

Washington State Manufacturing Within The Global Market

An Actionable Situation Analysis



Economic & Workforce Solutions

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Executive Summary

What do we need to know about the current state of manufacturing in Washington to effectively compete in the global market—a market place where competitors are no longer neighboring states but thriving countries with diverse economies and new markets? To produce a viable analysis aimed at answering this question, the Association of Washington Business (AWB) Institute has analyzed four fundamental contributors within the industry: (1) innovation and entrepreneurship, (2) workforce, (3) infrastructure and (4) exports.

National Manufacturing Snapshot

Manufacturing has been the backbone of this country for decades but its foundation is becoming compromised. While U.S. exports are still among the highest in the world (with our workforce being the most productive) other countries have worked hard to emulate the U.S.'s success and the nation is seeing mounting competition. Over the years, outsourcing and the influence of emerging countries have decreased what was a thriving industry and a primary source for job growth. Since the “Great Recession” began, America has shed 2.2 million manufacturing jobs; manufacturing in this country now employs roughly 11.6 million workers compared to the 19 million in the early 1980's. Action needs to be taken today.

Workforce Management

To compound the situation, the U.S. is dealing with workforce issues related to the transition of an aging demographic, significant advances in technology, a consistent lack of applicable skills (due to an outmoded education platform) and a trend that indicates a reduction in entry-level jobs. Nevertheless, there is a demand for performance-based skills (termed “soft skills”) for delivering service. In order to increase output and secure the needed workforce, we will need to reverse the negative trend by increasing the skill level of the average worker through education and promoting manufacturing as a clean and vital industry.

Policy & Regulation

Once a reliable foundation for business forecasting, policies and regulation from decades past do not account for the necessary measures and means to keep businesses, education and state government aligned to meet the demands of global competition. Furthermore, the prevailing manufacturing systems are slow moving and do not allow for rapid shifts to meet dynamic market demands.

A reactive approach, one that's currently being displayed most often, is shown through manufacturers being *forced* to adapt. A proactive approach would be one of innovation and leadership. In short, the principles of agile manufacturing call for strategic alliances that enhance supply chains for concept-to-market fulfillment. This is most easily had with precise business-friendly policy regulations aimed at streamlining process.

Infrastructure

The U.S. has benefited from a strong infrastructure that has made the most of the nation's resources. However, the system is becoming aged and is showing an increased need for repair, modification and upgrades. This is an important point due to the direct correlation between infrastructure advances and economic and job growth. Investment in energy, transportation, information technology, institutional and industrial infrastructure leads to a lower-cost environment that benefits manufacturers and their vendors tasked with delivery of goods and services. Systems focused on environmental sustainability are shown to lead to efficiencies over time—allowing for competitive cost advantages. It should not go without notice that energy-efficient export strategies are being reviewed at a national level.

Emerging Markets

The opportunity for increased revenue can be seen in emerging markets. Though the U.S. is a strong leader in exports, emerging markets continue to display exponential growth that outpaces our potential. To counteract this trend, the nation is placing emphasis on rebalancing the economy away from excessive consumption towards exports through policies, education and financing. U.S. exports of goods and services increased by 16.7 percent during the first quarter of 2010, indicating that there are significant opportunities globally for both large and small American-based businesses.

Washington state has the ability to lead this nation in discovering new ways to enhance the industrial ecosystem. Our heritage shows some of the brightest minds, most innovative companies and richest resources, both human and natural. As we look across the country, Washington has already defined its role as a leader in the new global economy, but the work is just beginning and the market is rapidly evolving. While all the state's efforts are positive, it will take much more for Washington to make a significant and lasting impact in the way we do business here and abroad. Analysis on market penetration, regulations, legislation, trade policy development and negotiations is needed to assure that emerging markets are within the reach of Washington businesses.

Introduction

Manufacturing has long relied upon networks, the interconnectivity of myriad businesses that deliver goods and services to fulfill consumer demand. Manufacturers with strategic partnerships and approaches have traditionally enjoyed competitive advantages and will continue to do so.

The rewards of strategic interdependency and leveraging holds true now, more than ever, as network bandwidths are rapidly expanding to include collaborative efforts with state and federal government, education and non-profits at an increased rate. Why the concentrated effort? It's largely because 95 percent of the world's customers and fastest growing markets are beyond our borders, and for many, this is unfamiliar territory that benefits from experience and support. It's also due to the fact that the new economy, with its emerging markets, has called for a competitive stance and America has equity in ingenuity.

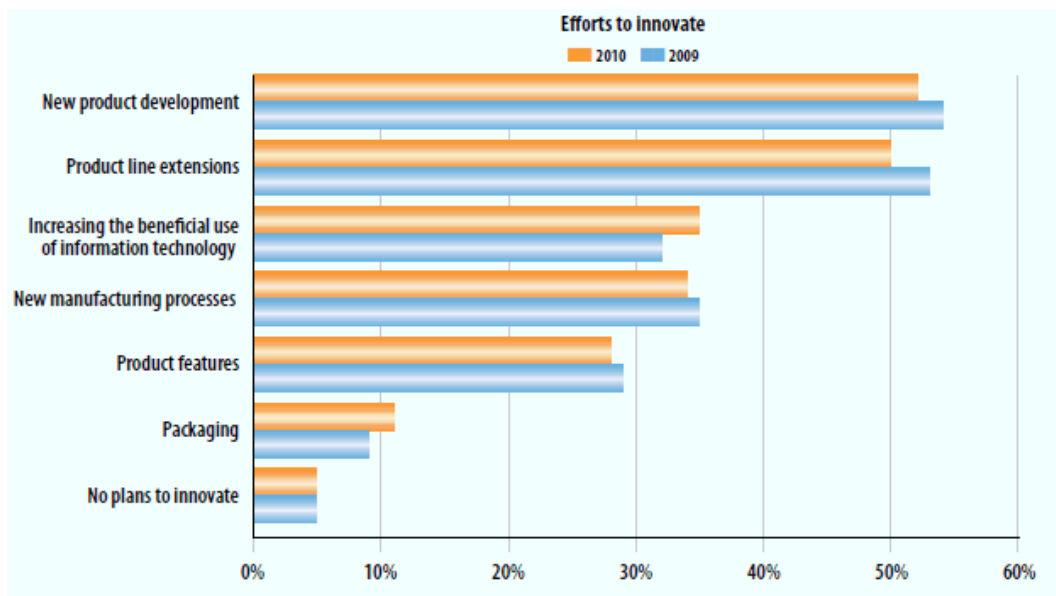
Whether adding to the proliferation of multinational companies, looking to become sustainable or seeking to bring a new product to market, manufacturers are in the process of adapting for the basic and fundamental reason of fulfilling customer need. As of today, some of their efforts are creating advanced alliances, increased communications, innovative techniques, progressive policies and advances in educational systems, whether focused on international or domestic trade. And, their advances are effecting more than their own sector in the process.

This cross-pollination to other non-manufacturing sectors of the economy has been defined as the Multiplier Effect and can be attributed to the networks on which the industry relies. Reports from the National Association of Manufacturing (NAM) indicate that each dollar's worth of manufactured goods creates another \$1.43 of activity in other sectors. When reviewing the Multiplier Effect across all industry sectors, manufacturing has the greatest reach and casts the widest net; double that of the service industry. Growth in manufacturing fuels other sectors, aiding in job growth and overall economic vitality. This is why manufacturing has been an essential building block of the national economy for decades.

Innovation & Entrepreneurship

Innovation is an important component of economic development because it produces product extension, new product categories and increased productivity. Successful innovation within the manufacturing industry requires four elements: (1) an environment that encourages idea generation, (2) a structured process that includes measurability to rank ideas, (3) leadership that is open to change and (4) engaged workers that demonstrate buy-in.

The following chart reflects results from a Manufacturing and Wholesale Distribution Survey and focuses on how innovation in the work place is being defined and implemented.



Innovation efforts are currently taking place in several areas related to product line extensions, new manufacturing processes, information technology (IT) and new production development. It continues to be touted in business communications and is increasingly becoming a “silver bullet” strategy (along with sustainable business models) that is aimed at providing possible revenue growth from existing resources. A quick online search results in numerous papers and blog postings regarding business innovation heralds and pitfalls. While many aim for innovation, it can be difficult to obtain when working in steadfast cultures that display a low tolerance for risk or are resistant to change. The need for calculated risk taking in innovation most often results from: an uncertainty of the timeframes needed to produce a measurable result, a lack of return-on-investment (ROI) metrics combined with a need for funding, pre-existing contractual obligations or other unforeseen supply chain logistics, an absence of individuals trained in techniques that foster idea generation, an inability to properly rank ideas for implementation and/or an absence of an established path from concept-to-market. Those adept in identifying and fulfilling business needs as they arise, through open collaboration (often through unique partnerships), appear to have higher rates of success.

According to a recent survey, new product development is the top innovation focal point for 548 of the responding companies. Executives at these companies say the top challenge to innovation is rapid implementation from concept-to-market, with 46 percent confirming it is a struggle. 21 percent of leaders say this is a previous challenge their companies have overcome. The next challenge is the ability to turn ideas into commercially viable products that address existing consumer needs.

The following chart reflects percentage of responses in regards to challenges of new product development:

CHALLENGES OF NEW PRODUCT DEVELOPMENT		
	Yes, currently a challenge	Yes, previously a challenge that we have overcome
Rapid Implementation from concept to market	46%	21%
Ability to turn ideas into commercial products	34%	22%
Ability to identify needs of the marketplace	32%	22%
Supply chain	30%	23%
Creating an environment that fosters idea generation and creativity	28%	22%
Available funding	26%	19%
Commitment by company ownership and/or leadership	9%	8%

High-Tech Company Roster Built on Innovation

With industry leaders like Microsoft, Amazon, The Omni Group, Boeing, Expedia and many more (combined with the research and development arm of our state university system), Washington houses a rich system that can support and encourage innovation on various levels. These innovative attitudes and attributes can benefit all businesses.

To clearly see the state's potential for innovation within industry, one need only to look to the high-tech sector. For five consecutive years, Washington's high-tech industry has added jobs; up 9,300 for a total of 186,800 in 2008. This represents a five percent gain during a period of recession that stands clearly ahead of the one percent gain reported in the state's private sector workforce in 2008. (For the sake of comparison, the national snapshot shows that high-tech industry lost 245,600 net jobs in 2009—equating to 5.9 million workers.)

The state's largest high-tech sector is software publishers, which grew by 3,200 net jobs for a total of 50,700 jobs. Washington continued to rank first in the country in this sector. Computer systems design and programming services saw the largest job increase in 2008, adding 3,300 net jobs to Washington's economy.

Other high-tech sectors that experienced significant growth in 2008 included:

- Engineering services at 2,100 net jobs
- R&D and Testing Labs at 500 net jobs

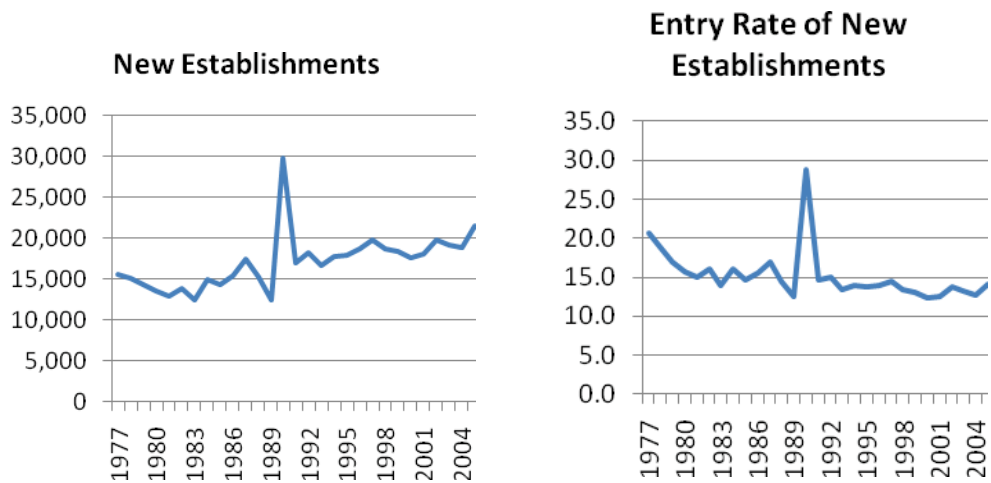
A focus on engineering sciences and technology enhances sustainable social and economic development through addressing societal needs in innovative ways. Engineering branches most often address aerospace, chemical, civil, electrical and mechanical engineering that make improvements to the status quo through applicable problem solving. Progress in science, mathematics and technology should be supported where possible.

Strong Rate of Startups and Patents

Business startups are an important indicator of economic vitality. When comparisons are made across peer groups, it is often considered a reliable indicator of a pro-business climate resulting from regulatory efficiency. The supplemental drivers for startups are made up of: business cycles, availability and cost of capital, market growth and the competitive structure of industry.

Washington has shown a steady upward sloping trend in the number of new business startups over the past three decades, with the exception of a spike during a brief period in the early 1990's. This steady entry rate of new business infusion represents approximately 15 percent of all businesses over the past two decades.

Washington State Business Startups, 1977-2005



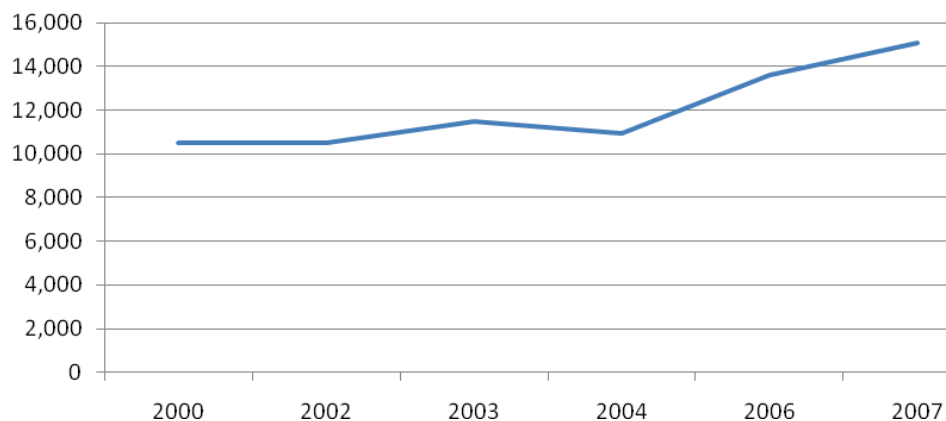
Notable R&D

The formal technology transfer process captures intellectual output from research and attaches appropriate intellectual property rights so that inventions, copyrighted works and technical information may be licensed to companies or used directly by the public. Technology transfer is another avenue through which the university system shares resources with the public. Discoveries in research can lead to large-scale innovation when it has the opportunity to be broadly adopted by multiple stakeholders. Offering the tools of innovation to the marketplace, state universities, containing vast amounts of information, have the potential to support state economies in more ways than education, community development or the proliferation of the arts. Finding innovative ways to effectively utilize this wealth of knowledge that exists could lead us to the next product that impacts the marketplace or world. Intellectual property rights are a constant cause for debate and should continue to be reviewed and refined in an attempt to protect individual rights while also benefitting others through a reliable distribution system.

The following chart shows that, since 2004, Washington state has received incremental increases in R&D funding.

Washington State Total R&D, 2000-2007 (\$ millions)

Source: AAAS, NSF, 2000-2007



Innovative Partnership Development

The Washington State Department of Commerce has developed a statewide program that is intended to fund innovative partnerships for the benefit of the state and businesses within it — titled Innovation Partnership Zones (IPZ). These partnership zones capture the rewards of collaborative effort by making the most of fundamental support systems. The result is state government, education, non-profits and industry gathering to discuss, develop and implement strategies to create innovative solutions that address the needs of emerging technologies, a variety of industry sectors and harness the potential within our state.

There are currently 12 IPZs operating in the state. They are actively working with university researchers, developing prototypes with their private-sector partners, providing internship opportunities for students, incubating startup companies, developing critical training programs, and pulling technologies through technology transfer.

The STARS program (Strategically Targeted Academic Research) is also aimed at innovation and partnership development with a targeted focus on research, technology and private business. The Washington Economic Development Commission, the Higher Education Coordinating Board and the Washington Education & Training Coordinating Board are actively recruiting entrepreneurial-minded researchers that serve as industry leaders to the benefit of regional businesses.

Another advancement in collaborative leadership can be seen in the Entrepreneurs in Residence (EIR) program that's focused on linking the rich resources from research institutes to business for the creation of market-driven products. The UW Center of Commercialization has had a positive regional impact when partnering and integrating with entrepreneurial advisors adept in product development and placement.

☑ Innovation & Entrepreneurship Action Items:

Establish Metrics

There are many components that make up manufacturing, whether it's the supply chain, internal processes, policy and regulation or the workforce itself, understanding how things have progressed and where they might evolve will determine how the metrics should be established and the support systems that will be needed to support growth. The Washington State Data Mining and Analytics Council (mentioned above) is working with experts in data mining and analytics while bringing state organizations, industry and education to the table to review the value of collaborative efforts and the resulting data.

Support Data Sharing for Robust R&D

This paper strongly supports the economic value of R&D and the leadership capabilities of the university system in contribution to data gathering. The potential synergy created between these factors is evident and is amplified when a culture of innovation exists. To enhance and stimulate growth for R&D for the betterment of thought leadership, it is essential that the state provide an environment that supports and encourages the SME (small and medium enterprises) through the sharing of research findings, to foster and grow their myriad ideas towards a viable product or

service. R&D, as an early stage of development within the innovation ecosystem, can lead companies to grow exponentially, and as a result, boost the economic development goals of many communities to the betterment of the state.

Started in the 1970's, applied to the masses in the 1990's and rapidly gaining ground in the 2000's, the information age has provided of the instant access the network was designed to afford. The result has been an equally rapid advancement in technology, the advent of social media, increased collaboration in open forums and myriad options for goods and services. Over the past decade, as more and more people populate the internet, most are turning to content management tools that narrow their focus and customize their experiences — promptly cutting out poor communicators. Stakeholders would be best served to cater to the expectation set forth by communication standards established and maintained by Generation X & Y users when developing web-based communications. The virtual environment supplements regular communications for many and offers business owners and workers a cost-efficient means to consult with peers, openly ideate, conduct research and connect instantly to support peer groups or personal interests. Streamlining data, displaying transparent behavior, developing end-user relationships through real-time dialogue and allowing for customization through personalized data bases, will foster data transfer, innovation and loyalty. Investments should be made in state-of-the-art communication systems when possible to remain relevant, to encourage technological advances and to foster innovation.

Draw Talent and Investment

Washington's spirit of innovation has equity that transfers well in the global marketplace. It is for this reason that Washington should strongly promote this core attribute to state, national and international audiences in a concerted, consistent and memorable way that displays the state's intrinsic culture of innovation. Evidences like the existence of STAR programs, the availability of R&D, state leadership in defining the new emerging green economy, the roster of innovative companies and key infrastructure investments (atop the accolades of reputable media sources regarding an innovative climate) can draw talent and investment to the state. With Washington's natural resources, deep water and skyway ports, an extensive rail system, highway corridors and close proximity to international markets, the state contains many support systems for innovative and entrepreneurial efforts.

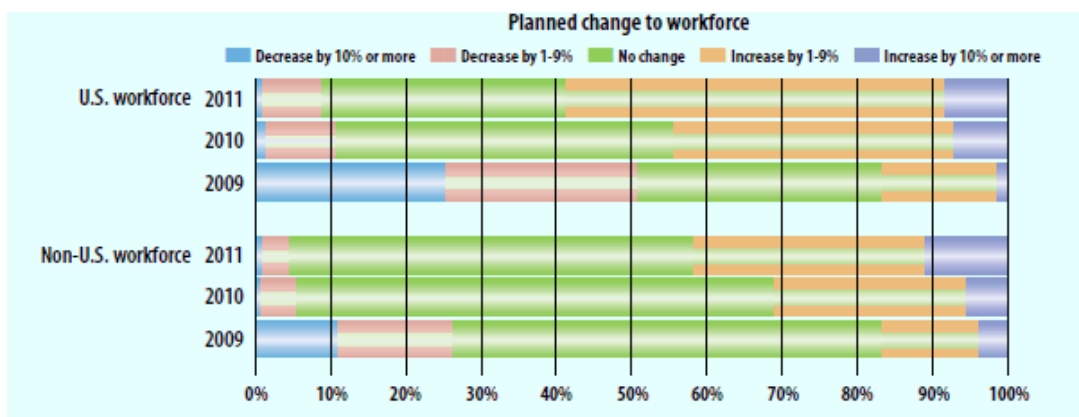
According to a 2007 U.S. Department of Commerce report, through the Bureau of Economic Analysis (BEA), Washington state saw foreign controlled companies employed over 90,000 workers, a total of 3.6 percent of all jobs in the private sector. A quarter of these were directly related to manufacturing, totaling 7.7 percent of all employed. Major foreign investors can be seen in the following countries: Canada, Germany, United Kingdom and Japan.

Economic and job growth can be had through drawing talent and capital to Washington state. Many factors that can greatly contribute to economic success in the newly emerging marketplace can be found within Washington.

Workforce

Talent and workforce development is the underpinning of a strong economy and is one of the most valuable resources within the manufacturing sector. Employing and retaining a skilled workforce is a manufacturer's greatest expense, with turnover requiring substantially more capital. Manufacturing, despite job losses, is still vital to regional economies throughout the nation due to the aforementioned Multiplier Effect of the industry.

More than 11 million people are working in manufacturing today across the U.S., and many firms report that they are starting to bring on new workers, now and into late 2010, with continued expectations for increased hiring into 2011. Results from the 2010 Manufacturing and Distribution Wholesale National Survey, conducted by RSM McGladrey, captured respondents' feedback on workforce development issues into 2011.



Higher education for our citizens has been a priority for Washington state leaders, in hopes that the region will be able to meet the needs of industry. Education statistics show that the state has the highest amount of college graduates, of all levels. This is partly due to Washington's major industries, some of which are directly tied to or influenced by the manufacturing sector. Data shows a higher percentage of bachelor degree holders, at 27.7 percent, compared to the national average of 24.4 percent and high school graduate ratings at 87.1 percent as compared to the national average of 80.4 percent.

Washington state houses a diverse inventory of colleges that support manufacturing to various degrees—some hosting programs designed towards specific sub-sectors, while others take a broader approach through teaching foundational entry-level skills. State colleges offer a wide range of programs that support their local industry needs but lack the unified statewide front needed to define and drive a comprehensive credentialing initiative that will meet state or national demands. Recent collaborative efforts, driven by grants provided by the Gates Foundation, the National Association of Manufacturing (NAM), the NAM Institute and the Washington State Manufacturers Commission (WSMC), (each informed by stakeholders representing industry, state government and education on state and/or national levels), have motivated colleges to work across borders to gain traction in providing a meaningful level of standardization. While efforts are underway, recent budget cuts have slowed or halted these preliminary advancements.

Job Loss

Manufacturing made up nearly 7.5 percent of the state's workforce in 2009. Data collected by the Employment Security Department's/Labor Market and Economic Analysis division (ESD/LMEA), shows the goods-producing industries of construction, manufacturing, mining and logging, as carrying a disproportionate amount of the job losses — a trend that is seen throughout most of the recent recession. Over the year, almost all employment losses within manufacturing came from its durable goods component, which lost 9,000 jobs overall. Among durable goods producers, the transportation and equipment manufacturing industry lost the greatest number of jobs, with most of those losses coming from aerospace.

The state's manufacturing sector is divided into 12 regions for a comprehensive, yet easy to review, perspective. The following table quantifies the percent of workers that are employed in manufacturing, along with sub-sector cluster type:

Washington State Manufacturing Jobs By Region

Benton-Franklin Region		6,606	6.2% of regional workforce
Counties:	Benton, Franklin	Equipment, food and product	

Eastern Partnership Region		5,499	9.9% of regional workforce
Counties:	Asotin, Columbia, Ferry, Garfield, Lincoln, Pend Oreille, Stevens, Walla Walla, Whitman	Wood product, transportation equipment, paper, computer equipment, printing	

North Central Region		7,133	6.6% of regional workforce
Counties:	Adams, Chelan, Douglas, Grant, Okanogan	Food, equipment, metal and paper	

Northwest Region		14,412	9.8% of regional workforce
Counties:	San Juan & Island, Skagit, Whatcom	Electronic/computer, parts, publishing, wood products and transportation equipment	

Olympic Region		4,251	3.7% of regional workforce
Counties:	Clallam, Jefferson, Kitsap	Transportation equipment, computers, wood products and publishing	

Pacific Mountain Region		11,102	6.7% of regional workforce
Counties:	Grays Harbor, Lewis, Mason, Pacific, Thurston	Forest products, seafood and transportation equipment	

Seattle-King County Region		102,418	9% of regional workforce
County:	King	Software and aerospace	

Snohomish County Region		52,404	21.55% of regional workforce
County:	Snohomish	Aerospace and electronic/computer/medical	

South Central Region		8,463	6.9% of regional workforce
Counties:	Kittitas, Klickitat, Skamania, Yakima	Aerospace and transportation equipment	

Southwest Region		17,574	10.7% of regional workforce
Counties:	Clark, Cowlitz, Wahkiakum	Industrial machinery and food products	

Spokane Region		15,060	7.4% of regional workforce
County:	Spokane	Metals	

Tacoma-Pierce County Region		166,126	6.2% of regional workforce
County:	Pierce	Concrete and material	

Washington state holds a robust sub-sector breakout with 8,000 companies classified as manufacturers. An additional 12,000 companies make up elements of the supply chain.

Washington state workers average \$18.27 per hour. In order to compete in the global arena, companies have chosen, and are continuing to choose, to outsource jobs to low-wage nations like Mexico and China. Free trade agreements, like the North American Free Trade Agreement (NAFTA), have encouraged global market growth. Americans are forced to compete with China's 113 million manufacturing workforce, with averaging wages of around .81 cents-per-hour — just three percent of U.S. hourly rates. Even neighboring countries like Mexico, employing 10.7 million industrial workers, averages approximately \$2.92 per hour, also a fraction of U.S. wages.

Atop significant job loss through outsourcing, new technologies and efficient delivery systems have been the focus for many companies across the state, thus eliminating the need for what once were vital production positions. While technology has replaced some jobs, it is also creating the need for a higher skilled worker that is familiar with system advances currently underway. Technological changes have impacted every phase of manufacturing resulting in a critical need for technically competent workers that can manufacture complex products and adapt to new processes and work models. This is a primary concern and disconnect as manufacturers move away from traditional supply chains established in the late 1980's and early 1990's. For the most part, manufacturing environments are no longer “dirty industry” but clean and modern workplaces that use cutting edge technology.

An Aging Demographic

There are equal concerns when it comes to the nation's aging demographic. NAM predicts that if current trends continue, the U.S. will face a shortage of 13 million skilled industrial workers by 2020. Employers, state government representatives and educational leaders share similar concerns about the future of manufacturing in Washington state. While manufacturers look at ways to train their workforce in new technologies in an effort to fill existing positions, they face the dilemma of properly transferring knowledge from one workforce demographic to the next. The current system, one designed to promote higher education, lacks focused career pathways and will increasingly fall short on delivering middle-skilled technically trained workers from which to mentor.

Part of the solution can be found in apprenticeship programs that capture transferable onsite worker knowledge along with customized training from the community college system to addressing skill gaps.

Workforce training strategies would ideally make use of industry-approved skill standards and credentialing programs to instill foundational and specialized skills (though, as stated above, none currently exists on a local or national level). A key component will be helping educational institutions make the connection to industry to create effective and efficient delivery systems to train new-, dislocated- and incumbent-level workers. All three worker types will need equal representation when formulating policy and regulation that directly provides incentives for educational institutions and their strategic work plans to provide targeted training that would be of benefit to the sector that is in dire need of specialty occupation training programs—including revitalized and updated apprenticeship programs that provide industry-recognized, portable specialty skill credentials. Specializing in one area is no longer the path for a skilled worker. As with all industries, there is an increasing need for specialists that are broad in their disciplines. These valuable individuals can be referred to as “system thinker” that demonstrate a high degree of situational awareness that benefits the outcome of the whole.

Apprenticeship programs have decreased dramatically in number and size over the past decade. These programs were created to advance technically proficient workers and they remain a viable strategy in transferring on-the-job knowledge to the new workforce as they enter their careers. Due to economic hardships and financial instability, many employers have become reluctant in investing in workplace training. There are costs associated with the effort (though data suggests that it costs much more to replace a worker than to train one) and the reworking of the supply chain that may negate positions. This development has reduced the number of qualified workers that are able to replace the retiring skilled trade's employee.

Industry, education and state leaders make up the Washington State Manufacturers Commission (WSMC) and are working to review and customize systems like the NAM stackable credential for implementation into Washington's community and technical college system. Work is currently underway through a sponsorship grant provided by the Gates Foundation and moves into a second phase for 2010/2011.

The pipeline for future workers is a mounting concern as experts and business owners continue to wonder where the industry's future workforce is going to come from. What implications do we face with the growing age gap and the rapidly retiring workforce coupled with fewer qualified job applicants? Naturally, this is a rising concern of industry and state leaders across the nation. In response the state, through the work of non-governmental organizations (NGO's) and state government, has started to foster K-12 programs aimed at promoting the attributes of the manufacturing sector.

Washington Business Week (WBW) launched a GET AMPT! manufacturing program as an extension of their current business curriculum. The Get AMPT! program was specifically created to address the demand for high-skill employees that can service the aerospace, marine and process technology professions (AMPT) found within the state. The WBW program promotes a hands-on learning experience through the application of free-enterprise education aimed at introducing students to in-demand occupations.

FIRST Robotics, For Inspiration and Recognition of Science and Technology (FIRST), has seen an increase in participation among young girls and boys alike. Its mission is one of inspiring young people to be science and technology leaders and fortifies their efforts through promoting teamwork, innovation and communication.

Inspiring Girls Now In Technology Evolution (IGNITE) invites young girls to consider a career in technology, once thought to be of primary interest to boys. As technology is becoming increasingly familiar and everyday, IGNITE is inspiring girls to take on challenges in science and engineering. This under-tapped resource can lead to strong futures in the world of manufacturing.

Another model that promotes pathways into industries, like manufacturing, can be seen through the 13 Skills Centers within the state. Skills Centers ensure that all students acquire leadership, academic, and industry-defined skills. They are regional secondary schools that provide extended, industry-defined technical education and are preferred by many for its relevant, customized approach that results in workforce placement and advancement. These examples have a high level of success and can be modeled to promote pathways for future workers. Even though these platforms host thousands of students each year, annual attendance is a fraction of what it could be.

Recruitment and Training Models

As touched upon above, advanced technology and new work processes have added to the skill requirements of most manufacturing occupations. Employers are seeking affordable ways to finance training for incumbent workers. Workers need specialized training to help them retain the higher paying jobs within their firms and industries. In order to become compliant to meet the needs of larger corporations, there is increased demand for specialty certifications as small and medium enterprises (SMEs) prosper. Due to increased global competition, specific certifications are required to do business within emerging systems and costs for this training and resulting certification are on the rise and becoming commonplace for compliance. SME's have fewer resources to commit to training programs and/or new employee recruitment efforts. To promote cost-effective new worker recruitment and incumbent worker training within these smaller firms, initiatives that aid in common training, assessment, and screening, for jobs at small and medium size manufacturers are especially important, as the SME makes up the majority of job growth across the nation.

Respondents from the statewide Manufacturing and Wholesale Distribution Survey, conducted by RSM McGladrey and the AWB Institute, identified skilled labor recruiting needs for 2010. Anticipated business growth will drive demand for these workers in 2011. (The results below compare Washington state respondents to the national average.)

Please indicate your company's level of need for each of the following qualified, skilled positions: [Companies with manufacturing-only operations]

	Not a position at our company		Urgent need		Need		No need	
	Nat'l	State	Nat'l	State	Nat'l	State	Nat'l	State
Entry-level workers	3%	5%	5%	2%	41%	55%	51%	39%
Machinists	13%	9%	5%	5%	28%	36%	54%	50%
CNC machinists	16%	9%	6%	2%	24%	20%	55%	68%
CNC programmers	16%	9%	4%	2%	20%	16%	60%	73%
CAD/CAM technicians	13%	14%	3%	0%	20%	14%	64%	73%
Welders	15%	17%	5%	5%	21%	14%	59%	64%
Tool and die makers	20%	16%	2%	0%	13%	9%	66%	74%
Engineers	7%	5%	11%	7%	37%	35%	45%	53%
Supervisory personnel	1%	2%	4%	9%	33%	34%	61%	55%
Quality control personnel	1%	2%	7%	9%	30%	32%	61%	57%
Salespeople	1%	2%	8%	5%	39%	32%	52%	61%
Accounting personnel	0%	0%	2%	5%	20%	20%	78%	75%
IT personnel	2%	2%	3%	2%	22%	23%	73%	73%

☑ Workforce Action Items:

Develop Statewide Training Platform

Washington state, through the efforts of the State Board for Community and Technical Colleges (SBCTC), the 34 community and technical colleges and NGO's (like the AWB Institute), is working to find innovative ways to connect business to education and the converse. While not all educational institutions offer manufacturing programs, the vast majority of those that do are working with businesses within their communities to customize curriculum to fit the needs of the current and future workforce. In some cases, success is had on a consistent basis. But when looking to review implementation and progress of manufacturing training programs statewide, demand surpasses supply by a substantial margin.

Studies are underway to determine if the community college system, operating in its current structure can respond within a reasonable timeframe to the demands of industry. Washington has successfully launched innovative programs that are currently being tested and reviewed. The efforts include programs like: I-Best, Life Long Learning, skills panels, soft skills curriculum integration, focused technical training, and now the pursuit of a NAM stackable credentialing system.

In response to K-12 needs, Skills Centers like the New Market Skills Center offer high school student an opportunity to focus on an industry-specific skill set that allows direct entry into the workforce with applicable knowledge directly out of high school. Upon review of Washington's assets that support manufacturing, there are numerous and admirable advances that are backed with positive results (see also IGNITE, GET AMPT! and FIRST Robotics mentioned above). But, they are hampered by a lack of synergy and, in their current form, cannot be implemented statewide with any certainty of success.

In summary, the current availability of programs is limited and they do not address the overarching need that the state faces in the near- or long-term future. While these programs are making an impact, they are not systematized for seamless statewide application, and results are measured in individual accomplishments that will not create the stronghold of workers needed to fill vacated manufacturing positions. The challenges before the state call for a consolidated and potent approach.

Align Education and Policy with Business

The college system, with its current operational protocol that's required for large-scale operations, is slow to evolve. When reviewed as a whole, the organizational structure shows a weakness is rapid response to industry needs — a characteristic

that may be more apparent due to the current shifts caused by emerging markets, global competition and fluctuations in the financial market. The result can be an outmoded curriculum that produces a worker that does not have practically applicable skills. The emphasis on entry-level jobs as compared to hi-tech jobs, operations and executive positions, should be as important as the next as they fulfill needs for the advancement of the communities, or countries, in which they serve. When fortifying and enhancing the current infrastructure through crafting policy that promotes near- and long-term community gains, multiple ranges of skill should be identified and taken into consideration when directing funds to program development that displays integrated sustainability and effective change management measures.

Layoffs are a part of the manufacturing landscape and employment opportunities exist in the sector for those with relevant skills. To address this challenge, workers and employers need:

- Apprenticeship or skills standards programs that provide portable, industry-recognized credentials to help workers access available jobs and help employers find skilled workers.
- Mechanisms to assure that laidoff manufacturing workers can promptly identify manufacturing jobs and training platforms available in their regional labor markets.

Recognizing workforce needs within the manufacturing sector will help policy makers, educators and industry leaders define the means to enhance and motivate existing and future employees, and provide the business community with a comprehensive approach to accessing workers in respect to their disciplines. While approaches differ among state government, education, nonprofit and the business community, all share common threads that can align work plans for a productive and adaptable workforce.

The following categories encapsulate the approach to supporting the system. Until all three pillars are able to find the commonalities, inefficient results typically occur. Common-use language that represent goals (derived from representatives within each sector) are identified in the breakdown below. It is offered to aid in understanding the various fronts that are of importance to each partner. Learning to incorporate each, in an effort to define efficient and measurable work plans, will be essential as each party requires measurable deliverables and incorporates their own understanding of compliance to funding origins. As elementary as this approach may be, the coordination of effort and communication skills are far from easy. This is where clear communications and thought leadership efforts can play a important and far-reaching role.

State Government Approach to Workforce Development:

- Develop home-grown talent
- Build a strong framework for the coordination of economic and workforce development
- Ensure that K-12 schools are preparing students for postsecondary education and work
- Improve the output of Washington's postsecondary system
- Ensure that working adults can learn new skills and move up a career ladder
- Communicate the need for change, discovery, life-long learning, and entrepreneurship
- Facilitate job transitions and continue modernizing unemployment insurance
- Strengthen apprenticeship programs

Education Approach to Workforce Development:

- Find ways to align curriculum with the business community's need
- Invest in research and development
- Seek out funding to expand training programs and services
- Find new ways to expand on capital investments
- Increase networks for industry-based training providers
- Expand training opportunities for future hires and incumbent workers

Industry Approach to Workforce Development:

- Find ways to measure and enhance performance-based soft skills
- Find ways to measure, access and enhance technical skills and certifications
- Find ways to measure, access and enhance leadership skills training
- Succession planning (positioning new and existing employees to become the new leaders, not centering leadership around any one individual, creating a diverse platform to mirror a diverse global market)
- Find ways to invest in their workforce without losing a competitive advantage through an offset in pricing

Leaders in these areas are making decisions surrounding sector approaches, and while the current economy is encouraging collaborative efforts for the purpose of gaining efficiencies required by the current economy, stakeholders demonstrate the proclivity to work in silos, as was done in the past. When leaders within these groups are fully aligned and communicating, their ability to adapt and overcome in the global market will lead to a better-served community. One that provides streamlined communications, allowing workers, businesses, educators and state officials to act in real time for maximum impact and recovery times.

Identify Skill Gaps

Much debate has taken place recently as to the diminishing numbers in employment over the last two decades and what it might mean. Is our nation losing our manufacturing capabilities or is it doing business in a different ways but measuring with antiquated metrics? Given this change, analysts continue to stay the course in the way they measure workforce and economic needs. Further discussion between state government, education and industry leaders surrounding data mining and analytics will need to take place to reassess the way the manufacturing industry is measured and reported upon — allowing for an accurate view of the full effect (see Multiplier Effect above). Once leaders have established reliable Executive Information Systems (EIS), that can track and report activity within the sector, they can adapt to strategies with sound policy, regulation, and education that support growth objectives. Data mining and analytics is the foundation on which proactive business intelligence is based.

Current formation of the Washington Data Analytics Council (WDAC) brings data mining and analytics experts representing the three pillars together to look at new ways to use and disseminate information, as related to economic data. Data delivery systems are currently being designed to meet the needs of state government, education and industry. Areas of interest could surround county-by-county demographics related to education and training, in comparison to the surrounding industry clusters. Education and outreach are a priority. Business leaders, state officials and educators will be fortified by a solid and widely informed and accepted credential. Where questions are unanswered, new metrics can be formed to identify needs. Since the recession, there has been a surge of data sharing. While it seems to come from many angles, a statewide initiative that reports pure data, in an easy-to-understand way, would be of benefit to many who are looking to strategically address the hard questions that continue to need attention in the current state of slow recovery. At the same time, data has become more relevant in the public eye and what was once an intimidating resource is now becoming easier to access and increasingly user-friendly due to the communications industry's increased use of infographics. Every effort should be made to work from commonly accepted and real numbers to inform Washington state strategies.

Position Manufacturing As Dynamic

In order to bring new workers on line, perceptions of the industry as a whole must change. Most communications efforts do not include a strategic communications plan that includes internal, or external, measures aimed at brand positioning that builds preference over competitors; whether they be other brands or other industries. As manufacturers roll out new programs aimed at stimulating the industry, they would be best served to target the candidates they prefer with messages that resonate with the audiences preferences, over their own. The consequence of not branding oneself and the industry in its best light is increased turnover rates, lackluster recruits, a lack of company culture and obscure leadership. If not told that manufacturing is a viable career that offers high-wages, career advancement, clean and safe work environments, camaraderie, job security and strengthens the state like no other industry, potential candidates may never know. General industry advertising and promotion is warranted for a clear and clean perspective of manufacturing.

Through NGO's, Workforce Development Councils (WDC), education channels and state organizations (like the Department of Commerce), strategic campaigns that produce targeted communications materials. Messaging should be aimed at the needs of the various target audiences (youth, dislocated and incumbent workers) and be delivered through the vehicles of the target's preference. This effort could have the added effect of serving as a recruitment tool for businesses interested in relocating their company, as well as supplementing efforts of Washington's current manufacturing base.

Furthermore, the state's roster of innovative companies is so impressive it often find's itself ranked as a top city for business in respected and well-circulated publications like Forbes, Kiplinger, Fortune, Money and Fast Company. The momentum created by these listings serves as a solid jumping point for building a discussion with potential new businesses, existing businesses and potential new hires. Washington is well positioned, through the equity of its culture and business base, to promote innovative advances in industry.

Infrastructure

Washington's infrastructure is a strong attribute in its own right. The state supplies various climate zones and geographic features that can suit a variety of market needs for manufacturers. Logistics management, a critical component of any manufacturers supply chain, is of paramount concern due to its effect on the bottom line. Being able to supply varied options in the way of moving product to market is a strong competitive advantage.

“Soft” infrastructure that maintains economic, cultural and social standards through systems like that found in public services are varied and comprehensive. Financial services, education and government systems are supported and are becoming increasingly relied upon by manufacturers.

The state's infrastructure, as a whole, requires a continuous and systematic review of capabilities and new market demands to remain relevant. In Washington, new systems like smart grid technology, wind power, hydropower and electronic highways are currently entering into various stages of implementation. Continued investment through both federal and state funds are imperative to meeting the market demands of the industrial sector and the customers they serve.

Improving on Infrastructure

Strategic advancement has taken place over the course of 2009/2010 to bring leadership to the discussion of developing and implementing strategies to enhance the state's infrastructure. As innovative solutions and emerging markets look to delivery systems that expedite business objectives for corporate health and vitality, the state will be pushed to comply with market demands to gain their positive economic impact. The Clean Energy Leadership Council (CELC), created by Senate Bill 5921 in 2009, has been created to directly address infrastructure needs and trends as they relate to a clean energy economy.

The primary goal of the council will be to develop a plan to bring economic development and job creation to the state through the clean energy sector. In order to fulfill this mission, the council has plans to contract with a reputable national expert in energy policy and market conditions to guide in conducting a statewide analysis. This study is meant to identify energy industry strongholds that should allow Washington to successfully lead efforts and grow the state's economy. The final report, which includes actionable recommendations, is due to the Governor by December 2010.

Another infrastructure initiative takes the form of an “electric highway”. The Washington State Department of Transportation (WSDOT) and Washington States Department of Commerce are teaming up to implement the nation's first “electric highway,” an initial network of public access electric vehicle (EV) recharging locations along Interstate I-5. Once implemented, Washington will have the first border-to-border highway to offer fast charge technology. This alternative

transportation investment can have a positive impact on the manufacturing cost of transporting goods to market. The project meets State Energy Program and Recovery Act funding goals to save energy, reduce dependence on foreign oil and provide long-term economic benefits.

According to the statewide Manufacturing Wholesale and Distribution Survey, Washington manufacturers rate above average for companies experiencing an increase in revenues due to green activities. Green initiatives take the form of improved energy efficiencies in operations through reducing energy and fuel consumption and analyzing recovery and looking to reuse or resources. Compared to the rest of the nation, Washington is leading the way when comes to using products with recycled materials and designing product or components capable of being recycled. This change in the industry leads to new product development that is opening new doors to new markets. The following charts display sample questions in relations to efforts to support innovation:

Into which of the following areas is your company placing most of its efforts to innovate? (Select all that apply.)

	Nat'l	State
New product development	52%	43%
Product line extensions	50%	48%
Product features	28%	29%
Packaging	11%	19%
New manufacturing processes	34%	45%
Increasing the beneficial use of information technology	35%	39%
No plans to innovate	5%	3%
Other	4%	6%

Has your company experienced any of the following challenges when implementing successful innovation in your organization? [Companies with Innovation efforts]

	Yes, currently a challenge		Yes, previously a challenge that we have overcome		Not a challenge / Not applicable	
	Nat'l	State	Nat'l	State	Nat'l	State
Available funding	26%	29%	18%	19%	56%	52%
Commitment by company ownership and/or leadership	9%	9%	9%	6%	82%	85%
Ability to identify needs of the marketplace	29%	20%	22%	17%	48%	64%
Creating an environment that fosters idea generation and creativity	30%	23%	22%	19%	48%	58%
Ability to turn ideas into commercial products	30%	21%	18%	12%	52%	68%
Supply chain	29%	24%	21%	25%	49%	51%
Rapid implementation from concept to market	38%	32%	18%	10%	44%	57%

☑ Infrastructure Action Items:

Continue Partnership Development

For business within the manufacturing sector, it is *their* responsibility to engage government and education directly, or through third party representation, with clear objectives regarding workforce, regulation and growth potential. It is also the responsibility of leadership within manufacturing organizations and associations to help guide and inform the metrics which government and education utilize in their overall assessments. This transfer of pertinent information can be done through responding to surveys and participating in approved and supported boards, committees, task forces, leadership councils and general advisory groups.

The information age is giving way to a new dawn of social engagement. Customers demand, and most often receive, customized products and services, real-time answers to questions and transparent views into organizations. Technology exists to meet the demand. While still innovative for some, this new levels of relationship marketing (driven by the large profits associated with successful implementation) are becoming a regular course of business for the mass and they monetarily reward those that comply. As manufacturers adopt new technologies to survive and compete in today's marketplace through agile manufacturing tactics, and as the distributors of their products adjust to represent the need of customers and promote product attributes, it is the role of state government and education to do the same. A streamlined approach to communications, one that clearly identifies single points-of-entry to official state government services, is becoming increasingly important. Consolidating state and federal resources could create efficiencies in building a responsive service that supports the efforts of new business while aiding collaborative efforts with those slow to change.

The resulting communications framework, in whatever form it takes, can and should be viewed as part of the manufacturer's supply chain efforts that can lead to competitive advantages in the global market. A clear channel that supports regular efforts to gather or disseminate information is needed to fill the gaps found in industry and acknowledge and/or address them in a business-friendly timeframe. Washington state, with its mass contribution to electronic communications efforts, may be held to a higher standard than other states who are less familiar with technological and innovative advances within the communications industry.

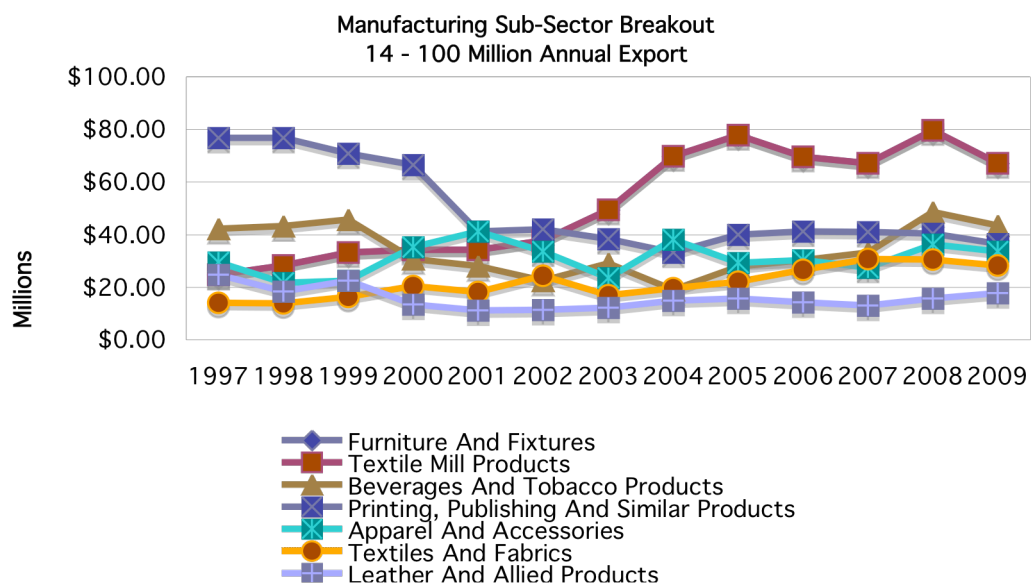
Exports

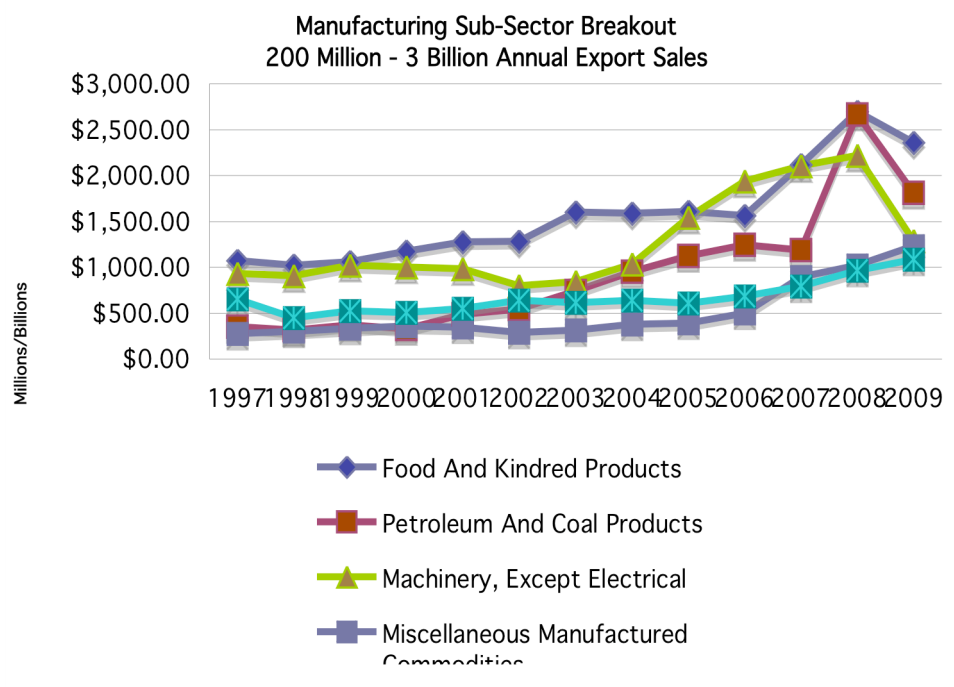
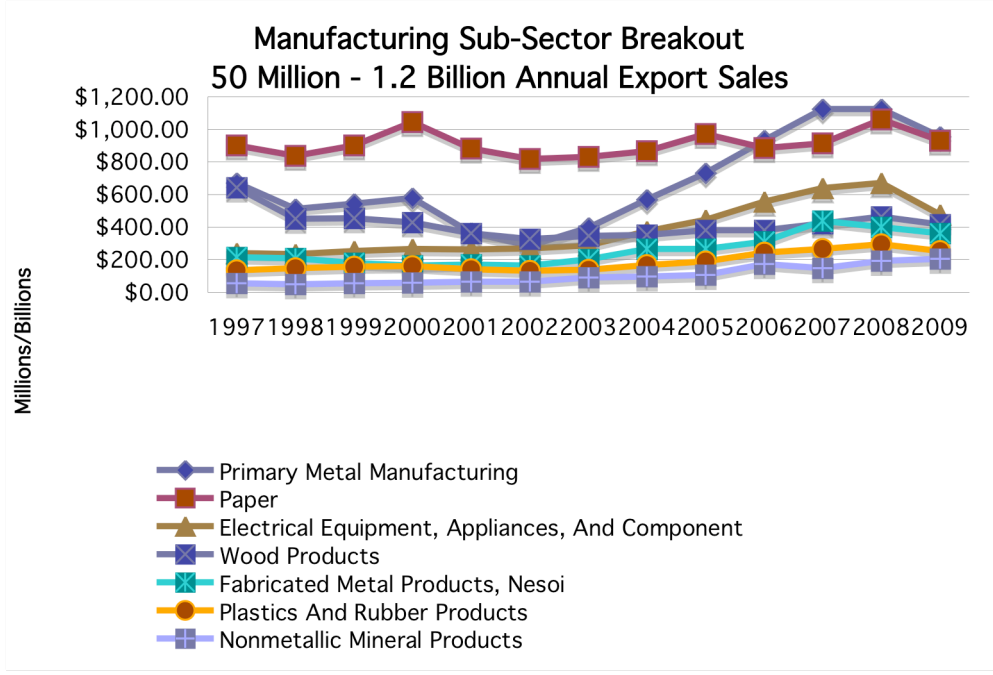
Key factors that help companies increase exports include: (1) an understanding of the global market place, (2) finance support, (3) education, (4) marketing, (5) assembly and (6) logistics. Washington state is positioned to be a national leader in exports due to its proximity to foreign markets and the myriad leaders within established enterprises that have developed prospering relationships and are involved in national-level export policy and regulation efforts. Recent emphasis from the federal government has resulted in state government taking a closer look at exports market and their large-scale financial gains, statewide businesses currently engaged in export activity and the current support services that have been established through economic leadership efforts. State leaders realize that Washington state continues to display a strong potential for growth and would like to double exports in the near future.

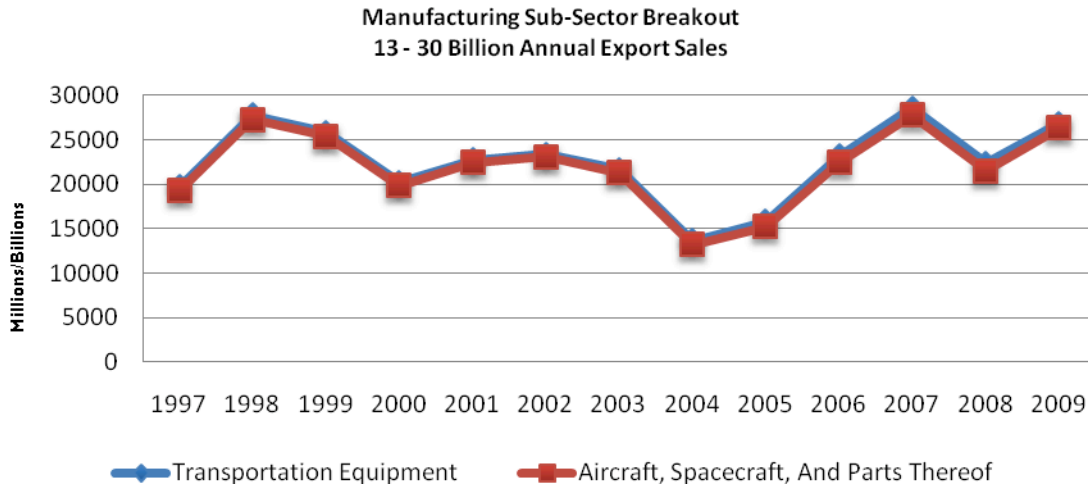
For the SME, the business of tapping into the global economy is daunting. With the expense of international certifications, limited resources, uncertain supply chains and the dynamics of a new marketplace or consumer, the SME is struggling to make the leap required to launch into the global economy. Current statewide initiatives include funding from the Community Economic Revitalization Board (CERB) towards fostering new pilot startups.

Looking at the exports landscape, it is apparent that aerospace-related products top the list of exports though the state's diverse economy produces a wide range of goods destined for international markets. China, Canada, and Japan continue to be the largest export markets for Washington goods, but emerging markets in the Middle East and South Asia have recently become important destinations.

The series of charts listed below reflects annual gross sales in exports which incorporate data from 1997-2009 and are broken out in to sub-sector indicators. (All data was sourced from the Washington State Department of Commerce.)





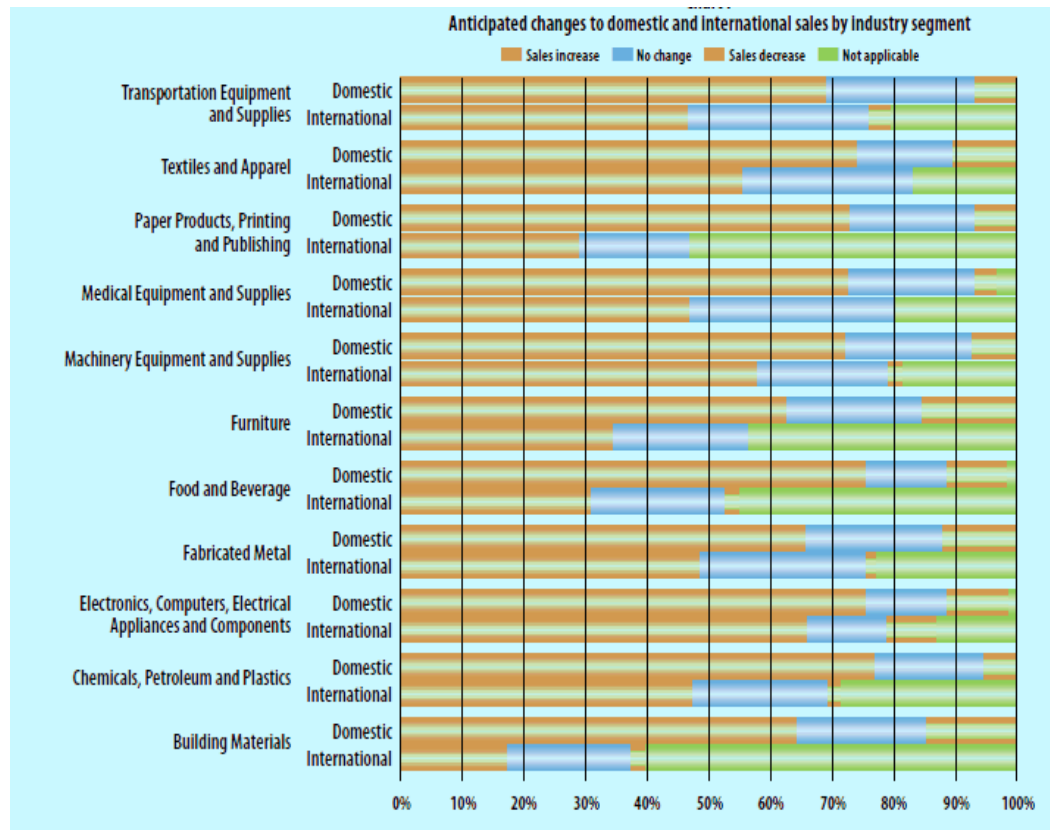


High National Ranking

Washington state places first out of the 50 states in export-related jobs of which 41.4 percent of those manufacturing jobs are directly related to exports. In 2007, it was reported that over 8,000 companies exported from Washington State. 89% of those companies were SME's with fewer than 500 employees. Manufactured goods made up 78% of Washington State's exports in 2008. According to data collected by the Department of Commerce, Washington state exported \$51.7 billion in goods in 2009. Washington ranked 4th among the 50 states (behind Texas, California and New York) for merchandise exports totaling \$51.7 billion in 2009.

According to the statewide RSM McGladrey manufacturing survey, 44 percent of all respondents expect their international sales to increase this year, up from 21 percent in 2009. Meanwhile, only 2 percent of companies expect a drop in international sales for 2010—a decisive turnaround from 2009 when 24 percent of survey respondents anticipated lower overseas sales. This year, electronics and related (66%), machinery (58%) and textiles and apparel (55%) project the highest international sales growth.

It should be noted that the primary beneficiaries of international sales are companies with \$500 million or more in annual revenue, which expect global sales increases of 14 to 27 percentage points higher than their smaller competitors.



Policy & Regulation

Policy and regulation that support large enterprise may not support growth for SMEs. Small- and medium-sized businesses generally have a smaller margin for error due to limited resources, but at the same time, account for the majority of manufacturers. In attempting to align the three pillars of business (industry, state government and education) it is important not to overshadow the equally entrepreneurial efforts of the SME. There is a pressing need for precision policy when addressing issues like funding, compliance, trade agreements and tax regulation to spur on growth in emerging markets.

Favorable Logistics

The state is currently witnessing above-average rates for Washington-based manufacturers who are incorporating global markets in to their marketing strategies. This trend may lead to increases in revenue due to the advances of businesses into emerging markets.

67 percent of respondents, from the statewide RSM Gladrey report, are involved in exports. Nearly half of these respondents report that export sales have increased over the last year with 47 percent of companies reporting that export sales have increased four percent from 2009.

Top Five Export Markets:

Canada	89%
Japan	52%
Western Europe	50%
Mexico	46%
China	41%

Among companies that say increased international sales are key to business growth, 88 percent are anticipating revenue increases in foreign markets. To accomplish this, companies are more likely to broaden their sights outside of traditional U.S. trading partners. An increase reliance on foreign sources is expected to influence the supply chain according to 42 percent of respondents.

Top Exporters from Washington Account for:

China	\$9.1 billion
Canada	\$6.8 billion
Japan	\$6.5 billion
United Arab Emirates	\$2.8 billion
South Korea	\$2 billion

Canada and Mexico remain the most frequent export target markets, at 86 percent and 67 percent, respectively. The number of companies that report exporting to China fell from 41 percent in 2009 to 37 percent this year. But China remains an opportunity for exporters, largely because of its strong economy, increasing standard of living and growing appetite for U.S. products. The most successful exporters to the Chinese market are Electronics and related (60%) and Machinery (50%).

IMPORT AND EXPORT ACTIVITY BY INDUSTRY SEGMENT IN 2009 AND 2010						
	Import			Export		
	2009	2010	Change	2009	2010	Change
Machinery Equipment and Supplies	74%	79%	5%	88%	86%	-2%
Food and Beverage	76%	79%	3%	67%	61%	-6%
Building Materials	91%	87%	-4%	49%	47%	-2%
Fabricated Metal	73%	66%	-7%	76%	85%	9%
Chemicals, Petroleum and Plastics	80%	84%	4%	82%	76%	-6%
Paper Products, Printing and Publishing	68%	81%	13%	71%	46%	-25%
Electronics, Computers, Electrical Appliances and Components	87%	87%	0%	83%	92%	9%
Transportation Equipment and Supplies	77%	77%	0%	86%	78%	-8%
Medical Equipment and Supplies	71%	73%	2%	79%	83%	4%

Year-over-year comparison data not available for the Furniture and Textiles and Apparel industry segments

☑ Export Action Items:

Educate on International Trade

Advancing into international marketplaces, for experienced and novice manufacturers will undoubtedly require a learning curve and the development of new partnerships. Manufacturers are, and will be, seeking information and engaging more frequently with state government and associations that offer assistance. Information that is easy-to-access, and is provided by a reliable and practiced provider, will be vital to helping businesses that are considering advancing into emerging markets. Information on trade events, industry leads, tariffs and taxes, international finance, foreign standards and regulations, workforce issues, logistics, pertinent marketing practices and overall export counseling assistance will be in demand for higher rates of success. All real or perceived barriers-to-entry should be identified and addressed for private-sector investment into the global arena. For the manufacturer, there are many areas of interest but the greatest concern remains the availability and reliability of a global supply chain.

Apply Sound Metrics

It will become increasingly important to develop a metric for the accurate measurement of exports. There are many tiers within export models. Current models do not take into account ancillary businesses (and their workforce) that provide support to those going to foreign markets. By identifying and measuring all variables, leadership will be more able to guide businesses in sustainable diversification efforts that will benefit the economy, as well as increase Washington state's competitiveness over time.

Conclusion

According to the Manufacturing & Wholesale Distribution survey, executives report high levels of concern regarding several legislative issues that could affect business operations. Even though many of these bills have yet to be enacted, the prospect of such changes is having an immediate and direct affect on the nation's economic recovery. Uncertainty can hinder business leaders' ability to evaluate risk and make thoughtful investments in people, technology and capital equipment needed to compete. Washington state is operating within a global economy, whether prepared for the challenges that ensue or not, and a new understanding that draws from valuable experience is needed for policy and regulation that supports growth. Making calculated decisions that solidify primary marketplace contributors, like the four within this paper, will create the most favorable headwind for overall economic growth.

Manufacturing has evolved over time and according to some experts is now in its sixth evolution. As industry has evolved, technology, education and policy has morphed as best they can to offset or support the many changes that have occurred. Today, the modern manufacturer has automation capabilities that ties itself to partnerships across the globe. The no-borders business model is becoming commonplace and is requiring informed and innovative policy and regulation to make the most of new partnerships. Conversations with stakeholders (state government, education and industry) will need to continue to evolve to allow for seamless and responsive systems that benefit the SME and supports the calculated risk-taking that is required for entrepreneurial efforts.

Through research, it would appear that a continual evolution would be the regular course of business in the coming years, as many industries, workers and economies have reached a tipping point where the momentum for change is unstoppable. Stakeholders continue to streamline for reasons of sustainability or gain, causing duplicity of effort and slow-moving processes to be viewed as a luxury that cannot be afforded or bad business practice. The emerging economy is making use of mega-communities that rely upon interdependency, clear missions and open collaboration for innovative solutions, and will ultimately do without single-focused efforts that often result within silos.

As business has adapted to the demands of the market, so must the primary partners that support its endeavor.

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