



MANUFACTURING BC – OUTLOOK 2020

CANADIAN MANUFACTURERS & EXPORTERS
BRITISH COLUMBIA

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EXECUTIVE SUMMARY

First and foremost, let's dispel the myth that the manufacturing industry is anything but a vibrant and vital part of the BC economy!

Manufacturing has the biggest economic footprint in the province, with over 12,000 B.C. firms, supporting more than 400,000 jobs spread throughout the province. An economic driver of the province, manufacturing represents \$8.6 billion in wages, at levels 15% higher than the overall average wage for all industries.

Manufacturing's 11.2% of total provincial GDP compares favourably to 5% in the high-tech sector and a mere 3.8% by tourism. Moreover, the manufacturing sector's GDP has expanded 43.1% since 1997, while high-tech is flat and tourism has actually declined. Furthermore, manufacturers represent 75% of all merchandise exports.

Every citizen in the province is impacted on a daily basis by manufacturing, whose economic spinoffs generate \$3.01 in new economic activity for every \$1 in manufacturing.

Manufacturers also account for a whopping 42.1% of all private sector R&D, helping to cement their status as B.C.'s "greenest" firms. Manufacturing is the one key industry sector that *actually meets* stringent Kyoto targets.

The global financial crisis and subsequent deep economic recession is accelerating both the challenges to B.C. firms and the need for immediate action to assist the manufacturing sector. To ensure B.C.'s economic success into the future, the manufacturing sector, in collaboration

with government, academia and labour, will have to work together to promote and adapt to the required changes.

In order for B.C. to truly become the "Best Place on Earth" the Government should commit to having a strong industrial policy focused on advanced manufacturing, based on the three principles of "Think Smart", "Work Smart" and "Carbon Smart".

Think Smart means embracing the Finnish industrial imperative to develop a broad common vision, support the expansion and diversification of key industrial clusters, accelerate the R&D share of GDP and create a culture of innovation characterized by consensus-building, and dense networking among companies, universities, and research organizations.

Work Smart is all about accelerating labour force productivity and working more effectively to embrace Lean Thinking and encouraging businesses to take more of the lead in workforce training and development. Furthermore, Work Smart is about creating more collaboration between educational institutions and business to foster learning using new technology in cost effective and innovative ways, thereby ensuring an effective response to changing global conditions.

Carbon Smart is all about manufacturers accelerating their leadership role in BC in mitigating greenhouse gas emissions while reducing, reusing and recycling materials and resources. The bottom line is for B.C. manufacturers to become the most cost effective users of energy in the world and the leaders in eliminating waste, and thereby, more competitive.

B.C. manufacturers believe the Government should implement the following set of actions to support long term growth, namely:

1. Develop "**B.C. Advantage**" where government commits to develop a strong industrial policy based on the Finnish knowledge-based model, invest at least 3.5% of GDP into research, development and commercialization of technologies, enhance the SRED program, accelerate depreciation allowances, implement a new Capital Investment Program to provide tax credits on Class 43 equipment and improve infrastructure links with the province's dominant trading partner, the United States.
2. Extend "**Work Smart**" by spreading Lean Thinking to every corner of British Columbia through a public/private partnership B.C. Lean Institute and through enhanced efforts to provide tax incentives for businesses and employees to do more skills upgrading. Work Smart also involves greater regulatory reform, GST/PST harmonization, border "thinning" efforts and other means to ensure B.C. manufacturers can compete successfully in fiercely competitive global markets.
3. Create "**Carbon Smart**", a cradle-to-cradle Green Energy program of capital tax credits to support efforts of manufacturers to modernize energy consumption and emission control systems and/or take advantage of alternate GHG-reducing energy and fuels. Furthermore, use directed carbon tax funds to provide target-based financial rewards for manufacturers who implement carbon-reducing measures.

INTRODUCTION

British Columbia is one of the most prosperous and richly endowed regions of the world. The province enjoys a wealth of natural resources, easy access to the world's largest markets, a stable legal and political system, and one of the strongest fiscal regimes in the world. B.C. has a solid infrastructure base with highly educated and highly skilled citizens, and has built a world leading standard of living.

British Columbia's manufacturing sector has been a vital part of this province since its inception and its critical importance to the well being of every British Columbian has been highlighted in the daily news reports commenting on the global economic recession triggered by the 2008 financial crisis. Declining consumer demand has highlighted the importance of manufacturing to the province and how its inter-connectivity impacts on the entire supply chain from primary producers to the final customers.

Most analysts agree the current recession will be amongst the worst in the past century, but B.C.'s manufacturing sector still remains well positioned to support a positive long term economic future. The industry's challenge in the next decades will be to outperform its competitors in this fiercely competitive global search for higher living standards and a better quality of life and it is a challenge that must be shared with government and the people of B.C.

The current rapid declines in sales and plunging exports focus attention on manufacturing, but B.C.'s manufacturing sector has been swept up in a fundamental global transformation, from which it must emerge fundamentally different than it is today.

B.C. must recognize and take maximum advantage of the two major market forces that are fundamentally transforming the nature of business and the ability of the manufacturing industry to create wealth and support prosperity.

- The first is a *shift in the way that value is created* – away from growing, extracting, and producing things and toward the specialized application of knowledge in fulfilling the needs of increasingly discerning customers;
- The second is the creation of the *integrated global economy* with trade and investment, communication networks and business organizations, industrial and financial markets, competitive challenges and opportunities extending around the world. Current global economic circumstances could not highlight this fact in starker terms.

British Columbia's future does not lie in continued reliance on the export of primary products. Rather, the province needs to accelerate the transition to a knowledge-based economy focused on advanced manufacturing¹ where innovation, technology and creativity will provide the basis for prosperity. Finland, a global competitive leader, provides a model for how a small open resource-based economy similar to B.C. can use new policies, business strategies, and work practices to build a world class knowledge-based manufacturing lead economy.

Many B.C. manufacturers are already global leaders, but the present global crisis will require **all** B.C. manufacturers to adjust to even more challenging and far-reaching economic adjustments

1 **Falvey et al** "Getting Agile and Fast – A 2003 Overture to Pre-eminence" defines advanced manufacturing as the "insertion of new technology, improved processes and management methods to improve the manufacturing of products." This definition suggests a link between how much a company invests in research and development and its associated qualification as "advanced". Advanced manufacturing uses new approaches, techniques or systems to create or assemble a product out of separate, constituent parts more efficiently. It is differentiated from normal manufacturing by "improving how you make what you make."

KEY FACTS 2007

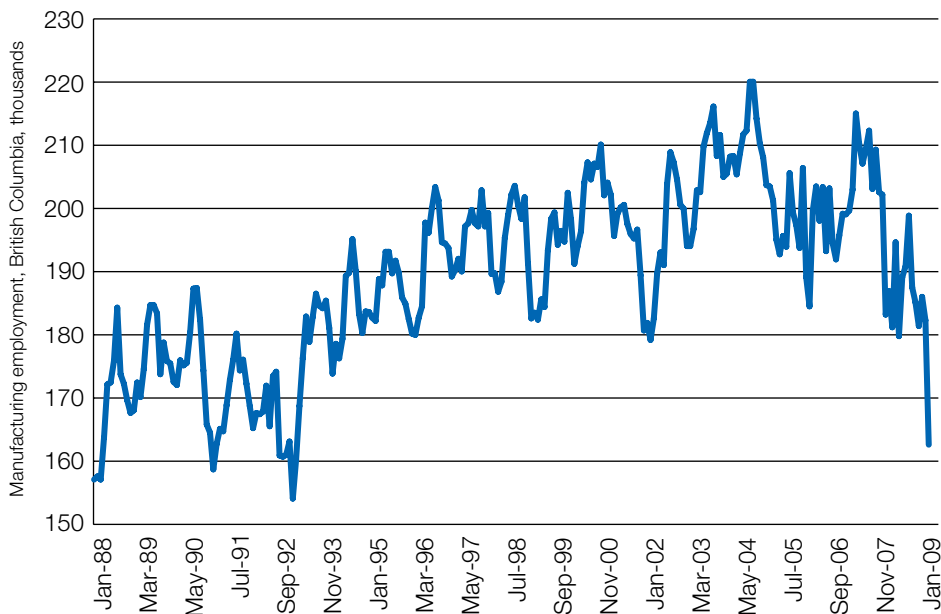
- Manufacturing is the largest goods producing sector and 11.2% of the provincial GDP.
- More than 400,000 jobs depend on manufacturing – one in every five workers.
- Over 94% of manufacturing jobs are full time and wages are 15% higher than the provincial average.
- Every \$1.00 of manufacturing output in B.C. generates \$3.01 in total economic activity.
- Manufacturers invested \$1.38 billion in new technologies and production facilities.
- B.C. manufacturers dominate exports, producing and shipping goods valued at \$21.9 billion, some 68% of all exports and 75% of merchandise trade.
- Regional manufacturers contribute over half the provincial exports and 77% of manufacturers are SMEs.
- Manufacturing is a GHG leader in B.C., reducing its emissions 3% since 1990. Total B.C. emissions rose 30% over the same period.

Source: BC Stats

over the next ten to fifteen years. These changes will need to be far greater than any made following the North American Free Trade Agreement. B.C. is not the Best Place on Earth for manufacturers, but it can become so.

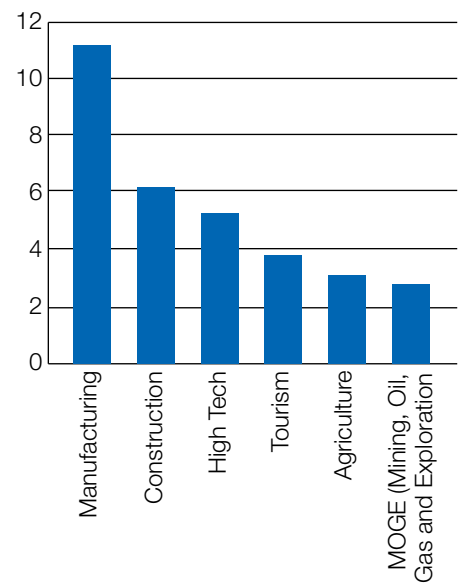
This paper will begin with a concise overview of the vital role manufacturing plays in the B.C. economy, including its key role as the province's principle exporter and the leader in emissions reductions. It will go on to discuss the global forces shaping manufacturing, outline trends that are defining the province's new manufacturing and provide ideas for achieving global excellence. Finally, it will suggest a way to future prosperity and

**FIGURE 1
BC MANUFACTURERS MAJOR EMPLOYERS**



Source: B.C. Stats

**FIGURE 2
SECTOR CONTRIBUTION TO GDP (%) 2007**



Source: B.C. Stats

higher living standards through a framework to use advanced manufacturing as a way for BC to Live Smart and to remain a global leader in quality of life.

BIGGEST ECONOMIC FOOTPRINT

While the average British Columbian is likely to remark that resources, tourism or high technology drive the provincial economy, the reality is that manufacturing has the “**biggest economic footprint**” in the province.

British Columbia’s manufacturing sector consists of 12,010 firms, who directly support one in five employees in the province, directly employing some 165,000 people and sustain another 235,000 people through the purchase of goods and services. Manufacturing employment trends have been positive for the province since 1988 demonstrating a steady increase in the importance of manufacturing to the people of British

Columbia (Figure 1). This positive trend has been undermined in recent years by declines in primary manufacturing, but the advanced manufacturing sector remains relatively robust.

Tourism and high technology are perceived as major contributors to the economy. However, Figure 2 shows the manufacturing sector is the **largest industrial sector in the province**, directly contributing over 11.2% of provincial GDP and outdistancing other key sectors.

Moreover, the sector’s GDP has expanded by 43.1% since 1997, considerably faster than other provinces, including Ontario.² **Not exactly a dying industry!**

By contrast, the high tech sector’s GDP contribution has remained relatively flat at around 5% over the past decade and tourism has actually declined to around 3.8%.³

2 B.C. Stats “Made in B.C.”, Business Indicators, March, 2008, pg 1.

3 Ibid. pg.3

British Columbians should also note that manufacturing in BC provides a strong source of **full time high paying jobs**, personal savings, and consumer spending. Over 94% of employees in the province’s manufacturing sector are employed on a full-time basis, while just 79% of the total workforce is employed full-time and less than 76% of tourism jobs are full-time.

Workers in the manufacturing sector also took home an estimated \$8.6 billion in wages and salaries during 2007, with weekly average earnings topping \$852.50. This total was up 1.2% over the previous year and more than 15% higher than the overall average wage for all industries (\$740) and 24% higher than the average for the tourism sector (at a mere \$704).⁴

However, manufacturing’s primary strength in B.C. lies in its **diverse nature**.

4 B.C. Stats “Made in B.C.”, Business Indicators, March, 2008, pg 1.

Figure 3 shows that the sector encompasses 21 sub-sectors, ranging from industrial products like telecommunications equipment, computers, and aerospace to consumer products such as plastics, vehicles, appliances and machinery and to value added resources such as food, pulp, paper and lumber.

Manufacturing is responsible for 60% of the total GDP contributions for the forestry, agriculture, fisheries and food sub-sectors and more than 30% of high technology's GDP originates in manufacturing high technology products such as computers, pharmaceuticals and electronics. Fully one quarter of the employment in the environmental industry is derived via manufacturing activities.⁵

Moreover, manufacturing firms actually dominate employment in a number of the key "resources" sectors in the province. For example, some 83% of jobs attributed to forestry (see Figure 4) are actually located within manufacturing operations, while more than half of all agri-food and fisheries jobs are in manufacturing plants.

INVESTMENT LEADER

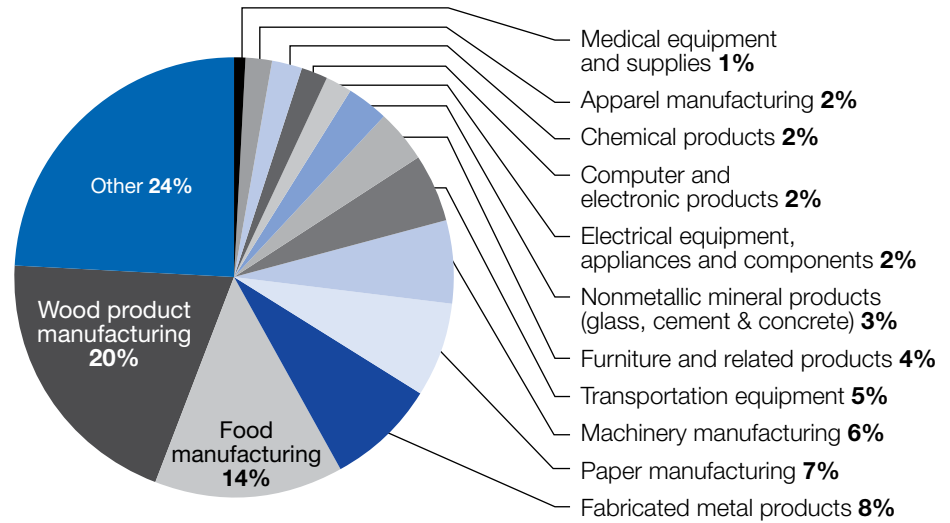
Profits made in the manufacturing sector are channelled into capital investments in construction, machinery, and equipment, with manufacturing firms investing more in new technologies, machinery & equipment and the construction of production facilities than any other business sector. Manufacturers' total capital investments are up 50% since 2002, with advanced manufacturing firm investments up 148%.⁶

Manufacturers also **invest heavily in R&D**, spending more than \$412 million annually in research and development

5 B.C. Stats, "B.C. Opportunities Profile- Manufacturing", pg.2 and the Appendix to the report provide a detailed listing of the sub-sectors that comprise manufacturing

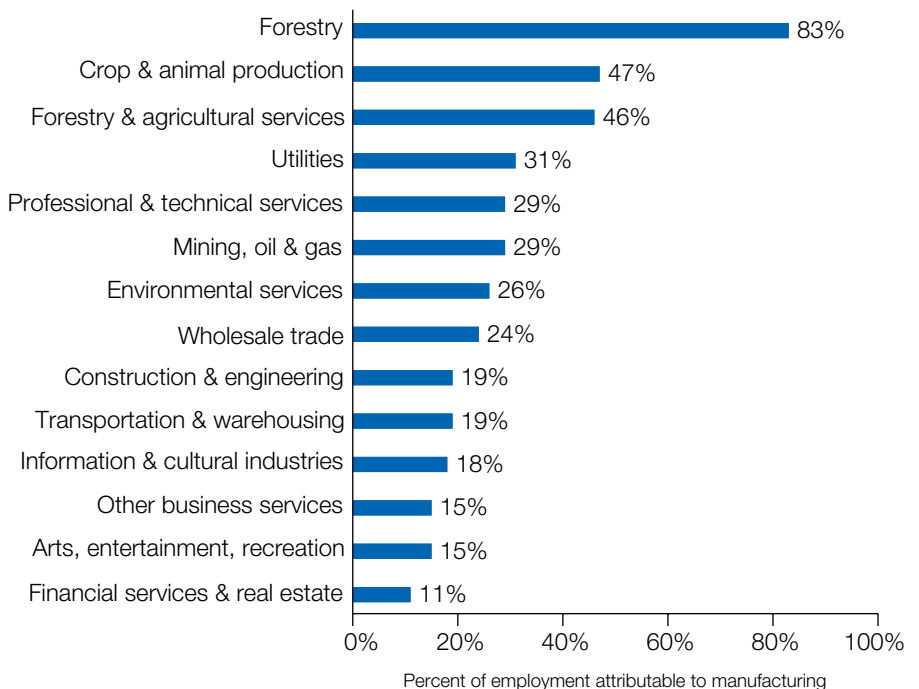
6 B.C. Stats "Advanced Manufacturing Investment 2002-2005", pg 4.

FIGURE 3
BC MANUFACTURING IS HIGHLY DIVERSIFIED MANUFACTURING
EMPLOYMENT IN BRITISH COLUMBIA BY SUBSECTOR



Source: B.C. Stats

FIGURE 4
PERCENTAGE OF MANUFACTURING JOBS IN KEY SECTORS (2007)



Source: Statistics Canada

and employing almost 3000 researchers in the province.⁷ Furthermore, manufacturers account for a whopping 42.1% of all private sectors R&D investment in the province. More importantly, these R&D investments will come from major world leading manufacturers like Rio Tinto Alcan all the way down to small niche players like FTS Forest Technology Systems.

Manufacturing firms also support government operation, accounting for almost 1/3 of all business tax revenues, while their employees contribute more than \$2.5 billion in personal taxes every year.

NOT ALL BUSINESSES ARE CREATED EQUAL

Not every business in the province brings the same return to the economy. In addition to having the biggest economic footprint in B.C manufacturing also has the “**broadest economic footprint.**” Every day in British Columbia, thousands of businesses are collaborating with the manufacturing sector to provide raw materials, intermediate goods and other business services. Scientists, engineers, raw material suppliers, transportation companies, energy firms and others are integrally involved in providing inputs to create manufactured products, while financial institutions, professional and technical services firms, along with business support services, help manufacturers to assemble market, distribute and provide after sales service for their products. Educators are training skilled trades and academic personnel to work in manufacturing operations, while information, computer and telecommunications firms find their key customers amongst the manufacturing sector. In addition, large parts of the public sector provide services to manufacturing employees.

This interaction creates **significant indirect and induced economic impacts**

7 B.C. Stats “R&D Investments in Canada 1997-2006”

“BC’s economy thrives on small and medium sized businesses. To be successful in this constantly evolving marketplace, a supplier must be able to deal with design change, speed to market and the challenges of small lot production. We have found that Lean thinking has become the cornerstone of our success. Combining technology with proven Lean tools/techniques has ensured we deliver quality products on time and in a profitable way, while keeping our valuable employees.

Lean certainly extends beyond the walls of an individual company; where all supply chain participants need to focus on customer value and waste reduction. Any initiatives to stimulate Lean thinking throughout the business community would certainly improve BC’s competitive position in global markets.”

Ron Walsh – President Humble Manufacturing Ltd., 2009

or “multipliers” in the economy. For every \$1 spent directly in manufacturing, an additional 80 cents of GDP is created in supplier industries and a total of \$3.01 is generated in total economic activity in B.C.⁸ These impacts are **three times** that of the tourism industry and double that of high-technology sector. Moreover, the indirect economic contribution made by manufacturing has grown over time as more products and services originally produced by manufacturers are now credited to other business sectors.

While primary manufacturing has suffered in recent years due to changing global markets and declining commodity prices, **advanced manufacturing is strengthening** the manufacturing industry’s contribution to the provincial economy, even as primary production declines. Advanced manufacturers are shifting the production focus to a greater emphasis on higher technology products like computers, electronics, plastics and clothing. As well, new types of manufacturing have emerged in order to take advantage of changes in technology, and these firms have adapted more quickly to

8 Data is derived from B.C. Stats input-output table for British Columbia. A document explaining the concept of economic multipliers is available from B.C. Stats web store online at www.bcstats.gov.bc.ca

shifting consumer and business demand for various types of products.

In the past fifteen years, advanced manufacturing businesses grew from just over 19% of all firms to almost 45% of the total manufacturing firms in the province.⁹ During that same period, the share of advanced manufacturing’s contribution to GDP has grown an average of 8.9% per annum to just over 33% of manufacturing’s contribution while corresponding employment increased 46%. Advanced manufacturing firms now provide four out of every ten manufacturing jobs, creating a more diversified and stable base for the province.¹⁰

To put this into perspective, the resources industries employment in B.C. rose by a modest 5% and GDP grew by just 19%.¹¹

9 B.C. Stats “A Guide to the B.C. Economy and Labour”, 2007 http://www.guidetobceconomy.org/major_industries/manufacturing.htm#1

10 Due to data constraints, advanced manufacturing is defined here as the secondary manufacturing component of the manufacturing sector, although many primary producing operations involve the use of advanced technology as part of the production process. Nine advanced manufacturing components had growth rates in the last decade that exceeded the provincial rates.

11 B.C. Stats “A Guide to the B.C. Economy and Labour”, 2007 http://www.guidetobceconomy.org/major_industries/manufacturing.htm#1

MANUFACTURING IS EVERYWHERE

Manufacturing jobs in B.C. are spread across the province, with firms located in every community. As expected, manufacturing jobs are prominent in the Lower Mainland, where two-thirds of the population reside, but Figure 5 shows that manufacturing employment makes a larger contribution in most rural areas of the province.

Manufacturing jobs in the Lower Mainland/ Southwest (+11.5%), Thompson Okanagan (+18.3%) and Northwest regions (+12.7%) are trending upward since 1997.

MANUFACTURING IS EVOLVING

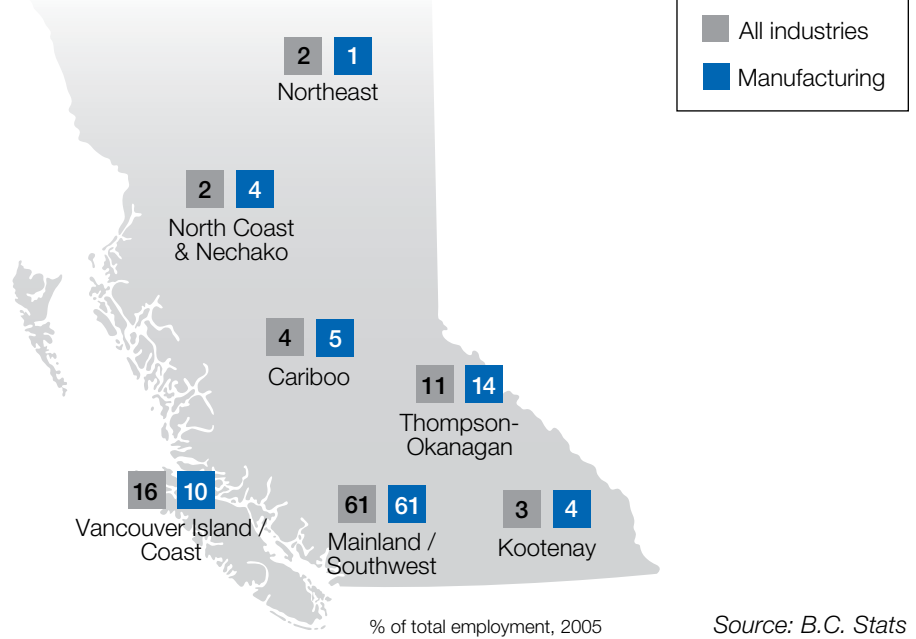
B.C. manufacturing is evolving. Traditional forms of manufacturing (defined as chemical or physical transformation) are making way for new process-oriented approaches. While B.C. has witnessed marginal decline in manufacturing based on its traditional narrow definition, the reality is that many of those manufacturing jobs simply were classified under research and development activities or defined as part of professional services when large firms outsourced a portion of their business activities.

CME estimates in B.C. that as many as 50,000 people are employed in outsourced functions or in manufacturing firms that are not incorporated within the traditional definitions of manufacturing. These components are integrally tied to the manufacturing process and remain fast growing segments of the economy and the manufacturing sector¹².

If manufacturing's value is to be truly recognized, then public and policy-makers need to recognize that manufacturing is far larger than just the definition

12 CME estimates derived from B.C. Stats data on manufacturing components not included in the traditional definition and from certain elements of the R&D sector.

**FIGURE 5
MANUFACTURERS' LOCATIONS**



of "traditional manufacturing" just as the tourism sector has been defined well beyond the narrow confines of accommodation, food and beverages.

EXPORT LEADER

Despite the commonly-held view that foreign tourists are the principle export earner, BC manufacturers are the **province's dominant exporters**. Manufacturers drive the provincial economy by selling products abroad and bringing inflows of income to the province from outside jurisdictions. B.C. manufacturers shipped more than \$43 billion worth of goods in 2007, half of which (\$21.9 billion) were exported. Manufacturing accounts for 75% of B.C.'s merchandise exports and 68% of total exports of goods and services, with the proportion of advanced-manufacturing products rising from 25% of total exports in 1990 to 37% in 2004.¹³ If exports are fundamental to B.C.'s

13 B.C. Stats "Manufacturing shipments" 2008. <http://www.bcstats.gov.bc.ca/pubs/lfs/lfsdata.pdf>

future prosperity, then a strong manufacturing sector is the key.

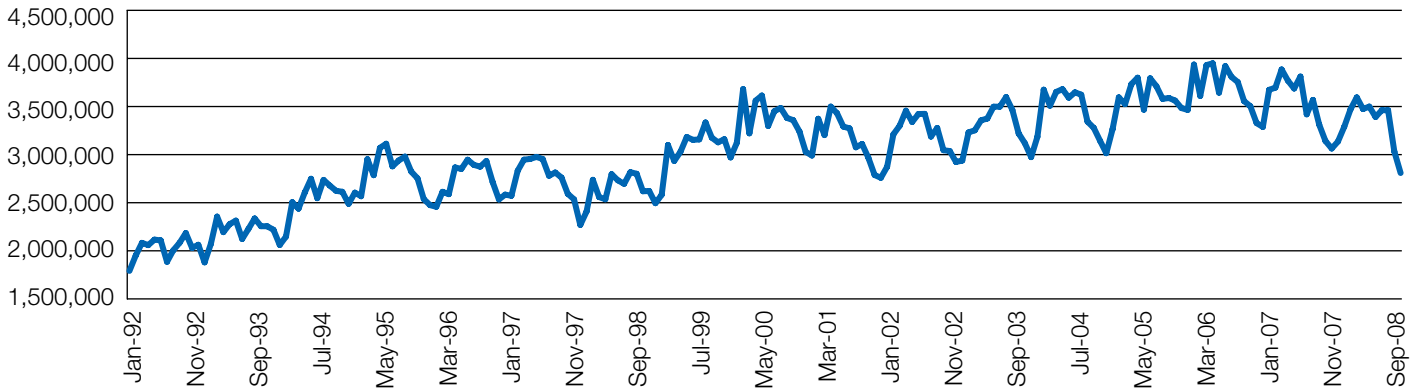
Access to international markets – and particularly to markets in the United States – has provided manufacturers with the customer base they require to expand production and to specialize in higher value goods and services.¹⁴

The province's markets for **manufactured products are more diversified than the country** as a whole with some 66.5% being sent south into the US markets, predominately along the US West Coast and most of the remainder being shipped to Asia. In fact, six US states are responsible for one third of the province's total trade and 60% of its advanced manufacturing sales. In total, 85% of all advanced manufacturing exports from B.C. go to the United States.¹⁵

14 B.C. Stats "Advanced Manufacturing Investment 2002-2005"

15 BC Stats "Manufacturing Exports – 2008" http://www.bcstats.gov.bc.ca/pubs/pr_expt.asp

FIGURE 6
BC MANUFACTURERS SHIPPED \$40 BILLION WORTH OF GOODS IN 2008
 BC MANUFACTURING SHIPMENTS, 1992-2008 MONTHLY, C\$, THOUSANDS



Source: Statistics Canada- Manufactured Shipments

Despite a slight downward trend, the **US market remains 3x more important** to B.C. manufacturers than all of China, Hong Kong, Taiwan and Japan *combined*. In addition to the recent emphasis on eastward-looking Gateway Projects, it is imperative that the provincial government ensure fast and efficient transportation corridors link the province's southern Gateways to the United States.

FIGURE 7
TOP TEN EXPORT DESTINATIONS

Destination	% of total exports
Washington	16.6
Japan	12.9
California	8.0
China/Hong Kong/Taiwan	7.9
W. Europe	6.7
Illinois	4.8
S. Korea	4.1
Wisconsin	2.3
Indiana	1.2
U.S.A.	66.5

Source: BC Stats, Statistics Canada

While the fastest growing markets for B.C. manufactured products since 2002 have been to Asia, (58.5% increase to Mainland China, 51% increase to Taiwan and 41% to India), the buyers have preferred to limit their purchases to basic primary products rather than those attributed to advanced manufacturing. Some 83% of manufactured goods shipped to Japan are primary manufactured commodities, while China (89%), South Korea (88%) and Italy (96%) have similar inclinations. This unbalanced trade relationship is worrisome, not only to the manufacturing industry, but for the province's economy as a whole. It becomes even more disconcerting when one recognizes that Canada runs a trade deficit with China at a ratio of close to 4.5:1¹⁶

This means that B.C. policy makers need to ensure that their export development programs encourage greater exports of advanced manufactured products and that exporters to the U.S.A. and Mexico should receive appropriate support in their efforts to grow existing export markets in North America.

16 Statistics Canada, Canada's Trade with China, June 2004 & DFAIT, State of Trade 2007.

MANUFACTURING IS MORE PRODUCTIVE

Increasing productivity levels is the key to future prosperity in British Columbia and **B.C.'s manufacturing sector is doing its part** to lift the economy. Manufacturing productivity (or real GDP/hour worked) increased by 3.6% in 2006 and has averaged 2.95% per year since 1997. This is more than 2.5 times the overall provincial increase of 1.16% in 2006 and 1.25% per annum growth since 1997. In fact, many advanced manufacturing sub-sectors had productivity increases at double digit rates over the period. For example, computer and peripheral equipment manufacturers saw productivity increases of 8% per annum for the last decade, while furniture manufacturers' productivity was up an average of 9.2% per annum and machinery equipment firm productivity was up 5.8% per annum.

This contrasts with the services sector, which faced productivity declines in many areas between 1997 and 2006. Arts and entertainment productivity, for example, declined an average of 1.96% per annum between 1997 and 2006, with declines of 0.73% per annum in accommodation

and food services and 1% in professional, scientific and technical services.

“GREEN” LEADER

B.C. manufacturers contribute just 15% of all greenhouse gas (GHG) emissions in the province and are leaders in GHG emission reductions through improvements in energy efficiency and better energy management.¹⁷ While GHG emissions for the BC economy rose by more than 9% in the past decade and manufactured shipments are up 130%, BC manufacturers have reduced overall GHG emissions by 16%. In fact, manufacturers in B.C. meet Kyoto targets.¹⁸ B.C. firms are also creating new “green” products and developing new markets for those products.

FORCES SHAPING THE MANUFACTURING INDUSTRY

Today, manufacturing is a global enterprise and British Columbia manufacturers are an integral part of a complex network of competing global supply chains. British Columbia’s manufacturers are sourcing raw materials, products, services, skills, knowledge and technologies from around the world and selling their products and services to the same global market place.

As newspaper accounts herald the deepening global financial crisis, report on the dire prospects of the collapse of the auto industry or define current trends as the coming of a second Great Depression, it is understandable that many British Columbians could believe that the manufacturing sector has no future as an economic force in the

17 Government of B.C. “Budget and Fiscal Plan – 2008/09-2010/11”, Victoria, B.C., February, 2008, <http://www.bcbudget.gov.bc.ca/2008/bfp/default.html#10>

18 Environment Canada, National Inventory Report 1990-2005: Greenhouse Gas Sources and Sinks in Canada, Annex 11, Table A11-20, http://www.ec.gc.ca/pdb/ghg/inventory_report/2005_report/ta11_20_eng.cfm.

province. While B.C.’s manufacturing employment base has suffered from disproportionate declines in recent months due to the rapid economic decline, B.C.’s manufacturers still contribute more than 11% of GDP and the long term employment trend for manufacturing remains positive, despite a move to

extend its leadership position in fostering prosperity over the next twenty years.

Future economic growth and competitiveness in the global marketplace will require B.C. manufacturers to adapt to at least four emerging trends that will impact on domestic manufacturing and the innovation it spawns, namely:

The state of manufacturing is very healthy and doing very well in except in the number of people it employs, largely due to changes in the classification of manufacturing jobs and outsourcing of “non manufacturing” jobs within large manufacturing organizations.

Bruce Bartlett – Senior Fellow with the National Center for Policy Analysis, 2003

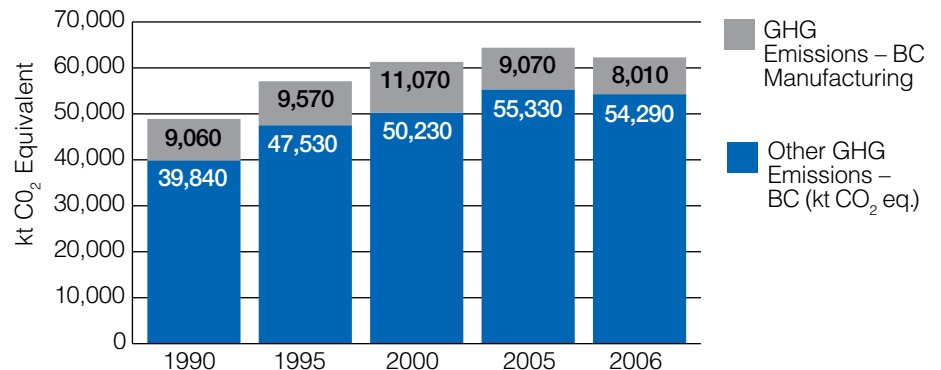
more capital intensive forms of manufacturing. Current economic circumstances are hitting manufacturers hard in the province, but they remain a vital and vibrant force in every community.

Moreover, manufacturing has a bright future if everyone embraces enhanced business-enabling structures such as the Finnish development model. In these circumstances, B.C.’s manufacturing sector could dramatically enhance its productivity and competitiveness and

1. A paradigm shift is changing global manufacturing. Manufacturing in developed countries is transitioning from a process of mass production to mass customization using advanced-manufacturing techniques. In order to succeed, governments, business and the public in BC will need to understand and support this new knowledge-based paradigm.

2. B.C.’s “Excellence Gap” must be eliminated. B.C. manufacturers are

FIGURE 8
BC MANUFACTURERS HAVE ACHIEVED THEIR KYOTO TARGET BY REDUCING GHG EMISSIONS BY 12% SINCE 1990; MEANWHILE BC’S TOTAL EMISSIONS HAVE GROWN BY 27%



Source: Statistics Canada

“failing” the excellence challenge and must significantly improve their performance to become global leaders.

3. Globalization is impacting every business. Fierce global competition, changing world economic conditions and geo-political issues are putting enormous pressure on B.C. manufacturers to improve their productivity, expand their R&D and accelerate the pace of innovation. B.C. firms are advancing too slowly and need to accelerate their efforts to build a knowledge-based economy.

4. Enabling Environments are transforming competitors. Successful global competitors have recognized the need for internationally-competitive business environments. In order to address market imperfections there must be a close collaboration between government, industry, labour and academia.

PARADIGM SHIFT AND MANUFACTURING'S EVOLUTION

Freer trade across North America in the late 1980s, began a manufacturing paradigm shift that has accelerated in recent years with freer global trade and the emergence of major new economies. Today, this paradigm shift has evolved into a business tsunami, as new technological capabilities emerge and the re-organization of manufacturing enterprises takes place. The world is a place where the pace of doing business is red hot, the competition is fierce, and the name of the game is adding value. Innovation is the key to success.

At the core of this paradigm shift has been the transition of the developed world away from the traditional approach of simply transforming raw materials into basic finished goods and towards a systematic process of production that involves focusing on creating much higher value products based on innovation, new

Major B.C. manufacturers are embracing new technology to remain competitive, while reducing costs and improving the environment. It's logical for BC to build its manufacturing sector on the solid platform of BC's successful resource sector. Rio Tinto Alcan's modernization project at Kitimat, BC will increase global primary aluminum production, reduce production costs, cut greenhouse gas emissions, create 1000 stable, technology enriched jobs and provide the opportunity for BC to benefit from new manufacturing opportunities.

Jean Simon – President – Primary Metal, North America, Rio Tinto Alcan, 2009

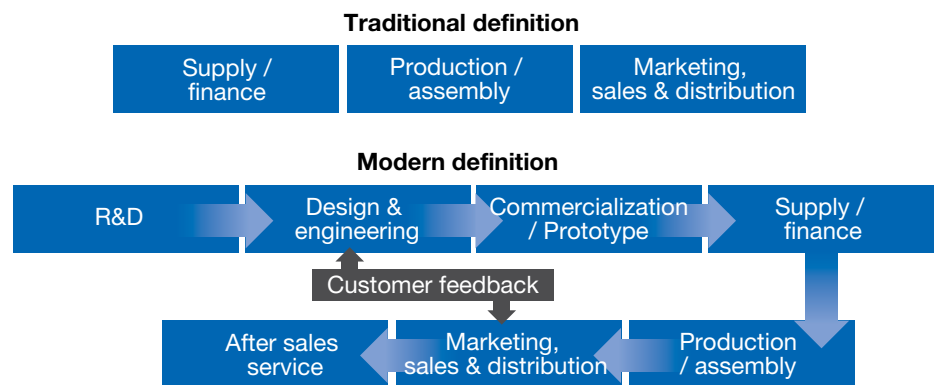
designs and advanced manufacturing techniques (see Figure 9).

Furthermore, manufacturers are transitioning from a system based on mass production techniques, such as those found in traditional B.C. sawmills, to an entire value chain based on “mass customization”. The new mass customization is a process that combines the advantages of producing larger quantities of products at lower costs, but with the added flexibility of individual customization. Dell Computers, for example, allows every customer to specify a computer unique to their needs prior to manufacturing, while Apple's iPod has several million variations of its machines, allowing each customer to personalize their product.

Today, manufacturing has transitioned into a business system encompassing all the activities required to deliver products that meet customer needs – a system that extends from research and development, design and engineering, to production, finance, sales and marketing, and after-sales service. It is a system that extends beyond any single enterprise, cuts across supply chains and links business networks that are increasingly global in scope. Moreover, manufacturing incorporates services as well as production activities into this value chain.

This means that B.C. manufacturing is “not your father's business”. While every community in B.C. will continue to require traditional forms of manufacturing, today B.C. manufacturers are

**FIGURE 9
MANUFACTURING IS A VALUE CHAIN**



increasingly more knowledge-based and diversified. Today, companies such as Rio Tinto Alcan are using new technologies and creating new high value products for global markets. Firms like Robo Coaster Ltd., QuestAir Technologies Inc., or Omnyx Control Systems are selling specialty technologies assembled in B.C. to niche markets. Businesses like Sierra Systems, Nicholson Manufacturing Ltd and FormaShape are using new technologies to produce traditional products with innovative applications. Firms like FTS Forest Technology Systems and Rimex Supply Ltd. are providing integrated solutions – selling products with services.

Figure 10 shows the key indicators of this new paradigm shift that will require changes across all facets of a business operation. As this paradigm shift continues, the primary functions of the manufacturing enterprise will shift from a focus on materials management and production processes, to process validation and pre-production planning, to prototype development and design validation, and finally, at the stage of the original equipment manufacturer, to technology genesis, product development, and testing.

This paradigm shift is now accelerating with the emergence of new economies like Brazil, Russia, India and China (BRIC). By 2020, the business of manufacturing will look very different in BC than it does today. To meet the challenges of this “new” customization, B.C. manufacturers will need to accelerate their innovation, drive productivity improvement and make a commitment to perfection with respect to product quality, production processes, and business systems.

To compete and grow their businesses, B.C. manufacturers will have to be fast, flexible, innovative, reliable, quality- and service-oriented, low-cost, and aligned squarely behind the objective of customer success. B.C. firms need to sell products

FIGURE 10
KEY INDICATORS OF THE NEW PARADIGM

Traditional Manufacturing	New Paradigm
Customers & Markets	Customers & Markets
Domestic/North American market	Global markets
Customers sourcing locally	Customers sourcing globally
Production push	Customer pull
Mass markets	Niche markets/individual customers
Competing for market share	Competing for markets, investments, product mandates
Higher costs are passed to customers in higher prices	Higher costs have to be absorbed – prices are falling
Prices determined by local competition	Prices set by disruptive global competition
Products	Products
Value based on products	Value based on service
Competitiveness based on cost, quality, time to market	Time is now the premium, but customization, service – price competitiveness is more important than ever
Operations	Operations
Efficiency drives competitiveness	Innovation drives competitiveness
Local purchasing & materials handling	Managing a global supply chain
Mass production	Mass Customization
Growth through higher volumes	Growth through innovation
Static production processes	Flexible production systems
Stand alone discreet technologies	Integrated technologies
Mechanical processes	Automated processes
Long production runs	Short production runs
Cost cutting	Waste elimination
Sequential product development	Complex systems
Pollution control	Environmental sustainability
Well established marketing channels	Myriad new marketing channels and extensive use of the internet
Organizations	Organizations
Corporate organizations	Business networks
Companies compete	Supply chains compete
Internal performance standards	World-class benchmarks
Manual skills	Knowledge based skills
Work under specifications	Problem solving
Functional materials, products, processes	Smart materials, products, processes
Production management	Life cycle management
Reactive governance	Proactive governance

Source: Canadian Manufacturers and Exporters

that require a higher degree of innovation and customization, involve smaller production runs, and use flexible production systems. B.C. firms must focus on expanding niche products and markets where they command a higher premium from their customers because they offer improved standards of quality, technical sophistication, and product and vendor reliability. In turn, B.C. firms will need to demand the same enabling qualities from their suppliers and business partners, as well as from the business environment in which they operate.

Most B.C. firms are individually too small to compete globally, so B.C. manufacturers will need to collaborate more closely amongst themselves and with outside educational institutions. In cooperation with universities, technical schools, business associations and government, manufacturers can design

and commercialize new products, rapidly adopt new technologies and processes, market new products to the world and aggressively compete globally. Industry clusters are critical to the expansion of advanced manufacturing operations and the growth of knowledge economies. This must be a key thrust of B.C.'s manufacturers and government leaders.

Innovation will be key to driving higher value and productivity improvements. International trade and business partnerships will be an integral part of business development. New investments will be needed to keep pace with accelerating technological change. New skills will be required in a more knowledge-intensive workplace. Time, agility, and customer service will be important differentiators of competitive success.

As this new paradigm moves toward mass customization and a focus on the

entire value chain rather than simple production and assembly, advanced manufacturing will continue to be a dynamic, growing, innovative, and most importantly the biggest knowledge based sector in the province. Manufacturing will remain a driving force in the provincial economy and, with proper support, become a global leader, even more powerful than countries like Finland. Governments simply need to adjust their thinking and policies to recognize this new reality and its rich potential.

THE GROWING EXCELLENCE GAP

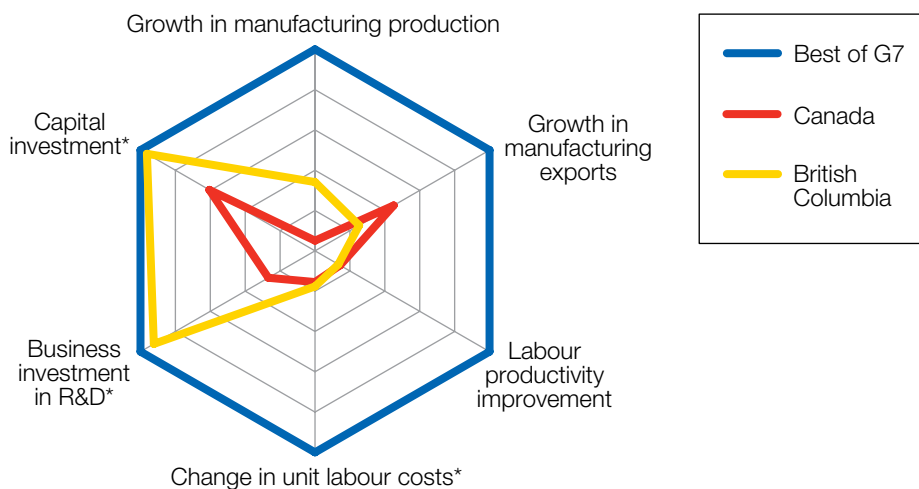
The data on British Columbia's manufacturing sector speaks for itself. The future and the standards of living of all British Columbians depend upon a prosperous manufacturing sector – on the ability of firms to innovate, continuously improve productivity, deliver customer value and compete around the world. How these companies and governments respond to the global challenges will fundamentally change the nature of B.C.'s manufacturing in the future.

Manufacturers stand at a critical crossroads. On one hand, many B.C. manufacturers are at the forefront of the knowledge revolution. The globalization of business activity is poised to transform the province into a new "ideas-based" economy. On the other hand, manufacturers as a whole face a growing "excellence gap" between world-class practices and the average performance of B.C. industry.

This excellence gap can be illustrated (see Figure 11) by benchmarking the performance of B.C. and Canadian manufacturers against the best of the world's seven leading economies¹⁹, using a number of indicators crucial to the competitive success of manufacturers

¹⁹ The Group of Seven (G7) industrial economies include Canada, the United States, Japan, Germany, France, Italy, and the United Kingdom.

FIGURE 11
CANADA & BC: MANUFACTURERS' EXCELLENCE GAP 2007



The excellence gap graph benchmarks the performance of BC industry against the best of the world's seven leading economies. It compares BC's rate of growth on six critical indicators to the best performance amongst the G7 countries since 2000. BC scores poorly on four indicators demonstrating that it is falling behind other countries, while growing on pace with the G7's best in Business R&D and Capital Investment. However, BC's total Business R&D and Capital Investment remains well below the G7, so good growth rates on those indicators hasn't translated into leading global competitiveness.

worldwide²⁰. The overall score is based on the average of the performance of B.C. against the best-in-class in each category. The excellence gap is the difference between B.C.'s rating in each indicator and a perfect score of 100%.

Using these indicators, B.C. turns in a failing grade on global competitiveness. In B.C.'s case manufacturers perform on average less than half (46.5%) as well as the best of the G7 across all competitiveness benchmarks. Moreover, this is a significant drop from the 2004 competitiveness comparison when B.C. manufacturers achieved a marginal passing grade (54%)²¹.

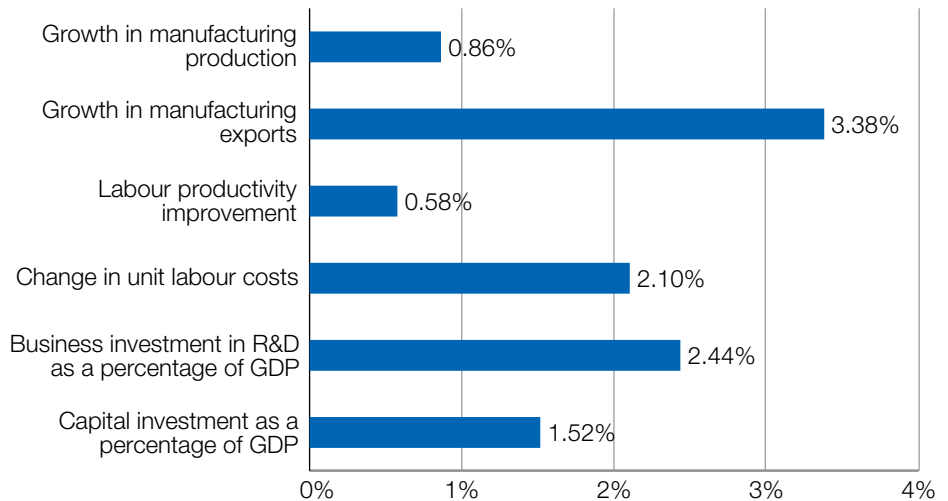
But, a failing grade is just not acceptable – especially when B.C.'s two major trading partners, the United States and Japan, registered significantly higher standings than B.C. at 79% and 67% in 2007. B.C. must accelerate its performance on all indicators if it is to be successful in 2020. Without changes in the way we organize our business operations, B.C. manufacturers will continue to lose ground to the competition. B.C. manufacturers are improving, but others are improving even faster.

Much of B.C.'s failing grade rests with the slowing of growth rates in production, exports and productivity in recent years. In 2004, B.C. manufacturers excelled at production, but manufacturing shipments have significantly declined in recent years, due to declining demand for commodity-based lumber products in North America and rising demand

20 The benchmarks of competitive success are based on annual averages and include: Growth in manufacturing production; growth in the value of manufactured exports; the rate of improvement in labour productivity; changes in unit labour costs; business investment in new technology as a percent of GDP; and business investment in research and development as a percent of GDP. An overall performance rating can be calculated as an average across all benchmarks of competitive performance. The excellence gap is the difference between this rating and a perfect score of 100%.

21 Jayson Myers – CME data 2005.

FIGURE 12
BRITISH COLUMBIA'S PERFORMANCE AVERAGE ANNUAL GROWTH SINCE 2000



Source: CME, 2008

for unprocessed commodities from the new markets in Asia. To close the excellence gap, B.C. manufacturers must be encouraged to produce higher value products and move even further to lucrative niche products.

While exports drive the provincial economy and manufacturing drives exports, B.C.'s **export performance has trailed** the G7 counterparts over the past seven years, and is well behind emerging nations like China, India, and Mexico, where output volumes have increased at average annual rates of 12.4%, 7.4%, and 4.6% respectively. More importantly, the competitive position is continuing to deteriorate against global competitors.

The average labour productivity growth of B.C. manufacturers has exceeded Canada's (3.6% versus 3.0%) in recent years, but the sector's **performance has lagged** well behind the best of the G7 and even trailing key emerging industrial economies such as China, India, and Mexico. Moreover, competitors are steadily increasing their distance from B.C. firms.

Capital investment is a key illustration of how B.C. is falling behind. The excellence gap shows that B.C.'s percentage growth in capital investment over the past five years has increased to approach the leaders' growth rates, but British Columbia's overall capital investment has remained 20-25% below Canada's and much further behind the G7 countries, especially the province's main trading partners, the United States and Japan.

In 2008, the average new investment will equal \$9,493 per BC worker. This contrasts against the average Canadian worker who will see approximately \$11,100 in new capital investment, while the U.S. counterpart would see a figure approaching \$12,500²². B.C. manufacturers are simply not adopting new technology as fast as they should or investing as heavily in training and development as a means of accelerating productivity growth. If this were a marathon race,

22 Robin Banerjee and William B.P. Robson, "New Tools for a Richer, Greener Future: Why Canadian Workers Need More Robust Business Investment", C.D. Howe Institute, Toronto, July, 2008, pg. 2

B.C.'s manufacturers would be fit and running fast, but domestic and foreign competitors would be fitter, running faster and winning the race.

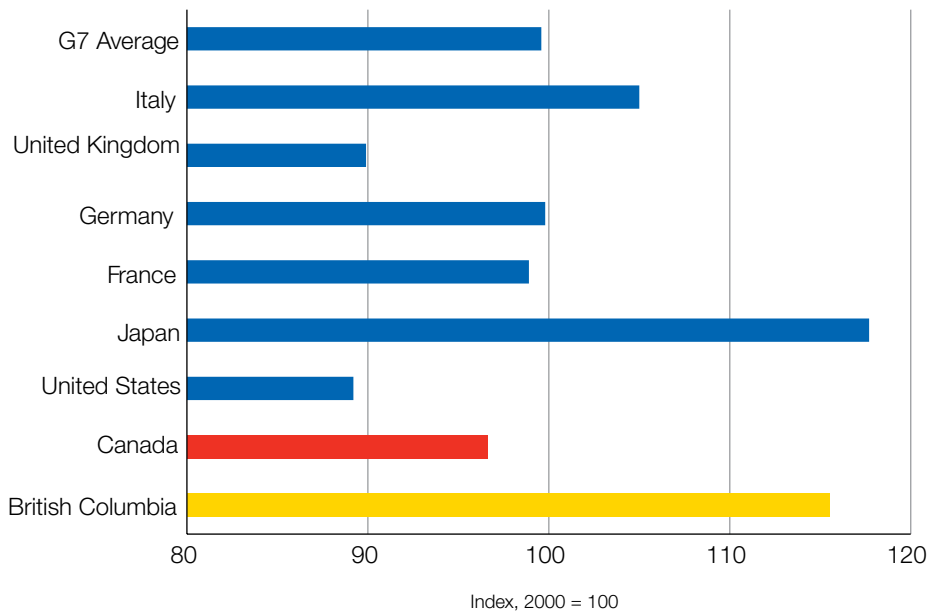
In addition to under-investing, the excellence gap has grown because the broad base of B.C. manufacturers has failed to take efforts to reduce input costs and eliminate waste by adopting the principles of continuous improvement or "Lean Thinking" in their business and production systems. According to the CME's 2008 Management Issues Survey, only 23.2% of B.C. firms have begun the Lean journey.²³ This lack of progress in adopting new operating methods has slowed productivity growth, constrained internal cash-flows and restricted further investment in new technology across the breadth of the manufacturing sector. This is particularly true for small manufacturers who have neither the cash-flow nor the expertise to implement these new operating processes.

B.C.'s unit labour costs make the province more competitive than the rest of Canada, but the province's major global competitors have been reducing their unit labour costs more quickly than this province due to greater focus on increasing capital investment spending, skills upgrading and training and improving operating efficiency. The upshot: B.C. prosperity will not keep up with the rest of the country or the world unless action is taken to achieve growth rates that bring capital investment and labour productivity on par with the global leaders.

On the bright side, B.C.'s manufacturing sector has made a strong commitment in the past few years to investment in research and development.

Just three years ago, B.C. manufacturers' R&D investment growth was falling be-

FIGURE 13
BUSINESS INVESTMENT IN R&D AS A PERCENTAGE OF GDP, 2000 TO 2006



hind the best in class amongst its G7 competitors, but by 2007 (see Figure 13) they were on par with the Japanese who were G7 leaders with a 1.5% per annum increase in R&D expenditures. In fact, in 2007, 47% of B.C. manufacturers indicated they spent more than 3% of their revenue on R&D.²⁴

Unfortunately, the 2008 Management Issues Survey, showed that the number had dropped to 34% investing more than 3% of their revenues and well below the national average of 44%.²⁵ Overall cash flow constraints were considered the key reason by firms for the decline in their R&D investments.

Despite the price/cost squeeze, B.C. manufacturers have been making significant efforts to develop new products to meet customer needs and to set the stage

for longer term productivity growth. More than 1/3 of the firms invest more than 3% of revenues on product commercialization and scale-up. Recent B.C. Government tax reductions will facilitate cash flow, but unlike other business sectors, B.C. manufacturers require additional support to encourage R&D investments. The Federal government's decision to allow for and later to extend accelerated depreciation allowances has been a welcome reprieve to manufacturers that will prove profitable to the country in future years.

B.C.'s prosperity depends on manufacturers speeding up the adoption of new technology, accelerating the rates of capital investments and enhancing worker skills, all in an effort to accelerate productivity. Moreover, regions with more capital per worker have higher incomes per worker. New machines and equipment, moreover, are likely to cut waste, reduce environmental stress and raise living standards as well as produce better goods and services.

24 CME, "View from the Top for Future Markets – 2007-08 Management Issues Survey, Toronto, October, 2007 pg.26

25 CME, "Building Our Global Future – 2008-2009 Management Issues Survey, Toronto, November, 2008, unpublished data on BC

23 CME, "Building Our Global Future – 2008-2009 Management Issues Survey, Toronto, November, 2008, unpublished data on BC.

To eliminate this excellence gap and succeed in the next decade, B.C. manufacturers and the government will need to collaborate to accelerate the efforts to innovate, to adopt Lean Thinking, to identify and target new markets and products and to ensure firms have sufficient cash flow to make the required investments and compete globally.

GLOBALIZATION IS CHANGING BUSINESS OPERATIONS

Each year Canadian Manufacturers & Exporters (CME) asks manufacturers and exporters in B.C. to discuss the critical issues and future trends that affect their business. In the most recent discussion, B.C. manufacturers identified that the issues of globalization, including intensification of competition in international markets, the volatility of the Canadian dollar, shortages of skilled and experienced personnel, and the costs and risks of new products and process innovations, are serious challenges.²⁶ These issues have become even more pronounced in 2009 where risk, uncertainty and fierce global competition has increased with the global recession and financial crisis.

The emergence and development of large export-oriented industry sectors in India, South-east Asia, South Korea, Mexico, and South America are generating new leaders of growth and development in a wide range of manufactured products and business services. Eastern Europe has become a magnet for manufacturers poised to take advantage of the expansion of the European Union. And manufacturers around the world have developed the capacity to supply high-value, sophisticated products to customers at lower and lower prices.

²⁶ More recently Canadian dollar volatility has been an issue, but most BC manufacturers in the CME Management issues survey believe the long term concern will be a high Canadian dollar.

“Cluster” development is critical to BC’s growth and the Okanagan Composite Manufacturing Group (OCMG) is committed to developing and marketing high value products to niche markets and ensuring that new technology and training techniques are fully transferred across all firms in the cluster.

The Okanagan has the largest manufacturing composite (fibreglass) manufacturing cluster west of Manitoba and a multi-party commitment to work smart by creating a new Okanagan Composite Research Network Centre can bring business, academia, labour and governments together to develop practical solutions to competing in today’s fiercely competitive global marketplace. The total is far greater than the sum of the parts.

Peter Jeffrey – Chairman, OCMG and President of Formashape, 2009

Faced with the rapid expansion of low-cost production capacity in China and other developing countries, BC manufacturers are experiencing competitive pressures as never before. Such pressures are expected to intensify over the next decade as new developing countries become larger players. Manufacturers are competing for the best in knowledge, skills, and technologies from around the world.

More and more developing countries are participating in the global markets, impatiently entering the realm of developed nations. These factors are expected to accelerate in the next decade and will require even more concentrated efforts by the Government if the sector is to continue to be the export leader.

This fierce global competition is putting intense downward pricing pressures on manufactured goods. Few companies are in the province are in a position to pass their input price increases along to their customers. In some cases, business customers seek price cuts of up to 20% or more over a period of only three years.

While competition constrains price increases, B.C. manufacturers are facing rising business costs on a range of fronts. Key input costs and

energy have increased by double digit amounts every year over the past five years. Moreover, B.C. firms pay hundreds of millions of dollars in retail sales tax for key raw materials and other inputs and are required to invest heavily to meet regulatory demands not faced by many of their global competitors.

This price/cost squeeze has been compounded by the volatility of the Canadian dollar in recent years. B.C. manufacturers have grappled with major increases in the Canadian dollar over the past six years, which effectively cut export sales revenue almost in half in that period, especially for firms exporting to the United States. The 2002 – 2008 dollar appreciation is estimated to have reduced profits to B.C. manufacturers by more than \$5 billion²⁷ and created significant cash flow problems that restrained investment and training. Firms are now dealing with a lower, but much more volatile Canadian dollar which makes it very difficult to accommodate changes or to properly forecast their revenues and profits.

²⁷ Dr. Jayson Myers, “Survival Strategies Toolkit”, CME 20/20 Magazine, November, 2007, pg3. Dr. Myers estimates that for every 1 cent increase in the Canadian dollar, national profits are reduced by \$1.5 billion and profits by BC firms by about \$150 million.

These impacts are forcing companies to restructure their internal operations, their supply chains, their marketing strategies, and their pricing policies in order to retain customers, cut costs, and boost productivity performance. With less cash-flow from operations, these firms struggle to address these day to day issues, while still investing in R&D, innovation, process improvement and skills upgrading. Smaller firms, who dominate the provincial economy, have noted that it is difficult and costly to implement hedging strategies, diversify export markets, restructure supply chains and invest in new products.²⁸

These enormous cost/price pressures are expected to continue over the next five to ten years and will require pro-active involvement by government and industry to ensure that B.C. manufacturers can adapt to this new market place before they succumb to the competition.

Not only are B.C. manufacturers having to rise to the challenges of the cost/price squeeze, they are required to respond to the rapidly changing customer requirements driven by this global competition. Customers are demanding new products to meet new needs and better products to fulfill old ones. They expect quality to be high, products to be delivered on time, and prices to be the lowest on the market. They are also demanding more in the way of value and service, and customer loyalty is disappearing almost everywhere. Consumers are expecting better functionality, customized design, financing, and after-sales service.

Suppliers are no longer being asked simply to manufacture to specifications, but to solve the technical and business problems of their clients – to provide design and engineering, financing, quality assurance, technical assistance, and ongoing services.

This pace of change will continue to accelerate as a result of new and transformational applications of information and communication technologies, biotechnology, micro- and nano-technologies, new materials, energy technologies, sensors, robotics, and other advanced machining, measuring, and automation systems.

A wave of retirements is already hitting the manufacturing sector, eliminating many highly skilled employees with years of experience and wisdom built up in the industry. At current rates of labour force growth, by 2010 there will be more people retiring than entering the manufacturing workforce and the challenges will accelerate over the following decade.

Growing trade protectionist sentiment and barriers to trade and investment are impacting dramatically on the ability of manufacturers to get their products to markets in a timely and cost efficient manner. This, and the failure of the Doha Round of trade negotiations and the current recession is fostering more protectionism and bilateral trade actions that will actually restrict rather than encourage greater trade openness, a situation detrimental to a small open economy such as British Columbia.

Finally, B.C. manufacturers are facing a more highly regulated business environment with respect to health and safety, environmental management, consumer protection, and corporate governance, while competing against foreign products that are not subject to stringent regulations. New regulations governing cradle to cradle production techniques, tighter emission standards, more stringent health and safety requirements and other regulatory actions add to manufacturing costs. When competing nations, especially in the developing world, do not face similar constraints, B.C. manufacturers struggle to attract new investment dollars and compete successfully.

POSITIVE BUSINESS CLIMATES ARE TRANSFORMING COMPETITORS

Over the past twenty-five years, B.C.'s economy was located on the fringes of the North American market and hence the global market economy, even in the context of freer trade under NAFTA. B.C. manufacturers who thrived in that environment have done so by being more agile and nimble, more market focused and niche oriented, more actively engaged in innovation, more customer sensitive and better able to manage global supply chains. These agile manufacturing activities have limited the negative impacts on the manufacturing sector and positioned B.C. better than other jurisdictions to compete in the future.

As world markets and economic has shifted away from the United States and toward the Pacific Rim, B.C. firms are now much more strategically located to benefit from the new global realities. This gives B.C. manufacturers significant new market advantages to doing global business, making the need for a rapid shift to mass customization even more critical.

To foster the B.C. advantage, the province will need to provide a globally competitive business environment where there is strong support for private R&D investment, an internationally competitive tax system and an enabling business environment.

B.C. manufacturers need to have “conditions-providing” policies that encourage innovation and export development. This is particularly crucial today, because the global price/cost squeeze means B.C. manufacturers operate on paper-thin margins, with less than six minutes out of each 480 minute (8 hr) shift to generate the profit required to invest in market development, product innovations, process improvements, organizational changes, workforce training, and new technologies necessary for sustaining competitive

28 CME “Management Issues Survey- Building Our Global Future” pg28

success. **Every dollar spent on taxation or unnecessary regulation reduces the ability of these firms to compete and can threaten business survival.**

The British Columbia Government has recognized the importance of having a competitive and encouraging environment, making remarkable efforts in the past few years to improve the general business environment for all firms, both inside and outside the manufacturing sector. Positive government initiatives include corporate and personal tax reductions, revisions to the B.C. Employment Standards Act, regulatory streamlining, the WorkSafe BC Industrial Health & Safety Association initiative, BC Hydro Power Smart Industrial Partners program, and more. Furthermore, changes to the PST specifically supported the manufacturing sector. These changes and others have been noticed and appreciated!

Unfortunately, despite this progress, it is clear that B.C. manufacturers have steadily fallen behind their competitors, because other provincial and international jurisdictions have been moving farther, faster and smarter than B.C. in a range of activities. Most of B.C.'s direct competitor regions have a stronger focus on R&D and innovation and more financial support to enable process improvements. These competitors are accelerating public/private collaboration in expanding markets and making better progress at reducing taxes, streamlining regulatory regimes, enhancing infrastructure and encouraging coordination of policies among key government agencies, and between them and the productive sector. Again as a marathon runner, B.C. continues to fall behind the leaders as the race progresses.

One of the key enabling public policies amongst global competitors has been to reduce taxes on corporations to help manufacturers increase their cash flows, which in turn allows them to make new R&D investments, improve productivity,

increase workforce training, raise wages and create greater prosperity.

The B.C. Government has moved in recent years to reduce nominal corporate taxes, but our major international competitors have been even more aggressive in reducing taxes. Analysts provide evidence that

“Taxation and regulatory policies (in BC) must be designed with a view to keeping overall business production costs competitive... competitive taxation and regulatory policies are essential to encourage the investment spending that leads to technological innovation and upgrading, higher productivity and lower productions costs.”

[BC Progress Board – 2002 Benchmarking pg. 4]

even other Canadian provinces, particularly those in the Maritimes, anticipate their taxes on manufacturers over the next five years that are half that of BC.²⁹ In the case of mainland China, for example, Chinese exporters are given a rebate of the value-added tax, not simply on the cost of the raw materials (as is the case in Canada), but on the *total* sales price of the exported good. This is, in fact, a direct subsidy from their government to Chinese manufacturers.

A leading indicator of investment intentions is the marginal effective tax rate (METR) on capital investment. B.C.'s METR rate of 31.6% is the third highest in the country³⁰ and sixth highest tax jurisdiction amongst the 36 countries monitored by the CD Howe Institute.³¹ These higher taxes restrict the ability of firms to retain the required cash flow to make key capital investments and to undertake skills upgrading and training. A related indicator is the METR on labour, which stands at 49.9% for employees at

B.C. manufacturing operations; a total amongst the highest in Canada.³² This means manufacturing workers are paying proportionally much more on payroll and income taxes than their competitors, which reduces the ability of these workers to enhance their technical skills.

These extra taxes reduce corporate cash flow and prevent B.C. firms from investing in new technology, enhancing worker skills and improving productivity and the quality of life in B.C.

The biggest cause of this higher METR is the negative impacts of the provincial sales taxes on manufacturers and their workers. The C.D. Howe Institute estimates B.C. industry pays more than 40% of the existing retail sales taxes in the province, which in turn accounts for the entire 8.6% difference between Alberta's 23.0% METR and B.C.'s 31.6% METR.³³

The Government's recent carbon tax will also effectively increase manufacturers' tax contributions. Manufacturers consume far more energy/dollar than other businesses, so the industry is unduly burdened with carbon taxes that are not properly offset by the 1% reduction in corporate income taxes. To the contrary, the carbon tax reduces precious cash flow, reducing the ability of the very firms most likely to invest in R&D, skills training, GHG reduction technologies

29 Ibid pg. 6

30 Ibid, pg. 11.

31 Mintz, Jack “The 2005 Tax Competitiveness Report: Unleashing the Tiger”, C.D. Howe Institute, pg. 6 TBC's rates are 31.6% compared to India (23.2%), U.K. (22.7%), Mexico (17.2%), Ireland (14.1%) and Hong Kong (6.1%).

32 Duanjie Chen, Jack Mintz, Andrey Tarasov, “Federal and Provincial Tax Reforms”, C.D. Howe Institute, No. 102, July, 2007, pg. 7 & 8.

33 Ibid, pg 8

and new market development initiatives. **In fact, this action penalizes the sector who is the proven leader in reducing GHG emissions.**

Finally, many municipal governments in the province have continued to burden manufacturers with the majority of property taxes, with some firms paying taxes several times higher than residential consumers. In the 2005 Canadian Manufacturers and Exporters Management Issues Survey, not a single respondent in B.C. thought the municipal taxation outlook was improving, while 28% of respondents felt municipal taxation was getting significantly worse.³⁴ These results were twice as high as those reported nationally.

To compete globally B.C. manufacturers need to be able to have a much more competitive tax regime than they do today.

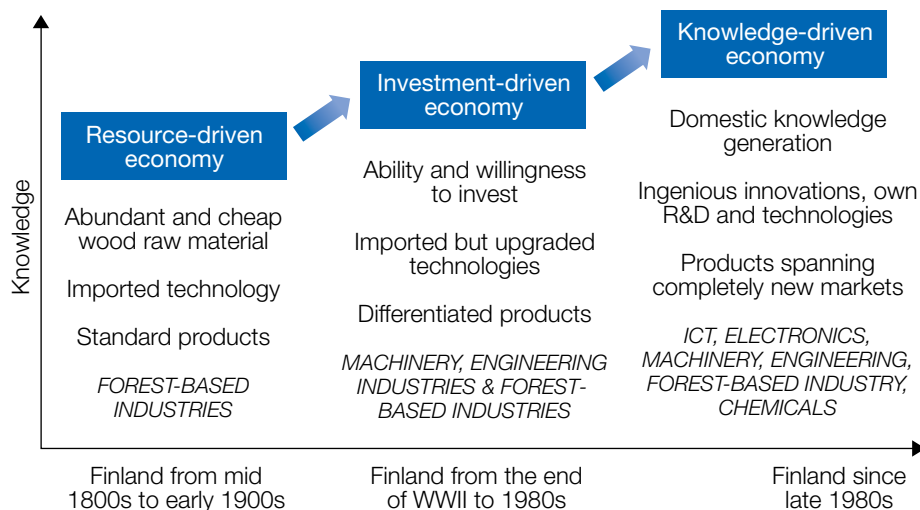
“Smart regulation” is another area where a positive business environment is critical to their success. Firms in many competitor nations face fewer regulations, while in other nations the governments have established more efficient regulatory regimes. Both actions result in reduced costs for competitor firms, which and thereby make it more difficult for B.C. manufacturers to compete. In the latest CME Management Issues Survey, more than one third of all B.C. manufacturers felt that regulatory conditions are getting worse rather than better, despite the work done by the B.C. Government to streamline regulations in the province.³⁵

B.C. manufacturers strongly favour appropriate regulations, but the Government needs them to be both efficient and effective. B.C. manufacturers are collaborating with B.C. Government Ministries to find further ways to create more “Smart Regulations” that protect

34 Canadian Manufacturers and Exporters (CME) “2004/05 Management Issues Survey”, Toronto, pg 12

35 CME Management Issues Survey 2008-2009, pg. 24

FINLAND'S STAGES OF INDUSTRIAL AND ECONOMIC DEVELOPMENT



Sources: Adapted from Porter 1990 and Hernesniemi

people and the environment, but reduce their regulatory burden.

Improving regulatory awareness is also critical. Some 86.1% of all manufacturers in B.C. have fewer than 20 employees and these B.C. manufacturers have a lack of understanding of the range of rules and procedures that exist across the wide variety of programs. In many cases these firms do not have the internal corporate infrastructure or the financial capacity to meet the rising array of regulatory demands being placed on them from the three dozen agencies and government organizations that regulate the province.³⁶

Finally, B.C. manufacturers believe the British Columbia Government needs to identify and actively embrace industrial policies that have driven comparable jurisdictions to the pinnacle of global competition. Finland is a world leader in manufacturing and the knowledge economy, yet it is a small open economy with many of the same characteristics as B.C. in terms of size, demographics,

36 Ibid, pg 32

socio-economic conditions, and governance. In 2008, Finland ranked 6th in the world for overall global competitiveness, while ranking 3rd for business competitiveness, 3rd for innovation, 3rd for business environment, 2nd for technological readiness and 1st for higher education and training.³⁷ B.C. by the same indicators would not have made the top 50.

This successful Finnish “model” was based on creating a single vision of a knowledge-based economy focussed on advanced manufacturing, supported by intensive inter-Ministerial networks. The model also emphasized a focus on supporting key regional, national and global clusters, heavy investment in research and development, and strong support to technological readiness and operating efficiency. The model encourages public/private partnerships in research, development and marketing, focuses attention on assembling complex networks of collaborating

37 Michael E. Porter, Zavier Sala-i-Martin & Klaus Schwab, “The Global Competitiveness Report”, World Economic Forum, Davos, Switzerland, 2007. pg 176.

public and private organizations, supports the development of the entire cluster value chains and supports the development of centres of excellence in core areas.³⁸

GETTING TO THE FUTURE

In the global economy over the next decade, money, knowledge and people will be highly mobile. British Columbia manufacturers have demonstrated their ability to compete around the world, but most firms believe several critical factors must be addressed, if the province is to transform itself into a competitive global leader.

What will anchor the high value-adding activities that are part of the business of manufacturing here in British Columbia? What needs to be done to ensure that B.C. manufacturers continue to lead the B.C. economy into the foreseeable future?

B.C.'s existing assets – its resources, skilled workforce, and strategic location at the cross roads of the rapidly expanding Pacific Regions and the United States – will help, but this province's economic success will ultimately depend on the ability of the manufacturing industry to continue to restructure in response to the challenges and opportunities that lie ahead and the willingness of the governments, academia and labour to support and encourage these changes.

In many ways Finland is B.C.'s twin, with a small open economy with similar population sizes, demographics and skills. Finland's economy is founded on manufacturing – principally wood, metals, telecommunications and electronics, while B.C.'s economy is similarly founded on manufacturing of natural resources. Both have excellent educational facilities and a strong infrastructure base. Both are primarily exporters and both invest heavily in social programming.

However, Finland was able to rapidly transform itself from a natural resource based economy producing primary products in their key clusters to one that relies heavily on high technology, advanced manufacturing and knowledge. Finland was able to establish various linkages between sectors and industries throughout the Finnish economy that produced higher value added and more knowledge-intensive products.

Forest-related industry clusters provided the pioneering electronics, while telecommunications firms had access to a sophisticated domestic market to experiment with new technology. In turn, these firms turned to the global marketplace to foster the type of competition needed to develop dynamic and competitive products and to enter new and/or niche markets.

“By 2020, there will be more change in the way we work and the way we do business in Canada than we have witnessed over the past 40 years.”

Peter Jeffrey, Chairman, CME-BC Division and President, FormaShape

For its part, B.C.'s industries have not evolved as rapidly up the value chain, with many B.C. firms focusing on being experts at producing lower value products at cheap prices, with much less emphasis on advanced manufactured products than does Finland.

Today, the Finnish industrial base relies heavily on the various linkages between sectors and industries and academia throughout the Finnish economy. Today, Finland, a country of just 4 million people, stands in the top 10 of global competitiveness and a demonstration that it is possible for B.C. to do the same. B.C. manufacturers believe that the province can follow and build upon the Finnish example.

Lesson one of the Finnish model is that crisis galvanizes opportunity, so the present global crisis provides just the opportunity for B.C. firms to succeed. Lesson two of the Finnish model is that technology

must be developed for the global market and sold to the global market and all firms must benchmark themselves only against the best in the world. And the third lesson of the Finnish model is that to succeed Government must provide a globally competitive enabling environment and taxes, strong linkages within and across sectors and industries, a world-class infrastructure base, and an educational system able to respond very quickly and flexibly to the new opportunities.

The cornerstone of the Finnish model is its focus on industrial development policy and developing a strong core of advanced manufacturing clusters that can drive the economy, supported by a range of research and development clusters to feed the core, a strong network of suppliers to strengthen the core and a range of

service firms to support, encourage and facilitate the marketing and servicing of the “core”. The Canadian aerospace industry provides a glimpse of that in North America, while Finland has focused on clusters arising out of natural resources and telecommunications (eg. Nokia).

In order for B.C. to truly become the “Best Place on Earth” the Government should commit to having a strong industrial policy focused on advanced manufacturing and based on the three principles of “**Think Smart**”, “**Work Smart**” and “**Carbon Smart**”.

Think Smart means embracing the Finnish industrial imperative to develop a broad common vision, support the expansion and diversification of key industrial clusters, accelerate the R&D share of GDP, encourage all firms to embrace Lean Thinking and create a system of innovation characterized by consensus-building

³⁸ Carl J. Dahlman, Jorma Routti & Pekka Ylä-Anttila “Finland as a Knowledge Economy: Elements of Success and Lessons Learned”, The World Bank, January, 2006 pg. 4

and dense networking among companies, universities, and research organizations.

Finland's phenomenal development was based upon the transformation of the primary forest sector into a global forest cluster dominated by advanced manufacturing with supporting industries, consultancies and research organizations. It was created by transforming some elements of those supporting clusters, namely: forestry equipment and telecommunications, into global clusters.

Think Smart first and foremost encourages B.C. business, government, labour and academia to recognize that B.C., like Finland, is a manufacturing economy based on manufacturing products, primarily using natural resources. Think Smart encourages people to recognize the reality so that industrial policy must focus on manufacturing innovation, evolution and technology diffusion rather than on finding new ways to sell the current lower value products. Government, industry and labour have a large role to play in this process.

Think Smart ensures that B.C.'s natural resources sectors remain a vital part of the economy, but follows Finland's lead by moving them into higher value products, developing new forest related technologies that can be manufactured and sold from B.C. and in developing new applications of other technology for use within and outside these sectors. Think Smart may involve encouraging firms like Rio Tinto Alcan to develop value-added opportunities adjacent to their facilities in order to take advantage of the power, raw materials and strategic location of those facilities in supplying aluminum products to the global markets. However, simply creating new plants close to inexpensive power may not be sufficient.

The B.C. aerospace industry demonstrates how a network of technical programmes, suppliers and infrastructure create the ideal conditions necessary for the manufacturing cluster to prosper over the long-term. Other centres such as the Okanagan's composite cluster or the Fraser Valley's food processing cluster need also be cultivated to create a diverse

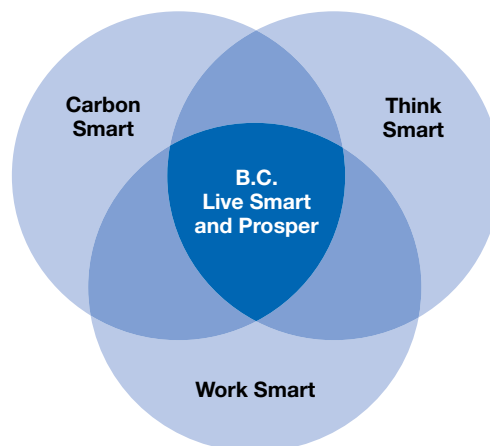
approach to advanced manufacturing in small regional centers across the province.

Think Smart also means B.C. manufacturers themselves must commit to moving into higher value added products and new/niche markets, making major R&D investments despite their relatively small sizes, accelerating innovation and commercialization and rapidly increasing operating efficiency through Lean manufacturing.

Work Smart is all about accelerating labour force productivity and working more effectively to embrace Lean Thinking and encourage business to take more of the lead in workforce development.

Work Smart is about B.C. business investing more heavily in internal training programs and providing incentives for staff to gain more expertise and skills on their own. Work Smart is about improving the flexibility of the education and training programs to be able to adapt more quickly and effectively to changing global circumstances. Work Smart is also about creating more collaboration between educational institutions and business to

THE BEST PLACE ON EARTH



Reducing GHGs

- ✓ **Green Capital**
 - Investment tax credits
 - Loan guarantees
- ✓ **Carbon Smart**
 - Reduce corporate taxes 2%
 - Lean green manufacturing
 - Carbon Smart energy program

BC advantage

- ✓ **Investing in new technology**
 - Accelerated depreciation allowances
 - Investment tax credits
- ✓ **Process innovation**
 - Lean thinking
 - Fully refundable SREDS/tech support
 - Cradle to cradle design support
- ✓ **Competitiveness**
 - PST/GST tax harmonization
 - Std municipal business taxes

Accelerating productivity

- | | |
|--------------------------------|-----------------------------------|
| ✓ B.C. Lean Institute | ✓ Workforce training |
| ✓ Lean consortia/awareness | ✓ Lean training tax credits |
| ✓ Lean thinking in all sectors | ✓ Individual training tax credits |

foster learning using new technology in cost effective and innovative ways.

Last but not least, Carbon Smart is about manufacturers accelerating their leadership role in BC in reducing greenhouse gases and in reducing, reusing and recycling.

THINK SMART – ENHANCING INNOVATION

As the globally competitive environment evolves, British Columbia manufacturers understand the need to move further up the value chain, focus on new products and expand into more diverse niche markets. Over the next decade B.C. manufacturers must make and keep a commitment to perfection with respect to product quality, production processes, and business systems and to benchmarking themselves only against the global leader in their area.

Finland’s innovation system successfully converted R&D and educational capacity into industrial strengths. R&D investments were 3.5% of GDP, almost double the EU average and the third highest in the world.

Carl J. Dahlman “Finland as a Knowledge Economy”

To achieve these goals, BC must develop a new “**B.C. Advantage**” that focuses all effort on rapidly reaching the new manufacturing paradigm rather than supporting traditional products and services. The province needs to focus more on encouraging rapid growth in advanced manufacturing and service support in four or five “global” clusters, matching Finland’s investment in applied research and development and placing significant focus on broad based engagement by stakeholders to develop a common “vision” and achieve real solutions.

The “**B.C. Advantage**” will ensure the province is a world leader in R&D investments, maintains “smart” regulatory frameworks, creates globally competitive

tax structures and actively supports efforts to make B.C. the preferred North American location for businesses to invest, manufacture, export from, employ, and grow.

The B.C. Advantage will build on the well-developed innovation infrastructure this province has developed over the past ten years from significant public investments made in recruiting top researchers, upgrading research facilities, and financing research overheads. The difference will be the commitment to putting at **least 3.5% of GDP into research, development and commercialization of technologies.**

Moreover, the B.C. Advantage will encourage the Province to continue its major investments in critical infrastructure including installing state of the art broadband telecommunications, expanding rapid transit, upgrading transportation corridors particularly to the United

States for commercial traffic, and developing renewable energy solutions.

The B.C. Advantage will continue this focus by giving B.C. manufacturers the support they need to free up cash flow to adopt new technology and equipment, which more than three quarters of them believe is the most critical factor in being globally competitive.³⁹ B.C. government leadership is required to:

1. **Lobby Ottawa** to ensure that the Federal Government indefinitely extends the accelerated depreciation allowances for investments in new manufacturing and processing equipment,

2. Implement a new “**Capital Investment Program**” providing tax credits on Class 43 equipment to support the efforts of B.C. manufacturers to acquire new technology for their operations.
3. Develop a strong industrial policy and a specific “**Cluster Strategy**” that focuses efforts on key globally competitive clusters and encourages expansion of advanced manufacturing and services within those clusters.
4. Monetize and accelerate use of **investment tax credits and research grants**, especially in rural universities and colleges, to support more public/private R&D efforts directed at product commercialization and technology diffusion.

While capital investment in new equipment and technology is the most critical need for B.C. manufacturers, B.C. firms believe it is equally critical for their business leaders to accelerate their process innovation. This means accelerating the pace at which they commercialize their products, develop new niche markets, eliminate waste from manufacturing processes and ensure world class after-sale service. With the cost/price squeeze and fierce global competition, B.C. manufacturers don’t have enough cash-flow to meet these requirements.

B.C. manufacturers believe the Scientific Research and Experimental Development (SRED) tax credit program can provide a strong tool to meet these challenges, but more than 60% of B.C. manufacturers don’t use the existing SR&ED program because it doesn’t address operations innovations (48%); it’s too burdensome to apply (20%); and many are not aware of its advantages or uses (63%).⁴⁰

To encourage more innovation, the **B.C. Advantage** would dramatically broaden the SRED base by dramatically increasing awareness programs and

⁴⁰ Manufacturers and Exporters (CME) “2004/05 Management Issues Survey”, Toronto, pg 16

³⁹ CME Management Issues Survey 2008-2009 pg. 26

doubling the numbers of Industry Technical Advisors, while simultaneously **enhancing the SRED program** by making commercialization and process improvement expenses eligible for funding, increase the tax incentive from 10 to 20%.

Finally, the **B.C. Advantage** will free up cash flow to manufacturers by embracing tax harmonization. Harmonizing federal and provincial sales taxes in B.C. would eliminate the existing tax discrimination for business and dramatically reduce businesses marginal tax rate on capital equipment, while increasing government revenues and stimulating the economy. Moreover, a harmonized retail tax system will improve business cash flow, thus encouraging even greater R&D, reduce administrative costs for both business and government and encourage exports by cutting the manufacturing costs for out of province shipments.

A 2004 report by the Institute for Competitiveness and Prosperity in Ontario showed that in real constant dollar terms, retail tax harmonization would raise living standards by 0.4%/annum, productivity by 0.3%/annum, personal disposable income by 0.7%/annum, employment by 0.5%/annum and capital stock formation by 3.2%/annum.⁴¹ Similar conclusions were reported in a 2008 C.D. Howe Institute study on tax harmonization, which also showed that B.C. would effectively cut its METR on equipment by 8% and generate more than \$5 billion in “extra” tax revenue.⁴² This step alone would eliminate the Government’s anticipated budget deficit. In these tough global economic times, the Premier of Ontario has committed to tax harmonization and B.C. manufacturers believe the Government of B.C. should join them in embracing this concept.

41 Institute for Competitiveness & Prosperity, “Tax Policy, Considerations and Prosperity in Ontario: Options for the 21st Century” pg.7

42 Dachis, Benjamin “Slicing the Pie: Federal Assistance for Provincial sales tax Reform”, C.D. Howe Institute, e-brief, April, 2008 pg. 6

A more standardized province-wide property tax regime for local property taxes would also provide a major economic stimulus to manufacturers in rural areas. The B.C. Advantage would propose to **harmonize the provincial and federal sales tax systems and establish a maximum total tax contribution by businesses in municipalities across the province by 2010**. This will eliminate significant input costs faced by manufacturers, create a simpler and more tax effective system and improve economic output.

WORK SMART – ACCELERATE PRODUCTIVITY

The Global financial crisis and downturn will have a long term impact upon British Columbia. The efforts to Think Smart will provide the impetus for accelerated capital investment in new equipment and technology, but there will be an equal or more imperative need to **Work Smart**.

“**Work Smart**” is about eliminating the excellence gap by accelerating labour productivity as well as capital efficiency. If B.C. manufacturers are going to weather the existing economic storms and adapt to the major paradigm shifts, there will be an urgent need to enhance workers skills, to make the best use of available knowledge on process improvements, and ensure that businesses eliminate the waste of time and resources. In short, Work Smart requires manufacturers to build world class work forces and design operating processes that are efficient, effective and flexible.

In the recent months of the Global financial crisis and the collapse of large sections of the US manufacturing sector, it has become clear to most North Americans that “Lean Thinking” is the way of the future.

Lean Thinking is focused on generating customer value, reducing waste, improving worker productivity and systematically increasing the cash flow needed to fund R&D and process improvement

has propelled Toyota Motor Company to be world’s biggest and most profitable automaker, despite recent downturns in customer demand. Toyota created the concepts and the adoption of Lean Thinking⁴³ and the tools for continuous improvement has proven its worth in very demanding economic times.

Lean Thinking will improve overall operating efficiency and effectiveness of all manufacturers, while reducing waste in all its aspects. The challenge is to get firms and employees to adopt the principles in order to drive renewed economic growth. Despite the fact that 87% of B.C. manufacturers have reported in the latest manufacturers’ survey that they recognize the importance of Lean Thinking, less than 23% have started the lean journey, only 10% of firms have it as a standard operating practice and few B.C. manufacturers can get beyond current practices.⁴⁴

More importantly most B.C. firms are too small to afford the resources to implement lean thinking and almost two thirds lack the implementation know how. Smaller companies, in particular, are looking for – but not finding – opportunities to share best practices and collaborate in various consortia working on process improvements. These firms cite a need to link local collaborative efforts to best practice and expertise from across Canada and around the world.

Lean Thinking is not only a practical part of **Work Smart**, it is also a profitable one. In a study concluded in 2003,

43 Lean thinking or lean manufacturing is a comprehensive term refers to the systematic methods to reduce costs by eliminating wastes and non-value added activities, while delivering what the customer wants, on time. Lean manufacturing has evolved in North America from its beginnings in the Toyota Production System (TPS) in Japan based on concepts pioneered by Henry Ford. Lean thinking was first applied to mass production, but is now being implemented in many service-oriented businesses, agencies and offices.

44 CME, Manufacturers Issues Survey 2008-2009, Unpublished data for B.C.

Lean thinking provides a way to do more and more with less and less—less energy, less human effort, less human equipment, less time, and less space—while coming closer and closer to providing customers with exactly what they want.”

www.lean.org

the National Institute for Science and Technology (NIST) in the US concluded that for every \$1 that was invested in programs to deliver lean thinking, the government earned \$4 in revenue, and the economy generated \$22 in activity.⁴⁵ Clearly Lean Thinking will reduce operating costs, increase government revenue and support economic prosperity. In our troubled times, Lean Thinking is a key part of the **Work Smart** recovery solution.

B.C. manufacturers believe a new public/private partnership should be created to support a **B.C. Lean Institute** – to be a “lean leader” in the province. This virtual institute would actively promote the adoption of Lean Thinking at all levels of B.C. society, assemble a world class repository of lean resources and knowledge, support benchmarking and certification, fund research and training related to lean thinking and establish rewards and recognition programs. Early priorities for lean thinking applications would be in Lean Manufacturing, Lean Healthcare and Lean Government, which between them could create a dramatic reduction in the costs of doing business and operating government.

As well the B.C. Lean Institute would support efforts to establish and sustain lean consortia across the province and implement awareness programs to demonstrate their value to firms in all sectors of the economy. Lean Thinking and continuous improvement is not taught in colleges, engineering, or business schools in British Columbia so the B.C. Lean institute will

45 National Institute of Standards and Technology (NIST), “Re-Examining the Core Premise of the Manufacturing Extension Partnership”, Washington, September, 2003 pg. 32.

work to create learning programs within BCIT. One or two universities should be implemented to formally train B.C. students on the principles of Lean Thinking and support the incorporation of Lean Thinking into all aspects of the economy.

Work Smart isn’t just about improving operating processes; rather it is also about developing highly skilled, engaged and productive employees. In the next fifteen years, B.C. manufacturers will require much more highly skilled workers as demographics and world competition impact on the provincial economy. Employees will need to be highly trained and flexible enough to adapt to changes in their job, but also willing and able to continuously upgrade their knowledge and skills on a path of life-long learning. B.C. manufacturers participating in CME’s 2007 Management Issues Survey noted that available and qualified personnel were critical to innovation activities (82%), fundamental to meet changing business practices (64%) and a significant factor in their firm’s location decisions (32%)⁴⁶. In many cases these new worker skills will be more efficiently provided by the manufacturer rather than the government.

The challenge will be to get B.C. manufacturers to increase their investments in formal worker skills training from a paltry 2.4% of their payroll⁴⁷ to more than the 3.5% invested by US firms and closer to the approximately 12% invested by Japanese manufacturing. Today B.C. manufacturers’ training budgets are under

46 CME “Management Issues Survey 2008-2009” Unpublished data for BC.

47 R.A. Malatest and Associates Ltd “A Catalyst for Change” for Canadian Manufacturers and Exporters-BC Region, December, 2003, pg.32.

extreme pressure due to a series of factors, including: shrinking cash flow, increasing training costs, rising complexity of training and insufficient in-house expertise. Smaller firms in particular can ill afford to devote the personnel or the resources.

In order to **Work Smart** and accelerate productivity, B.C. manufacturers propose that the government provide “**enhanced training tax credits**” to employers to encourage in-house skills upgrading and to manufacturing employees who take approved skills training and upgrading programs. Moreover, the Province should endeavor to conduct **marketing campaigns** targeting ethnic communities to promote and encourage more new Canadians to embrace suburban and rural areas of the province. Finally, continued efforts need to be made to eliminate barriers to labour mobility in all regions of Canada and to ensure that there is harmonized labour, professional accreditation and trade harmonization agreements across the country.

CARBON SMART – REDUCE GHG EMISSIONS

B.C. manufacturers are the leaders in reducing greenhouse gases in British Columbia over the past decade. The manufacturing community has clearly recognized the benefits of taking action to reduce global greenhouse emissions and is the only group to have reduced their carbon footprint amongst industrial users. In fact, most manufacturers are **Carbon Smart** and as an industry are the only ones to meet the Kyoto Protocol requirements nationally.

B.C. Manufacturers have also been actively working to reduce energy consumption in collaboration with B.C. Hydro’s Power Smart program. Power Smart provides a blueprint for further action for everyone in the province

The Government is thus encouraged to launch a new **Green Energy Carbon Smart** (GECS) program similar to Power Smart,

for other forms of energy and operational efficiency. GECS would offer preferred-rate financing, tax credits and target-based financial rewards for progress in reducing carbon emissions through the use of alternate GHG-reducing systems, such as biomass or biogas. This would counter-act the current problem with the carbon tax, which effectively taxes manufacturers more than the general business community.⁴⁸ GECS would replace valuable cash-flow for manufacturing firms who in turn would be encouraged to transform products and add value while switching to environmentally-friendly energy and acquiring new green technologies.

A Green Energy Carbon Smart program will also segue with other natural assets in the province, such as the Interior and Island's forestry sectors (biomass) or the Okanagan and Fraser Valley's agricultural sectors (biogas).

As per the Power Smart program, GECS would include energy management audits and an holistic approach taken to reduce energy use in all forms and with their resultant reductions in GHG.

Many firms are expanding their lean programs to incorporate Lean-Green Manufacturing. Lean-Green manufacturing is a **Carbon Smart** concept that incorporates lean principles – ensuring a reduction in solid waste, pollution, and toxicity in production processes. The program also increases environmental awareness throughout traditional lean training, value stream mapping, and kaizen events. Even without explicitly targeting environmental outcomes, lean efforts have yielded substantial environmental benefits as the chart shows. The results shown in the box

48 Manufacturers spend proportionally more on energy than almost any other sector of the economy, so the tax reduction does not fully compensate for the carbon tax. The reverse is the case for other businesses who are less energy intensive. Hence manufacturers pay more even though they are currently the only group to meet the Kyoto protocol.

above illustrate why Lean Green should be a part of any **Carbon Smart** solution.

B.C. manufacturers believe that any **Carbon Smart program** should involve the creation of a lean-green manufacturing program within the BC Lean Institute based on the Manufacturing Extension Program operated by regional organizations through the U.S.A. by the National Institute for Science and Technology. This program would have a goal to raise the percentage of those manufacturers actively pursuing Lean Thinking from 20% to at least 80% of all firms and to endeavor to use the program to achieve the new lower Kyoto II standards. Such an effort will make BC firms more productive, more profitable, more efficient and more environmentally sustainable.

Associated with the principles of lean-green manufacturing is the Carbon Smart concept of Cradle to Cradle Design (C2C),⁴⁹ where manufacturers design, build and recycle their products to ensure that waste is minimized and harmful pollutants like mercury are eliminated from the production process. More and more global firms, like Apple Computers and BP are using this system, but in B.C. the number of firms engaging in this Carbon Smart idea is very small. With some regions like the European Union and US States, such as California, enacting cradle to grave laws, cradle to cradle design will become a major export barrier for those who do not adopt the concept. BC should become a leader in C2C design and lean green manufacturing to provide a real export advantage for B.C. firms. In order to do that Carbon Smart would propose the Government **provide financing to firms to develop and implement C2C programs** for their products which will enhance innovation,

49 Cradle to Cradle Design or C2C is a holistic economic, industrial and social framework that seeks to create systems that are not just efficient but essentially waste free.[

eliminate waste, reduce carbon emissions and create a distinct export advantage for B.C. manufacturers.

In order to be Carbon Smart, B.C. manufacturers need help to implement the newest technologies and production processes. This links with Think Smart by fostering the application of new production processes. In order to be effective at **Carbon Smart**, B.C. manufacturers seek the support of the governments to ensure that they implement the investment tax credit programs outlined earlier and when they do so they ensure that “**green capital**” is considered eligible and that the credits are refundable for relevant projects and carried both forward and backward. Loan guarantees should also be provided to address the illiquidity in the financial markets caused by the recent financial crisis.

LEAN GREEN MANUFACTURING RESULTS

- 84% reduction in lead time
- 40 – 70% reduction in Work In Progress inventory
- 58% reduction in in-plant defects
- 59% reduction in product cycle-time
- 234% increase in plant-level profitability in 5 years
- 64% increase in units produced per person daily
- 95% reduction in plant foot print
- 43% reduction in material cost
- 50% reduction in energy and transportation costs
- Major reduction in solid waste and hazardous waste.
- Significantly less waste water
- Increased staff environmental awareness

Source: *Industry Week, Shingo Prize and the Pacific Northwest Pollution Prevention Resource Center (PPRC)*

Finally, B.C. manufacturers believe the Carbon Smart corporate tax reduction of 1% for manufacturers was insufficient to offset their required expenditures on taxed commodities and would encourage the government to drop corporate taxes for manufacturers by a further 1%.

CONCLUSION

British Columbia is one of the most prosperous and richly endowed regions in the world and a place often designated as the “Best Place to Live” on earth. The province enjoys a wealth of natural resources, proximity to the world’s largest markets, a stable legal and political system, well-developed infrastructure and highly educated and highly skilled workers. The province has built its standard of living on the strength of our primary resource industries, but the future success will be achieved by transforming the economy to a knowledge based manufacturing oriented economy.

British Columbia’s manufacturing sector has the biggest economic footprint and will remain a vital force in the provincial economy. Manufacturing is a key to sustaining and increasing this province’s economic prosperity, as a direct contributor to high paying full-time jobs, significant economic multipliers and a generator of earnings from abroad. Manufacturing is an engine of growth for other sectors of the economy and the province’s future prosperity is inseparably linked to a successful manufacturing base.

B.C. manufacturers are restructuring their businesses in response to the challenges they face in the global marketplace. However, the emergence of new markets and disruptive low-cost competition, the rapid development of new technological capabilities, more demanding customers, a more discerning public, and intense bottom-line pressures are changing the nature of manufacturing around the world.

B.C. manufacturers believe the future will require them to improve their operat-

“Our vision should be to become the most prosperous region in the Americas, based on the BC Progress Board’s benchmark indicators.”

Ben Hume, CEO – Alco Ventures

ing efficiency, invest heavily in research and development, upgrade the skills of their staff, and develop their global supply chains. Success in these endeavors will come from operating with a business environment that is globally competitive and has the support of partners for the use of tools like Lean Thinking to ensure future success.

A new industrial policy, a close public/private partnership, along with reduced corporate taxes, improved R&D investment incentives, new GHG emission reduction investment incentives, more training tax credits and expansion of lean thinking are all critical components of “Think Smart”, “Work Smart”, “Carbon Smart” ... so we Live Smart and prosper in B.C.

The manufacturing sector in B.C. envisions a strong, collaborative partnership, with government, academia and labour to develop strategies and programs to ensure the future prosperity of the province.

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CME BRITISH COLUMBIA

688 W. Hastings, Suite 540, Vancouver, BC V6B 1P1

email: bc.reception@cme-mec.ca **tel:** 604-713-7800 **fax:** 604-713-7801 **toll free:** 1-866-713-7802

www.cme-mec.ca/bc