EXECUTIVE SUMMARY

Purpose

After surveying the history of reports, analyses, and data points describing the Information and Communication Technology (ICT) Industry, the Washington Technology Industry Association (WTIA) determined a need to research and publish a current economic and fiscal impact study of the sector. The WTIA commissioned this study to help inform a productive collaboration among industry, education, and government leadership in matters of public policy, investments in public projects, and public-private partnerships.

The ICT Cluster: An Industry, Plus Cross-Industry Talent

Washington’s Information & Communication Technology (ICT) industry has two defining dimensions: (1) Companies that design and deliver innovative products and services, create economic value, and bring prestige to Washington State; and (2) individual professionals with essential skills (“Talent”) that make all that innovation, value creation, and prestige possible in ICT companies and other sectors of the economy.

Microsoft, for example, is an ICT sector Company that hires Talent to create exciting new systems and applications. Starbucks is a coffee retailer—not an ICT sector company—that nevertheless employs workers from the same ICT Talent pool to create exciting new systems and applications. In fact, Starbucks employs more ICT Talent than most ICT Companies. The competition for Talent therefore is not only global. ICT Talent is in demand in almost every sector of the State’s economy.

For the foreseeable future, the ICT sector will create jobs at a faster rate than the State’s public and private education institutions can produce workers qualified to perform those jobs. As a result, Washington State ranks as the highest importer of ICT talent in the nation. The State’s continued economic success is tied to developing and attracting the talent needed to serve the opportunities created by the ICT sector. State investments in ICT training and company support are needed to keep pace with the opportunities.

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1 A per capita observation, given the size of California and other states that rank high in absolute terms.
ICT Metrics and Impacts

Companies
In 2013, Washington State had an estimated **8,610 ICT employment establishments** that provide a wide variety of products and services including Application Software, Voice and Data Systems, Cloud Computing Services, Custom Software Development, Electronic Retail, Internet Publishing, and Manufacturing. More than 90% of all ICT companies employ fewer than 20 workers, which means that most ICT company leaders share the challenges and goals of typical small businesses across Washington State.

The total revenue reported in Washington by ICT companies is $36.9 billion. Of this total, Washington ICT companies exported $16.4 billion making it the third highest exporting state (after California and Texas) and growing exports at more than 10%—much faster than its larger rivals. No other state matches Washington’s combination of ICT export growth and absolute ICT export value.

The market value of the ICT sector, including only the top ten public ICT companies started in Washington State, is nearly $600 Billion. The total market value of all ICT companies operating in Washington state is in excess of $1 Trillion. While it is true that most of the sales leading to that market valuation are generated outside the state, the benefits of that business activity accrues to Washington through job growth, investment in research, commercial construction, and investment in new companies in the state.

Employment
Employment estimates for ICT are segmented into two main groups. The first is ICT Companies which includes 162,900 covered workers and an additional 13,700 sole proprietors and independent contractors in 2013. **This ICT core represents 176,600 workers**, including workers from across all occupations employed at ICT companies.

The second group is Tech Units—blocks of ICT talent and supporting team members that work in non-ICT companies. Tech Units represent an additional 62,300 workers who possess similar skills and face similar project challenges with their ICT Company peers.

Combining these two groups results in **total statewide ICT Talent employment of 238,900 workers in 2013**.

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2 Establishments is the employment data term for places of employment and can count one company more than once if the company has more than one office.
Occupations and density

Within the total employment set of 238,900 ICT workers highlighted above, there are certain occupations, some of which are essential to the ICT cluster. Examples of occupations considered essential to ICT delivery include Application Software Developers, Computer Systems Programmers, Computer Engineers, Network Architects, and Computer Science Researchers.

Washington State has 90,000 resident individuals in these essential ICT occupations.

Washington State ranks high in the number of resident professionals serving in these essential ICT occupations. The State indexes at 2.5 times higher than the national average on a per worker basis. The Seattle MSA is the primary regional driver, indexing at 4.3 times that of the U.S. average. And for the specific Application Software Development occupation, considered by industry experts to be one of the most essential occupations in the ICT sector, Seattle MSA indexes at 6.9 times the US average. This talent density makes the region especially attractive to private and corporate investment.

Wages

In addition to job creation, wages in the sector are also a large driver of economic benefit impact for the Washington economy. In 2013, the ICT sector paid out $22 billion in wages. Many of the essential ICT occupations pay very well. Median wages for workers in the essential ICT occupations range from $100,000 to $140,000, with wages in the 90th percentile of those occupations ranging from $150,000 to $187,000, in 2013.

Each ICT Company also employs a full spectrum of workers, including sales positions, administrative support, and many other occupations that do not call for computer science degrees. In most cases, the median wages for these other occupations in ICT Companies index above companies in other sectors.

Multiplicative Impact on Jobs

The economic value of the ICT sector extends to the entire state through two stages of economic multipliers. The archetypal anecdote is: “two developers in a garage code a new app, launch a company, and then hire many other people to build that company – which hopes to become the next IPO.”

Each of the 90,000 essential ICT occupations identified earlier – Application Software Developers, Computer Systems Programmers, Computer Engineers, Network Architects, and Computer Science Researchers – is the keystone to creating 1.7 additional jobs in each ICT Company or Tech Unit and resulting in the total of 238,900 jobs in the ICT cluster.
Each of those 238,900 high paying jobs then spurs further economic benefit through the spending generated by those workers, which creates 2.7 more jobs in the wider state economy. Combining the two factors, we have a combined economic impact of at least 7 additional jobs in Washington State associated with every essential ICT worker.

By investing into attracting and developing the workers needed for these essential ICT occupations - Software Developers, Computer Engineers, Network Architects, Computer Sciences Researchers – the State could build a sustainable, robust economy for the next several decades.

**Tax Revenues**

ICT businesses in Washington State paid $776 million directly in State taxes in 2013. The total tax contributions of the ICT sector are significant—when adding the tech units and secondary impacts from spending and business transactions—the total is in excess of $2.8 billion.

<table>
<thead>
<tr>
<th>Tax Type</th>
<th>Direct Payments</th>
<th>Tech Units and Secondary Impacts</th>
<th>Total ICT-Supported Tax Payments</th>
</tr>
</thead>
<tbody>
<tr>
<td>State Sales Tax</td>
<td>523.3</td>
<td>1,159.7</td>
<td>1,683.0</td>
</tr>
<tr>
<td>Business &amp; Occupation</td>
<td>219.9</td>
<td>652.5</td>
<td>872.5</td>
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<tr>
<td>State Use Tax</td>
<td>33.3</td>
<td>94.5</td>
<td>127.8</td>
</tr>
<tr>
<td>Other Taxes (e.g., Utility Tax)</td>
<td>0.0</td>
<td>152.7</td>
<td>152.8</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>776.5</strong></td>
<td><strong>2,059.5</strong></td>
<td><strong>2,836.0</strong></td>
</tr>
</tbody>
</table>

**Washington Start-Ups**

Nearly every ICT Company and nearly every tech unit in Washington today did not exist 20 years ago. The state has been awash in startups. And even the largest, oldest ICT companies still possess a startup ethos due to fierce global competition and the requirement to innovate. The entire startup ecosystem—and all its creativity—is driven principally by a survival instinct.

Washington enjoys a vibrant startup ecosystem that is evolving rapidly with many support organizations, entrepreneurial assistance, and tech incubators to help teams form companies and raise private capital to launch their products and services. Washington’s 2013 financial support for start-ups was particularly strong—with nearly $70 million in 60 seed investments and nearly $700 million in 140 Venture Capital investments. However, Washington startup activity is still lagging more established ICT regions including Massachusetts and California and is also being outpaced by new entrants such as New York. Additional talent and private investment capital will lead to more rapid growth of the industry.
Despite the smaller stature as a startup ecosystem, the Washington ICT sector has been a consistent pioneer in the most successful new products and services including Online Retail, Online Gaming, Cloud Computing, Music and Video Streaming. In recent years, the region’s prowess in Cloud Computing and high density of ICT talent has attracted significant private investment and has also resulted in many of the world’s most prominent ICT companies—including Hewlett Packard, Oracle, Google, Facebook, Alibaba, Apple and most recently Dropbox—to invest in building tech units in the region.

**Workforce Assessment**

Washington State forecasts for occupations compared to graduates show a significant shortage of workers to fill demand from in-state students. The greatest shortages are Application Software Developers, Programmers, Help Desk Specialists, Systems Analysts and Systems Administrators. The annual total shortage of supply versus demand for these essential ICT occupations is in excess of 3,000 workers.

Occupations in this arena are in general not interchangeable; the surplus in one occupation cannot typically serve the shortage in another without substantial retraining. State investments in ICT talent education and training have not kept pace with ICT Company growth. Therefore, companies must rely on workers migrating from other U.S. states and other countries to fill the jobs created.

Companies seeking ICT talent rely on significant recruiting efforts in California, Massachusetts and other ICT talent rich regions. Although H-1B visas are a potential source of additional talent from abroad, the current federal cap allocated in a national lottery severely limits this source of talent. As a result, the State’s lack of education investment, in particular in Computer Science, is retarding the growth of the ICT sector.

Further analysis shows that some occupations with talent shortage could be filled with retraining of unemployed professionals. For example, 396 unfilled jobs in the Computer User Support Specialist (aka Help Desk) occupation might be filled by retraining some of the 595 unemployed workers with prior experience in that field but whose technical skills are not current. A combination of public and private investment into specific adult re-training may alleviate some of the talent shortage in some of the less essential ICT occupations.

**Washington’s Universities and ICT Training**

The University of Washington’s challenging curricula and internship programs with industry produce some of the best talent for top ICT companies in Washington. The University reports that it graduates just over 300 students each year with degrees in Computer Software Engineering and Programming, making it the largest program of its kind in the state.
The University is a close recruiting partner for Washington ICT companies, with approximately 90% of graduates placed in the State.

Meanwhile, accredited higher education institutions in Washington produced a total of 4,864 students in 2-year and longer term programs intended to prepare a student for entry into the ICT sector. However, tech leaders agree that most of these programs are not suitable for the 3,000 unfilled essential ICT job openings.

Of the 4,864 graduates in 2013, 2,384 graduated with 2-year degrees and are not qualified for those jobs, according to tech leaders contributing to this study. The 2-year graduates result in a surplus of workers for ICT jobs requiring only a 2-year degree. Of the remaining 2,480 students graduating in 2013 with 4-year degrees or higher, the majority of programs – while leading to other employment opportunities – do not develop the skills or experience required for the leading firms to hire them into essential ICT jobs. As noted earlier, the result is a shortfall of 3,000 candidates that must be filled from out of state applicants.

A few education and industry leaders have begun an effort to better integrate skills requirements and curricula to improve placement of more Washington program graduates in the future. Some early successes are promising, but education and tech leaders interviewed for this study speak to the clear need for a systematic collaboration among industry and education leaders.

Conclusion

Washington’s ICT cluster drives the Washington State economy through its world-renowned companies and by leading innovation across all sectors of the economy. Employment and occupation forecasts show continued strong growth, yet Washington’s education systems do not have the capacity to fill the openings. Global talent will always seek ICT employment in Washington, but the shortage of locally trained talent increases the need for Washington companies to recruit from out of state. This retards growth by increasing recruitment costs and heightening the requirement for local companies to recruit and relocate workers from around the world. This talent shortage also forces growing local companies to invest in other more ICT talent rich regions.

While the industry has and will continue to invest in its own growth, the State would benefit immensely by serving as an investment partner with the industry to fully capture the potential for the region.

ICT talent creates jobs—both in the sector and more broadly in the economy. Each ICT job drives seven additional jobs in the State. A high density of ICT talent also attracts private investment capital, which leads to more companies formed, even more jobs created, and a dramatic economic benefit for the entire State of Washington for many decades to come.