A DIGITAL FUTURE FOR ALBERTA: OVERVIEW

STUDY SCOPE

This study forecasts the demand for digital talent in Alberta to 2023 and including a discussion of

- High-growth sectors and their top in-demand skills
- Oil and gas spotlight
- Regional analysis of three Alberta urban areas
- Pathways to filling the growing digital skills demand

BACKGROUND

Economic diversification is a pillar of resilient economies around the world. For decades, Alberta has sought to diversify its oil and gas-driven economy to buffer against the impacts of commodity-price cycles.

The Alberta economy, however, remains tethered to oil and gas, as evidenced by the punishing economic slowdown that followed the collapse of oil prices in late 2014. The province lost nearly 20,000 jobs and unemployment rates of over 9% in the fall of 2016, the highest seen in 20 years.

Recovery continues to elude Alberta due to persistently weak oil and gas prices, strong US oil output, pipeline constraints for Canadian oil and gas exports, and a lagging global economy. However, increased investment in digital technology across all sectors—including oil and gas—is having a positive impact and spurring demand for digitally skilled talent.
ICTC’s regional and Canada-wide labour market forecasts differ because of the following parameters:

- A Digital Future for Alberta includes only core digital jobs (software developers, etc.)
- Canada's Growth Currency: Digital Talent Outlook 2023 includes all jobs that are considered part of the digital economy

**KEY STUDY FINDINGS**

ICTC expects demand for core digitally skilled roles to reach nearly 9,000 positions by 2023, for a total employment in excess of 77,000 by 2023.

**DEMAND FOR DIGITAL TALENT ACROSS GROWTH SECTORS**

The digital economy has expanded at twice the rate of the overall economy in the past decade, with the following sectors in Alberta leading the charge as the development of artificial intelligence, data science and other digital disciplines accelerates:

- Healthcare
- Advanced manufacturing
- Cleantech
- Interactive digital media

Healthcare

Healthcare is expected to see a compound annual growth rate (CAGR) of 2.6% from 2018 to 2023, which is nearly double that of the wider economy. By 2023, Alberta will see 37,000 new jobs in healthcare, for a total employment of 315,000.

- Demand for more than 1000 digital roles is forecast for Alberta by 2023 in healthcare. If filled, the total employment of core digital roles will reach more than 5,600.

Technologies such as robotic surgery, wearables, and data analytics are driving new treatments and innovations. Significant shifts in skills demand may result from the shift
Demand for nearly 9,500 digital roles is forecast for Alberta by 2023 in advanced manufacturing. If filled, the total employment of core digital roles will reach more than 40,000 towards a “personalized care” model, based on the analysis of and predictive insights into patients’ genomes.

Top digital roles in Healthcare
(Percentage of Alberta employers selecting each occupation as "in-demand")

- Data Scientist .................................................................61%
- Software Developer .......................................................43%
- Lab Technician ...............................................................42%
- Machine Learning Engineer ..............................42%
- Chemical Engineer .........................................................29%

Advanced Manufacturing

In 2018, traditional manufacturing accounted for 3.5% of total employment in Alberta, with nearly 130,000 workers involved in metal and equipment manufacturing, petrochemicals, food, and other sectors.

- Demand for nearly 9,500 digital roles is forecast for Alberta by 2023 in advanced manufacturing. If filled, the total employment of core digital roles will reach more than 40,000

Advanced manufacturing and materials, particularly nanotechnology, is a growing subsector in Alberta. The province specializes in micro-electro- mechanical systems, micro-optical devices, nano biotechnology, nano-engineered thin film structures, and nano-materials.

While traditional manufacturing jobs are expected to decline by 3,000 jobs by 2023, employment in advanced manufacturing is expected to climb at a CAGR of 5.5% in the same period.

Top digital roles in Advanced Manufacturing
(Percentage of Alberta employers selecting each occupation as "in-demand")

- Mechanical Engineer...........................................45%
- Cybersecurity Analyst.............................................34%
- Industrial Designer.................................................31%
- QA Tester.............................................................24%
- Machine Learning Engineer.........................21%
Cleantech

Employment in the sector is forecast to increase by a CAGR of 2.2% from 2018 to 2023. A demand for nearly 4,500 workers is expected by 2023, with total potential employment reaching nearly 43,000.

- Demand for nearly 500 digital roles is expected in Alberta by 2023 in cleantech. If filled, the total employment of core digital roles will reach nearly 5,300.

Cleantech includes companies focused on advanced chemical processes, renewable power generation, IoT and sensors, energy storage, smart grid development, etc.

More than 40% of these companies identified funding as their biggest obstacle to business growth. Nonetheless, cleantech in Alberta has grown at 3.2% annually from 2001-2018.

Top digital roles in Cleantech
(Percentage of Alberta employers selecting occupation as “in-demand”)

- Data Science: 58%
- Software Developer: 43%
- Backend Developer: 42%
- Mechanical Engineer: 40%
- Chemical Engineer: 30%

Interactive Digital Media (IDM)

IDM includes digital platforms that have some level of user engagement (film, television, graphic design, game design, music and post-production services, etc., is expected to see a strong CAGR of 3.7% CAGR until 2023.

- Demand for more 3,300 digital roles are expected in Alberta by 2023 in IDM. If filled, the total employment of core digital roles will reach nearly 30,000.

Over 50 firms specialize in video game design and development alone in Alberta. This sector’s expansion is driven by technology advancement and favourable policy developments such as the Screen-Based Production Grant and the Interactive Digital Media Tax Credit.
Core digital occupations in IDM make up nearly 40% of all employment in the IDM sector.

Top digital roles in IDM
(Percentage of Alberta employers selecting each occupation as “in-demand”)

Full stack Developer……………………………………………………………………..72%
Software Developer…………………………………………………………….64%
UX/UI Designer…………………………………………………………..64%
Animator………………………………………………………………..62%
Graphic Artist………………………………………………………………60%

Spotlight on Oil and gas

Oil and gas sector is not identified as a high-growth sector for digital employment, but its sheer size in the Alberta economy and its uptake of digital technologies aimed at improving operational, environmental and safety efficiencies provide significant opportunities for digital talent.

- Near-term economic and employment forecasts point to flat growth for the sector in 2020, with total employment ranging from 146,000 to 148,000.

Continued investment in digital technologies in the sector, however, could profoundly impact employment demand in the coming years. Under a high-growth investment scenario, ICTC forecasts an employment CAGR of more than 3% till 2023, creating a demand for more than 20,000 jobs, with total employment potentially reaching peak oil and gas employment levels of 2015.

Western Canada’s upstream and midstream companies are looking to digital technologies to improve their competitive advantage. Examples include

- IoT and predictive analytics for improved productivity
- Data collection by field sensors for remote monitoring of assets
- AI and machine learning for better well performance and maintenance
- Real time data collection for rapid response times and reduced future errors
- High-resolution 3D models, the use of drones, and advanced imaging capabilities for improved detection and measurement of risk
Regional Centres Analysis: Calgary, Edmonton, Lethbridge

Calgary

- Calgary is expected to continue to lead Alberta in employment performance, with a demand for more than 58,000 workers by 2023. This will bring total potential employment to nearly 900,000.

Calgary accounts for 30% of Alberta’s employment. It has a young and highly-educated workforce—approximately 225,000 professionals with STEM backgrounds—and nearly 30,000 head offices.

Substantial growth in technology-based industries such as ag-tech, autonomous systems/drone testing, and digital media is responsible for a surge in employment opportunities, particularly in areas such as data science, GIS, and QA testing.

Calgary’s economic future is increasingly tied to technology. In 2018, between 4.5-12% of Canada-wide job postings for top digital occupations were located in Calgary.

Edmonton

- Edmonton’s population is growing at twice the national average, making for strong employment prospects. By 2023, demand for more than 60,000 workers across all occupations is expected, bringing total potential employment to approximately 840,000.

As the second-largest city in Alberta, Edmonton’s employment demand is expected to outperform smaller urban centres in the province.

Traditionally, Edmonton has benefited from growth in public administration, healthcare, and education, which employ a high proportion of post-secondary educated professionals and provide higher than average wages.

Innovative healthcare (e-health) and green energy solutions are two of Edmonton’s top technology-driven focus areas. In 2018, more than one quarter of the city’s fastest growing companies were health or green energy.

The city is also home to one of the largest AI research clusters in Canada and the world-class Alberta Machine Intelligence Institute (AMII). Homegrown AI solutions are expected to drive growth across the economy.
By 2023, Lethbridge will see a demand for about 4,500 workers in a variety of occupations, bringing total employment to approximately 68,000.

Smaller cities in Alberta have shown mixed employment outcomes. In Lethbridge, the current top sectors for employment include agriculture, manufacturing and construction.

Emerging sub-sectors such as ag-tech could substantially improve the city’s economic growth in the future. The Lethbridge Research Centre, for example, is the largest agriculture and agri-food initiative in Canada’s national network.

**The Talent Gap and Pathways to Meeting the Digital Skills Demand**

About 80% of Alberta employers expressed difficulty sourcing highly skilled digital talent, with approximately 30% of employers having hired mid and senior-level talent from other provinces or other countries.

Pathways to Meeting Talent Demand

Youth & New Grads: Over 70% of Alberta employers stated that new grads are their most common source of junior digital talent, with a clear preference given to grads from traditional post-secondary institutions.

Bootcamps and Short-Duration Training: Coding bootcamps in Canada and the US is an estimated $240 million business, producing more than 20,000 graduates between 2013 and 2018. They teach in-demand coding languages such as JavaScript, Java, Python, Ruby, etc. Averaged duration is slightly more than 3 months. Canadian bootcamp success stories include Lighthouse Labs and Evolve U (the latter graduated its first cohort in Calgary in early 2019).

Women: In 2018, 45% of the Alberta workforce was women, has one of the lowest female employment rates in Canada. Attracting more women to tech roles could improve Alberta’s digital talent supply.
Immigrants: Governments around the world are turning to immigration as a solution to an aging population and labour shortages in key sectors. Alberta is part of this trend. In 2018, 26% of the workforce was born outside of Canada, up from 20% in 2009.

Indigenous Peoples: Alberta is home to more 115,000 First Nations, nearly 100,000 Metis and 2,000 Inuit. In total, Indigenous peoples represent 7.5% of Alberta’s population but 4.5% of all employment. The development of special programs, based on the unique needs and opportunities in Alberta, could allow employers to draw upon this local supply stream.

Persons with Disabilities: In 2017, approximately 425,000 working-age Albertans reported having a disability. This is roughly 17% of Alberta’s total working-age population, up from nearly 15% in 2001. Breaking down the barriers to employment in the technology sector could improve the hiring of this segment of the workforce.