A Strategic Assessment of Oregon's Semiconductor Ecosystem



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About the Institute for Policy Research and Engagement

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The Institute for Policy Research & Engagement (IPRE) is a research center affiliated with the School of Planning, Public Policy, and Management at the University of Oregon. It is an interdisciplinary organization that assists Oregon communities by providing planning and technical assistance to help solve local issues and improve the quality of life for Oregon residents. The role of IPRE is to link the skills, expertise, and innovation of higher education with the transportation, economic development, and environmental needs of communities and regions in the State of Oregon, thereby providing service to Oregon and learning opportunities to the students involved.

AI Use Disclosure Policy

This policy review report integrates the University of Oregon's Microsoft Copilot artificial intelligence (AI) ecosystem to support the analysis and presentation of findings, Google's Gemini, and Anthropic's Claude AI, including the processing of interview data and policy interpretation. The following outlines the scope, oversight, and ethical considerations of AI use in this context:

Purpose of AI Use
AI tools were utilized to:

Analyze *anonymous* interview responses into common themes

Assist in *drafting* narrative summaries of state policies to assist with internal dissemination and increase understanding

Generate high-level summaries of research methodologies and assist with brainstorming of report framework

Human Oversight and Validation

All AI-assisted outputs were reviewed and refined by the report authors to ensure accuracy, contextual relevance, and alignment with the policy framework under review. Final interpretations and recommendations reflect human judgment and expertise.

Transparency and Methodological Integrity

AI was used as a supplementary tool to enhance analytical efficiency and communication. All data sources, survey instruments, and analytical methods—whether AI-assisted or manual—are documented in the methodology and references section of this report.

Limitations of AI Analysis

While AI tools can efficiently process large volumes of data, they may not fully capture nuanced policy contexts, stakeholder perspectives, or emergent issues. Readers should interpret AI-supported insights as part of a broader, expert-led analytical process.

Ethical and Responsible Use

AI tools employed in this report adhere to ethical standards, including data privacy, fairness, and transparency. Researchers followed University of Oregon guidelines for utilizing AI, as well as ensuring compliance with data confidentiality guidelines. No personally identifiable information (PII) was processed by AI systems, and all interview narratives were anonymized prior to analysis.

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Executive Summary

Oregon stands at a strategic crossroads in shaping the next phase of its semiconductor industry. Without timely action to address competitiveness, diversification, and workforce development, the state risks losing relevance in a rapidly expanding and evolving global semiconductor landscape. Once a rapidly expanding and dominant presence in the semiconductor industry globally, Oregon is now at risk of becoming an insignificant stakeholder in an industry slated to reach over $1 trillion in economic output by 2035.

Legacy strengths, notably deep technical expertise, anchor firms, and strong research institutions, offer a solid foundation, yet they are no longer sufficient on their own. As other states and countries pair aggressive incentives with coordinated workforce and infrastructure strategies, Oregon must decide whether to proactively reinforce its ecosystem or accept a future defined more by stability than by growth. As the global semiconductor industry is rapidly growing and expanding, Oregon's 50-year-old semiconductor industry is in decline.

The matrices below summarize IPRE's priority *policy* and *programmatic* recommendations (see Chapter 5 for additional details). Policy recommendations require actions by the state legislature to provide support for semiconductor industry activities. Programmatic recommendations are needed actions, or current actions that need additional support, that focus on supporting the networks and workforce that make the operation of the Oregon semiconductor industry possible. These recommendations vary significantly in required effort and resources; however, they require the state legislature, state agencies, communities, semiconductor businesses, and industry organizations to work in continuous partnership symbiotically.

Priority Policy Recommendations for Supporting the Oregon Semiconductor Industry

Policy Recommendations			
Recommendation	**Description**	**Task Lead**	**Task Partners**
Support Small and Medium-Sized Semiconductor Firms Through Targeted Incentives	Develop targeted incentives, financing tools, and workforce supports for small and mid-sized firms	Business Oregon, Oregon State Legislature	Silicon Forest Partnership, semiconductor businesses, Technology Association of Oregon (TAO)
Expand Industrial Land Supply and Infrastructure to Support Industry Growth	Unlock land for industrial development and assist in the implementation of necessary infrastructure to support industry activities.	Business Oregon, DLCD, Oregon State Legislature	Local governments
Demonstrate Clear and Consistent Support for Business as a Strategy to Improve Oregon's Business Climate	Work with businesses to identify and implement policies that supports their business activities. Aggressively advertise Oregon's competitive advantages and show that the state cares about being a supporting partner for business.	Business Oregon, Oregon State Legislature	Local businesses, local governments, and chambers of commerce

Priority Programmatic Recommendations for Supporting the Oregon Semiconductor Industry

Programmatic Recommendations			
Recommendation	Description	Task Lead	Task Partners
Improve Oregon's Statewide Image and Talent Attraction Strategy	Oregon, while possessing a very high quality of life, is unfavorably viewed from people unfamiliar with the state. Efforts need to be taken to highlight Oregon's livability.	Business Oregon, Governor's office, Oregon State Legislature	Local governments, local businesses, chambers of commerce
Enhance Oregon's Statewide Talent Pipeline Through Strategic Alignment With FAST	Align and scale K–12 education, community college training, university programs, and workforce systems through a strengthened FAST initiative	Frontiers for Advanced Semiconductor Technologies (FAST)	Higher Education Coordinating Committee; Regional Workforce Investment Boards; universities; community colleges; primary and secondary schools
Support and Formalize Retiree and Expert Networks	Formalize and support networks of experienced semiconductor retirees and late career professionals to mentor workers, support education and outreach, transfer tacit knowledge, and reinforce ecosystem resilience.	FAST and Silicon Forest Partnership	Business Oregon; industry experts, semiconductor businesses

Background

Oregon's semiconductor industry, known as the Silicon Forest, is one of the most mature and strategically important semiconductor ecosystems in the United States. Anchored by decades of investment, deep technical expertise, and a dense network of suppliers, the industry has been a major driver of statewide economic growth, exports, and innovation. Semiconductors generate tens of billions of dollars in economic activity annually and support some of Oregon's highest-paying jobs.

At the same time, the industry is operating at a critical inflection point. Global demand for semiconductors is expanding rapidly, driven by artificial intelligence, advanced computing, automotive electrification, and national security priorities. Federal policies such as the CHIPS and Science Act have intensified competition among states to attract and retain advanced manufacturing, research, and supply chain investments. While Oregon remains deeply embedded in the global semiconductor value chain, rising costs, workforce constraints, infrastructure limitations, and uncertainty around future expansion threaten the state's ability to capture its share of projected growth.

This assessment report evaluates Oregon's semiconductor supply chain through interviews with industry leaders and supporting analysis of economic and workforce data. Findings indicate that supply chain logistics and material inputs are functioning reliably today, with firms able to move materials into the state and products to global markets. However, industry leaders caution that this stability cannot be taken for granted given geopolitical risk, tariff uncertainty, rare earth mineral dependence, competition from other states, and global concentration of advanced fabrication capacity.

The state's most significant strengths in the semiconductor ecosystem lie beyond physical logistics. Oregon excels in research and development, process innovation, advanced manufacturing, and semiconductor equipment, supported by a highly skilled workforce and long-standing institutional knowledge. Universities and community colleges produce high-quality graduates, and the region benefits from exceptional "social capital" – networks of experienced engineers, managers, and retirees whose tacit knowledge underpins innovation and workforce development.

Nevertheless, growth prospects are fragile. Many existing semiconductor companies report that their commitment to remaining in Oregon is primarily related to sunk investments and legacy advantages. However, many are choosing to locate *new* expansions elsewhere. Interviewees consistently cited cost and competitiveness pressures, including taxes, regulatory uncertainty, limited industrial land availability, and constrained electrical capacity, as their business rationale for making these decisions. Furthermore, workforce shortages, especially among technicians and mid-career talent, further limit firms' ability to scale. Notably, competing with Intel and other large out-of-state semiconductor employers for workers intensifies hiring challenges for small and medium-sized firms.

Key Findings

- **Enduring Industry Commitment but Fragile Growth Prospects.** Oregon's semiconductor firms remain committed to the state due to deep legacy investments, but many are choosing to expand elsewhere, creating a risk of long-term stagnation rather than outright loss of the industry.
- **Intel's Outsized Influence and Ecosystem Vulnerability.** Intel continues to anchor Oregon's semiconductor ecosystem, but this concentration creates vulnerability, as reductions in Intel investment or employment ripple across suppliers and regional employment.
- **Global Industry Growth and Oregon's Strategic Moment.** Rapid global semiconductor growth presents Oregon with a narrow window to capture new investment, but intensifying interstate and international competition means Oregon must actively reinforce its competitiveness to benefit.
- **Talent Pipelines Under Strain from K-12 Through Workforce.** Workforce challenges persist across the pipeline, especially for technicians and mid-career talent, compounded by wage competition from large employers and insufficient early exposure to semiconductor careers.
- **Cost, Land, and Infrastructure as Barriers to Expansion.** High costs, regulatory uncertainty, limited industrial land, and emerging power constraints collectively deter new semiconductor investments, even when firms are not planning to leave Oregon.

Recommendations

- **Support Small and Medium-Sized Semiconductor Firms to Build Ecosystem Resilience**. Targeted incentives, financing tools, and workforce supports for small and mid-sized firms can diversify Oregon's semiconductor ecosystem, reduce reliance on Intel, and improve long-term resilience and innovation capacity.
- **Demonstrate Clear, Coordinated Support for Business and Talent Attraction**. Predictable regulations, proactive engagement with industry, and a coordinated, semiconductor-focused talent attraction and marketing strategy can restore confidence, counter negative perceptions, and encourage firms and workers to invest in Oregon.
- **Build an Integrated, Statewide Semiconductor Talent Pipeline**. Oregon should align and scale K–12 education, community college training, university programs, and workforce systems through a strengthened FAST initiative. This includes expanding early career awareness, technician training, apprenticeships, and work-based learning to create a diverse, predictable talent pipeline that meets industry needs.
- **Mobilize Retiree and Expert Networks to Strengthen Workforce and Innovation Capacity.** The state should intentionally formalize and support networks of experienced semiconductor retirees and late-career professionals to mentor workers, support education and outreach, transfer tacit knowledge, and reinforce ecosystem resilience.
- **Expand Industrial Land Supply and Critical Infrastructure**. Oregon must proactively assemble shovel-ready industrial sites and invest in power, utilities, and supporting infrastructure to remain competitive for semiconductor and advanced manufacturing investment and future expansion.

Taken together, the findings suggest that Oregon is not at risk of losing its entire semiconductor industry, but it is at high risk of stagnation, continual decline, and irrelevance. The core challenge is not retention, but growth. Without deliberate action, Oregon may be bypassed as new fabs, research centers, and advanced packaging facilities are sited in states offering lower costs, shovel-ready sites, faster permitting, and aggressive workforce pipelines.

Oregon can remain a leading semiconductor state, if it acts strategically. Key opportunities include strengthening technician pipelines from K–12 through community colleges, aligning statewide workforce efforts through FAST, improving site readiness and infrastructure, supporting small and medium-sized firms, utilizing existing funding opportunities such as the NIST CHIPS R&D office, formalizing retiree and expert networks, and delivering clearer signals of long-term support to industry. The global semiconductor market is expanding rapidly; Oregon's ability to adapt in the next several years will determine whether the Silicon Forest continues to thrive or gradually loses ground in an increasingly competitive landscape.

Chapter 1: Introduction

Oregon's semiconductor industry, referred to as the "Silicon Forest", is a major driver of economic development and prosperity within the state. A 2022 study commissioned by Business Oregon, Oregon's state economic development agency, found that the semiconductor industry generates an estimated $28 billion in economic productivity annually through direct and indirect impacts within Oregon.[1] With increasing pressures from global competition, workforce shortages, developing geopolitical instability, and an uncertain economic landscape, ensuring that Oregon's semiconductor industry is resilient to these challenges is imperative to Oregon's long-term economic security.

By engaging directly with Oregon's semiconductor sector, the state can take proactive steps to ensure consistent and reliable access to the critical inputs needed for the industry's operation, development, and growth. Proactive assessment and support also signal that Oregon is a stable, committed partner for both domestic and international semiconductor firms.

Project Overview

The semiconductor ecosystem in Oregon makes significant contributions to the global semiconductor industry, anchored by the high-tech corridor in the Portland metropolitan area, primarily Washington County. As of early 2026, the state remains a premier location for semiconductor research, development, and manufacturing. According to the Technology Association of Oregon, Oregon accounts for approximately 15% of the total U.S. semiconductor workforce.[2] The industry is a key driver of the state's economy, with computer and electronic products representing Oregon's top export category, valued at approximately $12.4 billion to $13 billion annually.[3] The semiconductor industry has helped Oregon maintain its position as one of only 11 states in the nation with a year-over-year trade surplus.

Oregon's semiconductor industry landscape is dominated by Intel, the state's largest for-profit employer with an estimated market cap of $207 billion. Other major players with a significant presence include Lam Research, Analog Devices, Microchip Technology, and onsemi. These large companies are supported by a network of over 500 local suppliers that also hire thousands of Oregonians.[4] In an effort to help Oregon retain its strong presence in the semiconductor industry, in 2023 the state passed Senate Bill 4, creating the Oregon CHIPS Program. The legislation created the Oregon CHIPS Fund, appropriating $240 million in state incentives to leverage federal funding from the U.S. CHIPS and Science Act with the aspiration to create more than 6,000 new jobs.[5]

Despite these investments, the Oregon semiconductor industry faces a complex set of structural and economic challenges that create a significant gap between the state's long-term job creation goals and its immediate labor market reality. Following the announcement of approximately 2,500 layoffs in the summer of 2025, Intel announced later in the same year that it would cut another 669 workers in Oregon by year-end. Moreover, in November 2025, Intel's total Oregon workforce had dropped to roughly

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[1] Oregon Business Development Department. "Oregon CHIPS: A New Era for Semiconductor Manufacturing." *Oregon.gov*, 16 June 2023, www.oregon.gov/biz/aboutus/blog/pages/oregon_chips_06162023.aspx.
[2] Technology Association of Oregon: https://www.techoregon.org/blog/the-future-of-semiconductors-begins-in-oregon
[3] Portland Metro Chamber: https://portlandmetrochamber.com/resources/2025-state-of-oregon-trade/
[4] Greater Portland Inc. https://www.greaterportlandinc.com/research-center/major-employers
[5] https://www.oregon.gov/highered/strategy-research/Documents/Reports/Semiconductor_Talent_Assessment_Jan2024.pdf

18,000, down from a peak of 23,000 in 2023 with these cuts being part of a broader $19 billion loss reported by the company and a strategic pivot to reduce costs while struggling to compete in the AI chip market.[6] Overall, the state semiconductor industry has experienced a $500 million contraction in total income distributed to workers, from $1.7 billion in the beginning of 2024 to $1.2 billion as of the 2nd quarter of 2025.[7]

Despite these headwinds, Oregon's semiconductor industry still presents significant opportunities for future expansion. The Silicon Forest is a mature and highly developed ecosystem of businesses that represent a spectrum of activities related to semiconductor manufacturing. No other state in the United States possesses a semiconductor manufacturing ecosystem as mature as Oregon's. A key question for the State of Oregon is, "What strategies can Oregon implement to leverage and sustain the ecosystem?"

Objectives and Methods

This project seeks to (1) assess the current state of Oregon's semiconductor industry, (2) concisely illustrate the challenges the industry faces, and (3) identify ways the State can help. This assessment provides information intended to assist Business Oregon (BO) and Oregon State University (OSU) Frontiers of Advanced Semiconductor Technologies (FAST) in understanding where and how the state and research partners can provide support to secure long-term manufacturing of semiconductors within Oregon. BO and OSU FAST partnered with the Institute for Policy, Research, and Engagement (IPRE) to lead this qualitative analysis to deepen the understanding of Oregon's semiconductor manufacturing supply chain through interviews and outreach with industry experts across a wide diversity of firms in the ecosystem.

The project has several objectives:

- Conduct a qualitative assessment of the semiconductor industry with an emphasis on supply chain support that identifies opportunities, challenges, and gaps for the sector
- Identify and interview key stakeholders that support the Oregon semiconductor industry supply chain to obtain insider knowledge
- Identify challenges, lack of redundancies, and opportunities within the Oregon semiconductor supply chain
- Generate a report that will illustrate the Oregon semiconductor industry's current conditions and needs as it relates to the supply-side of the industry (Materials, workforce, infrastructure, etc.,)

This analysis primarily relied on three methods:

- Literature Review
- Analysis of Economic Data
- Key Person Interviews

Limitations

This study was scoped in 2024, eventually contracted in Fall of 2025, and completed in late Spring of 2026. In that time, executive orders and tariffs implemented by the Trump Administration, technological

[6] https://www.klcc.org/economy-business/2025-11-17/intel-will-cut-another-669-workers-in-oregon-by-the-end-of-2025
[7] Confidential Oregon Quarterly Census of Employment and Wages Q1 2014- Q2 2025

advancements, and geopolitical dynamics have reshaped many of the operational characteristics of firms in the Oregon semiconductor industry.[8] IPRE assessed the industry through the lens of, "What can the state of Oregon do now, under current conditions, to assist the Oregon semiconductor industry?"

This report provides a static snapshot of an industry in an incredibly dynamic time presenting challenges with content in the report becoming immediately outdated. Even in the six-month duration of this project, tariffs have been raised and subsequently lowered for select countries. Similarly, new trade deals struck by the U.S. with other countries were eventually deemed illegal by the US Supreme Court in February of 2026. Despite this ruling, a new 15% global tariff was declared the following day. This is all to say that the policy and economic contexts at the time the assessment is being conducted are dynamic. Regardless, given the systemic challenges and dynamics within the state of Oregon, we believe that the recommendations in this report are relevant to supporting semiconductor business operations, generally, within the state.

As the study progressed, our findings suggested that supply chain linkages are for the most part not an issue with Oregon-based semiconductor businesses. Materials can get into the state easily and products are able to get out without issue. While this could change if geopolitical events unfold in ways that create supply chain disruptions, the focus of the study shifted to exploring how Oregon can best support the existing ecosystem and make the industry more resilient.

It is also important to acknowledge that the findings, conclusions, and recommendations presented in this report were distilled from interviews with 23 industry experts. The interviews were supplemented with research on trends in the semiconductor industry. Together, these sources provide a well-rounded foundation for the report, ensuring that its findings reflect both the lived experience of industry practitioners and broader market dynamics. While the perspectives gathered are necessarily limited to the individuals consulted, the alignment between interview insights and documented industry trends lends confidence to the report's overall assessment and recommendations.

[8] "Semiconductor Shakeup: Tariffs, CHIPS Act Uncertainty, and the Industry's Strategic Crossroads." Seertech Solutions, Apr. 2025, https://www.seertechsolutions.com/semiconductor-shakeup-tariffs-chips-act-uncertainty-and-the-industrys-strategic-crossroads/.

Chapter 2: The Semiconductor Manufacturing Process

This chapter provides an overview of the semiconductor manufacturing process and supply chain and where Oregon fits within the global semiconductor supply chain. To truly understand the gravity of importance of the semiconductor industry that is in Oregon, the full development process should be understood.

The design and manufacture of semiconductors is tightly linked with supply chains. The semiconductor supply chain can be described in four major production steps with each step supported by critical inputs such as materials, equipment, and intellectual property. Together, these form a multilayered ecosystem involving thousands of suppliers, highly specialized tools, and decades of accumulated process knowledge.

The Semiconductor Manufacturing Process and Supply Chain

The semiconductor supply chain is one of the world's most complex and globalized industrial networks. Producing a single computer chip can involve over 1,000 distinct steps and require components to cross international borders 70 or more times before reaching a final consumer. While the industry is global, the Indo-Pacific region—particularly Taiwan, Japan, China, and South Korea—alongside the United States, plays a pivotal role in the landscape.[9]

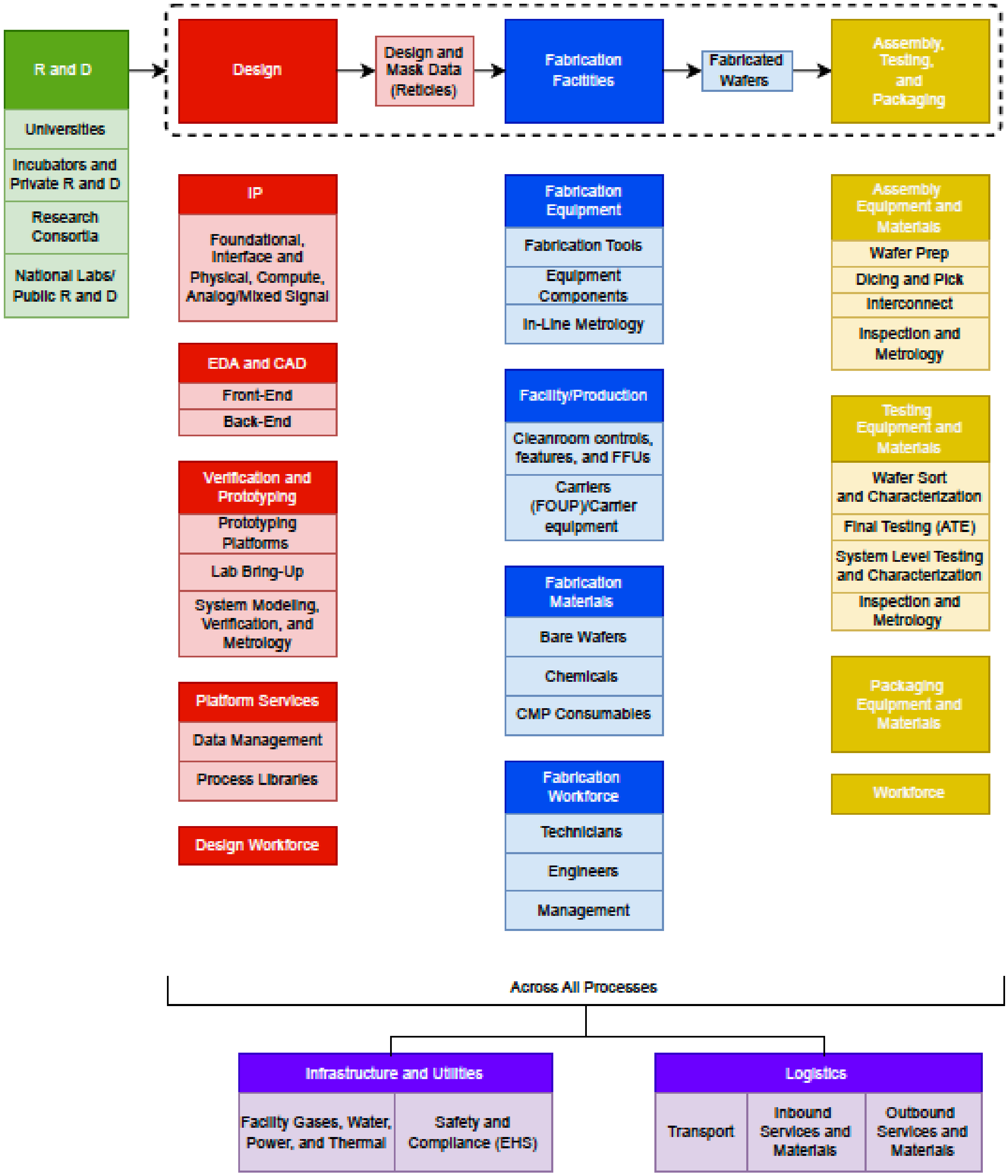
The supply chain is broadly categorized into four major stages:

- Research & Development
- Design
- Fabrication
- Assembly, Testing & Packaging (ATP)

Exhibit 1 shows a conceptual diagram of the semiconductor manufacturing process and key inputs into each step. Design is a critical step in the process and drives the other steps related to manufacturing chips and end products. We return to this exhibit in Chapter 3 where we explore the scale and scope of the semiconductor industry globally and in Oregon and other key states.

[9] Mapping the Semiconductor Supply Chain: The Critical Role of the Indo-Pacific Region. Akhil Thandani and Gregory C. Allen, Center for Strategic & International Studies, May 2023.

Exhibit 1. Semiconductor Supply Chain: Mapping Suppliers for Design, Fabrication, and Assembly/Testing/Packaging of Semiconductors



Source: IPRE

Following is a summary of the four main steps in semiconductor design and manufacturing.

1. Research and Development (R&D)

R&D serves as the foundation for all segments of the semiconductor supply chain, underpinning production, manufacturing equipment, and materials. The United States leads global semiconductor R&D spending, contributing over 60% of global private-sector investment and housing five of the top ten R&D spenders. Government programs such as the U.S. CHIPS and Science Act, Japan's and South Korea's "Chips Acts," and EU subsidies further reinforce national innovation capabilities.[10] R&D activities include:

- Exploratory research on new transistor structures (e.g., Gate-All-Around FETs)
- Materials science and photolithography innovation
- Design automation (EDA) advancements
- Device reliability, packaging, and integration research

Focus: It involves fundamental scientific research into materials, transistor architectures, and new manufacturing processes.[11]

Competitiveness: The United States is a dominant leader in semiconductor R&D. Major investments are being channeled into advancing logic chips for AI and high-tech applications.[12]

2. Design

Design is a high-value, technologically complex segment where the blueprints for integrated circuits are created. Chip design involves designing and verifying integrated circuits using sophisticated Electronic Design Automation (EDA) tools and core IP blocks. Designs optimize performance, power, and cost for specific applications such as CPUs, GPUs, AI accelerators, and IoT devices. Key characteristics:

- EDA tools are dominated by three U.S. firms—Synopsys, Cadence, and Siemens (Mentor)—which control approximately 70% of the market. These tools are essential and represent a major chokepoint for China and other nations.[13]
- Core IP (e.g., ARM CPU architectures) is largely controlled by firms in the United States and United Kingdom, comprising over 90% of the market.[14]
- The U.S. maintains about 47% of global design revenue, followed by South Korea, Taiwan, Europe, and China.[15]

Process: Designers use Electronic Design Automation (EDA) software and pre-designed functional blocks known as "Core IP" to create complex chip architectures.

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[10] The Semiconductor Supply Chain: Assessing National Competitiveness. Saif M. Khan, Dahlia Peterson, and Alexander Mann, Center for Security and Emerging Technology, January 2021.
[11] Mapping the Semiconductor Supply Chain: The Critical Role of the Indo-Pacific Region. Akhil Thandani and Gregory C. Allen, Center for Strategic & International Studies, May 2023.
[12] Ibid
[13] Ibid
[14] The Semiconductor Supply Chain: Assessing National Competitiveness. Saif M. Khan, Dahlia Peterson, and Alexander Mann, Center for Security and Emerging Technology, January 2021.
[15] Ibid.

Market Dynamics: "Fabless" companies specialize in design and outsource the physical manufacturing. The United States currently holds a strong foothold in chip design, with U.S.-headquartered firms maintaining a significant market share in Core IP.

3. Fabrication (Manufacturing)

Fabrication is the process of physically creating the semiconductor on silicon wafers in specialized facilities called "fabs". Fabrication is the most capital- and technology-intensive part of the supply chain, requiring multi-billion-dollar fabs, 500+ process steps, and nanometer-scale precision. Semiconductor manufacturing equipment (SME) is a major chokepoint:

- U.S., Japan, and the Netherlands control 90%+ of advanced fab tools, including deposition, etch, metrology, and cleaning systems.[16]
- ASML (Netherlands) exclusively supplies EUV lithography tools—required for 7 nm and below.
- Japan leads in many cleaning, photoresist, and packaging equipment categories.[17]

The Taiwan Semiconductor Manufacturing Corporation (TSMC - Taiwan) and Samsung (South Korea) dominate leading-edge foundry production (5 nm, 3 nm nodes). Intel (United States) is re-entering the foundry market at advanced nodes. China has extensive fab capacity but mostly at mature nodes (28 nm and above) and remains blocked from acquiring EUV equipment due to export controls. Leading-edge capacity expansion remains heavily concentrated in Taiwan, South Korea, and increasingly the United States due to incentive programs.

Technical Complexity: This stage is extremely capital-intensive, requiring advanced Semiconductor Manufacturing Equipment (SME) like photolithography tools. Fabrication involves hundreds of steps, including deposition (layering materials), etching (removing materials), and doping (modifying electrical properties).

Regional Leadership: Asia, specifically Taiwan and South Korea, excels in fabrication. Taiwan is dominant in the most advanced logic manufacturing, while South Korea leads in memory chip production.

4. Assembly, Testing, and Packaging (ATP)

ATP is the final stage of production, turning fabricated wafers into finished products. ATP separates finished wafers into chips, packages them, and tests performance and reliability. Historically labor-intensive, ATP has become more advanced with 3D stacking, chiplets, and advanced fan-out packaging. Key dynamics include:

- 95%+ of ATP capacity is in Asia, primarily in Taiwan, China, Malaysia, Vietnam, and the Philippines.
- Taiwan (ASE) and China (JCET) are major outsourced semiconductor assembly and test (OSAT) providers.
- Japan leads in test equipment, while U.S. firms maintain strong positions in advanced semiconductor testers and handlers.[18]

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[16] Mapping the Semiconductor Supply Chain: The Critical Role of the Indo-Pacific Region. Akhil Thandani and Gregory C. Allen, Center for Strategic & International Studies, May 2023.
[17] Semiconductor and beyond: Global semiconductor industry outlook 2026, PwC Semiconductor Center of Excellence, 2025.
[18] Mapping the Semiconductor Supply Chain: The Critical Role of the Indo-Pacific Region. Akhil Thandani and Gregory C. Allen, Center for Strategic & International Studies, May 2023.

Demand for advanced packaging is rising due to: (1) AI accelerators and HBM (high-bandwidth memory); (2) automotive zonal architectures; and (3) chiplet-based CPU/GPU design innovations.

Assembly and Packaging: Finished wafers are cut into individual dies, mounted on frames, and enclosed in protective casings. Modern "advanced packaging" now enhances chip performance through 2.5D or 3D architectures that stack multiple dies.

Testing: Rigorous testing is performed at both the wafer level and after packaging to ensure functional integrity and improve overall yield.

Market Dynamics: Compared to design and fabrication, ATP is more labor-intensive and has lower barriers to entry. Southeast Asia and China are currently at the forefront of this segment.

Summary

The semiconductor supply chain is a highly interdependent global ecosystem where no country can operate independently. There is a degree of geographic specialization, with different regions of the globe leading in different segments:

- U.S.: R&D, EDA, design, high-end SME
- Taiwan: Leading-edge foundry manufacturing, OSAT
- South Korea: Memory production, advanced logic
- Japan: Materials, photolithography subsystems, specialty chemicals
- Europe: Lithography (ASML), power semiconductors
- China: Mature-node manufacturing, ATP, raw materials

With rising demand for AI, connectivity, electric vehicles, and renewable energy, the industry is simultaneously scaling output while navigating geopolitical risks, export controls, and technology chokepoints. The literature emphasizes:

- The critical role of R&D and design leadership.
- The concentration of advanced fabrication in a few countries.
- The increasing importance of ATP and advanced packaging.
- Growing national efforts to build resilient, diversified chip ecosystems.

This complexity makes supply chain transparency, collaboration with allies, and sustained investment essential to maintaining competitiveness and technological sovereignty.

Chapter 3: Overview of the Semiconductor Industry

This chapter presents an overview of the semiconductor industry at the global, national, and state levels, highlighting the forces shaping production, competitiveness, and supply chain resilience. It begins with global trends, including shifting market dynamics, advanced node transitions, geographic concentration of fabrication capacity, and rising geopolitical pressures that complicate supply chain stability. The chapter then examines the United States' position, emphasizing national strengths in R&D, design, and semiconductor manufacturing equipment alongside emerging challenges such as talent shortages, AI-driven disruptions, and intensifying interstate competition. Finally, it turns to Oregon's semiconductor ecosystem, outlining its strategic assets, expanding and contracting industry nodes, state-level initiatives aimed at strengthening workforce pipelines and industrial capacity.

Global Trends[19]

The global semiconductor and electronic parts manufacturing industry is expanding in strategic importance, driven by rising digital adoption, advances in AI, supply chain restructuring, and intensifying global competition. Despite being a mature industry, rapid innovation, node shrinkage, and market complexity keep the sector highly dynamic and volatile.

Between 2020 and 2025, industry revenue declined at a -1.2% compound annual growth rate (CAGR), primarily due to supply chain shocks, economic slowdowns, and a downturn in 2023. Revenue rebounded in 2025 and is forecast to grow at 2.8 percent annually through 2030, reaching approximately $2 trillion. Growth is heavily concentrated in logic and memory semiconductors, fueled by AI and cloud-computing demand. In 2025, profit margins averaged 5.4 percent.

Key markets, including data centers, automotive, communications equipment, and consumer electronics, increasingly rely on specialized semiconductors:

- Data centers and AI computing now represent the fastest-growing demand segment, with GPUs, AI accelerators, and high-bandwidth memory driving exceptionally high growth rates
- Automotive manufacturers are major growth drivers due to EV adoption, ADAS/autonomy features, and power electronics
- Communications equipment is supported by 5G rollout and high-performance RF and networking chips
- Industrial and government buyers continue increasing orders for robotics, aerospace/defense systems, and advanced manufacturing equipment

Exhibit 2 shows revenue and market share of key semiconductor products. The distribution of revenue across product segments highlights the industry's heavy reliance on high-value, technologically intensive

[19] This section summarizes findings and analysis from the IBISWorld report titled: Global Manufacturing • C2524-GL - Global Semiconductor & Electronic Parts Manufacturing, January 2026.

components. Printed circuit assemblies represent the single largest category at nearly 21 percent of total industry revenue. Logic semiconductors follow closely at 18 percent, reflecting accelerating demand for advanced processing capabilities driven by AI, cloud computing and high-performance devices. The combined share of memory semiconductors (9%), analog chips (8%), and electronic connectors and inductors (6%) underscore the diversity of supporting technologies required to power modern systems.

Exhibit 2: Revenue and Market Share of Key Semiconductor Industry Products

Product	Revenue ($bn)	Market Share (%)
Printed circuit assembly	365.7	20.9
Logic semiconductors	313.2	17.9
Memory semiconductors	161.0	9.2
Analog semiconductors	141.7	8.1
Electronic connectors and inductors	99.7	5.7
Bare printed circuit boards	73.5	4.2
Other semiconductors	306.2	17.5

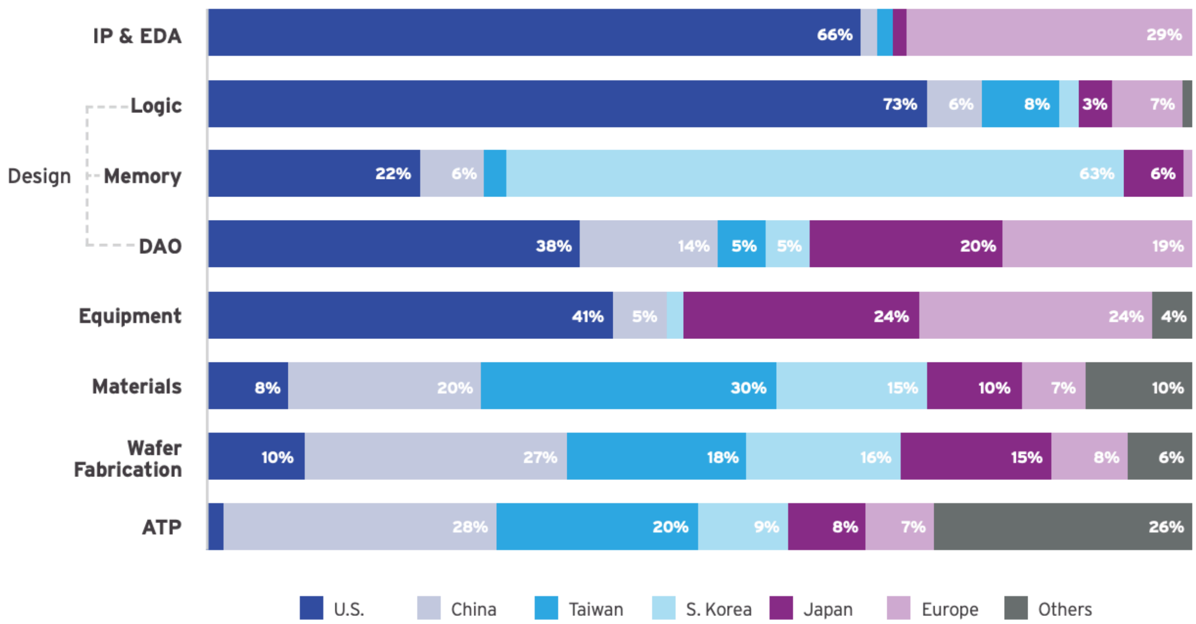
Source: IBISworld, Global Manufacturing • C2524-GL
Global Semiconductor & Electronic Parts Manufacturing, January 2026

Global chip supply remains concentrated in Asia—particularly Taiwan, South Korea, Malaysia, and China—which host most of the world's fabrication capacity. The U.S. has strengths in intellectual property (IP) and Electronic Design Automation (EDA) accounting for 66 percent of the global supply chain value, and 73 percent for logic design. Overall, the industry is highly diversified globally creating a complex supply chain (see Exhibit 3).

Western economies (U.S. and Europe) are working aggressively on reshoring production due to national-security concerns. The U.S. CHIPS and Science Act is injecting $52B, $11B of which is still being allocated for R&D, into domestic semiconductor capabilities, prompting TSMC, Samsung, Intel, and Micron to invest in U.S. fabs. The European Chips Act aims to double Europe's manufacturing share by 2030.

Importantly, rising U.S.-China tensions have triggered widespread export controls on advanced chips and manufacturing equipment. China has retaliated with import bans (e.g., on Micron) and strategic restrictions on critical rare earth minerals, further increasing supply chain complexity and stability. Moreover, China continues to pursue self-sufficiency, investing over $100B to reduce reliance on Western technology.

Exhibit 3: Supply Chain Value Added by Country and Region



Source: 2025 State of the U.S. Semiconductor Industry, IPnest, Wolfe Research, Gartner, SEMI, BCG Analysis

Purchases comprise nearly 50 percent of industry revenue, reflecting heavy reliance on specialty materials, wafers, rare earths, and advanced tools. Skilled labor and R&D investment remain key drivers of cost. Fabs face extraordinary capital requirements: a leading-edge facility can require more than $35B to $40B in initial investment, upgrades, and maintenance over its useful life.

Utility consumption, especially electricity and water, is also significant, pushing manufacturers to invest in renewable energy sourcing, recycling systems, and green-site incentives.

Looking forward, semiconductors will become increasingly essential as AI workloads multiply and device interconnectivity expands. The rise of chiplet architectures, advanced packaging, autonomous vehicle computing, and Internet of Things (IoT) proliferation will shape next-decade innovation. However, geopolitical risks, particularly surrounding Taiwan, remain the most significant threat to global semiconductor stability. Overall, the industry is set for sustained long-term growth but will continue facing sharp volatility, cyclical swings, and elevated capital and regulatory pressures.

United States Trends

The United States holds a leading position in the global semiconductor value chain, particularly in research and development, advanced chip design, and Electronic Design Automation (EDA). As of 2023, U.S. firms accounted for more than 40 percent of global integrated circuit design revenue, while three U.S.-based companies controlled roughly 70 percent of the global EDA market. [20] Together with the United Kingdom, U.S. firms dominate core semiconductor intellectual property, capturing over 90 percent

[20] IBISWorld. Semiconductor & Circuit Manufacturing in the U.S. IBISWorld, 2025, https://www.ibisworld.com/united-states/industry/semiconductor-circuit-manufacturing/752/.

of the market. Within the United States, Oregon's R&D presence in the semiconductor industry accounts for 15% of national activity, second only to California with 51%.

The United States is also a global leader in semiconductor manufacturing equipment (SME). U.S. companies command more than 40 percent of global SME sales and, alongside Japan and the Netherlands, control the supply of most critical fabrication tools. U.S. firms lead in wafer-fab and advanced packaging equipment, while U.S. and Japanese suppliers together provide more than 70 percent of the world's wafer-fab tools. Although the Indo-Pacific region accounts for the largest volume of equipment purchases, most of this demand flows to U.S. and Japanese manufacturers, reinforcing U.S. strengths in deposition, etch, inspection, and metrology technologies.

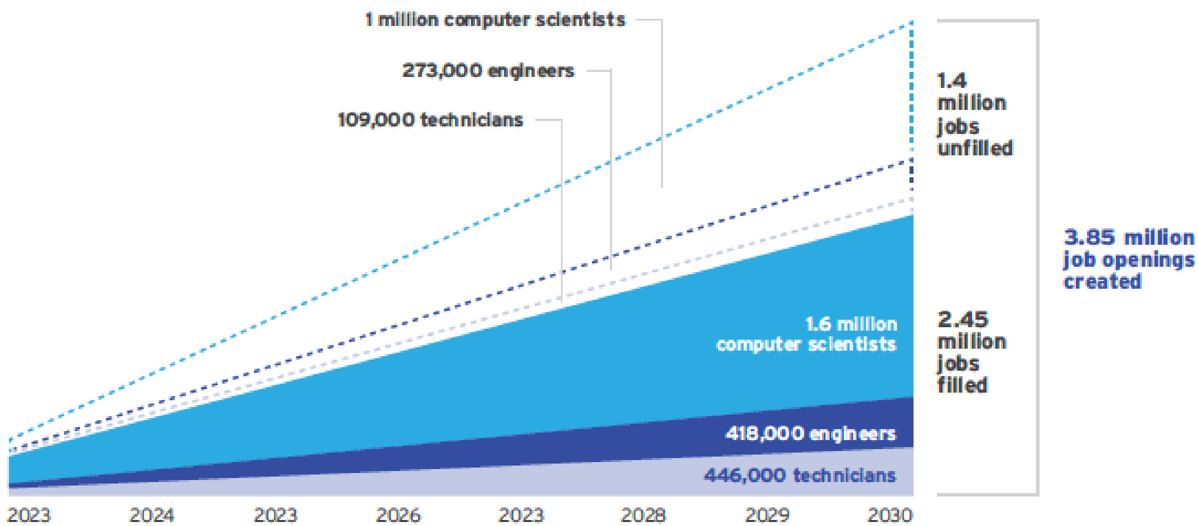
In contrast, the downstream assembly, testing, and packaging (ATP) segment is heavily concentrated in the Indo-Pacific. More than 95 percent of ATP facilities are in the region, with outsourced assembly and test operations concentrated in Taiwan, China, and Southeast Asia. [21] Similarly, most front-end fabrication capacity is located outside the United States, with over 80 percent of global wafer-fabrication facilities situated in the Indo-Pacific. This geographic imbalance underscores the United States' strategic strength in high-value design and equipment segments, alongside its continued reliance on Asia-based manufacturing and packaging capacity.

Existing data and literature highlight several supply chain gaps and disruptions which may inform the future of Oregon's Silicon Forest. The Semiconductor Industry Association (SIA) counts approximately 345,000 direct U.S. semiconductor jobs across design, EDA, device manufacturing, and equipment, and forecasts persistent talent gaps through 2030 (Exhibit 4). SIA highlights a shortfall of approximately 67,000 technicians, engineers, and computer scientists for the semiconductor industry by 2030, alongside a broader 1.4 million worker shortfall for the wider U.S. economy.[22] The report calls for expanding STEM pipelines and retaining/attracting top engineering talent.

[21] IBISWorld. Semiconductor & Circuit Manufacturing in the U.S. IBISWorld, 2025, https://www.ibisworld.com/united-states/industry/semiconductor-circuit-manufacturing/752/

[22] https://www.semiconductors.org/wp-content/uploads/2025/07/SIA-State-of-the-Industry-Report-2025.pdf

Exhibit 4. Economy-Wide Workforce Gap, 2023-2030, Projected US Demand for Computer Scientists, Engineers, and Technicians



Source: CES, QCEW, Oxford Economics

In addition, Artificial Intelligence (AI) is having a significant impact on the semiconductor industry. AI has simultaneously emerged as both a tool and a disruptive force for semiconductor supply chains. As a tool, AI holds the promise of boosting factory performance through predictive maintenance, inline quality inspection, and faster system optimization. These improvements could shorten tool downtime, improve yield, and lower energy usage on manufacturing floors, as the World Economic Forum highlights in its "AI transforming the factory floor" brief.[23] As a disruptive force, the use of AI is dramatically increasing the demand for both compute (GPUs) and memory. As AI buildouts redirect capacity to high-bandwidth parts, memory suppliers have struggled to quickly increase their semiconductor product output.[24]

Oregon

The roots of Oregon's semiconductor industry stretch back to the mid-20th century, when the region began developing a high-technology ecosystem. Early activity occurred in the 1930s with the establishment of the U.S. Forest Service Radio Lab in Portland. The lab attracted inventors Douglas Strain and Howard Vollum who would go on to establish two of Oregon's pioneering tech firms: Electro-Scientific Industries (originally Brown Engineering, founded 1944) and Tektronix (founded 1946). Tektronix evolved into one of the world's premier oscilloscope manufacturers and Oregon's largest private employer for much of the post-World War II era. These companies anchored the initial technology corridor that emerged along the Sunset Highway in Washington County.[25]

The semiconductor industry expansion accelerated in the 1980s as Oregon sought to diversify its economy amid the decline of the timber industry. In 1984, the state repealed the unitary tax and launched aggressive recruitment efforts. This resulted in major semiconductor firms – including Intel,

[23] https://www.weforum.org/stories/2024/10/ai-transforming-factory-floor-artificial-intelligence/
[24] https://www.reuters.com/world/china/ai-frenzy-is-driving-new-global-supply-chain-crisis-2025-12-03
[25] https://www.oregonencyclopedia.org/articles/silicon_forest/

NEC, Wacker Siltronic, Hewlett-Packard, Spectra-Physics, and Kentrox, among others – establishing or expanding operations in Oregon. The arrival of these companies transformed Washington County into a dense cluster of semiconductor and electronics manufacturing, solidifying the "Silicon Forest" identity and laying the foundation for Oregon's position as key U.S. semiconductor hub.[26]

Key strengths that have sustained the industry include a highly skilled technical workforce, strong engineering and research infrastructure, and well-established supply chains supporting high-value, low-weight manufacturing. Collectively, these have been an advantage given Oregon's geographic distance from major consumer markets. Over time, continued public and private investment, such as the development of the Oregon Graduate Center (1963)[27] to provide R&D support and today's CHIPS-related modernization efforts, has reinforced Oregon's semiconductor competitiveness. These historical factors collectively position Oregon as a longstanding hub in the U.S. semiconductor landscape with deep industry roots and resilient structural advantages.[28]

Over nearly a century, the Silicon Forest grew into a mature ecosystem in Oregon where industry leaders in chip design and manufacturing in Hillsboro are supported by equipment and metrology labs, wafer-materials capacity, and design/EDA teams across the state. This geographic concentration shortens handoffs between design, research and development, and technology transfer yielding significant process improvements. This concentration creates an ecosystem which both grow faster and establishes a more robust and secure supply chain.

Oregon Trends

Exhibit 5 shows annual employment trends in Oregon's semiconductor industry from 2000 to 2024. Following the 2000 dot-com crash, employment declined steadily through the early 2000s, reaching a low of approximately 22,000 workers during the Great Recession (2008–2009). From 2010 to 2016, the industry experienced moderate, sustained growth that continued through the COVID-19 pandemic. After the pandemic, employment rose sharply, driven in part by the Biden Administration's 2022 CHIPS Act, corresponding state investment through Senate Bill 4 (2023), and the unveiling and rapid implementation of AI globally.[29]

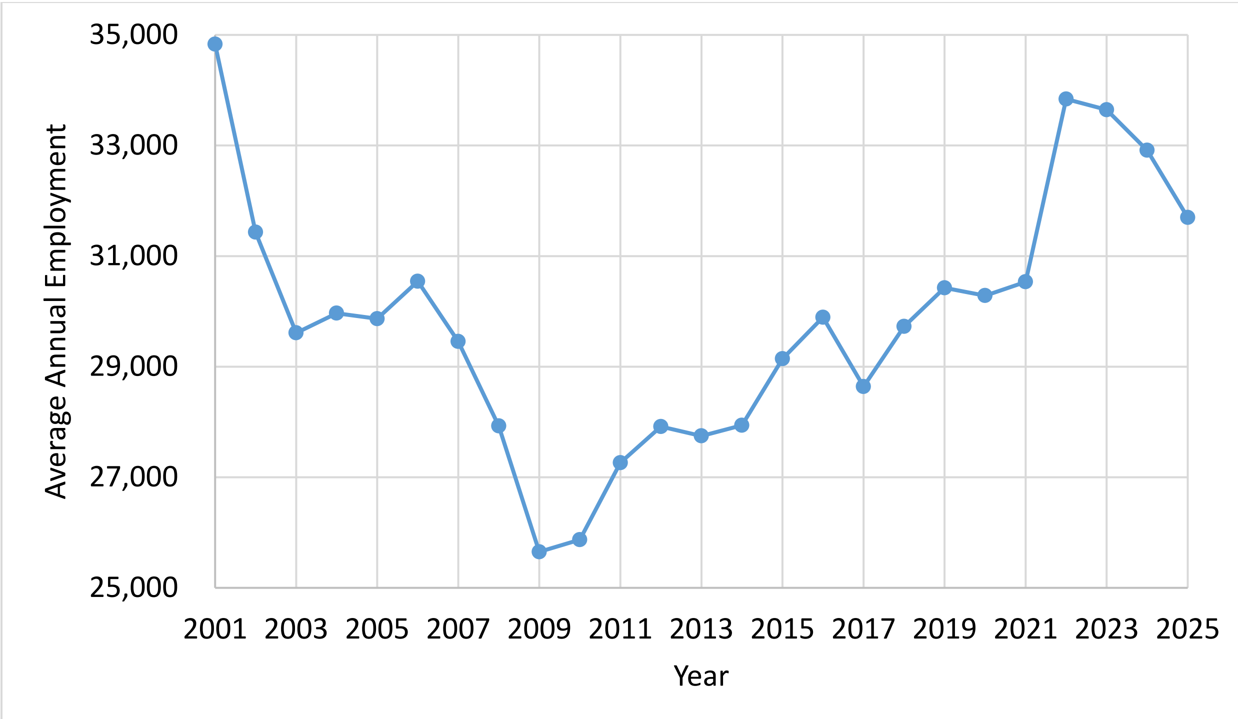
[26] https://cdn.orbusinesscouncil.org/docs/policy/Oregon_Semiconductor_Industry_Report.pdf

[27] The Oregon Graduate Center was a private, postgraduate-only research university in Washington County. The center was renamed the Oregon Graduate Institute in 1989 and merged with the Oregon Health Sciences University in 2001. The School was discontinued in 2008.

[28] https://www.oregonencyclopedia.org/articles/silicon_forest/

[29] U.S. Department of Commerce. "Two Years Later: Funding from the CHIPS and Science Act Creating Quality Jobs, Growing Local Economies, and Bringing Semiconductor Manufacturing Back to America." U.S. Department of Commerce, 12 Aug. 2024, https://www.commerce.gov/news/blog/2024/08/two-years-later-funding-chips-and-science-act-creating-quality-jobs-growing-local.

Exhibit 5: Oregon Annual Employment Trends for 5-Digit NAICS Related to the Semiconductor Industry



Source: US Bureau of Labor Statistics QCEW
NAICS – North American Industrial Classification System

Exhibit 6 highlights the strong geographic concentration of Oregon's semiconductor industry within the Portland Metro Region. Notably, Washington County, which alone accounts for more than 80 establishments and over 27,000 jobs, accounts for more than 80 percent of total semiconductor employment statewide. Washington County also leads the state in average annual wages, at nearly $195,000, reflecting its dominance in high-value manufacturing and advanced research roles. While Multnomah and Clackamas counties have experienced notable growth in the number of establishments since 2014, employment growth outside Washington County remains modest, underscoring the industry's continued reliance on a single regional hub.

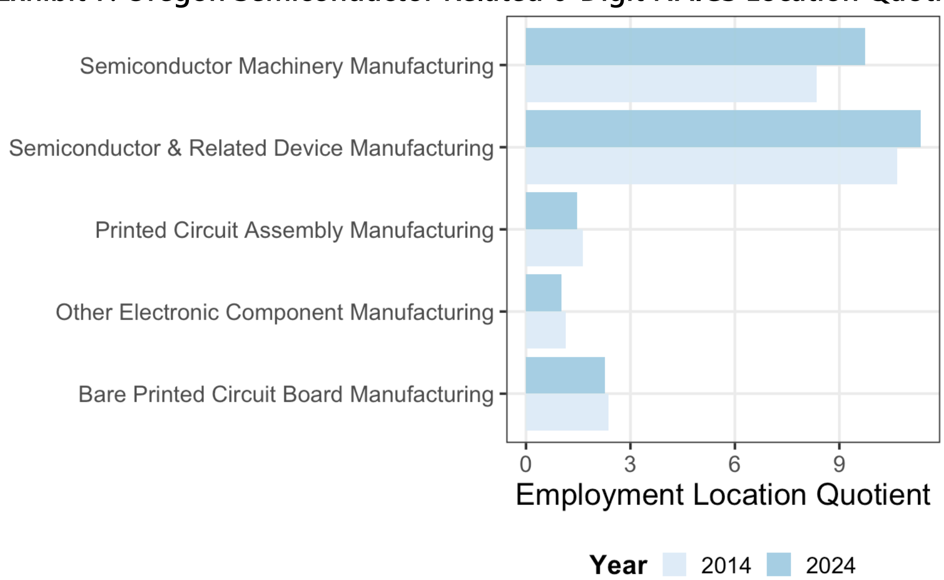
Exhibit 6. Semiconductor Establishments, Average Annual Employment, and Average Wage Per Employee, 2024 and Percent Change 2014-2024

	Establishments		Avg Annual Emp		Avg Wage/Emp ($)	
County	2024	% Change 2014-2024	2024	% Change 2014-2024	2024	% Change 2014-2024
Clackamas	20	43%	1,390	-8%	95,694	34%
Deschutes	7	40%	89	-43%	93,104	45%
Jackson	4	0%	151	10%	57,258	45%
Lane	6	0%	47	-43%	56,781	-39%
Multnomah	36	80%	2,098	20%	89,279	28%
Washington	81	4%	27,109	21%	194,736	32%
Rest of State	42	68%	2,028	8%	na	na
Oregon	**196**	**29%**	**32,912**	**18%**	**179,586**	**34%**

Source: U.S. Bureau of Labor Statistics, Quarterly Census of Employment and Wages (QCEW)

Exhibit 7 shows location quotients (LQs) at the six-digit NAICS level for Oregon's semiconductor industry between 2014 and 2024. These data illustrate the state's semiconductor-related employment concentrations relative to the United States. Notably, all semiconductor-related industries have LQs greater than 1, indicating that Oregon has a higher concentration of workers than the national average. This concentration is especially pronounced in semiconductor machinery manufacturing and semiconductor and related device manufacturing, where LQs were approximately 8 and 10 in 2014. By 2024, these LQs had increased further, reinforcing Oregon's strong and growing position in the national semiconductor ecosystem.

Exhibit 7: Oregon Semiconductor Related 6-Digit NAICS Location Quotients 2014 to 2024

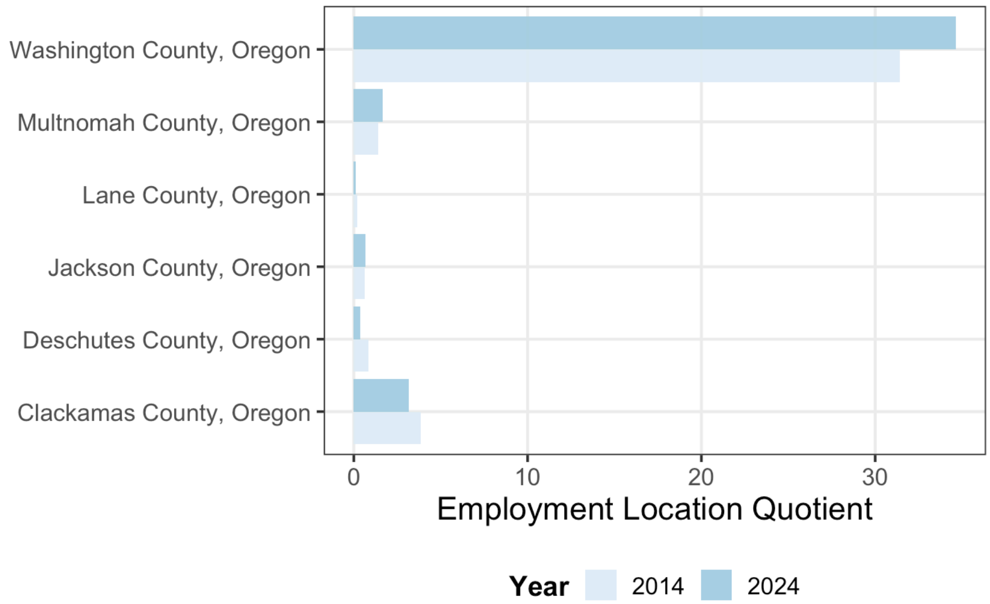


Source: US Bureau of Labor Statistics QCEW
Note: Location Quotients compare Oregon to the U.S.

While Oregon has a significant concentration of national semiconductor activity, the geographic concentration of the industry within the state is primarily located in the Portland Metro Region and

Washington County in particular. Exhibit 8 shows county-level LQs for semiconductor related industries for select counties. Of the six Oregon counties identified as having semiconductor industry activity, Washington County, by far, has the largest concentration of activity with a location quotient of over 30 in 2014 and increasing to nearly 35 in 2024.

Exhibit 8: Semiconductor Related Industry Employment Location Quotients by Oregon County



Source: Oregon QCEW 2014, 2024

Over the decade spanning 2014 to 2024 other states have aggressively recruited semiconductor businesses. Exhibit 9 shows the number of establishments and percent change in the number of establishments in semiconductor related industries in the states of Oregon, Arizona, Michigan, California, Minnesota, and Texas. While Michigan experienced the greatest growth in number of establishments of the past decade and had more semiconductor related establishments than Oregon in 2024, Oregon has over double the number of employees in the semiconductor industry. Of the states listed, in 2024 Oregon had the second highest average wage at $179,586, behind only California's average wage of $352,227.

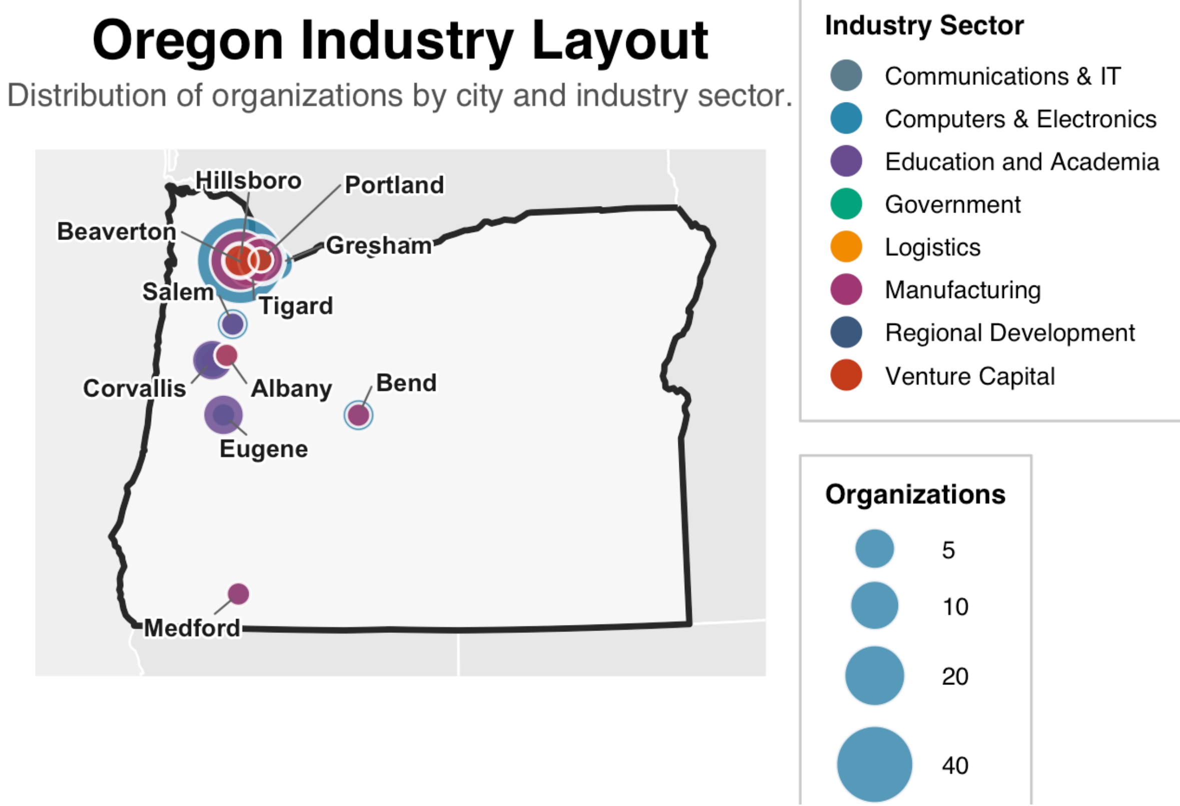
Exhibit 9: Number of Firms, Employees, and Average Wage Per Employee, Semiconductor 5-Digit NAICS Related Establishments for Primary Semiconductor States in US 2014 to 2024

	Establishments		Avg Annual Emp		Avg Wage/Emp ($)	
State	2024	% Change 2014-2024	2024	% Change 2014-2024	2024	% Change 2014-2024
Arizona	220	53%	25,212	12%	164,919	38%
California	1,555	11%	84,306	-2%	352,227	175%
Michigan	238	75%	12,179	55%	84,769	44%
Minnesota	148	10%	10,672	19%	90,958	51%
Oregon	**196**	**29%**	**32,912**	**18%**	**179,586**	**34%**
Texas	619	50%	50,475	25%	151,581	35%
U.S. TOTAL	**7,042**	**24%**	**392,839**	**7%**	**173,010**	**77%**

Source: Oregon QCEW 2014, 2024

Exhibit 10 shows the geographic concentration of firms in the semiconductor industry in Oregon. Most firms are in the Portland metro region (specifically Washington County) with notable concentrations of firms in Corvallis and Eugene. Bend has a small, but growing, presence of semiconductor related manufacturing entities. Medford, on the southern border of Oregon, also has a small presence of semiconductor-related manufacturing firms.

Exhibit 10: Composition and Geographic Distribution of Semiconductor Related Firms in Oregon, 2024



Source: Oregon QCEW 2024

Semiconductor-related industries in Oregon experienced a sharp contraction from peak employment and wage levels in the fourth quarter of 2024 to the fourth quarter of 2025. Total employment declined by approximately 5,273 workers (a 15% reduction) while total wages fell by over $450 million (nearly 34 percent) between Q4 2024 and Q2 2025 (see Exhibit 11). Because Oregon relies heavily on income taxes, this wage loss will have measurable impacts on state general revenues. While some segments continue to grow, the largest industry segment in Oregon—semiconductor and related device manufacturing—saw the steepest decline with wages falling nearly 40 percent and employment dropping by about 18 percent.

Exhibit 11: Change in Aggregate Wages and Employment Levels for Semiconductor Related NAICS in Oregon from Q4 2024 to Q4 2025

Semiconductor Related Industry	Aggregate Wages Change Q4 2024 – Q4 2025	Aggregate Employment Change Q4 2024 – Q4 2025	% Change Aggregate Wages Q4 2024 – Q4 2025	% Change Aggregate Employment Q4 2024 – Q4 2025
Semiconductor Manufacturing Related Equipment	$12,069,941	128	9.0%	3.5%
Bare Printed Circuit Board Manufacturing	$2,418,594	72	17.8%	9.1%
Semiconductor and Related Device Manufacturing	-$463,561,128	-5,223	-40.4%	-18.2%
Printed Circuit Assembly	$331,731	-66	1.8%	-6.0%
Other Electronic Component Manufacturing	-$1,737,199	-183	-11.0%	-22.6%
Total	-$450,478,061	-5,273	-33.9%	-15.0%

Source: Confidential Oregon QCEW Q4 2024, Q4 2025

Exhibit 12 highlights the volatility of Oregon's semiconductor-related industries, showing overall changes in aggregate wages and employment between Q1 2025 and Q4 2025 using QCEW data. Over the four quarters of 2025, aggregate wages declined by 16 percent and employment fell by 10.3 percent, resulting in approximately $143 million in lost wages and over 5,000 jobs.

Exhibit 12: Change in Aggregate Wages and Employment Levels for Semiconductor Related NAICS in Oregon from Q1 2025 to Q4 2025

Semiconductor Related Industry	Aggregate Wages	Aggregate Employment
Semiconductor Manufacturing Related Equipment	-35%	-0.6%
Bare Printed Circuit Board Manufacturing	14%	5.7%
Semiconductor and Related Device Manufacturing	-6%	-12.7%
Printed Circuit Assembly	7%	-3.7%
Other Electronic Component Manufacturing	-16%	-1%
Total	**-16%**	**-10.3%**

Source: Confidential Oregon QCEW Q1 2025, Q4 2025

Oregon Industry Outlook

Oregon is a national leader in the semiconductor industry and is widely recognized as a domestic hub for advanced manufacturing, research, and design.[30] The state's core activity is anchored in Hillsboro and Washington County, where manufacturing, R&D, and process development are closely integrated. Oregon's proximity to California's design, EDA, and venture ecosystems, as well as Washington's broader technology base, further strengthens these innovation cycles.[31] [32]

Beyond the Hillsboro hub, the Silicon Forest is expanding into a statewide network of complementary nodes. HP is expanding semiconductor-related activity in Corvallis, and Lam Research maintains significant operations in Tualatin and Sherwood. Deschutes County has also emerged as a fast-growing center for semiconductor and semiconductor-equipment activity. These activities reflect a gradual geographic broadening of the industry within Oregon.[33] [34]

This concentration of industry activity has attracted sustained federal attention. Since 2022, Oregon has received multiple awards through the CHIPS and Science framework.[35] [36] These include proposed incentives for Microchip Technology, with funding supporting its Gresham fabrication facility, as well as major federal commitments to Intel to modernize and expand leading-edge R&D and manufacturing capabilities in the state, including High-NA EUV development. Additional CHIPS funding has been proposed for Analog Devices to expand mature-node manufacturing across multiple sites, including Beaverton.[37]

Oregon has also benefited from smaller-scale federal investments, including a CHIPS SBIR Phase I award to The Provenance Chain Network to support semiconductor supply-chain security and provenance software.[38]

Despite broader volatility in federal industrial policy, Oregon's semiconductor ecosystem has remained a national priority. In August 2025, the federal government announced an unusual equity investment of approximately 10 percent in Intel, converting a portion of CHIPS and national-security funding into shares. Supporters argue this intervention reflects Intel's strategic importance to U.S. advanced logic R&D, manufacturing capability, and critical regional ecosystems such as Oregon's. Others have cautioned that

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[30] IBISWorld. Semiconductor & Circuit Manufacturing in the U.S. IBISWorld, 2025, https://www.ibisworld.com/united-states/industry/semiconductor-circuit-manufacturing/752/.
[31] IBISWorld. Semiconductor & Circuit Manufacturing in the U.S. IBISWorld, 2025, https://www.ibisworld.com/united-states/industry/semiconductor-circuit-manufacturing/752
[32] IBISWorld. Semiconductor & Circuit Manufacturing in Oregon. IBISWorld, March 2026, https://my.ibisworld.com/us/en/industry-state/or33441a/state-industry-report
[33] Home Building Association of Greater Portland. "HBA Supports Economic Expansion in Tualatin (Lam Research)." HBA PDX News, 3 Sept. 2025, https://web.hbapdx.org/news/newsarticledisplay.aspx?ArticleID=2675.
[34] IBISWorld. Semiconductor & Circuit Manufacturing in Oregon. IBISWorld, March 2026, https://my.ibisworld.com/us/en/industry-state/or33441a/state-industry-report
[35] Associated Press (AP). "U.S. Announces $162 Million to Expand Computer Chip Factories in Colorado and Oregon." AP News, 4 Jan. 2024, https://apnews.com/article/computer-chips-biden-commerce-microchip-technologies-f9f1984a1e524c33edc3d95e9da9d1b7.
[36] https://www.opb.org/article/2024/11/26/intel-18-billion-federal-chips-funding-hillsboro/
[37] https://www.nist.gov/chips/analog-devices-inc-washington-camas
[38] https://www.nist.gov/states/oregon

direct federal ownership introduces governance, market-distortion, and taxpayer-risk concerns.[39] [40] [41] Regardless, this investment underscores how Intel's success, and furthermore Oregon's contribution to the semiconductor industry, remains a national economic development and national security priority.

At the state-level, Oregon's legislature has made its own investment in the Silicon Forest. First, the Oregon CHIPS Act (SB 4, 2023) created a $240 million Oregon CHIPS Fund and a Business Oregon toolkit for grants/loans, site-readiness and industrial land assembly, and expedited land-use pathways for strategically significant projects.[42] Additionally, the state is building a single, statewide talent engine through the FAST (Frontiers of Advanced Semiconductor Technology) Engine initiative. FAST convenes industry, universities, and regional partners to build workforce pathways beginning at the K-12 level tied to the industry currently operating Oregon. FAST also supports industry-inspired research and the semiconductor start-up ecosystem. FAST integrates 95 stakeholders statewide to coordinate apprenticeships/co-ops, equipment access, and lab upgrades so learners can move quickly into in-state roles.[43]

Oregon may also continue to consider its competitive advantage as a domestic leader as other states actively assemble business-friendly incentives for semiconductor industry members. Stiff competition is emerging. Arizona Commerce Authority reports more than 60 semiconductor expansions since 2020, over 25,000 projected jobs, and $205 billion in announced investment. For example, major greenfield capacity such as Intel's Chandler complex, Fab 52, is now fully operational and targeting 18A high-volume production.[44][45][46] Similarly, in Texas, lawmakers created the Texas Semiconductor Innovation Fund (TSIF) in 2023 and appropriated approximately $698 M to pair state support with federal CHIPS awards.[47] Incentives have backed large projects such as Samsung's Taylor cluster.[48] Additionally, New York State has allocated significant funding, over $10 billion, for Green CHIPS tax credits, a 75% refundable tax credit for employee training, and a 15% tax credit for R&D projects over $100 million.[49]

Taken together, these recruiting efforts illustrate how other states are combining incentives, site-readiness, and predictable timelines to attract industry members. This context may shape how Oregon sustains a business-friendly environment to retain existing firms and continue drawing new players.

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[39] https://newsroom.intel.com/corporate/intel-and-trump-administration-reach-historic-agreement

[40] Shivakumar, Sujai, Charles Wessner, and Thomas Howell. "Too Good to Lose: America's Stake in Intel." Center for Strategic and International Studies (CSIS), 12 Nov. 2024, https://www.csis.org/analysis/too-good-lose-americas-stake-intel.

[41] Ruwitch, John. "The U.S. Government Is Taking a Stake in Intel. It's Rare — and It Has Some Risks." NPR, 6 Sept. 2025. (Syndicated version: WBHM), https://wbhm.org/npr-story/the-u-s-govern ment-is-taking-a-stake-in-intel-its-rare-and-it-has-some-risks/

[42] Business Oregon. "Oregon CHIPS Program." Business Oregon, 2025, https://www.oregon.gov/biz/programs/or_chips_fund/pages/default.aspx.

[43] https://fast-engine.org/

[44] https://www.reuters.com/business/intel-outlines-details-first-pc-chip-made-its-new-manufacturing-tech-2025-10-09

[45] https://www.nytimes.com/2025/10/09/technology/intel-chip-factory-fab52.html

[46] https://www.azcommerce.com/media/peipenio/fy26-semiconductor-chips-fact-sheet.pdf

[47] https://gov.texas.gov/business/page/tsif

[48] https://gov.texas.gov/news/post/governor-abbott-announces-texas-semiconductor-innovation-fund-grant-to-samsung-austin-semiconductor

[49] "Green CHIPS." Empire State Development, New York State, https://esd.ny.gov/green-chips.

Chapter 4: Oregon Semiconductor Supply Chain Assessment

This chapter presents synthesized key findings from the 23 interviews with 16 different semiconductor industry related firms. The primary themes derived from the interviews are:

- **Intel Anchoring and Ecosystem Resilience:** Intel's presence continues to anchor Oregon's semiconductor ecosystem, shaping supplier location, talent markets, and investment decisions. At the same time, firms emphasized that this concentration creates vulnerability, underscoring the importance of strengthening small and mid-sized firms to improve ecosystem resilience.
- **Talent Network and Ecosystem Support:** Workforce challenges emerged across all interviews, particularly for technicians and mid-career talent. Firms highlighted both the strength of Oregon's experienced workforce—and retiree knowledge networks—and the need for better coordination across education, workforce, and industry partners to sustain long-term talent pipelines.
- **Infrastructure (Ecosystem Logistics):** Firms reported that core supply-chain logistics currently function well, with reliable access to materials and markets. However, concerns are growing around long-term constraints—particularly industrial land availability, electrical capacity, and site readiness—that may limit future growth and large-scale investment.
- **Business Climate:** Interviewees expressed mixed but generally cautious views of Oregon's business climate. While firms value the state's legacy ecosystem and quality of life, many perceive Oregon as less competitive for future expansion due to taxes, regulatory uncertainty, and stronger incentives offered by other states.
- **Materials and Inputs (Equipment, Tools, and Raw Materials):** Access to materials and manufacturing inputs is not a near-term constraint, with firms relying on diversified global suppliers. Interviewees cautioned, however, that heavy dependence on foreign sources, rare earth concentration, tariffs, and geopolitical instability pose longer-term risks that could affect cost and resilience.

The remainder of this chapter explores these themes in more detail.

Intel Anchoring and Ecosystem Resilience

Many semiconductor firms originally chose to locate in Oregon to be geographically close to Intel. Interviewees emphasized that Intel's presence serves as an anchor for the broader Oregon ecosystem, influencing where suppliers, service providers, and related advanced manufacturing companies decide to operate. Proximity allows smaller firms to collaborate more easily, respond quickly to customer needs, and build long-term relationships within an established network.

However, this reliance also creates vulnerability. When Intel contracts or slows its operations, the surrounding ecosystem contracts as well. Some interviewees described a pattern in which reductions in Intel's capital spending or workforce cascade outward, affecting suppliers' order volumes, hiring plans, and long-term investments. This dependency on a single dominant firm limits the region's resilience and makes the semiconductor sector more sensitive to Intel's business cycles. Interviewees indicated that some businesses were attempting to mitigate this risk by selling to multiple companies, but the fact remains that Intel drives much of the activity in Oregon's semiconductor industry.

Strengthening small and medium-sized firms emerged as a key strategy for stabilizing the ecosystem. Interviewees noted that supporting these companies through workforce development, supply-chain programs, targeted incentives, and improved access to financing could help diversify the industry base. A stronger network of mid-sized firms would reduce regional vulnerability by distributing economic activity more evenly and creating more self-sustaining growth dynamics.

According to interviewees, it is unlikely that another company of Intel's size will establish operations in Oregon in the foreseeable future. Federal investments may help mitigate these risks somewhat, but Intel could choose to reduce its operational footprint in Oregon in the future. Interviewees also pointed out that large-scale semiconductor investments require significant land, infrastructure, and financial incentives, all of which are lacking in Oregon. The costs of siting, lack of strategically located industrial lands, costs of constructing, and operating a mega-fab in Oregon are viewed as too high compared to competing states, making it improbable that a second anchor tenant of similar scale will join the region

Why did Intel choose Oregon in the 1970s?[50]

In the mid-1970s, Intel was experiencing rapid growth following the invention of the microprocessor. Its home base in California's Santa Clara Valley (Silicon Valley) was becoming increasingly crowded, expensive, and competitive. Looking to establish its first manufacturing footprint outside of California, Intel broke ground in Washington County, Oregon, in 1974 and opened Fab 4 in Aloha in 1976.

Several factors, incentives, and geographical circumstances drove Intel to choose Oregon:

1. **Proximity to Silicon Valley (The "Two-Hour" Rule).** Intel's corporate planners drew a strict boundary when looking for a new location: it had to be within a two-hour travel radius of their Bay Area headquarters. This ensured that executives, engineers, and key suppliers could travel back and forth quickly. Washington County was just a 90-minute flight away, making it a highly accessible satellite location.

2. **Cheap and Abundant Power and Water.** Semiconductor manufacturing (fabrication) is an incredibly resource-intensive process requiring massive amounts of electricity and clean water. At the time, the Pacific Northwest offered some of the cheapest and most reliable industrial electricity and water rates in the nation, drastically lowering Intel's projected utility costs.

3. **Low Land and Construction Costs.** In the mid-1970s, agricultural and undeveloped land in Washington County was highly affordable, especially compared to the soaring real estate prices in California. Low land costs combined with lower construction costs meant Intel could buy large tracts of land with plenty of room for multi-decade expansions.

4. **Combating Silicon Valley "Job-Hopping".** Silicon Valley was already developing a volatile tech culture where engineers frequently hopped from competitor to competitor. Intel desired a more stable workforce to protect its intellectual property and retain talent. Oregon offered a highly educated, stable population with significantly lower turnover. Intel relocated entire engineering teams (such

[50] Wollner, Craig. "Intel." The Oregon Encyclopedia, Oregon Historical Society, 2022, https://www.oregonencyclopedia.org/articles/intel/.

as the iAPX432 microprocessor development team) to Oregon specifically to keep them insulated from California's high-turnover environment.

5. **An Existing Tech Foundation and Quality of Life**. While Oregon was not yet a tech hub, homegrown electronics pioneers like Tektronix and Electro Scientific Industries (ESI) had already established a baseline high-tech workforce in the region. Furthermore, the proximity to Portland provided the urban, social, and cultural amenities necessary to attract and convince out-of-state engineering professionals to relocate.

Intel's initial move to Aloha laid the groundwork for what is known today as the "Silicon Forest". Decades later, that original footprint has evolved into Intel's largest global concentration of facilities and its primary hub for cutting-edge semiconductor research and development, globally.

Workforce and Talent

The Silicon Forest's mature semiconductor ecosystem exhibits needs across the full talent spectrum, including advanced degrees for research and development as well as associate-level credentials for manufacturing and operations roles. The 2024 Oregon Semiconductor Workforce and Talent Assessment, conducted by ECONorthwest, confirms that technician and technologist roles represent the most acute and immediate workforce constraint, particularly in wafer fabrication, equipment maintenance, and process operations. While Oregon produces highly skilled engineers and researchers, industry interviews and workforce data indicate that growth in technician pipelines has not kept pace with anticipated expansion driven by CHIPS Act-related investments.[51]

> *"…growth in technician pipelines has not kept pace with anticipated expansion…"*

Data from the Quarterly Census of Employment and Wages shows that the average annual wage per job for semiconductor workers in Washington County was over $195,000 in 2024. This is in part because Oregon is a major research and development hub for the semiconductor industry. Consistent with interview findings, the 2024 Oregon Workforce and Talent Assessment highlights that Intel's compensation and benefits structure effectively sets a regional labor market benchmark, making it difficult for smaller Tier 2 and Tier 3 suppliers to compete for experienced technicians and mid-career workers. This dynamic exacerbates retention challenges and contributes to firms competing for talent within the regional ecosystem rather than net workforce growth.[51]

Oregon's Universities

Virtually all interviewees indicated that Oregon's larger research universities (Oregon State University, the University of Oregon, and Portland State University) produce high-quality graduates well suited for semiconductor research, design, and advanced engineering roles. ECONorthwest's assessment corroborates this view, finding that Oregon's semiconductor-related degree programs are generally on par with peer states in rigor and outcomes. However, interviewees note that the scale of Oregon's higher education system limits total graduate output. This is especially true when compared to states such as Arizona and

[51] Oregon Higher Education Coordinating Commission. Semiconductor Workforce and Talent Assessment. Prepared by ECOnorthwest and Wilfred Pinfold, Jan. 2024, https://www.oregon.gov/highered/strategy-research/Documents/Reports/Semiconductor_Talent_Assessment_Jan2024.pdf.

Texas, whose larger systems generate higher absolute numbers of engineers and technicians. For example, total enrolled university student population in all of Oregon is 99,600 compared to 194,000 for Arizona State University alone.

Industry participants emphasized, and ECONorthwest's report corroborates, that for Oregon, the quality of graduates is more strategically important than quantity due to the state's competitive advantage in research, process development, and advanced manufacturing rather than large-scale commodity fabrication. However, the 2024 Oregon Workforce and Talent Assessment also finds that many graduates exit the state after completion, weakening the return on Oregon's educational investments and intensifying local labor shortages.[51]

While Oregon State University and the University of Oregon host strong programs, neither campus is located geographically near the primary semiconductor clusters in the Portland metro region. ECONorthwest's assessment echoes interview feedback that this distance reduces opportunities for internships, applied research partnerships, and work-based learning, particularly at the undergraduate level.

The defunct Oregon Graduate Institute provides one potential model.[52] The Oregon Graduate Institute (OGI) functioned as a tight bridge between advanced academic research and industry by focusing graduate education on applied science and engineering problems directly relevant to Portland's "Silicon Forest," particularly semiconductors. Its close partnerships with companies like Intel created a talent pipeline where workforce development, university research, and commercialization reinforced each other. As a model, OGI shows how a specialized, industry-integrated research institution can anchor regional innovation while continuously upgrading the skills of the local technical workforce.

In contrast, community colleges, especially Portland Community College and Mt. Hood Community College, are identified by interviewees as important workforce anchors. These institutions play a critical role in training entry-level technicians, supporting incumbent worker upskilling, and providing stackable credentials aligned with industry needs. Employers consistently view community colleges as more agile and responsive to near-term workforce demands than four-year institutions.

Introducing Oregonians to the Industry

Despite Oregon's postsecondary strengths, interviewees commented that talent pipeline constraints emerge well before college entry. Student-level data and employer interviews from the 2024 Oregon Workforce and Talent Assessment show that many K-12 students lack awareness of semiconductor career pathways, credential options, and wage potential. The industry is frequently perceived as overly technical, inaccessible, or opaque, particularly among students from rural, low-income, and historically underrepresented communities. Moreover, interviewees suggested the semiconductor industry is not perceived as attractive as other industries such as robotics.

This lack of early exposure is compounded by competition from more visible technology sectors such as robotics, software, and renewable energy. Without earlier and more consistent engagement, including career-connected learning, dual-credit programs, and industry-supported outreach, semiconductor firms will continue to struggle to attract the next generation of technicians and engineers.

Attracting Workers from Outside Oregon

Global talent remains essential to filling Oregon's most specialized semiconductor roles. Both interviewees and the 2024 Oregon Workforce and Talent Assessment confirms that international hiring,

[52] https://vintagetek.org/oregon-graduate-center/

particularly through the H-1B visa program, remains critical for advanced engineering, research, and niche technical positions that cannot be readily filled domestically. However, interviewees expressed concern that federal policy uncertainty, visa caps, and improving economic conditions in workers' home countries are making the United States a less competitive and appealing destination than in previous decades.

Recruiting domestic workers from outside Oregon presents additional challenges. While interviewees report that relocated workers who settle in the state tend to remain long-term due to quality-of-life factors, high housing costs, taxes, declining public services, and negative perceptions of Portland discourage many potential recruits from considering a move. Employers repeatedly characterized this as a reputational and a messaging problem that undermines Oregon's ability to fully capitalize on historic semiconductor investment opportunities.

Talent Network and Ecosystem Support

Stewarding the regional talent network was a theme that emerged repeatedly in the interviews. This primarily focused on higher level staff or retirees who had decades of experience and specialized knowledge of semiconductor design and manufacture. This represents a unique type of capital that the state can leverage.

Social Capital and Its Importance for Oregon's Semiconductor Ecosystem

As Oregon positions itself to strengthen and expand its semiconductor industry, one underappreciated asset is the social capital embedded within the region's experienced workforce—particularly retirees and late-career professionals with deep industry knowledge. Social capital, broadly defined as the networks, trust, and norms that facilitate cooperation, has been shown in extensive research to correlate strongly with positive economic, institutional, and social outcomes. Mobilizing this form of capital represents a strategic opportunity for Oregon to accelerate innovation, improve workforce development, and reinforce its global competitiveness.

Social capital has long been associated with positive economic outcomes. Robert Putnam's work frames social capital as a *public good*. Social capital can be thought of as a community-level resource that enhances cooperation, strengthens governance, and improves collective problem-solving. Social networks, norms of reciprocity, and trust form the backbone of social capital, enabling economic and civic systems to function more effectively. Putnam argues that these features are not merely correlated with prosperity; in many cases, they are causal drivers.[53]

Broader research reinforces the connection between social capital and economic development while emphasizing the importance of context. For example, a meta-analysis of 83 studies found substantial variability in estimated effects of social capital on economic growth.[54] While the average effect was small, the results varied a lot – meaning that in some situations social connections help the economy a great deal, while in others they make less difference. European regional analyses have shown that participation in professional networks, industry groups, civic organizations correlate positively with regional economic growth. Importantly, it is not just the existence of networks, but active engagement within them that

[53] https://www.socialcapitalresearch.com/putnam-on-social-capital-democratic-or-civic-perspective/
[54] Xue, X., & Reed, W. R. (2024). Social capital and economic growth: A meta-analysis. Journal of Economic Surveys. https://onlinelibrary.wiley.com/doi/pdf/10.1111/joes.12660

predicts positive outcomes.[55] Finally, additional research shows the importance of localized forms of social capital, which differ across regions and cultures and must be cultivated in ways that reflect local strengths and needs.[56]

This suggests that social capital's impact depends heavily on regional, institutional, and social conditions, and that certain ecosystems such as Oregon's specialized semiconductor cluster can benefit disproportionately. The research on social capital provides clear evidence that well-structured networks with high trust and active participation can elevate economic development outcomes especially in knowledge-intensive sectors.

Infrastructure (Ecosystem Logistics)

Interviewees reported that their material and input supply chains are functioning reliably, for now. Interviewees emphasized that they can generally access essential components without major disruptions, and most indicated they have multiple suppliers. However, several noted that supply chain stability cannot be taken for granted indefinitely. This is especially true given the global volatility in chip-related supply networks, especially with rare earth metals. All interviewees indicated that they have back-ups of suppliers, and in some cases tertiary-level suppliers available if necessary. Firms in the semiconductor industry plan for supply and input needs decades into the future to prepare for new generations of technological advances.

> *"this [supply chain] stability cannot be taken for granted indefinitely…"*

Water is a key input in the semiconductor manufacturing process, but interviewees did not express concerns about water availability in Oregon. Notably, semiconductor firms are expanding into arid states like Arizona which have more constrained water resources than Oregon. Interviewees noted that semiconductor firms prioritize efficiency and sustainability in their manufacturing processes and have focused on water recycling approaches that requiring significantly less water for operations than was needed decades before.

Interviewees did express growing concern about potential constraints in other critical infrastructure areas. Electricity availability, for example, is projected to become a significant pinch point as new fabs, datacenters, and expansions come online, intensifying demand on the state's limited electrical grid.

Land availability is perceived as an even more immediate barrier: suitable industrial sites of appropriate size, zoning, and infrastructure are scarce, making it difficult for companies to plan for growth within the state. Furthermore, as semiconductor manufacturing firms seek to increase economies of scale, the land needed for sites has grown. In 2022, Intel announced a proposed major expansion in Ohio. Intel assembled roughly 2,000 acres in Ohio because the company intended to build a long-term, multi-fab semiconductor megacampus. The large site was required to provide:

- Space for multiple fabs and sub-fabs

[55] Beugelsdijk, S., & van Schaik, T. (2003). Social capital and regional economic growth. European Regional Science Association. https://www.econstor.eu/bitstream/10419/116233/1/ERSA2003_518.pdf

[56] Warwick Research Archive Portal. (2005). Social capital, economic growth and regional development.

https://wrap.warwick.ac.uk/id/eprint/34310/

- Massive water, power, and gas infrastructure
- Supplier, logistics, and research facilities
- Secure buffer and environmental control zones
- Flexibility for decades of future expansion

TSMC's new production facility in Arizona is over 1,100 acres. In Oregon there are no development ready industrial lands available over 1,000 acres in size that are suitable for semiconductor manufacturing. Interviewees expressed that if Oregon were to take a more proactive approach in acquiring industrial lands and making them 'shovel-ready', that would make expansion opportunities for the industry in Oregon much more viable.

Connectivity and accessibility of an established ecosystem emerged as strong catalysts for continued industry expansion. Firms pointed to the advantages of being part of a well-connected ecosystem that includes other semiconductor manufacturers, research universities, workforce partners, software companies, and supportive public-sector initiatives. This clustering effect not only accelerates innovation but also reduces operational friction by keeping talent, suppliers, and collaborators within close geographic proximity.

Finally, interviewees consistently identified Oregon's geographic position as a strategic advantage. The state's ocean ports and closer proximity to major Asian markets give it a slight logistical edge over competing semiconductor hubs like Arizona and Texas. That said, interviewees did confirm that states like Arizona and Texas do not appear to have issues with procuring supply chain inputs despite being geographically further from Asia.

Business Climate

Many interviewees commented that the reason semiconductor businesses are currently staying in Oregon is due to sunk legacy costs from firms' presence in Oregon over decades. While some semiconductor related firms are doing quite well and are expanding in Oregon, interviewees indicated that many businesses are looking for business friendly states to expand in, and Oregon is not currently perceived as being one of those states.

In January 2025, IPRE released a study commissioned by Business Oregon entitled, "External Business Recruitment: Are Businesses Leaving Oregon, and if so, why?", a comprehensive assessment of the perception of firms throughout the state on the business climate in Oregon.[57] This report found that Oregon firms are indeed being actively recruited by other states and that businesses are also being 'pushed out' of the state through complex regulations, and a punitive tax environment. The results from interviews with firms and professionals in the Oregon Semiconductor industry are consistent with these findings and suggest the potential that some semiconductor firms no longer see the state of Oregon as a good place to expand or even stay.

Virtually all interviewees indicated that Oregon has a very high quality of life. They appreciate the Pacific Northwest for its access to the natural beauty, sense of community, relatively mild weather, and outdoor recreational amenities. However, quality of life is less important to businesses who tend to prioritize

[57] External Business Recruitment: Are Businesses Leaving Oregon, and If So, Why? Business Oregon, Jan. 2025, https://www.oregon.gov/biz/Publications/Biz_Recruitment.pdf. [oregon.gov]

business metrics (taxes, incentives, land availability, etc.) over talent when deciding when and where to locate and expand. Quality of life can be a consideration in attracting and retaining talent, but many regions of the U.S. have a high quality of life and Oregon's comparative advantage may be less than many people perceive.

In addition to a hostile business climate, many interviewees expressed a perceived inequality in the amount and type of assistance the State of Oregon provides to businesses of varying sizes in the industry. While the Oregon CHIPS Act provided significant financial benefits to the larger firms operating in the industry in Oregon, mid-sized firms, smaller firms and start-ups perceive that there is limited to no support for them. While there are a handful of very large firms that steer the entire industry in Oregon, there are dozens of smaller firms in the ecosystem that support the larger firms. These smaller firms have meaningful economic impacts and the potential to grow if they can operate in a business environment that is conducive to their expansion.

Materials and Inputs (Equipment, Tools, and Raw Materials)

Interviewees consistently reported that materials can reliably move into the state and finished products can move out, both domestically and internationally. Some interviewees indicated that they were unsure if Oregon could accommodate or be competitive in expanding into new markets, primarily on the East Coast of the US. Companies emphasized that while logistics function well today, long-term competitiveness may hinge on expanding these market linkages.

Interviews noted that 75 percent or more of their materials and manufacturing inputs come from outside the United States, though the exact share varies significantly depending on where in the supply chain a company operates. These sourcing patterns are primarily cost driven, reflecting global price differentials and a highly specialized supplier ecosystem. Only about five percent of materials originate within Oregon itself, underscoring the state's limited base of local upstream suppliers. Several interviewees highlighted that rare earth metals could become a significant future pinch point, given China's continued dominance in their extraction and processing and the lack of diversified global alternatives.

Tariffs present another compounding challenge. Companies described how tariffs not only increase the direct cost of imported materials but also impose additional administrative, compliance, and time burdens. These layered effects slow down procurement and add uncertainty to planning. Recent federal decisions have intensified this uncertainty, leaving firms unsure about what tariff structures they will face in the near term and how much additional volatility they must absorb.

Artificial Intelligence in the Industry

Interviewees were asked how, if at all, they are utilizing AI in their manufacturing or production processes. Many companies are still in the early stages of exploring AI tools, but they see significant opportunity, especially in improving yields in the fabrication process. If models can be trained to identify where errors occur along the process, there can be marginal increases in the success of a process, increasing overall yield and subsequently lowering marginal costs. The primary challenge lies in procuring high-quality data from processes that may not currently have a mechanism to measure the process. There are also concerns around data confidentiality and intellectual property theft. Overall, the industry sees great promise in the utilization of AI in processes and is actively investing in its development, but firms have yet to fully integrate it into their production lines.

Chapter 5: Conclusions and Recommendations

This chapter presents key conclusions from our assessment of Oregon's semiconductor supply chain based on interviews with industry leaders, suppliers, and workforce partners. Building on the broader industry context established in previous chapters, it synthesizes key themes that describe how firms experience the state's business environment, infrastructure, workforce systems, and ecosystem dynamics. The findings highlight both the strengths that underpin Oregon's long-standing semiconductor cluster and the emerging pressures that could shape its competitiveness in the years ahead.

Conclusions

The conclusions that follow distill the major themes emerging from IPRE's industry analysis and stakeholder interviews. While the state retains significant legacy advantages, interviewees also identified structural challenges that may limit future growth and investment. This section summarizes those overarching insights to provide the foundation for the recommendations that conclude the report.

Enduring Industry Commitment but Fragile Growth Prospects

Across interviews, one message was remarkably consistent: no company is ready to abandon Oregon. Semiconductor firms both large and small highlight deep, long-standing investments in the state, including highly specialized infrastructure, well-established supply chain relationships, and a skilled workforce developed over decades. These legacy assets create substantial inertia that keep firms rooted in Oregon.

Staying, however, is very different from *growing*. Several interviewees indicated that Oregon has already lost out on significant expansion opportunities. Many others suggested that the state is increasingly at risk of losing out on future expansion opportunities, both from existing companies and from potential new entrants. The threat is not an exodus, but stagnation, where businesses maintain their current footprint but choose to scale elsewhere—often in more cost-competitive or business-friendly states. This is consistent with the conclusions of IPRE's 2025 report for Business Oregon on external business recruitment.[58]

This dynamic will likely also affect the viability of smaller semiconductor firms and suppliers that rely on anchor-company growth to generate demand. Beyond the immediate issue of retention, Oregon faces challenges in remaining competitive enough to earn the next wave of investment.

Intel's Outsized Influence and the Uncertain Future of the Ecosystem

Interviewees described Oregon's semiconductor ecosystem as deeply tied to Intel's strategic decisions, noting that Intel's presence shapes everything from the regional talent market to supplier viability. The future of Oregon's semiconductor strength is therefore intertwined with questions about:

[58] https://www.oregon.gov/biz/Publications/Biz_Recruitment.pdf

- What does Oregon look like with a smaller Intel footprint?
- How resilient is the ecosystem if Intel reduces production, headcount, or capital expenditure?

Many believed Oregon could transition to an industry structure less dependent on a single company. In this model, multiple mid-sized semiconductor firms including manufacturers, designers, materials suppliers, and advanced packaging companies could collectively support resilience. Generally speaking, ecosystems with more diversity and redundancy are better able to withstand or adapt to change or disruption. But reaching that future requires deliberate policy and ecosystem development, not just market forces.

When asked whether Oregon might attract "another Intel-scale company," the consensus was clear: highly unlikely within Oregon's current economic and policy context. Intel's scale, history, and land footprint are not replicable under current conditions. Instead, a more plausible, near-term path for Oregon to improve resilience in the semiconductor sector involves growing a diverse portfolio of small to medium-sized players, rather than waiting for another mega-firm.

Global Industry Growth and Oregon's Strategic Moment

A January 2026 IBISWorld report on semiconductor manufacturing forecasts the global semiconductor industry revenue is expected to increase three percent between 2025 and 2030, approaching $3 trillion. IBISWorld concludes global performance will be impacted by three major factors (and many minor factors):

- 5nm and 3nm process nodes have boosted chip performance. Manufacturers have enhanced device capabilities and energy efficiency without significantly changing the physical size of chips.
- Downstream innovation has driven growth. Semiconductor and electronic parts manufacturers have worked closely with automakers, consumer electronics manufacturers, AI companies and other manufacturers to produce cutting-edge technology.
- Companies must navigate an increasingly complex regulatory environment. As tensions between the West and China heat up, companies are fleeing Chinese markets.

This creates potential opportunities. Oregon does not need to win every project to thrive; it only needs to capture a desirable share of this expansion. But the growing global market also intensifies competition among states and countries, meaning Oregon must reinforce its business environment and talent pipeline to remain viable.

In short, the next five years represent a critical inflection point: the industry is expanding rapidly, but Oregon must strengthen its competitive position or risk being bypassed despite decades of semiconductor expansion.

Talent Pipelines Under Strain - From K-12 Through Workforce

Workforce challenges surfaced in nearly every interview. Leaders cited multiple pressure points:

- **Talent Supply Gaps.** Companies struggle to hire for both expert and technician-level roles. While Oregon has recent experiences with workers being laid off from large employers, many of those workers expect Intel-level compensation. This creates a mismatch for smaller and mid-sized businesses that cannot match the salary levels provided by larger companies.
- **Pipeline Development Issues.** Industry engagement with higher education is strong, but interviewees expressed concern that the K-12 system is not producing sufficient STEM educated

students. Some companies are independently investing in partnership programs or early exposure initiatives—such as outreach materials for primary students—to build long-term interest in STEM pathways.

- Geographic Imbalances. Several interviewees noted tensions around talent in rural communities. While semiconductor firms seek to expand outreach and job opportunities statewide, they worry rural regions may experience talent drain if students must leave home for training or work. Some asked whether parts of the industry could transition to remote or hybrid roles to reduce rural-to-urban migration.

Taken together, companies view workforce constraints as a bottleneck to expansion—especially if Oregon cannot keep pace with rivals that are aggressively developing technical training pipelines (e.g., Arizona, Texas, and Ohio).

Cost and Competitiveness Pressures - A Key Barrier to Expansion

Finally, interviewees consistently described Oregon as a costly and unpredictable place to operate. Concerns included:

- Higher overall state and local taxes relative to competing states
- Regulatory volatility, with frequent or unpredictable changes that complicate long-term capital planning
- Comparisons to semiconductor-heavy, aggressively competitive states such as Arizona and Texas, which offer lower taxes, streamlined permitting, and large incentives

These cost factors don't necessarily push companies to leave Oregon—but they do serve to push them to put new fabs, R&D centers, and expansions elsewhere. For capital-intensive industries like semiconductors, predictability and total cost of ownership strongly influence investment decisions.

Summary: A State at a Crossroads

The interviews paint a picture of an industry that is deeply rooted in Oregon but increasingly skeptical about its future competitiveness. The state's semiconductor ecosystem faces several inter-related challenges:

- Maintaining competitiveness for capital investment despite higher costs and regulatory uncertainty.
- Diversifying beyond Intel's dominance while preparing for potential reductions in Intel's local presence.
- Developing robust talent pipelines that serve both urban and rural communities and meet the needs of companies of all sizes.
- Ensuring adequate land and infrastructure exists to compete with other states

Given global market expansion, Oregon has a rare opportunity to grow but only if it adapts quickly. The next decade will determine whether the state remains a semiconductor powerhouse or becomes increasingly peripheral as the industry grows elsewhere.

Recommendations

The recommendations that follow translate the findings and conclusions of this assessment into a set of actionable strategies aimed at strengthening Oregon's semiconductor ecosystem. They are designed to address challenges identified by industry stakeholders—including workforce constraints, infrastructure limitations, business climate pressures, and the need for greater ecosystem resilience—while building on the state's long-standing competitive advantages.

Priority Policy Recommendations

The following recommendations require state legislative action to support or implement. They address state-level structures that require change or additional resources to support the retention and eventual expansion of the semiconductor industry in Oregon.

Support Small and Medium-Sized Semiconductor Firms Through Targeted Incentives

Responsible for Implementation and Execution: Business Oregon and Oregon State Legislature

Impact: Stabilize Oregon's semiconductor industry and slow the pace of further decline

Time Needed to Implement: Months to Years

Interviews revealed strong concerns that Oregon's incentive structure disproportionately benefits large firms, leaving small and medium-sized suppliers who form the backbone of the ecosystem without adequate support. These firms struggle to compete with Intel for talent, absorb tariff-related price volatility, or finance expansions and equipment upgrades. Yet their success is essential to reducing Oregon's over-reliance on a single anchor company.

Oregon can rebalance its economic development tools by creating tailored incentives for SMEs, such as innovation grants, tax credits for equipment purchases, scale-appropriate workforce subsidies, or low-interest financing for facility improvements. These programs can strengthen supplier resilience, diversify the ecosystem, and help cultivate the mid-sized companies that stakeholders view as essential to long-term stability.

A more inclusive incentive portfolio would also increase return on investment (ROI) by supporting firms that add agility, specialization, and economic spillover effects, while reducing vulnerability to Intel's business cycles.

To champion and support these efforts, the state's economic development agency, Business Oregon, can operate in its current capacity to administer loans and grants. Business Oregon also maintains an active and strong relationship with the semiconductor industry. This supports targeted investments by Business Oregon that yield the highest return on investment, both in terms of financial gain to the state and industry health and resiliency. For Business Oregon to administer support to the industry, the Oregon state legislation will need to appropriate funding and grant Business Oregon additional loan and grant program administration mechanisms.

Expand Industrial Land Supply and Infrastructure to Support Industry Growth

Limited industrial land availability surfaced in many interviews, with firms emphasizing that Oregon lacks development-ready sites of sufficient size and infrastructure to support large-scale semiconductor expansions. As other states prepare shovel-ready megasites of 1,000 acres or more, Oregon risks losing major investments due to insufficient development-ready land supply, constrained power capacity, and slow permitting processes.

To address the industrial land supply constraint, the state could adopt a strategy of pre-assembling industrial land and investing in site development ahead of proactive marketing and recruitment efforts. The added benefit of this approach is it would increase opportunities for industrial expansion outside the semiconductor industry as well (e.g., in forestry and wood products, metals and machinery, food and beverage, etc.). Policymakers may also consider reforms to streamline land-use expansion, particularly for strategically significant sites such as those near Hillsboro's technology cluster. Proactively preparing sites for expansion or attraction of semiconductor, equipment, or advanced-packaging businesses would signal that Oregon is serious about growth and capable of accommodating the next generation of industry expansion.

Another potential pathway is to expand the Central Oregon Regional Large Lot Industrial program (OAR 660-025-0045) to include the Portland Metro Region and potentially other regions. The program is administered by the Central Oregon Intergovernmental Council (COIC), is a regional land-use and economic development tool designed to identify, protect, and bring to market large industrial sites (≥50 acres) for traded-sector employers.[59] The program is codified in OAR 660-024-0045,[60] which allows cities and counties in Crook, Deschutes, and Jefferson counties to collaboratively determine a regional 20-year need for large industrial land and then designate suitable sites via an intergovernmental agreement (IGA). The rule sets key parameters, including minimum site size (50+ acres), the need for sites to be "available" and suited to traded-sector uses, and a target regional inventory (generally six sites of varying sizes, with provisions for replenishment).

COIC coordinates the program by reviewing site applications and ensuring they meet regional criteria, addressing a gap in Oregon's typically city-by-city planning system. The program emerged from recognition that Central Oregon functions as a single economic market; thus, a regional inventory helps recruit major employers that require large, contiguous parcels that individual cities could not justify independently. The original regional analysis identified demand for a mix of 50–100 acre, 100–200 acre, and 200+ acre sites to compete for industries such as data centers, logistics, and advanced manufacturing.

Infrastructure investments, particularly in electrical generation and transmission, should accompany land development efforts, as grid constraints are an emerging bottleneck for fabs, data centers, and supporting industries. Aligning critical infrastructure investments with Oregon's broader economic and regional resilience goals represents yet another opportunity to increase the state's return on investment.

Lead Organization: Business Oregon

Supporting Partners: Department of Land Conservation and Development, Local governments, Silicon Forest Partnership, semiconductor businesses

Timeframe: Mid- to long-term (1 to five or more years)

[59] https://www.coic.org/lli/
[60] https://secure.sos.state.or.us/oard/displayDivisionRules.action?selectedDivision=3074

Demonstrate Clear and Consistent Support for Business as a Strategy to Improve Oregon's Business Climate

Many interviewees indicated that Oregon's business climate feels uncertain and uncompetitive compared to other semiconductor-intensive states. High taxes, complex regulatory processes, and inconsistent communication create an environment that discourages expansion even among firms committed to staying in the state. Interviewees emphasized that business leaders want clearer signals that Oregon values their presence and is actively working to improve conditions.

The state can address this through predictable regulatory timelines, proactive business outreach, periodic reviews of semiconductor-relevant policies, and transparent communication about state-level initiatives. Demonstrating appreciation for existing firms including mid-sized and smaller firms can help reinforce confidence and encourage ongoing investment.

Clearer alignment between state agencies, economic development partners, and industry would help Oregon maintain competitiveness at a moment when other states are aggressively recruiting semiconductor projects.

Lead Organization: Business Oregon, Oregon State Legislature

Supporting Partners: Economic development organizations, Local governments, Silicon Forest Partnership

Timeframe: Mid- to long-term (1 to five or more years)

Priority Programmatic Recommendations

The following recommendations present actions that can be taken, or are already underway and need additional support, that will strengthen the Oregon semiconductor industry without the need for state legislative action.

Enhance Oregon's Statewide Talent Pipeline Through Strategic Alignment With FAST

Responsible for Implementation and Execution: OSU FAST

Impact: Increase availability of talent needed to support semiconductor industry

Time Needed to Implement: Months to years

The FAST Initiative is emerging as a central mechanism for building Oregon's semiconductor workforce. But its effectiveness hinges on strong and ongoing alignment between industry, higher education, and workforce boards. Interviews show that companies value FAST's statewide coordination but see opportunities for deeper integration, particularly in expanding technician-level training, scaling apprenticeship and co-op models, and increasing access to lab space and equipment.

Strengthening FAST's capacity would allow it to serve as a "single front door" for employers, students, educators, and job seekers thus reducing fragmentation and ensuring that training programs remain responsive to changing technical requirements. As Oregon's industry evolves toward more advanced manufacturing, design, and packaging technologies, FAST can also play a role in forecasting emerging skill needs and supporting rapid curriculum development.

By expanding FAST's scope and fully funding its coordination infrastructure, Oregon can build a consistent, statewide talent engine that supports firms of all sizes and keeps pace with global industry dynamics.

Strengthen Semiconductor Education and Career Awareness Across Oregon's K-12 System

Oregon's long-term semiconductor competitiveness depends, in part, on cultivating interest and technical readiness long before students reach higher education. Interviews and workforce analyses consistently show that many students have limited exposure to semiconductor careers, wage potential, or the breadth of technician-level opportunities available in the industry. This is compounded by Oregon's notoriously short annual instructional time for students and subsequently poor student performance, ranking 47th out of 50 in national rankings.[61] This is particularly true in rural, low-income, and underrepresented communities. This lack of early awareness contributes to a weak talent pipeline and limits the number of math-ready students entering relevant post-secondary programs.

To address this, the state can partner with FAST, school districts, educational service districts, and industry to expand career-connected learning opportunities such as classroom visits, hands-on demonstrations, dual-credit pathways, and curriculum modules aligned with semiconductor manufacturing, materials science, and design. These efforts should emphasize accessibility and demystify the industry, particularly as many students perceive semiconductors as "too technical" or "too difficult" compared to more visible technology fields like robotics. As noted above, leveraging Oregon's extensive retiree and expert networks could be a key opportunity here.

Investments in statewide K–12 semiconductor education would help Oregon build a more predictable, diverse future talent pipeline while supporting regional equity goals. A coordinated strategy also ensures Oregon remains competitive with states such as Arizona and Texas, which have built aggressive early-pipeline systems tied directly to CHIPS-related industry expansion.

Strengthen Industry/Public Education Partnerships to Align Training With Industry Needs

The semiconductor industry requires tight coordination across universities, community colleges, workforce boards, and industry partners. Yet interviewees noted persistent fragmentation within Oregon's education ecosystem, particularly around piloting new programs, aligning curricula with industry standards, and fostering consistent engagement across institutions.

To address this, Oregon should formalize and deepen cross-sector partnerships through structured advisory councils, shared equipment networks, joint faculty/industry appointments, and agreements that allow students to smoothly transfer credits across academic programs. More predictable collaboration mechanisms would accelerate curriculum changes, expand experiential learning opportunities, and ensure rapid translation of industry needs into educational programs.

Strengthening these partnerships also supports regional equity by ensuring students across Oregon have access to high-quality semiconductor educational pathways.

Support and Formalize Retiree and Expert Networks

Responsible for Implementation and Execution: FAST and Silicon Forest Partnership

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[61] Oregon State Legislature. *Committee Meeting Document*. 2025 Interim Session, Oregon Legislative Information System, https://olis.oregonlegislature.gov/liz/2025I1/Downloads/CommitteeMeetingDocument/311239. Accessed 4 May 2026.

Impact: Develop a talent ecosystem that supports industry collaboration and ecosystem appeal

Time Needed to Implement: Months to years

Oregon's semiconductor cluster benefits from a highly skilled legacy workforce that includes retirees, late-career engineers, managers, and technologists with decades of knowledge and experience. These individuals form naturally occurring high-trust networks—precisely the type of social capital research identifies as economically beneficial.

Given Oregon's slow population growth and tight labor supply, mobilizing this talent pool becomes both an economic development strategy and a workforce necessity. Social capital generated by experienced industry veterans can:

- Strengthen workforce pipelines by mentoring early-career workers
- Improve cross-institution collaboration among education providers, industry, and government
- Support start-up formation and innovation diffusion
- Enhance Oregon's attractiveness to outside talent by fostering a sense of community and identity
- Serving as industry ambassadors for youth (K-12)

This aligns with Putnam's findings that networks of trust and engagement create "sturdy norms of reciprocity" that spill over into broader economic benefits.[62] Based on the research literature and current needs, several potential steps emerge:

- **Integrate Experienced Talent into Workforce and Innovation Initiatives**. Retirees and late-career professionals can play structured roles in programs such as FAST, community college curricula, internship pipelines, and technical education partnerships. Social capital research shows that active engagement is what drives economic outcomes.[63]
- **Actively support retiree groups**. Business Oregon can actively strengthen social capital by financially and organizationally supporting industry retiree groups. Providing micro-grants, facilitation staff, or convening support can help these networks scale their mentoring, knowledge-sharing, and volunteer activities. This builds on the importance of dense, face-to-face networks in building trust and economic capacity.
- **Strengthen Cross-Organizational Collaboration**. Business Oregon can help weave connections between industry, education, workforce boards, and civic groups by supporting coordinators or "network weavers." These roles enhance the density and effectiveness of local networks, a key driver of regional economic performance.[64]
- **Incorporate Social Capital Measures into Economic Development Planning**. Tracking indicators such as mentorship hours, collaboration frequency, trust levels across institutions, and volunteer engagement aligns with Putnam's conceptual framework and can help ensure ongoing ecosystem health.

Social capital that is rooted in trust, networks, and shared norms has been consistently linked to positive economic outcomes across multiple regions and contexts. In Oregon, the semiconductor industry benefits from an unusually strong potential reservoir of social capital in its experienced workforce. By supporting,

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[62] https://ldnet.eu/ldnet-robert-putnam/
[63] https://www.econstor.eu/bitstream/10419/116233/1/ERSA2003_518.pdf
[64] https://wrap.warwick.ac.uk/id/eprint/34310/

organizing, and strategically mobilizing this talent (i.e., serving as a convenor), Business Oregon can help create the conditions for accelerated innovation, stronger workforce pipelines, and a more resilient and prosperous semiconductor ecosystem.

Improve Oregon's Statewide Image and Talent Attraction Strategy

Interviewees repeatedly emphasized that Oregon's reputation affects its ability to attract and retain workers, particularly mid-career engineers and technicians considering relocation. High-quality-of-life remains a strong attractor, but rising housing costs, public-service concerns, and negative perceptions of Portland undermine recruiting efforts. Because external audiences often conflate Portland with the entire state, these perceptions have statewide economic consequences.

To remain competitive, Oregon should develop a coordinated semiconductor-focused talent attraction strategy that highlights the state's lifestyle advantages, career opportunities, and unique semiconductor ecosystem. This may include targeted marketing campaigns, industry-led storytelling, relocation incentives, and partnerships with chambers of commerce and regional economic development organizations.

A refreshed statewide image that is grounded in Oregon's strengths rather than its challenges would support workforce recruitment, business retention, and Oregon's broader competitiveness for future semiconductor investment.

Lead Organization: Business Oregon, Governor's Office, Oregon State Legislature

Supporting Partners: Regional and local economic development organizations, Silicon Forest Partnership, Technology Association of Oregon, semiconductor businesses

Timeframe: Mid- to long-term (1 to five or more years)

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