

FOSTERING WASHINGTON'S INNOVATION ECONOMY

SB 6015 REPORT

REPORT TO THE GOVERNOR & THE WASHINGTON STATE LEGISLATURE

LIFE SCIENCES AND INFORMATION & COMMUNICATION TECHNOLOGIES



NOVEMBER 23, 2009



Department of Commerce
Innovation is in our nature.

PARTICIPANTS & ACKNOWLEDGEMENTS

Many people across the state participated in developing the ideas and recommendations in this report. The Advisory Group acknowledges the help of the numerous experts in diverse areas within the Life Sciences and ICT sectors who generously contributed their time and insights to this project.

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SB 6015 REPORT & RECOMMENDATIONS

FOSTERING WASHINGTON'S INNOVATION ECONOMY

EXECUTIVE SUMMARY

INTRODUCTION AND REPORT OVERVIEW

LEGISLATIVE DIRECTION. This report was prepared in response to Senate Bill 6015, a bill enacted by the 2009 Legislature directing the Department of Commerce to review commercialization and innovation efforts in the state's Life Sciences and Information & Communication Technology sectors. The legislation requested an inquiry and recommendations to the Governor and the Legislature on *"how the state can best encourage and support the growth of innovation in the development and commercialization of proprietary technology in the life sciences and information technology industries."*



ALIGNMENT WITH THE NEW DEPARTMENT OF COMMERCE VISION AND FRAMEWORK.

This report was prepared during a period of change and realignment at the state Department of Commerce. The study's findings and recommendations were developed by an Advisory Group in collaboration with Commerce, to ensure that they are congruent with the Department's new vision and mission to support innovation and job creation. In particular, the recommendations parallel and provide support for Commerce's evolving focus on competitiveness and a sector-driven approach to economic development.

REPORT ORGANIZATION. This report is organized into two volumes: Volume One contains a competitive assessment of the state's strengths, gaps and opportunities in the Life Sciences and Information & Communication Technologies (ICT) sectors, and compares and contrasts the two sectors' strategic needs from a public policy perspective. The report makes four recommendations for advancement, with major initiatives delineated for each recommendation. Volume Two is a Technical Annex containing supporting materials organized in seven sections.



COMPETITIVE ASSESSMENT: CHALLENGES AND OPPORTUNITIES

WASHINGTON'S OPPORTUNITY TO ADVANCE ITS INNOVATION ECONOMY. As we enter the second decade of the 21st Century, the world is changing, with structural shifts in state and local economies creating new challenges and opportunities at an accelerating rate. Washington is fortunate to have an increasingly diversified economy, base of knowledge companies and workers, and high levels of technological innovation. But the state is also operating in a very competitive global environment. To realize the state's potential, we need to pull together and make best use of our strengths, to compete effectively for capital and talent, and to create new pathways for innovation and economic growth.

ECONOMIC BENEFIT. The Life Sciences and ICT sectors constitute a growing economic force in Washington. In 2008, there were 28,000 people employed in the Life Sciences, working in 950 organizations, a 9% increase over 2003 employment levels. In ICT, there were 125,000 people working in more than 5,100 organizations, a 23% increase in employment from 2003-08.

Life Sciences and ICT, together with the state's emerging clean energy industry, also constitute some of the most promising opportunities for Washington to not only participate, but to lead the way in supporting innovation and job creation. To realize the promise of these innovative sectors, however, the state has work to do. This report contains key findings and recommendations to build on the state's assets, address its gaps and position Washington to achieve its full potential in the Life Sciences and ICT sectors.

COMPARING AND CONTRASTING THE ICT AND LIFE SCIENCES SECTORS. While both sectors are important to Washington's economy, their strengths, challenges, and opportunities are different. The ICT sector is a foundational strength of Washington's economy and a catalyst for growth in other industries. Life Sciences is a growing and emerging sector, and one with greater challenges related to commercialization of research and technology. While the capital requirements for an early stage ICT startup can be relatively low, Life Sciences startups usually require a significant financial investment in facilities and equipment and a long timeline to reach the proof-of-concept stage, all of which creates higher levels of risk, and higher hurdle rates for investors. This challenge, together with the relatively small pool of venture capital funders interested in Life Sciences investments, impedes new company creation in Washington.

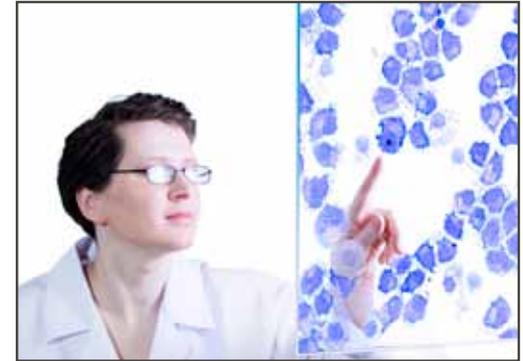


STRENGTHENING THE STATE'S LIFE SCIENCES AND ICT ECOSYSTEM: GAPS AND OPPORTUNITIES.

Washington has many important elements of a successful, high functioning innovation ecosystem in the Life Sciences and ICT sectors. However, there are several critical gaps, which if addressed, could serve to significantly leverage the state's assets and improve its competitive position. Several key areas for improvement have been identified, with their corresponding recommendations:

- ✿ Provide stronger state leadership, an active partnership, and a focused point of industry contact for business retention, expansion, and attraction in the Life Sciences and ICT sectors (*Recommendation #1*)
- ✿ Align the system to better connect major institutional programs, industry initiatives, and state efforts, with an overarching goal of growing jobs and companies in Washington (*Recommendation #1*)
- ✿ Elevate Washington's profile and strengthen the "state brand" as a global center for the Life Sciences and ICT sectors (*Recommendation #1*)
- ✿ Provide competitive funding support and a more competitive set of funding tools to help form and retain Life Sciences talent and companies, especially early stage companies (*Recommendation #2*)
- ✿ Focus on programs that attract top-level research talent to Washington (*Recommendation #3*)
- ✿ Provide supportive programs and facilities to help small, innovative companies grow in Washington (*Recommendation #3*)
- ✿ Develop a collaborative, outcome-focused approach to address the big opportunities that exist, while strengthening the state's overall innovation ecosystem (*Recommendation #4*)

Opportunities to address these system gaps and deficiencies are addressed in the four recommendations and major initiatives outlined below.



RECOMMENDATIONS: GOALS & MAJOR INITIATIVES

NOTE: The following recommendations were developed in the wake of a deep global recession and in the context of significantly reduced state revenues. The recommendations call for engagement and resources from the private sector, research institutions and state government to advance growth in Life Sciences and ICT.

Given the magnitude of the state's budget challenges, the state can and should accomplish its portion of these recommendations within existing resources, potentially reconfiguring and redirecting current resources and programs, and leveraging others. In addition to this approach, some recommendations will likely require new funding.

1. ENHANCE THE STATE'S LEADERSHIP AND GLOBAL PROFILE

A. Create Innovation and Commercialization Sector Leads in the Department of Commerce.

Commerce should appoint sector leads with responsibility for accelerating the state's economic development efforts in the Life Sciences, ICT and other technology based sectors. The Life Sciences and ICT industries should each have a sector lead, and sufficient resources to advance the state's innovation ecosystem for each sector.

Overall Sector Lead Responsibilities

- ✿ Be the "go to" sector leader and facilitator for retention and expansion activities, with a decision-making role and responsibilities for advancing the state's ability to support and attract growth in the sectors.
- ✿ Identify and actively track the needs of the state's Life Sciences and ICT businesses, and collaborate with trade associations, the Governor's Office and other agencies when specific actions are needed to retain or attract businesses to Washington.
- ✿ Serve as a clearinghouse and information resource for Life Sciences and ICT companies seeking information, assistance or economic development services.
- ✿ Partner with other Commerce sector leads to realize synergies between the Life Sciences, ICT, and other key sectors.



Life Sciences Sector

- ✱ Promote Washington's Life Sciences sector nationally and globally.
- ✱ Establish a Life Sciences Advisory Council to advise and engage with the Department of Commerce's Life Sciences sector lead.
 - » The Advisory Council should include leaders from all areas of the Life Sciences, including research; small emerging companies; medium and large companies with products on the market; companies working in various areas such as medical devices, bioinformatics, biologics, and diagnostics representing a cross-section of disease areas from cancer to autoimmune to cardiac and lung diseases; entrepreneurs and venture capitalists; technology transfer; and the state's Life Sciences trade association.
 - » The Advisory Council should make recommendations to help emerging companies attract funds for innovative products that address unmet needs, and that result in creation of well paying jobs.



Information & Communication Technologies Sector

- ✱ Focus attention on the needs and concerns of companies in the ICT sector, specifically with regard to tax policies.
- ✱ Play an active role in highlighting and promoting the strengths, advantages, diversity and innovations of the state's ICT sector, to national and international audiences.
- ✱ Strengthen the state's international resources to provide connections and business support services to ICT companies, in the areas of international business development and sales, product development, supply chain optimization and strategic investor alliances.
- ✱ Ensure that Washington becomes a leader in the convergence of software and mobile communications with the energy efficiency and health care sectors. Promote these emerging sub-sectors, facilitate technology transfer and company creation in these areas, and ensure that Washington companies and organizations successfully compete for grants and other public funding.



B. RAISE THE STATE'S GLOBAL PROFILE AND IDENTITY AS AN ICT AND LIFE SCIENCES CENTER

The Department of Commerce should develop a strategy to enhance the state's reputation, brand and profile in both the Life Sciences and ICT sectors.

- ✿ Work collaboratively with industry to develop key messages and effectively communicate about the work and strengths of the ICT and Life Sciences sectors.
- ✿ Promote the state's existing ICT and Life Sciences assets at regional, national, and global events and through publications.
- ✿ Develop communications and outreach materials to share information broadly with companies, funders, researchers, graduate program candidates, and others.
- ✿ Help advance Life Sciences sector initiatives by providing visibility and introductions at the federal and state levels.
- ✿ Collaborate with other organizations to organize and host national and international ICT and Life Sciences meetings in the state.



2. PROVIDE TARGETED FINANCIAL SUPPORT FOR EARLY STAGE COMMERCIALIZATION OF LIFE SCIENCES RESEARCH

A. Support Funding to Help Early Stage Life Sciences Commercialization Efforts

- ✿ The Life Sciences Discovery Fund should be restored to its intended funding level of \$33 million dollars per year.
- ✿ The state should form a Life Sciences Industry Advisory Council as part of the Department of Commerce's sector lead strategy.
- ✿ The Board of Trustees of the state's Life Sciences Discovery Fund should consider development of an expanded gap funding program and/or other programs that would allow Fund investment in early stage Life Science companies, as well as continued investment into promising research.
- ✿ The Life Sciences Industry Advisory Council should identify sources of capital in addition to the LSDF, and should recommend ongoing strategies to help fund early stage Life Sciences companies in the state.



B. Authorize the State's Research Universities to Develop Programs to Fully Support Startup Company Formation

- * Authorize the research universities to create and manage a bridge funding program to support companies created around technologies developed at the institutions. The programs would be similar to those established at other universities.
- * Funding for these programs could come from the state, the federal government, or private donors.
- * Authorize the research universities to provide additional support to companies created around institution technologies, such as access to space, equipment, and university staff time.



C. Facilitate State Efforts to Obtain Increased Federal SBIR and STTR Funding

- * Develop a plan to help the state's eligible businesses obtain significantly increased funding from the SBIR and the STTR programs.
- * Develop relationships with the federal agencies providing the grants to understand their needs and stay in the forefront of the funding pipeline and timeline.
- * Enhance outreach to small businesses across the state to inform them about SBIR/STTR opportunities.
- * Coordinate with the state's research institutions and supporting nonprofit organizations and serve as a connecting resource to more thoroughly assist businesses in accessing funding.
- * Track the state's performance in securing SBIR/STTR funding, by federal agency, type of research, and other measures.



D. Continue Supportive Tax Policies to Retain and Help Grow Life Sciences and ICT Businesses

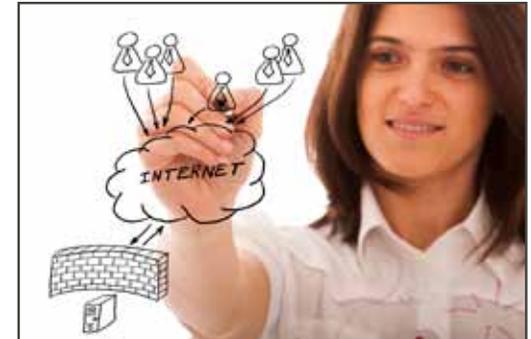
- * Maintain existing state tax incentives for R&D and advanced/high tech manufacturing.
- * Evaluate costs and benefits of the following:
 - » Expanding B&O and sales tax incentives for companies building critical infrastructure, such as data centers and telecom/broadband providers.
 - » Granting tax credits to companies who invest as a qualified investor in the first \$1.5M that a start-up company raises.
 - » Providing tax credits for keeping a company in state when raising B or C series funding.



3. FOCUS ON TALENT ATTRACTION AND SUPPORTIVE FACILITIES

A. Support Funding for Programs to Attract Research Talent to Washington

- * Invest in funding for and further development of the STARS program and the Life Sciences Discovery Fund.
- * Support funding for and further develop the Entrepreneur-in-Residence programs at the University of Washington and Washington State University.
- * Pursue matching funds from the private sector for STARS and the Life Sciences Discovery Fund.
- * Plan and implement talent recruitment missions to the highest quality graduate schools around the country, to communicate that Washington is an attractive place for Life Sciences and ICT careers and entrepreneurship.



B. Provide Facilities Support to Accelerate the Successful Development of Entrepreneurial Start-up Companies

- * Analyze and learn from the success of early-stage incubator companies, such as Accelerator Corporation and Atlas Accelerator.
- * Evaluate whether tech-focused incubator programs such as SIRTI can be deployed statewide.
- * Further develop the IPZ concept in alignment with the Department of Commerce's sector strategy, and with a focus on supporting new technology companies.



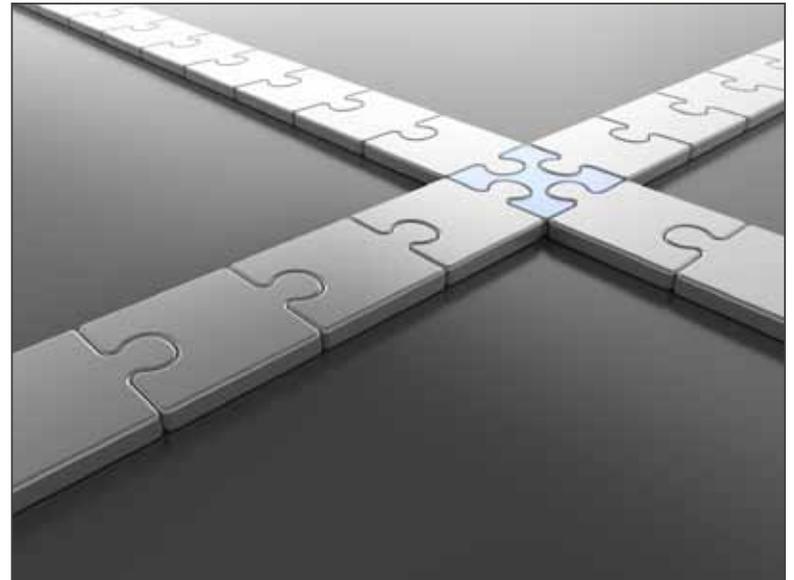
4. DEVELOP A COLLABORATIVE, OUTCOME-DRIVEN OPERATING MODEL

A new collaborative model should be implemented that manages and coordinates the state's assets to create a whole that is greater than the sum of its parts. This approach requires coalescing key players across organizational boundaries, to identify and address major opportunities and challenges. The model would improve the state's ability to successfully compete for large-scale projects that require collaboration and investment by multiple entities. Such projects could include large-scale new federal facilities and ARRA-related programs, and technology-related opportunities that span across jurisdictions and stakeholders, in areas such as smart grid, clean energy, health information technology, transportation, and agriculture.

A. Identify Major Innovation-Related Opportunities for Washington

The Department of Commerce should convene a new initiative of people and organizations focused on creative, collaborative, and innovative solutions to critical problems at a national and global scale. The group would specifically be charged with responsibilities to:

- ✱ Identify the state's large-scale opportunities, and catalogue the capabilities available to address those opportunities, as well as the gaps in the system.
- ✱ Convene leadership councils around selected, large-scale outcomes and catalogue all capabilities in the state that are available to support the outcomes. The Clean Energy Leadership Council can serve as a model for this approach.
- ✱ Create a roadmap and plan of actions needed to achieve successful outcomes.
- ✱ Identify overall performance outcomes and metrics that hold the group accountable for progress in achieving the outcome.



SB 6015 REPORT & RECOMMENDATIONS

FOSTERING WASHINGTON'S INNOVATION ECONOMY

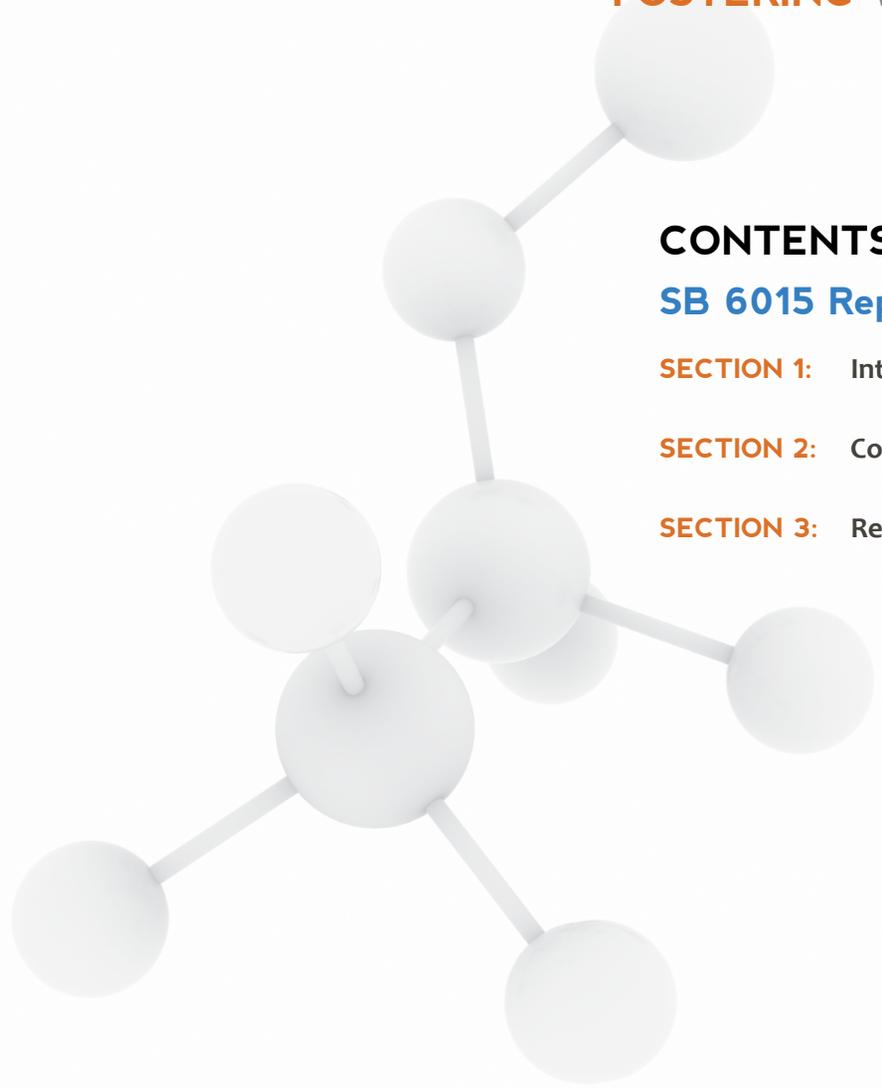
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SECTION 3: Recommendations: Goals and Major Initiatives



SECTION 1: INTRODUCTION AND REPORT PURPOSE

LEGISLATIVE INTENT AND DIRECTION

This report was prepared in response to Senate Bill 6015, a bill enacted by the 2009 Legislature directing the Department of Commerce to review commercialization and innovation efforts in the state's life sciences and Information & Communication Technology sectors. The legislation requested an inquiry and recommendations to the Governor and the Legislature on "how the state can best encourage and support the growth of innovation in the development and commercialization of proprietary technology in the life sciences and information technology industries." The Act further states that:

To leverage its potential, the state must actively work to create and ensure a supportive environment that enables entrepreneurial people and companies to convert their innovative ideas into marketable new products and services. Providing such an environment would:

- * Investigate and recommend strategies to increase the amount of early stage capital for Life Sciences and Information & Communication Technology companies;
 - * Recommend alternatives to state laws, rules, appropriations, and taxes that will support the growth of these industries;
 - * Recommend any additional infrastructure or programs needed for state economic development;
 - * Review the status of technology transfer and commercialization efforts at the University of Washington and Washington State University;
 - * Provide the report's draft recommendations to the state's Economic Development Commission (EDC), for review and development of written observations regarding alignment between the report and the EDC's Comprehensive Economic Development Plan.
- * Solidify Washington State as a global leader of knowledge and technology commercialization;
 - * Create more highly rewarding and well-paying careers for Washington's citizens;
 - * Grow more companies in new and far-reaching markets;
 - * Renew traditional industries through value-added technology adaptation; and
 - * Generate solid returns for Washington State.

The Legislature directed Commerce to:

- * Investigate and recommend strategies to increase the amount of early stage capital for Life Sciences and Information & Communication Technology companies;
- * Recommend alternatives to state laws, rules, appropriations, and taxes that will support the growth of these industries;
- * Recommend any additional infrastructure or programs needed for state economic development;
- * Review the status of technology transfer and commercialization efforts at the University of Washington and Washington State University;
- * Provide the report's draft recommendations to the state's Economic Development Commission (EDC), for review and development of written observations regarding alignment between the report and the EDC's Comprehensive Economic Development Plan.



STUDY PROCESS AND PARTICIPANTS



In response to the SB 6015 directive, the Department of Commerce convened an Advisory Group of stakeholders from industry, the state's research universities, the investor community, and major non-profit institutions across the state. The Group met to discuss the key needs, challenges, and recommendations in this report. Many other stakeholders across the State were consulted as part of the process, offering their diverse perspectives on the current situation and recommended actions for improvement. A roster of project participants is shown on the inside cover of this report. The project

team also worked with the Economic Development Commission to obtain review and comment on the recommendations in this report; the EDC's comments are contained in Attachment A.

ALIGNMENT WITH THE DEPARTMENT OF COMMERCE'S VISION AND FRAMEWORK

This report was prepared during a period of change and realignment at the state Department of Commerce. The study's findings and recommendations were developed by the Advisory Group in collaboration with the Department of Commerce, to ensure that they are congruent with the Department's new Vision and Principles for moving it forward towards greater collaboration, innovation, and job creation. In particular, the recommendations parallel and provide support for Commerce's evolving focus on competitiveness and a sector-driven approach to economic development.

ASSESSMENT OF PREVIOUS REPORTS AND STUDIES

Many reports, plans and studies have been written on topics covered in this report.

In all, 42 reports were reviewed and analyzed for this project: 14 reports specific to Washington, and 28 other state and national studies and articles.

A complete bibliography of resources is contained in Attachment G.

DEFINITION OF TECH TRANSFER

Technology transfer is a term used to describe a formal transfer of rights to use and commercialize new discoveries and innovations resulting from scientific research to another party. Universities typically transfer technology through protecting (using patents and copyrights), then licensing new innovations. The major steps in this process include the disclosure of innovations, patenting the innovation concurrent with publication of scientific research and licensing the rights to innovations to industry for commercial development.

Association of University Technology Managers

<http://www.autm.net/home.htm>

WASHINGTON'S OPPORTUNITY TO ADVANCE ITS INNOVATION ECONOMY

As we enter the second decade of the 21st Century, the world is changing, with structural shifts in state and local economies creating new challenges and opportunities at an accelerating rate. Washington is acknowledged to be one of the country's fortunate states, with our increasingly diversified economy, base of knowledge companies and workers, and levels of technological innovation. But the state is also at an important inflection point in a very competitive environment. To realize the state's potential, we need to pull together and make best use of our strengths, to compete effectively for existing projects and funding, and to create new pathways for innovation and economic growth.

Life Sciences and Information & Communication Technology together with the state's emerging clean energy industry, constitute some of the most promising opportunities for Washington to not only participate, but to lead the way in supporting innovation and job creation.

To realize the promise of these innovative sectors, however, the state has work to do. In particular, it needs to address the existing gaps that exist in the ecosystem. This report contains key findings and recommendations to build on the state's assets, address its gaps and position Washington to achieve its potential in the Life Sciences and ICT sectors.



IMPACT OF UNIVERSITIES IN FOSTERING ENTREPRENEURIAL GROWTH

A 2009 study by the Kauffman Foundation highlights the role universities play in fostering innovation and business growth. The study, *Entrepreneurial Impact: The Role of MIT*, was based on a 2003 survey of all living MIT alumni.

The study found that in the last 10 years, while 224 companies were licensed by MIT, the far greater economic impact was from companies started by MIT alumni.

In the same period, MIT alums started 9,950 companies. Of these, 6,900 (69%) are located in Massachusetts. The MA-based firms generated worldwide sales of \$164 billion, or 26% of the sales of all state companies.

The study confirms the importance of great universities as economic drivers, based on the students they graduate, and the importance of retaining those highly skilled graduates in the state.

SECTION 2: COMPETITIVE ASSESSMENT

OPPORTUNITIES TO GROW WASHINGTON'S
ICT AND LIFE SCIENCES SECTOR

WASHINGTON'S ICT SECTOR SUMMARY OF STRENGTHS, ASSETS, & MAJOR NEEDS

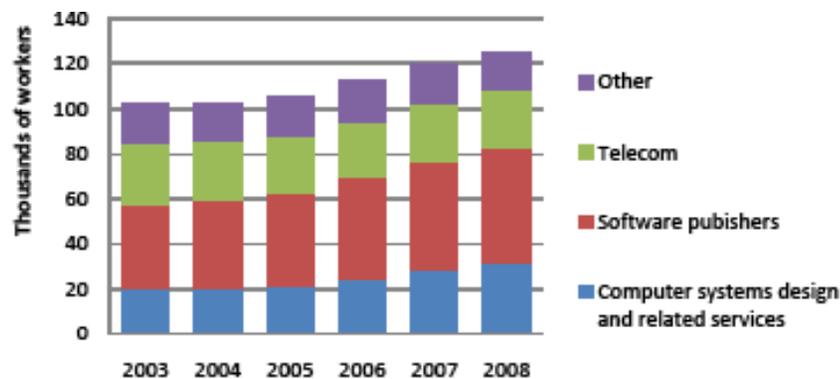
WASHINGTON IS A CENTER FOR ICT BUSINESS CREATION AND TALENT. Washington has long served as a major regional hub for Information & Communication Technology (ICT) activities and innovation, notably through the presence of Microsoft, the world's largest software publisher. In recent years, the ICT sector has been further strengthened by the rise of Amazon, Attachmate, and Real Networks, along with large regional operations for Google, Yahoo!, and Adobe. Collectively, software and Internet industries constitute more than \$30 billion in business statewide, and Washington ranks first in the nation in the creation of new software companies.

A critical mass of ICT talent and companies has led to creation of spin-off companies and new business starts over the last 20 years. Washington state is home to an extensive and vibrant ICT sector, with more than 5,100 companies innovating in fields as diverse as: software publishing (both enterprise and consumer); interactive media (notably casual and core games); telecommunications, mobile applications and wireless enabling technologies; online services (notably e-commerce); network systems and solutions; technical and engineering software; and health care applications. Indeed, Washington encompasses a broader range of ICT products and services than almost any other state in the country.

ICT EMPLOYMENT IN WASHINGTON. As shown in Exhibits 1 and 2, the State's ICT sector employed approximately 125,000 people in 2008, a 23% increase above the 2003 employment levels of 102,000 jobs. These employees are working in more than 5,100 companies.

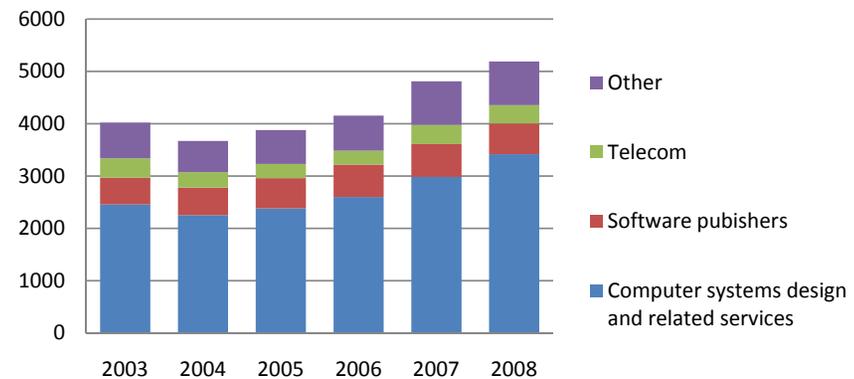


EXHIBIT 1: Washington's ICT Workforce: 2003-2008



Source: Washington State Employment Security, Washington Department of Commerce, 2009

EXHIBIT 2: Washington's ICT Firms: 2003-2008



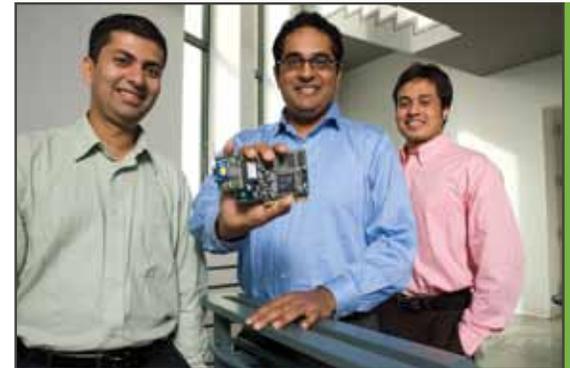
A MATURE AND SUCCESSFUL SECTOR. Several independent rankings reflect the state's strength in the ICT sector. For example, the 2008 New Economy Index, published by the Information Technology and Innovation Foundation, ranks Washington State second among U.S. states, behind only Massachusetts, an improvement in the state's #4 ranking in 2007. The New Economy Index rating is based on performance against 29 indicators, including the number of total ICT professionals, workforce educational attainment, high-wage traded services, foreign direct investment, percentage of online population, and other metrics.

Washington has a robust ICT ecosystem of management talent, skilled technical and professional workers, funding, support services, and informal relationships that cut across companies. Many of the state's original start-up companies have created significant wealth for their founders and employees, and a number of those people have moved on to start new firms, sometimes serially. Likewise, some former ICT company managers and employees have migrated to start or support financing for new company formation, creating a relatively large and experienced pool of angel and venture capital investors with knowledge of the ICT sector.

STATE ROLE IN FACILITATING SECTOR GROWTH. As a relatively successful and well-financed industry, the ICT sector generally requires less economic development support than many others. According to a recent study prepared by the state, *Washington's ICT Sector: A New Role for the Department of Commerce* (May 2009), the ICT sector will likely continue to grow, assuming that new barriers are not created to hamper such growth.

Key sectoral issues for the state to be attentive to include fostering support for potentially high-growth, but capital-intensive subsectors where ICT converges with energy efficiency, Life Sciences, and healthcare; and ensuring that the regulatory framework does not hamper the state's competitiveness in attracting or retaining data centers. There are also increasing calls from the ICT sector for assistance with top talent attraction. Removing barriers to immigration, specifically H1B Visas, would enhance the state's (and the country's) ability to retain critical talent.

NEXUS OF BUSINESS GROWTH AND THE STATE'S EDUCATION SYSTEM. Industry leaders are critically interested in improving the state's K-12 and higher education system, including improving graduation rates generally, and graduating increasing numbers of students with backgrounds in science, technology, engineering, and math (STEM). Thus, the industry energetically supports the CORE 24 and STEM initiatives at the K-12 level, and has a strong interest in developing more and better entrepreneurship programs at the state's universities. Furthermore, the state needs to increase its capacity of high demand programs at the universities, particularly in engineering, to provide the industry with a greater Washington-grown workforce.



WASHINGTON'S LIFE SCIENCES SECTOR: SUMMARY OF STRENGTHS, ASSETS, AND MAJOR NEEDS

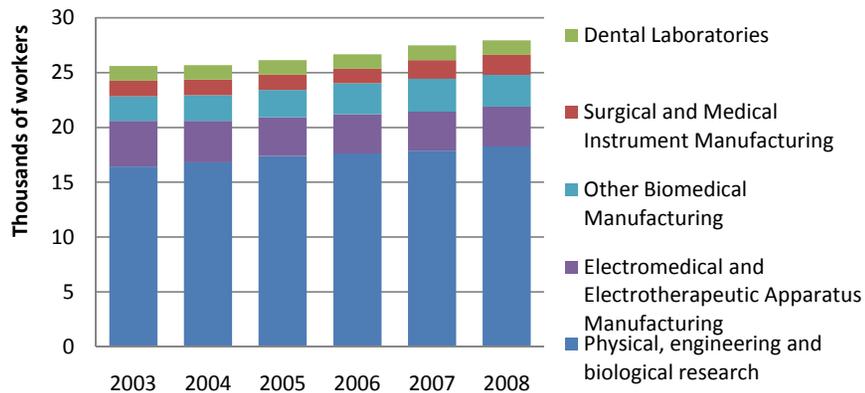
A DIVERSE, INNOVATIVE AND GROWING SECTOR. Washington's Life Sciences sector is characterized by its diversity, innovation, and collaborative spirit. Organizations in the state are known worldwide for their research and discovery of revolutionary technologies and life altering treatments. For example, outpatient renal dialysis was pioneered by Dr. Belding Scribner at the University of Washington Medical Center, and sonar technology developed at the University of Washington has led to ultrasound imaging technology and to Washington's leadership in that field. One of the most successful and life altering biologics, Enbrel, made for patients with rheumatoid arthritis, was developed at Immunex, now Amgen.

Although the state's Life Sciences sector has seen many such high profile successes, the sector is still emerging and growing as an integrated network of research institutions, companies, funders and partners across the world. The sector includes both distinct and collaborative subsectors, for example, biotech, biomedical devices, drugs and pharmaceuticals, agriculture and plant sciences, industrial use and energy, global health, and animal health.

LIFE SCIENCES EMPLOYMENT IN WASHINGTON. As Exhibits 3 and 4 show, in 2008 the State's Life Sciences sector employed approximately 28,000 people working in more than 950 non-profit and corporate organizations.

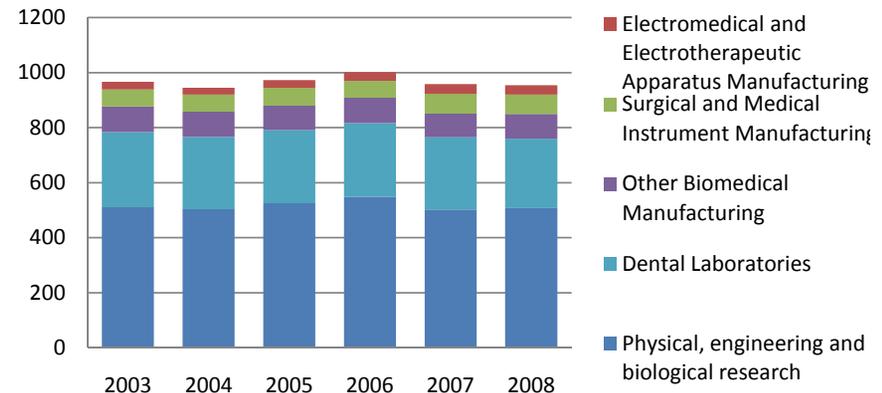


EXHIBIT 1: Washington's Life Sciences Workforce: 2003-2008



Source: Washington State Employment Security, Washington Department of Commerce, 2009

EXHIBIT 2: Washington's Life Sciences Firms: 2003-2008



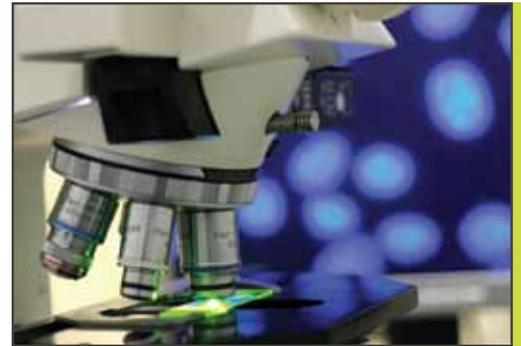
A NETWORK OF LIFE SCIENCE INSTITUTIONS AND COMPANIES. Foundational components of Washington's Life Sciences sector are the state's two world class research universities, the University of Washington and Washington State University, and major research institutions, such as the Pacific Northwest National Lab (PNNL)/Battelle, the Fred Hutchinson Cancer Research Center, Institute for Systems Biology, Infectious Disease Research Institute (IDRI) to name only a few, and hospitals such as Seattle Children's and Harborview that treat patients beyond the state's borders. In particular, Seattle is becoming known globally as a center for global health due to the presence of organizations such as the Bill and Melinda Gates Foundation, PATH, the Seattle Biomedical Research Institute (SBRI), and several others.

The Life Sciences are represented by large and small companies from Amgen to ZymoGenetics. The majority (~85%) of companies in the Life Sciences community are relatively small, with fewer than 50 employees and without products on the market. The research, development and commercialization life cycle is far different for the Life Sciences than it is for the ICT sector. Recent data suggests that it can take up to 12 years to bring a new drug to market, yet a research program or company focused on the development of a single product can employ dozens of scientists, lab techs, administrators and business support personnel in a community.

PRODUCT INNOVATION AND COMMERCIALIZATION LIFECYCLE. The Life Sciences sector can best be understood in a three-stage framework that reflects the phases of company creation and maturity:

- * Research and outcomes
- * Clinical testing, product design and development
- * Commercialization and distribution

From an economic development and job-creation perspective, a flourishing Life Sciences sector will reinforce all three areas: research, clinical testing and product development, and commercialization of discoveries. However, in Washington the linkage from research and clinical testing to commercialization opportunities is not as strong as it could be; therein lies a gap in the state's innovation ecosystem.



SUPPORT FOR RESEARCH AS A DRIVER OF INNOVATION

The number, quality, and reputation of research institutions in a region is a strong indicator of success in the Life Sciences and in other technology-based sectors. While Washington has world class institutions, its standing cannot be taken for granted as other U.S. cities and countries around the world compete to attract top talent with funding, state-of-the-art facilities, and the presence of well established researchers and institutions. On the research side, competition across academic and nonprofit institutions is ongoing, with China and other Asian countries most recently entering the fray as strong, well resourced competitors. On the industry side, other states and countries are courting our tech companies and entrepreneurs to move their operations, so that their local economies can benefit from the economic impact of these companies and their technologies.

The ability to retain and attract talented researchers is a primary driver of innovation and ultimately, job creation. Washington has developed several programs to support research excellence and talent attraction, including three successful programs summarized below. More details on these programs are in Attachment C.

- ✱ **The Life Sciences Discovery Fund (LSDF).** Established in 2005, the LSDF provides funding to in-state researchers with a goal of promoting life sciences competitiveness, enhancing economic vitality, and improving health and health care. Thanks to \$6 million of support from foundation and corporate donors, LSDF was able to begin grant making in 2007, ahead of the receipt of the first state money in 2008. Though lead recipients of the LSDF awards are non-profit institutions, more than half of the awards involve a corporate partner.
- ✱ **The STARS Program.** STARS provides funds to the UW and WSU to recruit the world's most accomplished researchers, to help build on and leverage university strengths while focusing on translating basic research into commercial opportunities. STARS recruits can then recruit additional researchers to their labs or projects. In 2008 each university recruited one STARS researcher, and funding has been authorized for each university to recruit an additional STARS researcher in 2010.
- ✱ **The Entrepreneurs-in-Residence (EIR) Program.** As part of the STARS programs, both WSU and the UW have now established Entrepreneurs-in-Residence Programs designed to facilitate start-up company formation and commercialization of academic research.



SUPPORT FOR PLACE-BASED INNOVATION

To be successful, early stage companies need adequate facilities and equipment, technical support, and sometimes, community support. In some regions, these needs are met through city or state-supported incubator facilities. In Washington, there are a couple of combined incubator/technical assistance facilities, and more are in development.

SIRTI, based in Spokane, is a particularly successful place-based economic development agency. SIRTI is a state agency that accelerates the development and growth of innovative technology companies in the Inland Northwest. It operates as a full service accelerator, offering office and lab space, entrepreneurial coaching, business services, marketing support, access to capital, and legal services such as IP-related issues to emerging companies. Sirti is a strong asset for growth of the innovation economy in Eastern Washington and has launched numerous successful companies since its inception.

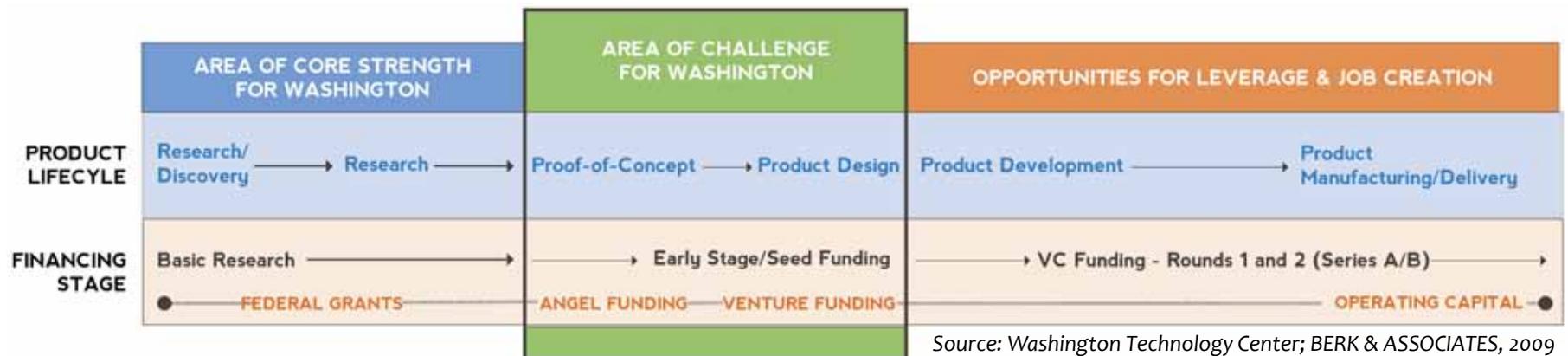
The state’s Innovation Partnership (IPZ) program also provides communities and companies with a place-based opportunity to catalyze new business growth. A description of the IPZ program and a summary matrix of the state’s 12 IPZs is contained in Attachment D.

EARLY STAGE CAPITAL NEEDS TO FACILITATE COMMERCIALIZATION AND BUSINESS GROWTH

Substantial amounts of very patient capital are needed in Life Sciences and in emerging technology-based industries to commercialize and transfer technology from basic research to a prototype or a company with saleable products and services. Many new drugs, for example, can take ten years or more to start clinical trials, with no guarantee that they will receive FDA approval and go on to commercial success.

Exhibit 1 below shows the relationship between the Life Sciences product life cycle stage and available funding, by type. As the Exhibit shows, the “area of challenge” for Life Sciences commercialization is in the proof of concept/product design stage, which is primarily funded through seed and pre-seed investments.

EXHIBIT 5: Financing Lifecycle for Commercialization of Life Sciences Research and Innovation



FUNDING FOR UNIVERSITY-GENERATED PRODUCT DEVELOPMENT EFFORTS. Washington has several funding sources that help university-generated projects that require additional research or prototype development become ready for licensing or transition as a start-up company: the Technology Gap Innovation Fund (TGIF); the Cougar Gap Fund (CGF); the Life Sciences Discovery Fund Commercialization Grant Competition; the Washington Technology Center’s RTD (Research and Technology Development) Grant Program, and gifts from the Washington Research Foundation. Information on these funds is contained in Attachment C.

While these funds are very useful and important, they are limited to projects within the state’s two research universities and cannot be used to support commercialization efforts outside those institutions. Thus there remains a significant lack of early-stage funding for the university start-up companies that may form in the state. There are, however, programs at other public and private universities that have established bridge funding programs to address this issue. A summary of several university-based bridge funding programs is contained in Attachment E.

INCREASED SBIR/STTR FUNDING. The federal government offers more than \$2.5 billion annually in small business funding for technology and science innovations through the Small Business Innovation Research (SBIR) and Small Business Technology Transfer (STTR) grants. The grants are designed to stimulate technological innovation, increase the number of small businesses meeting federal research and development needs, and support private commercialization of technologies. The Washington Technology Center has led the state’s SBIR outreach and support program and currently provides outreach for SBIR/STTR applicants, but this is an underfunded program. Sirti has also been a significant player in supporting companies all across the state in understanding, applying for and winning SBIR awards.

AVAILABILITY OF EARLY STAGE FINANCING IS A CHALLENGE. The early stage funding gap extends beyond university-related product development and company formation. There is a shortage of early stage funding available for entrepreneurs in the Life Sciences generally. In the venture capital realm, Washington ranked fourth among peer states in the share of total U.S. venture capital funding, and in the share of VC investment in the biotech industry in 2008. However, the great majority of venture capital investment in the state is targeted toward later-stage companies, creating an absence of funding to bridge the “valley of death” for startup companies. Such funding is needed to establish validation of products and technology platforms, which can then lead to venture capital investment.



The Washington Technology Center's (WTC) Investing in Innovation Fund is an example of an established, legislatively authorized program intended to support growth in the state's technology sectors through creating and commercializing intellectual property. The program was enacted in 2003, but without accompanying funding. Still, the WTC is implementing the intent of the program through its RTD program, and lab access program that provides short-term access to startup companies with needs for specific high-tech fabrication equipment.

On the private sector side, Washington has a limited number of private angel and venture capital funds that invest in early stage Life Science companies. A summary list of these funds is contained in Attachment F.

COMPARING AND CONTRASTING THE ICT AND LIFE SCIENCES SECTORS

As required by SB 6015, this report has identified opportunities to support innovation and commercialization of technology in the ICT and Life Sciences sectors. A key point for this analysis, however, is that while both sectors are important to Washington's economy, their strengths, challenges, and opportunities are quite different. While ICT is a foundational strength of Washington's economy and a catalyst for growth in other industries, the Life Sciences is an emerging sector, and one with greater challenges to commercialization of research and technology.

ASSESSING RISKS AND CHALLENGES OF THE TWO SECTORS. Exhibit 2 highlights the key features and risks across the two sectors. As the Exhibit reflects, the ICT sector has an established track record of successful companies that, in some cases, have generated substantial wealth that has been used to provide early stage funding for new ICT companies. This reinforcing network has not yet been demonstrated to the same extent in Life Sciences, for a number of reasons. First, ICT entrepreneurs tend to invest in other ICT ventures because it is what they know and understand. For ICT startups, there is a healthy community of angel and venture capital investors in the state who have formed, led or managed successful ICT companies. These successful individuals have confidence in investing in other ICT startups, and there are many more of them in the ICT realm than in other fields.

Second, while the capital requirements for an early-stage ICT startup can be relatively low, Life Sciences start ups usually require significant capital investment in facilities and equipment to reach the proof-of-concept. Thus the "ask" and the risk level for investors is significantly greater in Life Sciences than for ICT start-ups. Relatedly, the long timelines in the Life Sciences industry constitute a barrier for many investors. When clinical trials or FDA approval are required, the certainty of a return on investment can be difficult to estimate and price. This creates higher levels of risk, and higher hurdle rates for investors. This challenge, together with the relatively small pool of venture capital funders interested in early stage Life Science investments, serves as an effective barrier to business creation of companies in Washington.

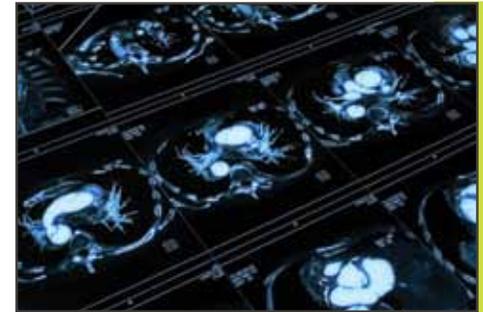


EXHIBIT 6: Comparative Challenges and Risks in the ICT and Life Sciences Sectors

	INFORMATION & COMMUNICATIONS TECHNOLOGY	LIFE SCIENCES
CAPITAL REQUIREMENTS		
Infrastructure, Facilities, Equipment	Minimal requirements - Office space, computers, internet	Intensive, purpose built requirements - Laboratories, HVAC systems, equipment
START-UP TEAM		
Management/CEOs Professional/Technical	Lots of local talent available; additional need for management/business expertise	Very deep and strong research capabilities, less management experience
ACCESS TO FUNDING		
Friends & Family	Large entrepreneurial community with wealth creation from earlier successes	Small entrepreneurial community
Angel Network	Large Angel Investor community	Small Angel Investor community
Venture Capital	Many local VC companies	Limited number of in-state VC firms focused on Life Science
REGULATORY LEGAL/ ENVIRONMENT		
	Minimal regulatory requirements Legal/regulatory issues include privacy, network access, and piracy challenges	Multi-year, expensive process to obtain regulatory approvals for new products
CUSTOMER/CLIENTS		
	Business of varying sizes; many large and very large companies Many customers, every home, work place, car	Limited number of medium and large companies

Source: BERK & ASSOCIATES, 2009

STRENGTHENING THE STATE'S LIFE SCIENCES AND ICT ECOSYSTEM: GAPS AND OPPORTUNITIES.

Washington has many important elements of a successful, high functioning innovation ecosystem in the Life Sciences and ICT sectors. However, there are several critical gaps, which if addressed, could serve to significantly leverage the state's assets and improve its competitive position. Several key areas for improvement have been identified, with their corresponding recommendations:

- ✿ Provide stronger state leadership, an active partnership, and a focused point of industry contact for business retention, expansion, and attraction in the Life Sciences and ICT sectors (*Recommendation #1*)
- ✿ Align the system to better connect major institutional programs, industry initiatives, and state efforts, with an overarching goal of growing jobs and companies in Washington (*Recommendation #1*)
- ✿ Elevate Washington's profile and strengthen the "state brand" as a global center for the Life Sciences and ICT sectors (*Recommendation #1*)
- ✿ Provide competitive funding support and a more competitive set of funding tools to help form and retain Life Sciences talent and companies, especially early stage companies (*Recommendation #2*)
- ✿ Focus on programs that attract top-level research talent to Washington (*Recommendation #3*)
- ✿ Provide supportive programs and facilities to help small, innovative companies grow in Washington (*Recommendation #3*)
- ✿ Develop a collaborative, outcome-focused approach to address the big opportunities that exist, while strengthening the state's overall innovation ecosystem (*Recommendation #4*)

Opportunities to address these system gaps and deficiencies are addressed in the four recommendations and set of major initiatives outlined in the next section.



SECTION 3: RECOMMENDATIONS

Goals and Major Initiatives

1 ENHANCE THE STATE'S LEADERSHIP AND GLOBAL PROFILE

NOTE: The following recommendations were developed in the wake of a deep global recession and in the context of significantly reduced state revenues. The recommendations call for engagement and resources from the private sector, research institutions and state government to advance growth in Life Sciences and ICT.

Given the magnitude of the state's budget challenges, the state can and should accomplish its portion of these recommendations within existing resources, potentially reconfiguring and redirecting current resources and programs, and leveraging others. In addition to this approach, some recommendations will likely require new funding.

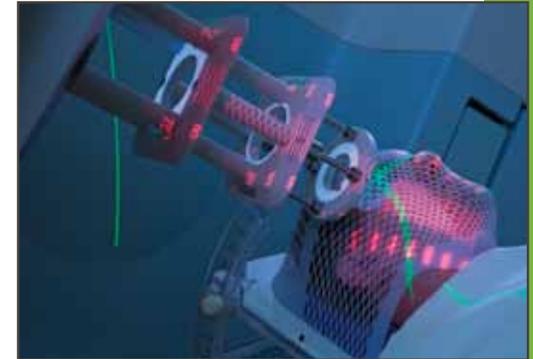
Major Initiatives

A. Create Innovation and Commercialization Sector Leads in the Department of Commerce

The Department of Commerce should appoint sector leads with responsibility for accelerating the state's economic development efforts in the Life Sciences, ICT and other technology based sectors. The Life Sciences and ICT industries should each have a sector lead, and should have sufficient resources to advance the state's innovation economy, including facilitating, coordinating and connecting the state's network of researchers, investors, university programs, and trade associations. Specific roles that the sector lead should play to foster growth and competitiveness are:

OVERALL SECTOR LEAD RESPONSIBILITIES

- * Be the "go to" sector leader and facilitator for retention and expansion activities, with a decision-making role and responsibilities for advancing the state's ability to support and attract growth in the sectors.
- * Identify and actively track the needs of the state's Life Sciences and ICT businesses, and collaborate with trade associations, the Governor's Office and other agencies when specific actions are needed to retain or attract businesses to Washington.
- * Serve as a clearinghouse and information resource for Life Sciences and ICT companies seeking information, assistance or economic development services.
- * Partner with other Commerce sector leads to realize synergies between the Life Sciences, ICT, and other key sectors.



LIFE SCIENCES SECTOR

- ✱ Promote Washington's Life Sciences sector nationally and globally.
- ✱ Establish a Life Sciences Advisory Council to advise and engage with the Department of Commerce's Life Sciences sector lead.
 - » The Advisory Council should include leaders from all areas of the Life Sciences, including research; small emerging companies; medium and large companies with products on the market; companies working in various areas such as medical devices, bioinformatics, biologics, and diagnostics representing a cross-section of disease areas from cancer to autoimmune to cardiac and lung diseases; entrepreneurs and venture capitalists; technology transfer; and the state's Life Sciences trade association.
 - » The Advisory Council should make recommendations to help emerging companies attract funds for innovative products that address unmet needs, and that result in creation of well paying jobs.

INFORMATION & COMMUNICATIONS TECHNOLOGY SECTOR

- ✱ Focus attention on the needs and concerns of companies in the ICT sector, specifically with regard to tax policies.
- ✱ Play an active role in highlighting and promoting the strengths, advantages, diversity and innovations of the state's ICT sector to national and international audiences.
- ✱ Strengthen the state's international resources to provide connections and business support services to ICT companies, in the areas of international business development and sales, product development, supply chain optimization and strategic investor alliances.
- ✱ Ensure that Washington becomes a leader in the convergence of software and mobile communications with the energy efficiency and health care sectors. Promote these emerging sub-sectors, facilitate technology transfer and company creation in these areas, and ensure that Washington companies and organizations successfully compete for grants and other public funding.

B. Raise the State's Global Profile and Identity as an ICT and Life Sciences Center

The Department of Commerce should develop a strategy to enhance the state's reputation, brand and profile in both the Life Sciences and ICT sectors. Increased visibility and awareness nationally of the state as a Life Sciences and ICT center will help Washington attract more of the talent, businesses and funding needed to grow the sectors.

- ✱ Work collaboratively with industry to develop key messages and effectively communicate about the work and strengths of the ICT and Life Sciences sectors.
- ✱ Promote the state's existing ICT and Life Sciences assets at regional, national, and global events and through publications.
- ✱ Develop communications and outreach materials to share information broadly with companies, funders, researchers, graduate program candidates, and others.
- ✱ Help advance Life Sciences sector initiatives by providing visibility and introductions at the federal and state levels.
- ✱ Collaborate with other organizations to organize and host national and international ICT and Life Sciences meetings in the state.

2 PROVIDE TARGETED FINANCIAL SUPPORT FOR EARLY STAGE COMMERCIALIZATION OF LIFE SCIENCES RESEARCH

Major Initiatives

A. Support Funding to Help Early Stage Life Sciences Commercialization Efforts

Increased access to early stage capital is one of the most significant needs to build Washington's Life Sciences industry. This funding is a critical missing piece in an otherwise effective Life Sciences ecosystem. With additional access to early stage capital for emerging companies, the state could see a higher rate of successful company formation, with associated job and wealth creation.

Formation of a Life Sciences Advisory Council is recommended as part of the Department of Commerce's sector lead strategy.

- * The Board of Trustees of the state's Life Sciences Discovery Fund should consider development of an expanded gap funding program and/or other programs that would allow Fund investment in early stage Life Sciences companies, as well as continued investment into promising research.
- * The Life Sciences Advisory Council should identify sources of capital in addition to the LSDF, and should recommend ongoing strategies to help fund early stage Life Sciences companies in the state.

B. Authorize the State's Research Universities to Develop Programs to Fully Support Startup Company Formation

There is substantial evidence that successful technology-based economic development occurs in close proximity to major research universities. Specifically authorizing the state's research universities to provide support to the startup companies created at the institutions would provide clarity about the policy framework for these activities.

- * Authorize the research universities to create and manage a bridge funding program to support companies created around technologies developed at the institutions. The programs would be similar to those established at other universities (see Attachment E for details)
- * Funding for these programs could come from the state, the federal government, or private donors.
- * Authorize the research universities to provide additional support to companies created around institution technologies, such as access to space, equipment, and university staff time.



C. Facilitate State Efforts to Obtain Increased Federal SBIR and STTR Funding

- ✱ Develop a plan to help the state's eligible businesses obtain significantly increased funding from the SBIR and the STTR programs.
- ✱ Develop relationships with the federal agencies providing the grants to understand their needs and stay in the forefront of the funding pipeline and timeline.
- ✱ Enhance outreach to small businesses across the state to inform them about SBIR/STTR opportunities.
- ✱ Coordinate with the state's research institutions and supporting nonprofit organizations and serve as a connecting resource to more thoroughly assist businesses in accessing funding.
- ✱ Track the state's performance in securing SBIR/STTR funding, by federal agency, type of research, and other measures.



D. Continue Supportive Tax Policies to Retain and Help Grow Life Sciences and ICT Businesses

- ✱ Maintain existing state tax incentives for R&D and advanced/high tech manufacturing.
- ✱ Evaluate costs and benefits of the following:
 - » Expanding B&O and sales tax incentives for companies building critical infrastructure, such as data centers and telecom/broadband providers.
 - » Granting tax credits to companies who invest as a qualified investor in the first \$1.5M that a start-up company raises.
 - » Providing tax credits for keeping a company in state when raising B or C series funding.



3 FOCUS ON TALENT ATTRACTION AND SUPPORTIVE FACILITIES

Major Initiatives

A. Support Funding for Programs to Attract Research Talent to Washington

Retaining and attracting top research talent is essential if Washington is to remain a leader in the Life Sciences and ICT sectors. Funding levels should remain stable or increase to allow the universities to retain and attract their researchers, and for the state to benefit from the innovation, economic impact, and reputation enhancement that these programs provide.

- * Invest in funding for and further development of the STARS program and the Life Sciences Discovery Fund.
- * Support funding for and further develop the Entrepreneur-in-Residence programs at the University of Washington and Washington State University.
- * Pursue matching funds from the private sector through communication about and demonstration of results from STARS and the Life Sciences Discovery Fund.
- * Plan and implement talent recruitment missions to the highest quality graduate schools around the country, to communicate that Washington is an attractive place for Life Sciences and ICT careers and entrepreneurship.

B.. Provide Facilities Support to Accelerate the Successful Development of Entrepreneurial Start-up Companies

- * Analyze and learn from the success of early-stage incubator companies, such as Accelerator Corporation and Atlas Accelerator.
- * Evaluate whether tech-focused incubator programs such as SIRTl can be deployed statewide.
- * Further develop the IPZ concept in alignment with the Department of Commerce's sector strategy, and with a focus on supporting new technology companies.



4 DEVELOP A COLLABORATIVE, OUTCOME-DRIVEN OPERATING MODEL

Major Initiative

A new collaborative model should be implemented that manages and coordinates the state's assets to create a whole that is greater than the sum of its parts. This approach would strengthen the state's competitive position, while amplifying and accelerating innovation across sectors. It requires coalescing key players across organizational boundaries, to proactively identify and address major opportunities and challenges. The model would improve the state's ability to successfully compete for large-scale projects that require collaboration and investment by multiple entities.

Such projects could include large-scale new federal facilities and ARRA-related programs, and technology-related opportunities that span across jurisdictions and stakeholders, in areas such as smart grid, clean energy, health information technology, transportation, and agriculture.

A. Identify Major Innovation-Related Opportunities for Washington

The Department of Commerce should convene a new initiative of people and organizations focused on creative, collaborative, and innovative solutions to critical problems at a national and global scale. The group would specifically be charged with responsibilities to:

- * Identify the state's large-scale opportunities, and catalogue the capabilities available to address those opportunities, as well as the gaps in the system.
- * Convene leadership councils around selected, large-scale outcomes and catalogue all capabilities in the state that are available to support the outcomes.
- * Create a roadmap and plan of actions needed to achieve successful outcomes.
- * Identify overall performance outcomes and metrics that hold the group accountable for progress in achieving the outcome.

