business services (including utilities)

Table 2 is a long and diverse list. Not all of the clusters are easily influenced by activities at the municipal level. While all may be affected by macroeconomic factors, such as the Canada/US dollar exchange rate, some are more amenable to municipal influence than others. Equally, the path dependencies and life cycles of these clusters are important.

For example, the oil refining sector is based on Burnaby being the termination of oil pipelines from Alberta, feeding a local market. That said, this cluster is static (if not declining) and has little potential for expansion outside than that resulting from the overall growth in demand for petroleum products in the GVRD. The wood products sector is being squeezed by costs from other sources, and it too is not likely to grow in a region of high land costs and high labour rates such as the GVRD. Thus, while

recognizing the importance of these industries to the local economy, they should not be priorities for local economic development.

The logistics clusters in Burnaby are a function of regional geography. They do not service export markets (unlike, for example, the coal terminal at Roberts Bank, or the container terminals at Vanterm) The intermodal transfer and warehousing industries may well be of interest to Burnaby, since Burnaby enjoys a central location in the geography of the region, but they do not necessarily have a high density of employment, nor are they generally knowledge-based. As with the oil industry, they are strongly linked to overall economic growth patterns. Thus these industries also rank low in terms of potential for economic and social development within Burnaby.

The knowledge-based clusters are all elements of larger clusters that are part of the growing high-tech products and services industries of BC. They all depend upon the input of technologies and highly skilled human capital from the post-secondary institutions. These are the clusters which are most sensitive to local (Burnaby-wide) conditions and where the City of Burnaby could make a difference through specific economic and social policies.

Not all of these clusters may be self-sustaining within Burnaby. For example, there is ample evidence of the existence of a biotech cluster in the GVRD, and there are, indeed, biotech firms based in Burnaby. However, the factors that affect the development of biotech clusters are not in Burnaby, such as a large research hospital, and a large biotech research community at the university⁴. There must be a number of hard, selective, decisions as to what clusters should be studied and which should be passed over.

There may also be clusters that do not immediately present themselves as being important, or indeed, even being a “cluster”. A good example of this is the grouping (possibly a cluster) of enterprises that make up the environmentally sustainable technologies cluster. This includes engineers, equipment suppliers and project developers who handle projects related to land, air and water pollution, remediation and treatment. Data exist on these enterprises in the GVRD – the test will be to see if there is a significant concentration of these firms in Burnaby, and what the conditions are that support it. Another such cluster might be the grouping of English as a Second Language (ESL) schools which market their post-secondary programs.

Post-secondary institutions are (possibly) a cluster which spawns other clusters. Studies carried out by the Innovation Systems Research Network have demonstrated that, in Canada, the presence and vitality of these institutions is a necessary prerequisite for the development of knowledge-intensive clusters. Thus the post-secondary institutions are necessary to the economic development of Burnaby, but they should not necessarily be seen as clusters in themselves. Yet consumer-financed education, such as commercial

⁴ See J.A.D.Holbrook, M.Salazar, N. Crowden, S. Reibling, K.Warfield, and N. Weiner, “The biotechnology cluster in Vancouver” in *Clusters in a Cold Climate: Innovation Dynamics in a Diverse Economy*, David.A.Wolfe and Matthew Lucas, editors, McGill-Queen's University Press, Kingston, 2004

ESL colleges, may form quite local clusters, as for example, the grouping of these colleges in downtown Vancouver.

Consumer-based clusters lend themselves to actions by the City of Burnaby through specific economic and social policies. Indeed the sports-tournaments cluster is one that depends almost entirely on infrastructure developed by the City. Tourism on the other hand is a spill-over from the destination tourism of the GVRD – Burnaby’s specific role in this cluster would be to provide support services and consumer-related services such as accommodation. The same applies to retail and light manufacturing⁵. Here the clusters provide goods and services to clients drawn from across the GVRD – Burnaby’s competitive advantage lies in its location and accessibility from other parts of the GVRD. The growth of these clusters is strongly tied to the economic growth of the GVRD as a whole.

The office service cluster is very similar in nature to the consumer-based clusters. There are several examples where office-based service firms take advantage of their geographic location within the GVRD primarily to attract and retain skilled employees. Like the consumer-based clusters the growth of the clusters can be affected by economic planning decisions made by the City (e.g. zoning) and by the GVRD (transportation).

1. Human Capital as a Competitive Advantage

The overall trend in industrialized economies, and indeed in the GVRD and Burnaby, is a move away from resource-based industries and labour-intensive manufacturing industries towards industries whose competitive advantage rests on their acquisition and maintenance of human capital. High-tech knowledge-based industries are the clearest example of this, but many other industries rely more heavily on the skills of their labour force than they do on their physical investments.

Hence Burnaby’s over-arching objective should be to foster and retain human capital. There is ample evidence that human capital is a highly mobile asset and that one of the greatest roles a government can play is to provide an environment favourable to the attraction and retention of human capital.

This has a beneficial effect, not only to the enterprises located in a jurisdiction, but also to the municipality itself. Concentrations of human capital lead to the development of social capital. Many authors (see Putnam⁶, for example) argue that jurisdictions with greater levels of social capital have much better outcomes in areas such as health, education, crime, etc., all of which impact directly on the fabric of the community. There is clear evidence that economies that have higher levels of social capital also have better systems of innovation, if only because higher levels of social trust reduce transactional costs among firms and lead to better exchanges of knowledge among innovators and

⁵ By light manufacturing we mean small manufacturing establishments that often sell directly to the consumer – a good example would be a firm that makes kitchen cabinets and furniture.

⁶ Robert Putman, “*Bowling Alone*”, Simon & Schuster, New York, 2000

technical transfer agents. There is a strong relationship between the encouragement and development of industrial clusters that require human capital, the attraction and retention of that human capital, and the emergence of social capital within the community. This analysis will focus on the human capital-intensive clusters in Burnaby.

Both the consumer-based and office services clusters owe their strength to Burnaby's central location in the GVRD. Thus decision-making is, in part, influenced by the GVRD and other region-wide institutions such as Translink. But these clusters are people-centred and programs to make Burnaby a more people-centred city can draw enterprises into these clusters. Knowledge-based clusters are the most complex to analyze, but also the most amenable to local civic action. These are the clusters where the City of Burnaby can add "value" by direct action on its own.

Finally it should be noted that it is often difficult to assign a specific firm to a specific cluster. Firms can operate in a number of clusters – at the same time the definition of a cluster can be quite flexible.

From a human capital point of view the list of human capital intensive clusters can be agglomerated into those shown in Table 3.

Table 3
Human Capital Intensive Clusters

New Media and ICT	
-	Film production
-	Multimedia
-	Wireless and associated ICT
Life Sciences (Biotechnology)	
Environmental	
-	Fuel cells
-	Alternative clean power generation
-	Environmentally sustainable technologies
Education	
-	Post-secondary education
Office services	
-	business services (including utilities)
Consumer –based	
-	Sports and tournaments
-	Tourism
-	Light manufacturing
-	Retail

Applying Gollub's life-cycle model to these clusters, one can classify them as show in Table 4.

Table 4
Life Cycles of Clusters in Burnaby

Seed	Emerging	Expanding	Transforming
life sciences	multimedia	sports	business services
post.sec.education	wireless & ICT	tourism	utilities
alt.energy	fuel cells	film production	light manufacturing
	env. sustain. tech		retail

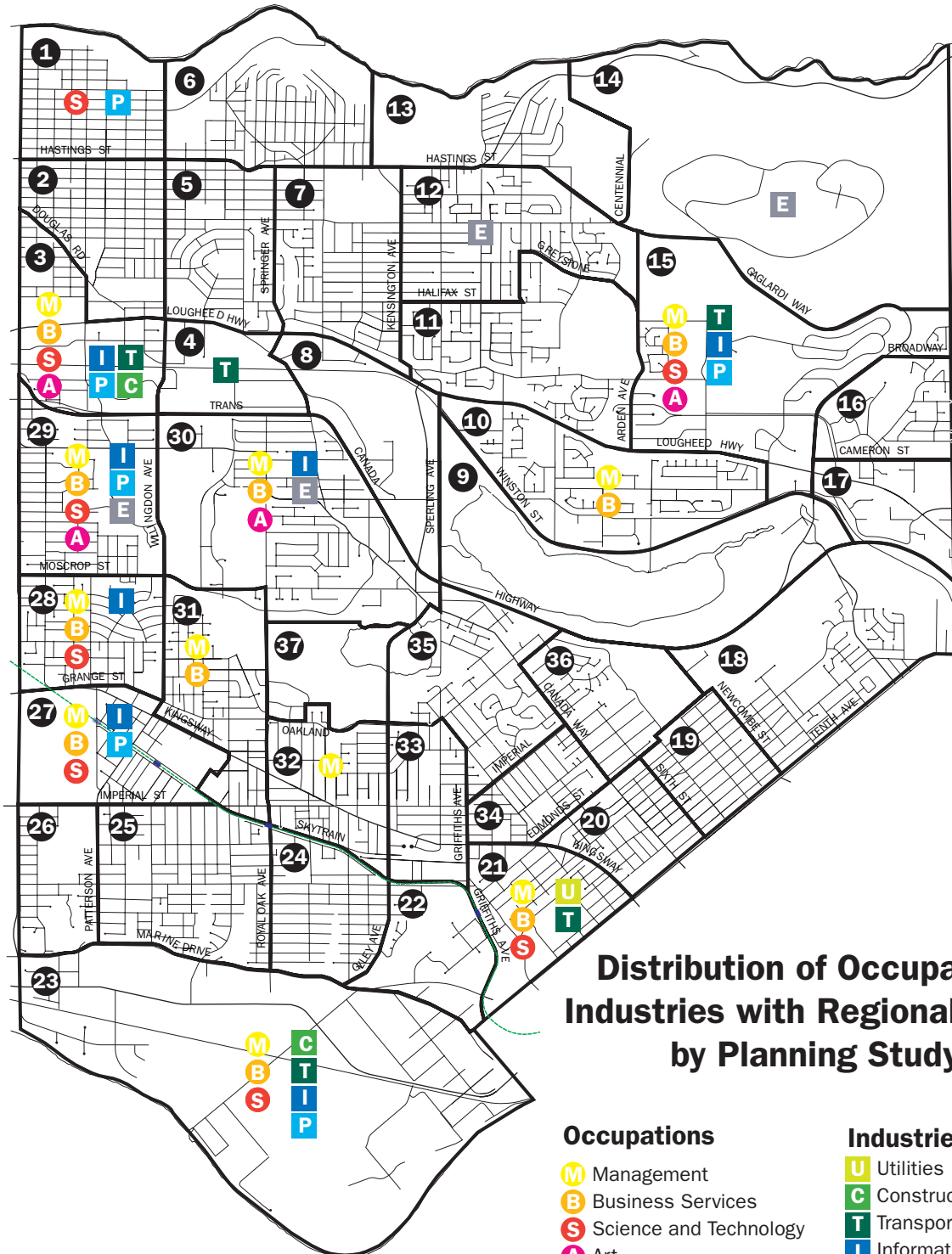
2. Clusters and Neighbourhoods

Since medieval times it has been common for specific trades and industries to congregate in quite small geographic areas. Although, at first glance, this might seem counterintuitive, as it puts a firm, literally, side-by-side with its competitor, time has shown that geographically concentrated industrial clusters are far more successful. Although human capital can more easily move from one enterprise to another, innovations flow far more rapidly, to the general good of all firms in that area. Thus it is not surprising to see geographic clustering even within a relatively small area such as the City of Burnaby. In modern times this has been formalized by zoning regulations, but in general zoning regulations tend to follow rather than lead development.

Thus, while the StatCan categories are very broad we see clustering, by those industries and occupations that that have a significant locational advantage in Burnaby, the following Burnaby neighbourhoods by industrial classification (where employment is greater than 500) as shown in Table 5 and Figure 3.

An analysis of this information shows that the greatest concentration of advantage, based on industry or occupational codes, lies along the western edge of Burnaby in the Western Central Valley, Cascade-Schou, Garden Village and Maywood areas. There are two other "hot-spots" of areas where clusters with locational advantage appear: Big Bend/Stride Ave. and Lake City. The Stride Ave. area is based on the utilities sector, while Big Bend is probably linked to the extensive redevelopment going on there.

From a knowledge-intensive industries and occupations point of view, the clustering suggests that policies and programs targeted at building up opportunities and the cultural environment in either the Lake City, or in the Western Central Valley/Cascade-Schou areas would be the most successful.



Planning Study Areas

- 1 Burnaby Heights
- 2 Willingdon Heights
- 3 West Central Valley
- 4 Dawson - Delta
- 5 Brentwood
- 6 Capitol Hill
- 7 Parkcrest - Aubrey
- 8 Ardingley - Sprott
- 9 Burnaby Lake
- 10 Government Road
- 11 Sperling - Broadway
- 12 Lochdale
- 13 Westridge
- 14 Burnaby Mountain
- 15 Lake City
- 16 Lyndhurst
- 17 Cameron
- 18 Cariboo - Armstrong
- 19 Second Street
- 20 Edmonds
- 21 Stride Avenue
- 22 Stride Hill
- 23 Big Bend
- 24 Clinton - Glenwood
- 25 Sussex - Nelson
- 26 Suncrest
- 27 Maywood
- 28 Garden Village
- 29 Cascade - Schou
- 30 Douglas - Gilpin
- 31 Mariborough
- 32 Windsor
- 33 Kingsway - Beresford
- 34 Richmond Park
- 35 Morley - Buckingham
- 36 Lakeview - Mayfield
- 37 Oakalla

Distribution of Occupations and Industries with Regional Advantage by Planning Study Area

Occupations

- M Management
- B Business Services
- S Science and Technology
- A Art

Industries

- U Utilities
- C Construction
- T Transportation
- I Information and Culture
- P Professional and Scientific Services
- E Educational Services

37 Planning Study Area



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Table 5
 Distribution of Industries and Occupations
 with Locational Advantage in Burnaby

INDUSTRIES	
<i>Utilities</i>	<ul style="list-style-type: none"> • Stride Ave
<i>Construction</i>	<ul style="list-style-type: none"> • West Central Valley • Big Bend
<i>Wholesale</i>	<ul style="list-style-type: none"> • Douglas-Gilpin • West Central Valley • Government Road • Lake City • Big Bend • and one slightly smaller concentration (in Dawson-Delta)
<i>Transportation</i>	<ul style="list-style-type: none"> • West Central Valley • Lake City • and three slightly smaller areas (Dawson-Delta, Stride Avenue, and Big Bend)
<i>Information and cultural</i>	<ul style="list-style-type: none"> • Douglas-Gilpin • West Central Valley • Maywood • Garden Village • Cascade-Schou • and three slightly smaller areas (Willingdon Heights, Lake City and Big Bend)
<i>Real estate</i>	No areas with more than 260 employees.
<i>Professional and scientific services</i>	<ul style="list-style-type: none"> • Burnaby Heights • West Central Valley • Big Bend • Maywood • Cascade-Schou • and a smaller grouping at Lake City
<i>Educational services</i>	<ul style="list-style-type: none"> • Douglas-Gilpin • Lochdale • Burnaby Mountain • Cascade-Schou

OCCUPATIONS	
<i>Management</i>	<ul style="list-style-type: none"> • Douglas-Gilpin • West Central Valley • Lake City • Big Bend • Maywood • Garden Village • Cascade-Schou • with four (4) smaller clusters (Government Road, Stride Avenue, Marlborough and Windsor)
<i>Business services</i>	<ul style="list-style-type: none"> • Douglas-Gilpin • West Central Valley • Lake City • Stride Avenue • Big Bend • Maywood • Garden Village • Cascade-Schou • Marlborough • with a smaller clusters in Government Road
<i>Science and technology</i>	<ul style="list-style-type: none"> • Burnaby Heights • West Central Valley • Lake City • Stride Avenue • Big Bend • Maywood • Garden Village • Cascade-Schou
<i>Arts</i>	<p>There are no groupings of more than 500 workers, but there are smaller concentrations in:</p> <ul style="list-style-type: none"> • Douglas-Gilpin • West Central Valley • Lake City • Cascade-Schou.

4. CONCLUSIONS

Based on the highly aggregated data available from industrial and occupational coded data from StatCan data, areas for further analysis can be identified. Not surprising they are the human capital intensive clusters:

Knowledge-based

- Film production
- Multimedia
- Wireless and associated ICT
- Biotechnology
- Fuel cells
- Alternative clean power generation
- Post-secondary education
- Environmentally sustainable technologies

Office services

- business services (including utilities)

A complete analysis would also argue for the inclusion of consumer-based industrial sectors, such as sports and tournaments, tourism, light manufacturing, and retail. These may be areas where the GVRD as a whole has an advantage, but there does appear, from the StatCan data, to be only slight specific competitive advantages to Burnaby, possibly due to its location on transportation arteries.

Any municipality has a number of economic and social levers at its disposal. In many cases these policy instruments are reactionary, responding to macroeconomic and social influences. Thus, for example, both the heavy industry and logistics clusters are at the mercy of global economic forces and, other than through direct subsidies (such as cheap land or tax rebates), are unlikely to be influenced by planning decisions made by the City.

The evidence from StatCan shows that Burnaby has a clear competitive advantage in knowledge-based industries, even though, in terms of numbers, employment is higher in manufacturing and other more traditional industrial sectors. Of the knowledge-based sectors, one, utilities is in its final phase, where the cluster spins off into other localities. Similarly the consumer-based clusters are in the transforming category. The “seed” clusters have some potential but all are tied to external factors, such as the availability of provincial and federal funding for post-secondary education and health services. However there are several knowledge-based clusters which are emerging or expanding:

Emerging: multimedia, wireless and ICT, fuel cells, and environmentally sustainable technologies

Expanding: film production

It is these emerging and expanding clusters which require focussed action by the City of Burnaby.

Consumer-based sectors such as sports and tournaments, tourism, finance, insurance and retail, are part of the quality of life in the city, and thus will follow rather than lead cluster development. Traditional strengths such as saw mills and primary wood processing, and oil refining are “post-transforming” clusters and, given current economic conditions have little to offer in the way of future growth.

Logistics (including warehousing) is a cluster where Burnaby will always have strength, because of its geographic location. The trend in modern logistics is towards “just-in-time” delivery – in other words, knowledge based logistics, where the physical goods remain at the warehouse for minimal periods, and where the value-added is in the timely receipt and dispatch of the products.

The overarching policy to assist the creation and maintenance of clusters, of any type, is one of making Burnaby attractive to the skilled human capital required by growing clusters. Burnaby’s industrial clusters are concentrated in a relatively few neighbourhoods. The ideal is to have the skilled labour used by these clusters live close to these centres of production. The challenge then is simple: how to make Burnaby a better place to live, as well as to work.