Labour Market Research Insights: Automotive and Mobility Sector
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Executive Summary
Recent Trends and Evolving Talent Needs
- Impact of recent technological developments on labour force requirements and skills development needs
- Trends related to electrification, automation, and digitalization, and how they affect skills requirements in the sector

Labour Market Gaps
- Occupational gap in each sector segment through comparing the current and future total demand and total supply
- Emerging skills outlook in the labour market by comparing the frequency of skills in job postings and jobseeker profiles for relevant occupations
- Analysis and representation of women and minorities

Equity, Diversity and Inclusion in the Sector
- Minority groups representation in education commonly required by employers in the automotive and mobility sector
- Women’s representation in education, as well as educational attainment by visible minorities and Indigenous peoples

Labour Market Trends
- Provincal hiring trends in the sector based on recent job postings
- Labour supply trends using education, apprenticeship and vocational training statistics
- Provincial outlook for labour market demand, supply for 10-year time period
- Estimations of labour market gap for:
  - Employment
  - Technical skills, technologies, and tools

Talent and Workforce Development
- Talent development opportunities mapped on to the labour and skill gaps
- Technological trends and advancements with associated labour requirements
- Jurisdictional scan of available opportunities by broken down by:
  - Local and National programs
  - Global programs

Current State Analysis
- Relevant industries and occupations pertinent to the traditional automotive and broader mobility sector segments.
- Provincial hiring trends based on recent job postings for occupations associated with the sector segments
- Skills and labour supply trends, including training programs, immigration data, and job seeker profiles

Expected Labour Market Gaps
- Summary of projected labour market gaps in the next decade in Ontario across key occupation groups
- Occupations with the highest labour market gaps that will require new labour force entrants or reskilling workers, and those with excess supply of workers will likely require training to transition to in-demand occupations

Future State Analysis
- Provincial outlook for labour market demand and supply over a 10-year time period from 2023-2032
- Outlook based on labour demand and supply drivers, such as employment growth and graduation and retirement rates

Emerging Skills and Curricula Development
- Existing programs and curricula in the automotive and mobility sector in Ontario, nationally, and globally that target emerging skills development
- Education programs, such as university and college degrees, training programs, career navigation tools, and work-integrated learning programs

Upskilling
Upskilling refers to the process of gaining new knowledge and skill to advance in one’s career

Reskilling
Reskilling refers to gaining new knowledge and skills to shift or transition into a new role or industry
Executive Summary
Ontario has a dynamic and evolving workforce in the automotive and mobility sector

Employment by Occupation Categories

<table>
<thead>
<tr>
<th>Occupation Category</th>
<th>Employment Share</th>
</tr>
</thead>
<tbody>
<tr>
<td>Managers and Supervisors</td>
<td>8%</td>
</tr>
<tr>
<td>Digital Technologies</td>
<td>19%</td>
</tr>
<tr>
<td>Engineering, Design &amp; Technical</td>
<td>12%</td>
</tr>
<tr>
<td>Tradespersons</td>
<td>12%</td>
</tr>
<tr>
<td>Manufacturing &amp; Processing</td>
<td>10%</td>
</tr>
<tr>
<td>Retail Operations</td>
<td>16%</td>
</tr>
<tr>
<td>Transportation &amp; Supply Chain</td>
<td>6%</td>
</tr>
<tr>
<td>Drivers and Delivery Persons</td>
<td>17%</td>
</tr>
</tbody>
</table>

709,170 workers were employed in the automotive and mobility sector in Ontario in 2021.

Labour Demand

Monthly Job Postings

- Job postings across all relevant occupations have been trending upwards in recent years.
- The posting volume has increased rapidly since the beginning of the COVID-19 pandemic, in particular for Transportation & Supply Chain, Drivers and Delivery persons, and Retail Operations roles.
- The average number of monthly postings was 1,485 in April 2020 and 7,288 in April 2022. Between April 2021 and April 2022, the number of monthly job postings doubled, surpassing pre-pandemic levels. This resonates with the recent general economic trends and a tight labour market environment.

In-demand Qualifications

- The automotive and mobility sector has seen 100,635 job postings between 2021 and 2022. Most of these occupations require college or vocational education (44%) or secondary school (41%).
- Employer requirements for University education in the sector have declined since 2018.
- Employer requirements for College, Apprenticeship and Secondary School have stayed the same, with an increase in Secondary School or Occupation Specific training.

Sources: Statistics Canada, Vicinity Jobs. Note: Relevant occupation and occupation categories in the automotive and mobility sector are defined in the Appendix.
Executive Summary
Graduation data provides a snapshot of potential workforce entrants in the current labour market

Current State of the Automotive and Mobility Sector

Equity, Diversity and Inclusion

27%
The share of female employment in Ontario for the automotive and mobility sector, compared to 47% across all industries.

41%
The share of visible minority employment in Ontario for the automotive and mobility sector, compared to 34% across all industries.

2%
The share of Indigenous employment in Ontario for the automotive and mobility sector, compared to 2% across all industries.

Top Industries with Highest Employment Share of Persons with Disabilities in the Automotive and Mobility Sector
1. Retail and wholesale trade
2. Manufacturing
3. Transportation and warehousing

In 2021, the automotive and mobility sectors employed mostly workers with engineering educational backgrounds, totalling 30% of all workers in Ontario, followed by workers with computer and information sciences backgrounds at 17%.

Science, Technology, Engineering and Mathematics (STEM) graduation data in Ontario over the last decade indicates an expanding qualified labour pool for the automotive and mobility labour market.

Sources: Statistics Canada, Census 2021.
Executive Summary

Technological advancements in the sector are prominent and command repositioning of the labour market

In recent years, the emergence of new technologies in the automotive and mobility sector impacted skills and training that workers require to be successful in the field. Below is a breakdown of major trends in electrification, automation, and digital transformation that are driving training, education, and skills requirements for workers in the sector. These trends and technological advancements have raised upskilling and talent development needs for individuals seeking employment in the sector. In particular, job seekers may need to gather an increasingly technical and specialized skillset to fulfill employers’ needs.

<table>
<thead>
<tr>
<th>Electrification</th>
<th>Automation</th>
<th>Digital Transformation</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Increased demand for electric vehicles</strong></td>
<td><strong>Advancements in IoT for automotive applications</strong></td>
<td><strong>Increased connectivity-enabled technologies</strong></td>
</tr>
<tr>
<td>Increasing affordability, shifts in consumer preferences, along with considerable government incentives have made electric vehicles (EVs) an attractive option in a rapidly changing market.</td>
<td>Increasing affordability and adoption of systems such as sensors and cameras in vehicles have popularized the use of Internet of Things (IoT) systems that leverage sensor data for optimized performance.</td>
<td>Technologies enabled by internet connectivity, including telematics and sensor data, have been rapidly adopted in the automotive sector and require specialized knowledge.</td>
</tr>
<tr>
<td><strong>Battery technology advancements and development</strong></td>
<td><strong>Self-driving vehicles enabled by machine learning and AI</strong></td>
<td><strong>Data analytics needs for vehicle performance analysis</strong></td>
</tr>
<tr>
<td>Advancements in battery technology, including improved affordability and capacity, have incentivized manufacturers to rapidly adopt battery-powered vehicles in their offerings.</td>
<td>Rapid advancements in machine learning (ML) and artificial intelligence (AI) technologies enable vehicle self-driving functionality. The automotive sector has rapidly evolved thanks to this technology.</td>
<td>Vehicles with interconnected digital technology devices generate a great amount of data, which major players in the sector can leverage to optimize performance and carry out predictive maintenance.</td>
</tr>
<tr>
<td><strong>Growth and development of electric vehicle charging infrastructure</strong></td>
<td><strong>Increased adoption and complexity of autonomous driving systems</strong></td>
<td><strong>Cybersecurity in modern interconnected vehicles</strong></td>
</tr>
<tr>
<td>The rapid growth of vehicle electrification and consumer adoption of EVs has increased the demand for infrastructure, such as charging stations, needed to support the EV ecosystem.</td>
<td>Rapid adoption of autonomous driving systems, enabled by multiple connected devices has increased the reliance on expertise in computer science and software engineering.</td>
<td>Connectivity in modern vehicles has caused security concerns for manufacturers and consumers, driving the need for individuals with expertise in data and software security.</td>
</tr>
</tbody>
</table>

Sources: International Energy Agency, Victoria Transport Policy Institute, National Center for Manufacturing Sciences, Ericsson, Frontiers in Future Transformation
**Executive Summary**

**Skills and training programs need to capture the evolving talent needs of the sector**

**Upskilling and Reskilling Needs**

As innovation and development of new technologies takes place in the automotive sector, job requirements have evolved to fulfill the needs of the sector. As such, workers in traditional roles in the sector need to learn new skills to adapt to the needs of employers, and some workers may be displaced. Below is a selection of major upskilling and reskilling needs for workers in the automotive sector.

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**Specific vehicle electrification technology**

Aftermarket technicians need to upskill to service EVs, while assembly workers may find training related to advanced manufacturing more useful. Power companies will need to develop solutions to the challenges on the electrical grid’s capacity to provide electricity at peak hours to EVs.

**Sensor technology and IoT systems**

Workers in the automotive sector may benefit from learning skills and gaining working knowledge related to sensor technology, such as radar and lidar, and other IoT automotive applications.

**Regulation and safety knowledge**

The rise of autonomous vehicles and vehicle electrification put pressure on transportation authorities to adapt safety and transportation regulations, as well as compliance requirements for manufacturers going forward.

**Battery technology**

Canadian workers are at risk of being displaced by the changing requirements for EV manufacturing. The government has shown interest in supporting reskilling programs to help develop the country’s battery supply chain.

**Data science, artificial intelligence and machine learning**

These fields are amongst the key enablers of up-and-coming technologies such as vehicle automation, therefore, professionals with skills in these areas will likely be in high demand in the near future.

**Cybersecurity knowledge and skills**

Workers with working knowledge and skills in computer system security will likely be in high demand in the coming years as automotive connectivity is vulnerable to cyber attacks and privacy concerns.

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Sources: Conference Board of Canada, Future Skills Centre, IBM, Catapult, Information and Communications Technology Council, 1 CBC News “Stellantis confirms layoffs coming to Windsor, Brampton plants”
Recent Labour Market Trends
Automotive and Mobility Sector Definitions

Labour market insights are presented for key sector segments and occupational categories.

Automotive and Mobility Segments

- **Auto & Parts Manufacturing**
  - The production and assembly of components for vehicles, often using advanced manufacturing techniques.

- **Tool, Die & Mold**
  - The design and development of tools, dies, and molds used in the vehicle and components production.

- **Electrification**
  - The development and implementation of electric technologies, such as electric powertrain systems, to power vehicles.

- **Rail Transportation**
  - The movement of goods and passengers by rail, which include freight transportation, passenger rail services, and development of railway infrastructure.

- **Marine Transportation**
  - The movement of goods and passengers by water, which include shipping and ports, as well as development of marine infrastructure.

- **Connected & Autonomous Vehicles**
  - The development and implementation of technology that allows vehicles to communicate with surrounding infrastructure and with each other, as well as operate autonomously.

- **Aftermarket, Maintenance & Repair**
  - The services provided to vehicles after the initial purchase, which include repair and maintenance, as well as purchases of parts and accessories.

- **Freight & Goods Movement**
  - The movement of materials and other goods in the sector, which includes shipping, logistics, and supply chain management.

- **Mobility Planning & Infrastructure**
  - The planning and development of infrastructure and systems for transportation and mobility, such as public transit and roads.

- **Connected & Autonomous Vehicles**
  - The technologies and processes that are designed to improve the safety of vehicles, such as driver assistance systems.

Note: Detailed segment and occupational categories definitions are provided in the Appendix.

Occupational Categories

The labour market analysis is categorized into eight relevant occupational categories that encompass various roles embedded in the thirteen automotive and mobility segments.

- **Managers & Supervisors**
  - Workers who oversee multiple business aspects in the sector, such as development, production, sales, and after-sales services.

- **Engineering, Design & Technical**
  - Professionals who design, develop, and test components using advanced tools and technologies.

- **Tradespersons**
  - Skilled technicians or mechanics who diagnose and fix problems, ensuring efficiency and safety.

- **Digital Technologies**
  - Workers who develop and implement technologies, such as telematics, to improve user performance and experience.

- **Retail Operations**
  - Individuals who work in sales and marketing of vehicles, auto parts, and automotive repair and maintenance services.

- **Transportation & Supply Chain**
  - Workers who manage logistics, shipping, and supply chains in the sector to ensure timely delivery of vehicles and components.

- **Manufacturing & Processing**
  - Individuals responsible for the production and assembly of components utilizing advance manufacturing processes.

- **Drivers & Delivery persons**
  - Workers who operate vehicles, such as trucks and delivery vehicles, to transport goods safely and efficiently.
Job Postings Trends

The number of monthly job postings has doubled between April 2021 and April 2022

Job postings data from January 2020 to June 2022 reveal important trends since the beginning of the COVID-19 pandemic in March 2020 and reflect the demand for select occupation groups:

- Job postings across all relevant occupations have been trending upwards in recent years. The average number of monthly postings was 1,485 in April 2020, 3,601 in April 2021 and 7,288 in April 2022. Between April 2021 and April 2022, the number of monthly job postings more than doubled.
- Job postings totals vary on a monthly basis for each occupation group due to cyclical hiring patterns. For example, the number of postings tends to fall in November and December and increase in the early months of the year (January to April).
- Engineering, Design & Technical roles have had the fewest postings of any occupation category; however, the number of postings has increased year-over-year in 2022.
- The average number of monthly postings was the highest for Retail Operations (2,215) over the past year.
- The posting volume has increased rapidly since the beginning of the COVID-19, in particular for Transportation & Supply Chain, Drivers and Delivery persons, and Retail Operations roles.

[Monthly Job Postings Chart]

Source: Vicinity Jobs.
In-demand Occupations and Credentials

In-demand occupations may indicate a rise in employment or high levels of turnover

- In-demand occupations were identified by computing the ratio of the total number of job postings for each occupation to its total employment in the occupation within relevant industries for the segment "job postings per worker". Occupations with a ratio above the average (all shown in chart) are considered in-demand, and could indicate either a rise in employment or high levels of turnover. Mathematicians, statisticians, actuaries and data scientists and retail salespersons and managers were high in demand in the last two years.

- Some job postings also identify the level of education required by employers, which is a key component of understanding labour demand. Job postings for relevant occupations were categorized by educational requirements in each year between 2018 and 2022 to illustrate trends.

- Requirements for University education have declined since 2018. Requirements for College, Apprenticeship and Secondary School have stayed the same, with an increase in Secondary School or Occupation Specific training.

### Educational Requirements, Ontario

<table>
<thead>
<tr>
<th>Year</th>
<th>University Education</th>
<th>College or Vocational Education or Apprenticeship Training</th>
<th>Secondary School and/or Occupation Specific Training</th>
<th>On-the-job Training or No Formal Education Required</th>
<th>Total Number of Job Postings with Education Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>2018</td>
<td>23,744</td>
<td>18,100</td>
<td>6,581</td>
<td>4,882</td>
<td>50,217</td>
</tr>
<tr>
<td>2019</td>
<td>22,714</td>
<td>18,100</td>
<td>6,581</td>
<td>4,882</td>
<td>50,217</td>
</tr>
<tr>
<td>2020</td>
<td>20,674</td>
<td>18,100</td>
<td>6,581</td>
<td>4,882</td>
<td>44,237</td>
</tr>
<tr>
<td>2021</td>
<td>18,634</td>
<td>18,100</td>
<td>6,581</td>
<td>4,882</td>
<td>42,207</td>
</tr>
<tr>
<td>2022</td>
<td>16,594</td>
<td>18,100</td>
<td>6,581</td>
<td>4,882</td>
<td>40,167</td>
</tr>
</tbody>
</table>

Source: Vicinity Jobs and Statistics Canada

### In-demand Occupations

<table>
<thead>
<tr>
<th>Occupation</th>
<th>Total Job Postings (Ontario, 2021-2022)</th>
<th>Total Employment (Ontario, 2021)</th>
<th>Job Postings per Worker</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mathematicians, statisticians, actuaries and data scientists</td>
<td>7,295</td>
<td>3,245</td>
<td>2.24</td>
</tr>
<tr>
<td>Retail salespersons and non-technical wholesale trade sales and account representatives</td>
<td>21,272</td>
<td>18,135</td>
<td>1.17</td>
</tr>
<tr>
<td>Retail and wholesale trade managers</td>
<td>11,448</td>
<td>11,800</td>
<td>0.97</td>
</tr>
<tr>
<td>Transport equipment operators, utility maintenance and related maintenance workers</td>
<td>2,339</td>
<td>3,020</td>
<td>0.77</td>
</tr>
<tr>
<td>Mail and message distribution occupations</td>
<td>7,626</td>
<td>15,020</td>
<td>0.50</td>
</tr>
<tr>
<td>Transportation and production logistics coordinators and customs and related broker occupations</td>
<td>2,163</td>
<td>7,675</td>
<td>0.28</td>
</tr>
<tr>
<td>Water and rail transport operators and labourers and related occupations</td>
<td>240</td>
<td>855</td>
<td>0.28</td>
</tr>
<tr>
<td>Supply chain logistics, tracking and scheduling coordination occupations</td>
<td>4,544</td>
<td>21,035</td>
<td>0.21</td>
</tr>
<tr>
<td>Longshore workers and material handlers</td>
<td>8,133</td>
<td>38,385</td>
<td>0.21</td>
</tr>
<tr>
<td>Labourers in processing, manufacturing and utilities</td>
<td>2,863</td>
<td>14,795</td>
<td>0.19</td>
</tr>
<tr>
<td>Computer and information systems professionals</td>
<td>7,295</td>
<td>40,550</td>
<td>0.17</td>
</tr>
<tr>
<td>Automotive service technicians</td>
<td>1,358</td>
<td>8,290</td>
<td>0.16</td>
</tr>
<tr>
<td>Machinery and transportation equipment mechanics (except motor vehicles)</td>
<td>1,334</td>
<td>8,330</td>
<td>0.16</td>
</tr>
<tr>
<td>Machining, technical metal forming, shaping and erecting trades</td>
<td>2,833</td>
<td>18,410</td>
<td>0.15</td>
</tr>
</tbody>
</table>

### Occupation Category Legend

- Managers and Supervisors
- Digital Technologies
- Drivers and Delivery persons
- Tradespersons
- Transportation & Supply Chain
- Manufacturing & Processing
- Retail Operations
- Engineering, Design & Technical

Source: Vicinity Jobs and Statistics Canada
Graduation and Immigration Trends in Ontario
Current labour supply and new workforce entrants are reflected in graduation and immigration trends

- Graduation data provides a snapshot of the current state of labour supply since these individuals are able to immediately enter the workforce. Growth rates in graduation by field of study can help establish trends for emerging skills. The strongest growth occurred in Computer related (20.0%), followed by Business (12.8%). Total average growth across all applicable fields of study was 5.3%.

- Degrees required by employers in the automotive and mobility sector are reflected in the most common fields of study for workers currently employed in the segment. These fields are identified by triangulating education (CIP), occupation (NOC), and sector (NAICS) data. Engineering is the primary field of study (22%), with Computer related coming at 17%. The Engineering fields, which include engineering and engineering related, combine for 30% of current employment in the segment.

- The workforce benefits from the addition of skilled workers through immigration. Between 2016 – 2021, the majority of immigrants in the segment indicated the intention of working in Digital Technologies, followed by Engineering. Additionally, between 2016-2021, immigration patterns show that those indicating Digital Technologies and Engineering as their intended occupation have decreased, compared to other occupation categories which have gone up in aggregate numbers.

Graduation Growth, Ontario

<table>
<thead>
<tr>
<th>Field of Study</th>
<th>Avg. Annual Growth in Graduates (2017-2020)</th>
<th>Relevant Skills</th>
</tr>
</thead>
<tbody>
<tr>
<td>Engineering/engineering-related technologies/technicians*</td>
<td>9.1%</td>
<td>Basic engineering principles and techniques</td>
</tr>
<tr>
<td>Mechanic and repair technologies/technicians</td>
<td>4.0%</td>
<td>Adjustment, maintenance, part replacement and repair</td>
</tr>
<tr>
<td>Business, management, marketing and related support services</td>
<td>12.8%</td>
<td>Management, technical support, applied research, communication</td>
</tr>
<tr>
<td>Computer and information sciences and support services</td>
<td>20.0%</td>
<td>Programming, data processing, software design</td>
</tr>
<tr>
<td>Engineering*</td>
<td>7.1%</td>
<td>Mathematical and scientific principles</td>
</tr>
<tr>
<td>Total, all fields of study</td>
<td>5.3%</td>
<td>--</td>
</tr>
</tbody>
</table>

Source: Statistics Canada, Postsecondary Student Information System (PSIS). *Note: Engineering comprises of instructional programs that prepare individuals to apply mathematical and scientific principles to the solution of practical problems. Engineering technologies/technicians comprises of instructional programs that prepare individuals to apply basic engineering principles and technical skills in support of engineering and related projects.

Immigration by Intended Occupation Category, Ontario

Employment by Field of Study, 2021

Source: Statistics Canada and Immigration, Refugees and Citizenship Canada (IRCC).
Postsecondary Enrollment and Graduation
Trends in postsecondary enrollment and graduation in Ontario indicate an expanding qualified workforce

- The total number of graduates in fields of study commonly requested by employers in the automotive and mobility sector grew by over 50% between 2016 and 2022. The fastest growth was seen in Business, management, marketing, and related fields, which is increasingly in demand in a wide range of sectors in Ontario, including in the automotive and mobility sector for strategic planning and supply chain management capacities. Number of graduates in Mechanic and repair technologies/technicians fields stayed flat.

- University-level degrees are prominent in STEM-related fields of study, while non-tertiary education and short-cycle tertiary education is popular amongst those studying business administration and trades.

Source: Statistics Canada, Postsecondary Student Information System (PSIS).

Postsecondary Graduates by Field of Study, Ontario

<table>
<thead>
<tr>
<th>Field of Study</th>
<th>Total Enrollment/Graduation, 2020</th>
<th>Post-secondary non-tertiary education</th>
<th>Short-cycle tertiary education</th>
<th>Bachelors or Equivalent</th>
<th>Master’s or Equivalent</th>
<th>Doctoral or equivalent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Science and Science technology</td>
<td>99,018</td>
<td>0.3%</td>
<td>2.3%</td>
<td>16.6%</td>
<td>8.4%</td>
<td>24.3%</td>
</tr>
<tr>
<td>Engineering and engineering technology</td>
<td>93,012</td>
<td>3.3%</td>
<td>13.7%</td>
<td>10.2%</td>
<td>11.6%</td>
<td>17.8%</td>
</tr>
<tr>
<td>Mathematics and computer and information sciences</td>
<td>67,956</td>
<td>3.3%</td>
<td>8.6%</td>
<td>7.4%</td>
<td>6.1%</td>
<td>6.5%</td>
</tr>
<tr>
<td>Business and administration</td>
<td>160,914</td>
<td>18.6%</td>
<td>27.4%</td>
<td>15.9%</td>
<td>13%</td>
<td>2.5%</td>
</tr>
<tr>
<td>Trades, services, natural resources and conservation</td>
<td>87,150</td>
<td>26.1%</td>
<td>19.1%</td>
<td>6.2%</td>
<td>6.5%</td>
<td>3.5%</td>
</tr>
<tr>
<td>Science and Science technology</td>
<td>19,521</td>
<td>-</td>
<td>2.4%</td>
<td>14.5%</td>
<td>8%</td>
<td>29%</td>
</tr>
<tr>
<td>Engineering and engineering technology</td>
<td>27,486</td>
<td>0.5%</td>
<td>11.6%</td>
<td>9.4%</td>
<td>14.8%</td>
<td>19.1%</td>
</tr>
<tr>
<td>Mathematics and computer and information sciences</td>
<td>18,102</td>
<td>0.3%</td>
<td>8.1%</td>
<td>6.2%</td>
<td>6.4%</td>
<td>6.4%</td>
</tr>
<tr>
<td>Business and administration</td>
<td>66,849</td>
<td>16.8%</td>
<td>33.9%</td>
<td>17.1%</td>
<td>18.9%</td>
<td>2.1%</td>
</tr>
<tr>
<td>Trades, services, natural resources and conservation</td>
<td>32,127</td>
<td>30.9%</td>
<td>16.1%</td>
<td>6%</td>
<td>7.2%</td>
<td>2.9%</td>
</tr>
</tbody>
</table>

Source: Statistics Canada, Postsecondary Student Information System (PSIS).
Apprenticeships and Certifications

Trends in apprenticeships and certifications indicate the uptake of training opportunities in the sector

- For both apprenticeship registration and completions as well as certifications, there has been a decline nationally and provincially. This trend captures various trades in the automotive and mobility sector, including tradespersons, engineers and information technology developers. According to the Canadian Apprenticeship Forum, Ontario will require 52,843 new certifications in Red Seal trades by 2025.

- In 2020, there were 45,993 apprenticeship registrations in the automotive and mobility sector in Ontario, with an additional 4,875 successful completions. Across Canada, the sector saw 160,791 registrations with 13,938 total completions. Similarly, there were 5,787 certification completions in Ontario and 18,474 in Canada in 2020.

**Average Growth Rates, 2017-2019**

<table>
<thead>
<tr>
<th>Ontario</th>
<th>Canada</th>
</tr>
</thead>
<tbody>
<tr>
<td>apprenticeship registrations</td>
<td>apprenticeship registrations</td>
</tr>
<tr>
<td>apprenticeship completions</td>
<td>apprenticeship completions</td>
</tr>
<tr>
<td>certifications granted</td>
<td>certifications granted</td>
</tr>
</tbody>
</table>

**Apprenticeship Registrations and Completions**

Registrations and completions in both Ontario and Canada have fallen drastically from 2014-2017, and this is attributable to several factors including the impact of low crude oil prices in 2014 in Alberta in demand for skilled trades and adjustment of Statistics Canada data collection methods.

In contrast, apprenticeship uptake went up from 2018 onwards as a result of an increase in employment in the construction industry (which helps apprentices meet on-the-job training requirements) and a 4,000 greater uptake of traditionally male-dominated apprenticeship programs by women.

**Certifications Granted**

Note: The trade groups included in the figures above are automotive service, electricians, electronics and instrumentation, heavy duty equipment mechanics, heavy equipment and crane operators, machinists, metal workers, millwrights, sheet metal workers, user support technicians, welders, stationary engineers and power plant operators. Apprenticeship registrations reflect the number of apprentices who are newly registered or continuing and still registered, while completions indicate successful completion of the entire program with a certification granted.

Source: Statistics Canada, Registered Apprenticeship Information System (RAIS).
3 Labour Market Outlook
Labour Market Gap Outlook

Expected labour market gaps are presented for key sector segments

Labour Market Outlook

- Labour market outlook is developed based on projected growth in:
  - Demand: sector expansion driven by economic growth and replacement demand arising from retirements in the sector; and
  - Supply: new workforce entrants, including new graduates and trainees, immigrants, and workers from related sectors.

Labour Market Gaps

- Expected labour market gaps are determined based on the difference in future labour demand and supply.
  - **High labour force gaps** indicate that projected total demand for workers exceeds availability of workers in the labour market, suggesting potential challenges in finding qualified workers.
  - **Moderate labour force gaps** indicate that the excess demand for workers compared to availability is less acute, indicating hiring challenges are less significant, albeit still present.
  - **Low labour force gaps** indicate sufficient availability of workers in the labour market compared to what employers demand.

Reskilling and/or upskilling as well as talent attraction efforts are an important mechanism for supporting labour market rebalancing. Workers in segments with low labour force gaps may be absorbed in the automotive and mobility sector segments with high gaps.

High labour market gaps are expected in freight and goods movement, propulsion systems, light weighting, auto and parts manufacturing, and safety management and controls segments.

Additionally, given high level of employment and expected growth over the next decade, segments such as advanced air mobility, connected and autonomous vehicle, freight and goods movement, and mobility planning and infrastructure can be seen as priority areas for talent development and attraction.

While segment-level gaps indicate the overall difference between expected labour demand and supply growth, there may be a further mis-match in specific occupations, tasks, and skills required in the evolving sector.

Source: Statistics Canada and Oxford Economics.

Note: The size of the bubble indicates the relative magnitude of the expected occupational gap in each segment. Detailed segment definitions are provided in the Appendix.


Labour Market Gap Outlook

Expected labour market gaps are presented for key occupation categories

- Occupational gaps in the automotive and mobility sector are expressed as a share of projected employment growth.
- Positive occupational gaps are expected in manufacturing and processing, drivers and delivery persons, and transportation and supply chain roles.
- Low occupational gaps are expected in managers and supervisors category.

### Expected Occupational Gaps, Ontario, 2023-32

<table>
<thead>
<tr>
<th>Occupation Category</th>
<th>Top 10 Occupations with High Occupational Gap</th>
</tr>
</thead>
<tbody>
<tr>
<td>-16% Managers and Supervisors</td>
<td></td>
</tr>
<tr>
<td>0% Engineering, Design &amp; Technical</td>
<td></td>
</tr>
<tr>
<td>1% Tradespersons</td>
<td></td>
</tr>
<tr>
<td>1% Digital Technologies</td>
<td></td>
</tr>
<tr>
<td>4% Retail Operations</td>
<td></td>
</tr>
<tr>
<td>Transportation and Supply Chain 15%</td>
<td></td>
</tr>
<tr>
<td>Drivers and Delivery Persons 33%</td>
<td></td>
</tr>
<tr>
<td>Manufacturing &amp; Processing 36%</td>
<td></td>
</tr>
<tr>
<td>-20%</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Occupation Category</th>
<th>Top 10 Occupations with Low Occupational Gap</th>
</tr>
</thead>
<tbody>
<tr>
<td>Computer and information systems managers</td>
<td></td>
</tr>
<tr>
<td>Automotive service technicians, truck and bus mechanics/repairers</td>
<td></td>
</tr>
<tr>
<td>Information systems analysts and consultants</td>
<td></td>
</tr>
<tr>
<td>Supervisors, motor-vehicle assembling</td>
<td></td>
</tr>
<tr>
<td>Manufacturing managers</td>
<td></td>
</tr>
<tr>
<td>Construction millwrights and industrial mechanics</td>
<td></td>
</tr>
<tr>
<td>Power engineers and power systems operators</td>
<td></td>
</tr>
<tr>
<td>Electrical power line and cable workers</td>
<td></td>
</tr>
<tr>
<td>Contractors and supervisors, mechanic trades</td>
<td></td>
</tr>
<tr>
<td>Industrial electricians</td>
<td></td>
</tr>
</tbody>
</table>

### Labour Gap Outlook by Occupation Category, Ontario, 2023-32

**High Occupational Gap**

The highest occupation gaps indicate a potential shortage of workers. This means that to fulfill automotive and mobility sector demand for workers in these occupations, talent attraction and retention efforts may be required. Additionally, these occupations may absorb workers from low occupational gap categories through reskilling and upskilling opportunities.

**Low Occupational Gap**

Occupations with the lowest occupational gap indicate excess availability of workers in the labour market compared to what automotive and mobility employers demand. This points to the potential need for reskilling and/or upskilling for workers in these occupations so that they transition to in-demand occupations in the automotive and mobility sector.

Source: Statistics Canada, Vicinity Jobs. Note: The occupational gap in Ontario is expressed in terms of the number of workers for the timeframe of 2023-32.

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### Technical Skills Outlook

These technical skills are expected to be in-demand to mark ongoing digital transformations in the sector

#### Emerging Skills

**Managers & Supervisors**

Managerial roles increasingly require knowledge of digital tools and software, including ERP, Microsoft Visio, and project management software, among others. These tools will help managers to make data-driven decisions, automate business processes and increase operational efficiencies.

**Manufacturing & Processing**

With increased opportunities for automation, manufacturing and processing roles will require CAM and CNC skills to control machinery and equipment. Troubleshooting tasks are expected to be enhanced by using diagnostic software such as asTech.

**Engineering, Design & Technical**

Engineers and graphic/technical designers are expected to use CAD and 3D modeling to develop complex designs and improve testing and performance. Knowledge of AI is required to develop autonomous vehicle technologies, improve safety, and optimize vehicle performance.

**Tradespersons**

Tradespersons are expected to use more digital solutions in their everyday tasks, including CMMS to organize maintenance activities, Kronos to manage scheduling, Autodesk to create and modify designs, and SAP to manage production, supply chain, and logistics.

#### Emerging Technologies and Tools by Occupation Category

**Technologies**

- Enterprise resource planning (ERP) software
- Microsoft Visio
- Project management software
- Customer relationship management (CRM) software
- SQL (Structured query language)

**Tools**

- Safety Alarm systems
- Routers
- Communication computers
- PCB / PCBA (Printed Circuit Board / Assembly)
- Material Safety Data Sheets (MSDS)

**Emerging Skills**

Source: Statistics Canada and Vicinity Jobs. Note: Emerging technical skills are identified based on occupational labour market outlook and skills requirements in job postings. Please see Appendix B for a glossary of tools and technologies mentioned here.
Emerging Skills

Digital Technologies
Workers in digital technologies will need to be proficient in coding languages, AI, cloud computing to develop applications, automate tasks, develop autonomous vehicles and predictive maintenance systems. CAD knowledge will help to create and modify 3D designs.

Retail Operations
Retail operations roles are expected to be enhanced by digital transformation and, therefore, require workers to be familiar with software to manage sales, CRM, and inventory management. There tools are expected to improve supply chain and customer relationship management.

Drivers & Delivery persons
Drivers and delivery persons are expected to rely on digital tools such as GPS and routing software to optimize their routes, and fleet management systems (e.g., PeopleNet) to manage fleets.

Transportation & Supply Chain
Transportation and supply chain roles are expected to adopt digital and automation tools, including SAP to optimize supply chain processes, GIS and GPS to track shipments and optimize delivery routes, and adopt Electronic Data Interchange systems to streamline exchange of documents.

Emerging Technologies and Tools by Occupation Category

Source: Statistics Canada and Vicinity Jobs. Note: Emerging technical skills are identified based on occupational labour market outlook and skills requirements in job postings. Please see Appendix B for glossary of tools and technologies mentioned here.
Equity, Diversity, and Inclusion
Gender and Race Diversity in the Workforce

Gender and race diversity in the workforce is integral to building a successful automotive hub

An Inclusive Workforce

As the automotive and mobility sector advances, promoting inclusive economic opportunities and diversity in the workforce will be integral to talent and development of the future workforce. Increased participation of women, visible minorities and Indigenous groups will expand the pool of qualified talent in the labour market.

One way this can be achieved is through supporting underrepresented communities in their access to education and training opportunities, especially for STEM fields and technical skills training.

Gender Diversity

- The share of female employment in the workforce in Ontario is 47%. To that end, the share of female employment in all the segments of the automotive and mobility sector is lower than the average for Ontario’s economy.
- Among the 13 segments of automotive and mobility sector illustrated in this report, female workforce representation is lowest for Rail Transportation and highest for Marine Transportation.

Race Diversity

- The share of employment of visible minorities across all industries in Ontario is 34% while the share is 2% for Indigenous Peoples.
- Among the 13 segments of automotive and mobility sector illustrated in this report, visible minority representation is lower than average for Electrification, Light Weighting, Rail Transportation, Aftermarket, Maintenance and Repair, and Tools, Die and Mold.

Source: Statistics Canada, PSIS

Note: Detailed segment definitions are provided in the Appendix. Data for people with non-binary genders is not available at this level of granularity.

Gender Diversity in the Workforce

Share of Women in Employment, Ontario, 2021

<table>
<thead>
<tr>
<th>Sector</th>
<th>Male</th>
<th>Female</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electrification</td>
<td>74%</td>
<td>26%</td>
</tr>
<tr>
<td>Connected and Autonomous Vehicles</td>
<td>68%</td>
<td>32%</td>
</tr>
<tr>
<td>Advanced Air Mobility</td>
<td>71%</td>
<td>29%</td>
</tr>
<tr>
<td>Light Weighting</td>
<td>66%</td>
<td>34%</td>
</tr>
<tr>
<td>Propulsion Systems</td>
<td>70%</td>
<td>30%</td>
</tr>
<tr>
<td>Rail Transportation</td>
<td>36%</td>
<td>64%</td>
</tr>
<tr>
<td>Marine Transportation</td>
<td>63%</td>
<td>37%</td>
</tr>
<tr>
<td>Safety and Management Controls</td>
<td>78%</td>
<td>22%</td>
</tr>
<tr>
<td>Auto and Parts Manufacturing</td>
<td>75%</td>
<td>25%</td>
</tr>
<tr>
<td>Aftermarket, Maintenance and Repair</td>
<td>80%</td>
<td>20%</td>
</tr>
<tr>
<td>Freight and Goods Movement</td>
<td>73%</td>
<td>21%</td>
</tr>
<tr>
<td>Mobility, Planning and Infrastructure</td>
<td>73%</td>
<td>27%</td>
</tr>
<tr>
<td>Tool, Die, and Mold</td>
<td>83%</td>
<td>17%</td>
</tr>
</tbody>
</table>

Note: Detailed segment definitions are provided in the Appendix. Data for people with non-binary genders is not available at this level of granularity.

Race Diversity in the Workforce

Share of Visible Minorities in Employment, Ontario, 2021

<table>
<thead>
<tr>
<th>Sector</th>
<th>Not a Visible Minority</th>
<th>Visible Minority</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electrification</td>
<td>71%</td>
<td>29%</td>
</tr>
<tr>
<td>Connected and Autonomous Vehicles</td>
<td>50%</td>
<td>50%</td>
</tr>
<tr>
<td>Advanced Air Mobility</td>
<td>49%</td>
<td>51%</td>
</tr>
<tr>
<td>Light Weighting</td>
<td>68%</td>
<td>32%</td>
</tr>
<tr>
<td>Propulsion Systems</td>
<td>62%</td>
<td>38%</td>
</tr>
<tr>
<td>Rail Transportation</td>
<td>78%</td>
<td>22%</td>
</tr>
<tr>
<td>Marine Transportation</td>
<td>59%</td>
<td>41%</td>
</tr>
<tr>
<td>Safety and Management Controls</td>
<td>64%</td>
<td>36%</td>
</tr>
<tr>
<td>Auto and Parts Manufacturing</td>
<td>63%</td>
<td>37%</td>
</tr>
<tr>
<td>Aftermarket, Maintenance and Repair</td>
<td>73%</td>
<td>27%</td>
</tr>
<tr>
<td>Freight and Goods Movement</td>
<td>52%</td>
<td>48%</td>
</tr>
<tr>
<td>Mobility, Planning and Infrastructure</td>
<td>61%</td>
<td>39%</td>
</tr>
<tr>
<td>Tool, Die, and Mold</td>
<td>81%</td>
<td>19%</td>
</tr>
</tbody>
</table>

Note: Detailed segment definitions are provided in the Appendix. Visible minorities are defined as persons, other than Aboriginal peoples, who are non-Caucasian in race.
Youth and Persons with Disabilities in the Workforce

Representation of youth and persons with disabilities in imperative to creating an inclusive workforce

Youth Representation

- Among the 13 segments of the automotive and mobility sector illustrated in this report, workforce representation of those under 25 years old is low across all segments, signaling an opportunity to attract young talent.
- Through K-12 programs and work-integrated learning opportunities, attracting and training the youth for emerging skills will be another opportunity to expand the pool of qualified talent.

24.1% of Ontarians over the age of 15 identify as disabled

22% male
26% female

Employment by Age Group, Ontario, 2021

Highest Employment Share, Persons with Disabilities

<table>
<thead>
<tr>
<th>Occupation Group</th>
<th>Share</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trades, transport and equipment operators and related occupations</td>
<td>15.1%</td>
</tr>
<tr>
<td>Management occupations</td>
<td>12.1%</td>
</tr>
<tr>
<td>Occupations in manufacturing and utilities</td>
<td>4.4%</td>
</tr>
</tbody>
</table>

Persons with Disabilities

According to the 2019 Canadian Survey on Disability, the unemployment rate for persons with disabilities is 9.8%. This gap can be minimized in the automotive and mobility sector through:

- Job modifications for persons with disabilities
- Increase and encourage uptake of STEM education amongst persons with disabilities and explore assisted learning opportunities
- Offer technical skills training with appropriate accommodations for persons with disabilities.

Sample job modifications for adults with disabilities

<table>
<thead>
<tr>
<th>Job Redesign</th>
<th>Reduced Work Hours</th>
<th>Technical Aids</th>
<th>Modified and/or Ergonomic Work Station</th>
</tr>
</thead>
</table>

Sources: Canadian Survey on Disability, Statistics Canada.

March of Dimes Canada offers various digital learning programs on in-demand information and communications technology skills to prepare those with disabilities for the job market, along with career coaching and job placement assistance.
The visible minority and Indigenous educational attainment figures represent the educational attainment in the overall Ontario’s labour force.

- The share of total visible minority with postsecondary degrees in the major fields of study is lower than the share of non-visible minority population, with the exception of the computer related and engineering field, which were 2.7% and 4.6% higher, respectively.
  - In general, the Black population has significantly lower educational attainment than the other minorities, whereas South and West Asian minorities show the highest.
- The share of Indigenous peoples with postsecondary degrees in major fields of study considered is lower than the share of Non-Indigenous population.
- The fields of mechanic and repair technologies and technicians, precision production, along with transportation and materials moving are the fields in which the proportion of Indigenous population is greater than in the Non-Indigenous population.
  - The fields of computer related and engineering show a much greater proportion of Non-Indigenous population pursuing degrees in the field, in comparison to the Indigenous Population.

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**Equity, Diversity, and Inclusion Snapshot**

Improving representation of minorities in STEM fields will expand the qualified workforce

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**Representation of Visible Minorities in Labour Force by Educational Attainment, Ontario, 2021**


Gender diversity in education is analyzed across segments in the automotive and mobility sector:

- In 2019, women accounted for approximately two thirds of all postsecondary graduates in multidisciplinary and interdisciplinary studies and over 40% in the transportation and moving field.
- Between 2017 and 2019, there has been a steady increase in female representation across all fields selected, noting a substantial increase in the transportation and materials moving sector, growing from 20% to 43%.

### Postsecondary Graduates (Ontario)

<table>
<thead>
<tr>
<th>Field</th>
<th>2018</th>
<th>2019</th>
</tr>
</thead>
<tbody>
<tr>
<td>Computer and information sciences and support services</td>
<td>Male 6,957, Female 2,535</td>
<td>Male 8,493, Female 3,306</td>
</tr>
<tr>
<td>Engineering</td>
<td>Male 9,504, Female 2,535</td>
<td>Male 10,095, Female 3,039</td>
</tr>
<tr>
<td>Engineering technologies and engineering-related fields</td>
<td>Male 9,963, Female 1,899</td>
<td>Male 11,418, Female 2,382</td>
</tr>
<tr>
<td>Multidisciplinary/interdisciplinary studies</td>
<td>Male 1,764, Female 3,588</td>
<td>Male 1,869, Female 3,756</td>
</tr>
<tr>
<td>Mechanic and repair technologies/technicians</td>
<td>Male 2,496, Female 171</td>
<td>Male 2,940, Female 216</td>
</tr>
<tr>
<td>Precision production</td>
<td>Male 1,206, Female 435</td>
<td>Male 1,296, Female 183</td>
</tr>
<tr>
<td>Transportation and materials moving</td>
<td>Male 366, Female 132</td>
<td>Male 420, Female 312</td>
</tr>
</tbody>
</table>

Source: Statistics Canada, RAIS; Canadian Apprenticeship Forum (2016) "Women and Apprenticeship in Canada", PSIS. Data for people with non-binary genders is not available at this level of granularity.

Equity, Diversity, and Inclusion Snapshot (continued)

Improving representation of women in STEM fields will expand the qualified workforce.
**Talent and Workforce Development**

*Shaping the future workforce synchronously with sectoral transformations require an integrated framework*

1. Technological disruptions and market volatility require greater resilience in the talent development embedded in the automotive and mobility sector.

2. Acute demand can be expected in Ontario in three broad areas: computer programmers and software developers, assemblers and testers, and truck drivers.

3. Future skills requirements reveal the importance of digital skills in AI, design and automation in manufacturing processes.

4. An integrated approach is required for talent and workforce development for the future of the automotive and mobility sector.

**Key Labour Market Trends**

1. **Education**
   - There is a greater need for high-skilled labour and new graduates in technology-focused occupations, including software and computer engineering. Additionally, University education requirements by employers have declined since 2018, while there is greater demand for on-the-job training.

2. **Training**
   - Apprenticeships and work-integrated learning in the automotive sector help to gain hands-on experience and training. For various automotive trades, uptake of apprenticeships have been declining both for Canada and Ontario, but there is growing demand for it in the sector.

3. **Reskilling/ Upskilling**
   - Technological disruptions indicate that as the sector evolves, skill requirements change with it and displaced workers can be absorbed back into the sector through reskilling and/or upskilling programs.

4. **Diversity**
   - Improving representation of women, visible minorities, and Indigenous people in STEM fields will provide employers with qualified workers, helping to address skill gaps. This will also strengthen the sector’s diversity and inclusion efforts underscoring talent and workforce strategies.
**Talent and Workforce Development**

*Ontario is home to a variety of programs to equip the future workforce with the required qualifications*

Presented below is a sample of programs and tools in Ontario and across Canada, available to support potential workers in the automotive and mobility sector to acquire the necessary knowledge and training needed for the emerging technologies and tools shaping the sector. Outlined below is a selection of training and education programs available in Ontario and Canada.

<table>
<thead>
<tr>
<th>Apprenticeship Programs</th>
<th>Online Courses and Micro Credentials</th>
<th>Upskilling and Reskilling Programs</th>
<th>Work-integrated Learning</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Skilled Trades Ontario</strong>&lt;br&gt;The Automotive Service Technician program consists of three different curriculum levels aimed at the repair and service sector. It is administered by the Minister of Labour, Immigration, Training and Skills Development.</td>
<td><strong>McMaster University</strong>&lt;br&gt;The McMaster Manufacturing Research Institute Industrial Training Program is an educational program with the aim of training individuals in the core areas of advanced manufacturing, including processes, material characterization, and sector.</td>
<td><strong>Ontario Tech</strong>&lt;br&gt;The Automotive Engineering Co-op and Internship program focuses on the design and manufacturing of automobiles, components, and assemblies. Students enrolled in this program have had placements in Tesla, GM, Siemens, BMW Group and others.</td>
<td><strong>APMA LEAD LEACH CONNECT</strong>&lt;br&gt;The Automotive Parts Manufacturer’s Association offers the DRIVEN Digital Learning Program, which is an online learning platform that offers certifications and courses for current and new workers in the sector.</td>
</tr>
<tr>
<td><strong>OYAP</strong>&lt;br&gt;The Automotive Service Technician program is aimed at youth with Grade 12 education and higher, and involves 6,500 hours of training and 8 week in-class training sessions with focus on maintenance and repair.</td>
<td><strong>I-CAR</strong>&lt;br&gt;I-CAR’s collision repair sector Gold and Platinum certifications are a sector standard recognition for collision repair professionals who have achieved and maintained the highest levels of role-relevant training.</td>
<td><strong>The EV Technician Program</strong>&lt;br&gt;The EV Technician Program is a training program that intends to teach skills in the diagnosis, service, and repair of high voltage EVs and commercial charging stations.</td>
<td><strong>The Automotive Service Technician Co-op program</strong>&lt;br&gt;The Automotive Service Technician Co-op program provides technician training, with an 8-month work placement. Program partners are Trillium Automobile Dealers Association and Fiat Chrysler Automobiles.</td>
</tr>
<tr>
<td><strong>The Automotive Parts Manufacturer’s Association</strong>&lt;br&gt;Offers the DRIVEN Digital Learning Program, which is an online learning platform that offers certifications and courses for current and new workers in the sector.</td>
<td><strong>Skills &amp; Career Navigator</strong>&lt;br&gt;Comprehensive resource offering detailed information pertinent to a range of audience, outlining current and forthcoming sector transformations, skills needs, career and learning pathways, etc.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Career Development Tools**<br>*Government of Canada*

**Job Bank**<br>Online resource that provides job seekers access to a wide range of job opportunities in Canada. It also offers resources to support with career planning, resume writing, and job search strategies.

**Skills & Career Navigator**<br>Comprehensive resource offering detailed information pertinent to a range of audience, outlining current and forthcoming sector transformations, skills needs, career and learning pathways, etc.
Talent and Workforce Development
Organizations in Canada and across the world are developing policies and programs to improve EDI

Select Programs in Ontario and Canada

The Automotive Parts Manufacturers’ Association hosts the EDI fund, which is designed to support employers and community partners in building, attracting and developing a diverse talent pipeline.

The Future Skills Centre issued the Risking Skills project which explores barriers to upskilling and reskilling, including financial and age-related challenges, and suggest ways to strengthen training in the sector.

The Automotive Industries Association of Canada holds the annual Women in Auto Care Leadership Conference, which serves to connect, empower and mentor women in the auto care industry.

Select Programs Globally

The Women of EVs is a global space which allows women to share ideas, resources, and strategies in order to become better leaders and innovators in electrification.

The International Association of Public Transport organizes an online training on Diversity and Inclusion in Public Transport, which allow for public transport staff understand EDI in the context of transportation.

The Center for Automotive Diversity, Inclusion and Advancement is an organization that was born with the purpose of creating avenues of success for people of all diversity dimensions in the automotive sector.

Opportunities to Improve EDI

Fostering a Culture of Diversity and Inclusion
Companies in the sector can seek to create an inclusive workforce by promoting internal policies, allowing for current and potential workers to feel included regardless of their background or gender.

Engaging with Indigenous Communities
Stakeholders in the industry may seek engage with Indigenous communities to promote greater diversity, incorporate Indigenous knowledge and perspectives, as well as build and improve relations.

Advocating for Equal Opportunity Policies
A key for EDI promotion is to create consciousness and advocate to local and national authorities for legislature and policy to allow for equal advancement opportunities and treatment.

Opportunities to Increase Women’s Representation in the Automotive and Mobility Sector

Providing Women with Information Platforms
Stakeholders can support this by developing information materials and creating educational partnerships so that women may have accessible knowledge of open opportunities in the field.

Addressing Women Turnover Rate
Companies can implement internal policies to support an inclusive workforce for women where working conditions and advancement opportunities are fair and equitable regardless of gender.

Promoting Women in Leadership Positions
Companies in the field can make an active effort to promote women’s representation in leadership positions across all levels, ensuring a platform for women’s advocacy in the workplace.
Leading Ontario’s Automotive and Mobility Transformation

The automotive sector is undergoing a significant shift, with technological advances and evolving mobility preferences redefining its future.

OVIN, led by the Ontario Centre of Innovation (OCI), is supported by the Government of Ontario’s Ministry of Economic Development, Job Creation and Trade (MEDJCT), Ministry of Labour, Immigration, Training and Skills Development (MLITSD) and Ministry of Transportation (MTO). Through OVIN, Ontario is at the forefront of major sectoral trends in electrification, automation, and digital transformation. OVIN capitalizes on the economic potential of advanced automotive technologies and smart mobility solutions such as connected and autonomous vehicles, and electric and low-carbon vehicle technologies, while enabling the province’s transportation and infrastructure networks to plan for and adapt to this evolution.

OVIN is accelerating the development and commercialization of next generation electric, connected and autonomous vehicle and mobility technologies and supporting Ontario’s role as the manufacturing hub of Canada, while leveraging critical minerals development in Ontario’s North.

OVIN has five main objectives:

1. Foster the commercialization of Ontario-made advanced automotive technologies and smart mobility solutions

2. Showcase the Province of Ontario as the leader in the development, testing, piloting and adoption of the latest transportation and infrastructure technologies

3. Drive innovation and collaboration among stakeholders at the convergence of automotive and technology

4. Leverage and retain Ontario’s highly skilled talent, and prepare Ontario’s workforce for jobs of the future in the automotive and mobility sectors

5. Harness the Province of Ontario’s regional strengths and capabilities, and bridge its automotive and technology clusters to promote the development of EV and power train technologies in Ontario
Automotive and Mobility Team

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Appendix A: Automotive and Mobility Segment Definitions
Appendix A: Segment Definitions

Electrification

Industries
1. Metal ore mining (NAICS 2122)
2. Electric power generation, transmission and distribution (NAICS 2211)
3. Basic chemical manufacturing (NAICS 3251)
4. Non-ferrous metal (except aluminum) production and processing (NAICS 3314)
5. Semiconductor and other electronic component manufacturing (NAICS 3344)
6. Electrical equipment manufacturing (NAICS 3333)
7. Other electrical equipment and component manufacturing (NAICS 3355)
8. Computer and communications equipment and supplies merchant wholesalers (NAICS 4173)
9. Remediation and other waste management services (NAICS 5629)

Occupations

Engineering & Technical
1. Mechanical engineers (NOC 2132)
2. Electrical and electronics engineers (NOC 2133)
3. Electrical and electronics engineering technologists and technicians (NOC 2241)

Digital Technologies
1. Computer and information systems managers (NOC 0213)
2. Information systems analysts and consultants (NOC 2171)
3. Software engineers and designers (NOC 2173)
4. Computer programmers and interactive media developers (NOC 2174)

Tradespersons
1. Power system electricians (NOC 7243)
2. Electrical power line and cable workers (NOC 7244)
3. Construction millwrights and industrial mechanics (NOC 7311)
4. Power engineers and power systems operators (NOC 9241)
5. Electronics assemblers, fabricators, inspectors and testers (NOC 9523)
6. Other labourers in processing, manufacturing and utilities (NOC 9619)

Connected and Autonomous Vehicles

Industries
1. Communications equipment manufacturing (NAICS 3342)
2. Navigational, measuring, medical and control instruments manufacturing (NAICS 3345)
3. Other transportation equipment manufacturing (NAICS 3369)
4. Specialized design services (NAICS 5414)
5. Computer systems design and related services (NAICS 5415)

Occupations

Retail Operations
1. Business development officers and marketing researchers and consultants (NOC 4163)

Engineers
1. Electrical and electronics engineers (NOC 2133)
2. Computer engineers (except software engineers and designers) (NOC 2147)
3. Software engineers and designers (NOC 2173)

Digital Technologies
1. Computer and information systems managers (NOC 0213)
2. Information systems analysts and consultants (NOC 2171)
3. Computer programmers and interactive media developers (NOC 2174)
4. Web designers and developers (NOC 2175)
5. Computer network technicians (NOC 2281)
6. User support technicians (NOC 2282)
Appendix A: Segment Definitions

Advanced Air Mobility

Industries
1. Communications equipment manufacturing (NAICS 3342)
2. Navigational, measuring, medical and control instruments manufacturing (NAICS 3345)
3. Aerospace product and parts manufacturing (NAICS 3364)
4. Non-scheduled air transportation (NAICS 4832)
5. Wired and wireless telecommunications carriers (except satellite) (NAICS 5172)
6. Computer systems design and related services (NAICS 5415)

Occupations
Managers and Supervisors
1. Computer and information systems managers (NOC 0213)
2. Manufacturing managers (NOC 0911)

Digital Technologies
1. Information systems analysts and consultants (NOC 2171)
2. Software engineers and designers (NOC 2173)
3. Computer programmers and interactive media developers (NOC 2174)
4. Computer network technicians (NOC 2281)

Engineering & Technical
1. Mechanical engineers (NOC 2132)
2. Aerospace engineers (NOC 2146)
3. Aircraft mechanics and aircraft inspectors (NOC 7315)

Tradespersons
1. Welders and related machine operators (NOC 7237)
2. Material handlers (NOC 7452)
3. Aircraft assemblers and aircraft assembly inspectors (NOC 9521)
4. Other labourers in processing, manufacturing and utilities (NOC 9619)

Light Weighting

Industries
1. Metal ore mining (NAICS 2122)
2. Resin, synthetic rubber, and artificial and synthetic fibres and filaments manufacturing (NAICS 3252)
3. Plastic product manufacturing (NAICS 3261)
4. Alumina and aluminum production and processing (NAICS 3313)
5. Machine shops, turned product, and screw, nut and bolt manufacturing (NAICS 3327)
6. Specialized design services (NAICS 5414)
7. Remediation and other waste management services (NAICS 5629)

Occupations
Design & Technical
1. Graphic designers and illustrators (NOC 5241)
2. Construction millwrights and industrial mechanics (NOC 7311)

Managers and Supervisors
1. Manufacturing managers (NOC 0911)
2. Supervisors, plastic and rubber products manufacturing (NOC 9214)

Manufacturing & Processing
1. Machinists and machining and tooling inspectors (NOC 7231)
2. Tool and die makers (NOC 7232)
3. Welders and related machine operators (NOC 7237)
4. Material handlers (NOC 7452)
5. Machining tool operators (NOC 9417)
6. Plastics processing machine operators (NOC 9422)
7. Motor vehicle assemblers, inspectors and testers (NOC 9522)
8. Plastic products assemblers, finishers and inspectors (NOC 9535)
9. Labourers in rubber and plastic products manufacturing (NOC 9615)
10. Other labourers in processing, manufacturing and utilities (NOC 9619)
Appendix A: Segment Definitions

**Propulsion Systems**

**Industries**
1. Boiler, tank and shipping container manufacturing (NAICS 3324)
2. Engine, turbine and power transmission equipment manufacturing (NAICS 3336)
3. Motor vehicle parts manufacturing (NAICS 3363)
4. Electrical, plumbing, heating and air-conditioning equipment and supplies merchant wholesalers (NAICS 4161)
5. Other machinery, equipment and supplies merchant wholesalers (NAICS 4179)

**Occupations**

**Engineering & Technical**
1. Computer and information systems managers (NOC 0213)
2. Manufacturing managers (NOC 0911)

**Manufacturing**
1. Manufacturing managers (NOC 0911)
2. Machinists and machining and tooling inspectors (NOC 7231)
3. Tool and die makers (NOC 7232)
4. Welders and related machine operators (NOC 7237)
5. Material handlers (NOC 7452)
6. Metalworking and forging machine operators (NOC 9416)
7. Machining tool operators (NOC 9417)
8. Motor vehicle assemblers, inspectors and testers (NOC 9522)
9. Other labourers in processing, manufacturing and utilities (NOC 9619)

**Rail Transportation**

**Industries**
1. Rail transportation (NAICS 4821)
2. Other transit and group passenger transportation (NAICS 4859)

**Occupations**

**Managers and Supervisors**
1. Managers in transportation (NOC 0731)
2. Supervisors, supply chain, tracking and scheduling co-ordination occupations (NOC 1215)
3. Contractors and supervisors, heavy equipment operator crews (NOC 7302)
4. Supervisors, railway transport operations (NOC 7304)

**Technical**
1. Industrial electricians (NOC 7242)
2. Heavy-duty equipment mechanics (NOC 7312)
3. Railway carmen/women (NOC 7314)
4. Railway and yard locomotive engineers (NOC 7361)

**Tradespersons**
1. Material handlers (NOC 7452)
2. Heavy equipment operators (except crane) (NOC 7521)
3. Railway yard and track maintenance workers (NOC 7531)
4. Railway and motor transport labourers (NOC 7622)

**Transportation**
1. Railway traffic controllers and marine traffic regulators (NOC 2275)
2. Ground and water transport ticket agents, cargo service representatives and related clerks (NOC 6524)
3. Railway conductors and brakemen/women (NOC 7362)
4. Bus drivers, subway operators and other transit operators (NOC 7512)
# Appendix A: Segment Definitions

## Marine Transportation

<table>
<thead>
<tr>
<th>Industries</th>
<th>Occupations</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Boiler, tank and shipping container manufacturing (NAICS 3324)</td>
<td>Engineering managers (NOC 0211)</td>
</tr>
<tr>
<td>2. Navigational, measuring, medical and control instruments manufacturing (NAICS 3345)</td>
<td>Civil engineers (NOC 2131)</td>
</tr>
<tr>
<td>3. Ship and boat building (NAICS 3366)</td>
<td>Mechanical engineers (NOC 2132)</td>
</tr>
<tr>
<td>4. Deep sea, coastal and Great Lakes water transportation (NAICS 4831)</td>
<td>Electrical and electronics engineers (NOC 2133)</td>
</tr>
<tr>
<td>5. Inland water transportation (NAICS 4832)</td>
<td>Engineering managers (NOC 0211)</td>
</tr>
<tr>
<td>6. Support activities for water transportation (NAICS 4883)</td>
<td>Civil engineers (NOC 2131)</td>
</tr>
<tr>
<td>7. Freight transportation arrangement (NAICS 4885)</td>
<td>Mechanical engineers (NOC 2132)</td>
</tr>
</tbody>
</table>

### Design

1. Architectural technologists and technicians (NOC 2251)
2. Drafting technologists and technicians (NOC 2253)

### Engineering & Technical

1. Engineering managers (NOC 0211)
2. Civil engineers (NOC 2131)
3. Mechanical engineers (NOC 2132)
4. Electrical and electronics engineers (NOC 2133)
5. Civil engineering technologists and technicians (NOC 2231)
6. Electrical and electronics engineering technologists and technicians (NOC 2241)

### Tradespersons

1. Longshore workers (NOC 7451)
2. Material handlers (NOC 7452)
3. Boat assemblers and inspectors (NOC 9531)

### Transportation

1. Managers in transportation (NOC 0731)
2. Dispatchers (NOC 1525)
3. Deck officers, water transport (NOC 2273)
4. Engineer officers, water transport (NOC 2274)
5. Railway traffic controllers and marine traffic regulators (NOC 2275)
6. Water transport deck and engine room crew (NOC 7532)
7. Boat and cable ferry operators and related occupations (NOC 7533)

## Safety Management and Controls

<table>
<thead>
<tr>
<th>Industries</th>
<th>Occupations</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Other leather and allied product manufacturing (NAICS 3169)</td>
<td>Engineering managers (NOC 0211)</td>
</tr>
<tr>
<td>2. Electrical equipment manufacturing (NAICS 3353)</td>
<td>Civil engineers (NOC 2131)</td>
</tr>
<tr>
<td>3. Motor vehicle parts manufacturing (NAICS 3363)</td>
<td>Mechanical engineers (NOC 2132)</td>
</tr>
<tr>
<td>4. Automotive repair and maintenance (NAICS 8111)</td>
<td>Engineering managers (NOC 0211)</td>
</tr>
</tbody>
</table>

### Engineering & Technical

1. Mechanical engineers (NOC 2132)
2. Electrical and electronics engineers (NOC 2133)
3. Industrial and manufacturing engineers (NOC 2141)
4. Metallurgical and materials engineers (NOC 2142)
5. Mechanical engineering technologists and technicians (NOC 2232)
6. Industrial engineering and manufacturing technologists and technicians (NOC 2233)
7. Non-destructive testers and inspection technicians (NOC 2261)
8. Automotive service technicians, truck and bus mechanics and mechanical repairs (NOC 7321)

### Tradespersons

1. Material handlers (NOC 7452)
2. Other automotive mechanical installers and services (NOC 7535)
3. Rubber processing machine operators and related workers (NOC 9423)
4. Motor vehicle assemblers, inspectors and testers (NOC 9522)
Appendix A: Segment Definitions

Auto and Parts Manufacturing

Industries
1. Spring and wire manufacturing (NAICS 3326)
2. Metalworking machinery manufacturing (NAICS 3333)
3. Semiconductor and other electronic component manufacturing (NAICS 3344)
4. Electrical equipment manufacturing (NAICS 3333)
5. Other electrical equipment and component manufacturing (NAICS 3359)
6. Motor vehicle manufacturing (NAICS 3361)
7. Motor vehicle body and trailer manufacturing (NAICS 3362)
8. Motor vehicle parts manufacturing (NAICS 3363)

Occupations
Managers & Supervisors
1. Manufacturing managers (NOC 0911)
2. Supervisors, motor vehicle assembling (NOC 9221)
3. Supervisors, electronics manufacturing (NOC 9222)
4. Supervisors, electrical products manufacturing (NOC 9223)
5. Supervisors, furniture and fixtures manufacturing (NOC 9224)
6. Supervisors, other mechanical and metal products manufacturing (NOC 9226)
7. Supervisors, other products manufacturing and assembly (NOC 9227)

Engineering & Technical
1. Mechanical engineers (NOC 2132)
2. Electrical and electronics engineers (NOC 2133)
3. Industrial and manufacturing engineers (NOC 2141)
4. Metallurgical and materials engineers (NOC 2142)
5. Mechanical engineering technologists and technicians (NOC 2232)
6. Industrial engineering and manufacturing technologists and technicians (NOC 2233)
7. Electrical and electronics engineering technologists and technicians (NOC 2241)
8. Industrial instrument technicians and mechanics (NOC 2243)

Manufacturing
1. Machining tool operators (NOC 9417)
2. Motor vehicle assemblers, inspectors and testers (NOC 9522)
3. Electronics assemblers, fabricators, inspectors and testers (NOC 9523)
4. Mechanical assemblers and inspectors (NOC 9526)
5. Plastic products assemblers, finishers and inspectors (NOC 9535)
6. Industrial painters, coaters and metal finishing process operators (NOC 9536)
7. Other labourers in processing, manufacturing and utilities (NOC 9619)
Appendix A: Segment Definitions

Aftermarket, Maintenance and Repair

Industries
1. Motor vehicle merchant wholesalers (NAICS 4151)
2. New motor vehicle parts and accessories merchant wholesalers (NAICS 4152)
3. Used motor vehicle parts and accessories merchant wholesalers (NAICS 4153)
4. Automobile dealers (NAICS 4411)
5. Automotive parts, accessories and tire stores (NAICS 4413)
6. Automotive repair and maintenance (NAICS 8211)

Occupations

Retail Operations
1. Retail and wholesale trade managers (NOC 0621)
2. Storekeepers and parts persons (NOC 1522)
3. Retail salespersons (NOC 6421)

Engineering & Technical
1. Mechanical engineering technologists and technicians (NOC 2232)
2. Electrical and electronics engineering technologists and technicians (NOC 2241)
3. Industrial instrument technicians and mechanics (NOC 2243)
4. Information systems testing technicians (NOC 2283)

Tradespersons
1. Contractors and supervisors, mechanic trades (NOC 7301)
2. Automotive service technicians, truck and bus mechanics and mechanical repairers (NOC 7321)
3. Other automotive mechanical installers and servicers (NOC 7535)

Freight and Goods Movement

Industries
1. General freight trucking (NAICS 4841)
2. Specialized trucking (NAICS 4842)
3. Postal service (NAICS 4911)
4. Couriers (NAICS 4921)
5. Local messengers and local delivery (NAICS 4922)

Occupations

Managers & Supervisors
1. Managers in transportation (NOC 0731)
2. Supervisors, supply chain, tracking and scheduling co-ordination occupations (NOC 1215)

Delivery persons
1. Mail, postal and related workers (NOC 1511)
2. Letter carriers (NOC 1512)
3. Couriers, messengers and door-to-door distributors (NOC 1513)

Supply Chain
1. Shippers and receivers (NOC 1521)
2. Dispatchers (NOC 1525)
3. Transportation route and crew schedulers (NOC 1526)
4. Material handlers (NOC 7452)

Drivers
1. Transport truck drivers (NOC 7511)
2. Delivery and courier service drivers (NOC 7514)
Appendix A: Segment Definitions

**Mobility and Planning Infrastructure**

**Industries**
1. Highway, street and bridge construction (NAICS 2373)
2. Urban transit systems (NAICS 4851)
3. Intercity and rural bus transportation (NAICS 4852)
4. Taxi and limousine service (NAICS 4853)
5. School and employee bus transportation (NAICS 4854)
6. Charter bus industry (NAICS 4855)
7. Other transit and ground passenger transportation (NAICS 4859)
8. Architectural, engineering and related services (NAICS 5413)
9. Scientific research and development services (NAICS 5417)

**Occupations**

**Managers & Supervisors**
1. Engineering managers (NOC 0211)
2. Architecture and science managers (NOC 0212)
3. Computer and information systems managers (NOC 0213)

**Engineering**
1. Civil engineers (NOC 2131)
2. Mechanical engineers (NOC 2132)
3. Electrical and electronics engineers (NOC 2133)

**Digital Technologies**
1. Information systems analysts and consultants (NOC 2171)
2. Database analysts and data administrators (NOC 2172)
3. Software engineers and designers (NOC 2173)
4. Computer network technicians (NOC 2181)
5. Information systems testing technicians (NOC 2183)

**Infrastructure**
1. Architects (NOC 2151)
2. Urban and land use planners (NOC 2153)
3. Civil engineering technologists and technicians (NOC 2231)
4. Drafting technologists and technicians (NOC 2253)

**Transport**
1. Bus drivers, subway operators and other transit operators (NOC 7512)
2. Taxi and limousine drivers and chauffeurs (NOC 7513)

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**Tool, Die and Mold**

**Industries**
1. Foundries (NAICS 3315)

**Occupations**

**Managers & Supervisors**
1. Senior managers - construction, transportation, production and utilities (NOC 0016)
2. Manufacturing managers (NOC 0911)
3. Supervisors, mineral and metal processing (NOC 9211)
4. Supervisors, furniture and fixtures manufacturing (NOC 9224)
5. Supervisors, other mechanical and metal products manufacturing (NOC 9226)

**Engineering & Technical**
1. Mechanical engineers (NOC 2132)
2. Industrial and manufacturing engineers (NOC 2141)
3. Mechanical engineering technologists and technicians (NOC 2232)
4. Industrial engineering and manufacturing technologists and technicians (NOC 2233)
5. Electrical and electronics engineering technologists and technicians (NOC 2241)
6. Industrial instrument technicians and mechanics (NOC 2243)

**Tradespersons**
1. Contractors and supervisors, machining, metal forming, shaping and erecting trades and related occupations (NOC 7201)
2. Machinists and machining and tooling inspectors (NOC 7231)
3. Tool and die makers (NOC 7232)
4. Welders and related machine operators (NOC 7237)
5. Industrial electricians (NOC 7242)
6. Construction millwrights and industrial mechanics (NOC 7311)

**Manufacturing & Processing**
1. Machine operators, mineral and metal processing (NOC 9411)
2. Foundry workers (NOC 9412)
3. Inspectors and testers, mineral and metal processing (NOC 9415)
4. Machining tool operators (NOC 9417)
5. Labourers in mineral and metal processing (NOC 9611)
Appendix B: Glossary of Tools, Equipment and Technologies
Appendix B: Glossary of Tools, Equipment and Technologies

► **3D Modeling:** Software that runs specialized programs for automating the manufacturing process, particularly the fabrication, assembly, and control aspects of manufacturing.

► **Artificial Intelligence (AI):** Artificial intelligence is the use of machines, tools and technologies to simulate human intelligence and automate tasks that typically required physical workers.

► **asTech:** asTech is a remote diagnostic tool used in collision shops by repair technicians, to scan the vehicle for issues before and after repair work.

► **Autodesk AutoCAD:** Software for designing various engineering, architectural, and industrial objects.

► **Autodesk Combustion:** Software for drawing, manipulating images, adding color, and using special effects for print or presentation programs.

► **Cloud Computing:** It is an on-demand availability of computer system resources, especially data storage and computing power, without direct active management by the user.

► **Computer aided design (CAD) software:** Software for designing various engineering, architectural, and industrial objects.

► **Computer aided manufacturing (CAM) software:** Software that runs specialized programs for automating the manufacturing process, particularly the fabrication, assembly, and control aspects of manufacturing.

► **Computer numerical control (CNC) software:** Software for controlling, configuring, and monitoring intelligent industrial control devices by operation from a computer or microprocessor.

► **Computerized maintenance management system (CMMS):** Software for optimizing the resources of a company. This software offers built-in reporting capability for moves, assets, and space availability. C*Milerand can also schedule personnel relocation ahead of time. This software is often capable of much more and has provisions available for ad-hoc custom report generation to meet the unique needs of the company.

► **Customer relationship management (CRM) software:** Software for managing customer interactions.

► **Electronic Data Interchange (EDI) systems:** Software for integrating application data and processes.

► **Epicor:** Epicor software provides a wide range of solutions in the automotive sector, including enterprise resource planning, customer relationship management, supply chain management, and human capital management.

► **JavaScript:** JavaScript, often abbreviated as JS, is a programming language that conforms to the ECMAScript specification. JavaScript is high-level, often just-in-time compiled, and multi-paradigm. It has curly-bracket syntax, dynamic typing, prototype-based object-orientation, and first-class functions.

► **Kronos:** Kronos is a type of ERP software used for product planning and implementation.

► **Linux:** A free, open-source operating system, released under the GNU General Public License.

► **Macros:** An electronic data capture system for the collection and analysis of routing data.

Sources: National Center for O*NET Development.
Appendix B: Glossary of Tools, Equipment and Technologies

► Material Safety Data Sheets (MSDS): Software for providing tools and support documents that enable clients to effectively monitor, check, and correct essential areas of control. This software helps with achieving compliance with federal, state, standard, or local regulations devices.

► Microsoft Operating System: Software for providing the operation interface to the computer and providing higher-level services and application programming interfaces (APIs).

► Microsoft Visio: Microsoft Visio is a diagramming and vector graphics application and is part of the Microsoft Office family.

► Milling Machines: Milling is a machining process used in manufacturing processes.

► Oracle PeopleSoft: This is an ERP software for enabling product planning and implementations.

► PC*Miller: This is a routing, mileage and mapping software widely used in the transportation industry.

► PCB / PCBA (Printed Circuit Board / Assembly): Designing circuit boards and assembling them in engineering/industrial setting.

► PeopleNet: Software for fleet management for vehicle monitoring and other to supply chain management tasks.

► Programmable logic controller PLC software: A programmable logic controller (PLC) or programmable controller is an industrial digital computer that has been ruggedized and adapted for the control of manufacturing processes, such as assembly lines, robotic devices, or any activity that requires high reliability, ease of programming, and process fault diagnosis.

► Project management software: Software for assisting in the process of planning, organizing, staffing, directing, and controlling the production of a system.

► Routing software: Software for assisting the user in moving from one geography to another using a selected path or route.

► SAP: SAP, or Systems Applications and Products is a type of ERP software used for product planning and implementation.

► Scrapers: Scrapers are used in automotive manufacturing to remove the carbon deposited on the cylinder head, piston head, or other parts.

► Spectrum Analyzer: Spectrum analysers are used to measure electrical signals for frequency, power, distortion, etc.

► SQL (Structured query language): SQL is a domain-specific language used in programming and designed for managing data held in a relational database management system (RDBMS), or for stream processing in a relational data stream management system (RDSMS). It is particularly useful in handling structured data, i.e., data incorporating relations among entities and variables.

► Vision systems: Robotic systems with cameras and sensors that feeds information to the robot.

► Warehouse/Inventory Management systems: Software for maintaining the inventory of companies and restaurants. This software uses barcodes or unique ids for their inventory management system.

► Winches: A mechanical device, typically used for pulling and lifting.

Sources: National Center for O*NET Development.
Appendix C: Methodology and Data Limitations
Appendix C: Methodology and Data Limitations

Methodology

An overview of the methodology of the analysis is presented below:

- **Monthly job postings** were collected from Vicinity Jobs, a labour market analytics firm, at the level of occupations (4-digit NOC) and grouped into occupation categories based on the similarity of their roles within each segment of the automotive and mobility sector, including information regarding the education level and workforce characteristics (e.g., skills, knowledge, tools & technology) required in postings by occupation.

- **Skill gaps** were defined based on the average occurrence rate of a skill in job posting related to the segment and the average occurrence rate of the same skill in relevant job seeker profiles. Occurrence rate is the frequency or percentage of job postings that mention a given skill, tool, or technology, in relevant occupations. Skill gaps where demand exceeded supply are included in the report.

- **Occupational demand** is projected based on industry’s forecasted growth as per Oxford Economics, in combination with expected changes in the demand for workers, including annual change in employment by occupation and replacement demand. Replacement demand is based on estimated rates of exit from the labour force due to retirement, emigration or death. Exit rates are based on the Canadian Occupational Projection System (COPS) data.

- **Occupational supply** is projected based on three distinct sources: school leavers (i.e. post-secondary graduates and apprenticeship completions), immigrants, and job changers (i.e. individuals currently in the workforce who may enter the sector).

- **Occupational labour gaps** were determined subtracting total projected supply from total projected demand across all forecast years (2023-2032). The skills outlook was based on occupational projections for a common set of skills available in both job postings (demand) and job seeker profiles (supply).

Data Limitations

Identified limitations with the datasets and approach used in the analysis include:

- The job posting are linked to occupations associated with the segment based on the National Occupational Classification (NOC) codes used by Statistics Canada. Additionally, it covers the period between January 2018 and June 2022. Due to the impact of the COVID-19 pandemic on the labour market the data during that period should be treated with caution.

- The job seeker profiles database covers only the period between September 2018 and February 2020. The relatively small sample size also means data trends should be treated with caution.

- Both the job posting and job seeker profiles databases include data from across Ontario, however, at the regional level the data is limited and may not provide reliable insights.

- The analysis of skills was limited by the availability and completeness of data. There were gaps in terms of job posting and job seeker profiles in Vicinity Jobs data, which means that the estimations of skills demand, supply, and gap should be considered as a ranking rather than a definitive estimation.

- Future skill insights were limited by the skills present in current state data from job posting and job seeker profiles, meaning “new” skills that are not related to occupations in the present could not be identified.

- The data used for the analysis of representation of women, visible minorities, and Indigenous groups in Ontario’s employment by industry and by occupation is sourced from Statistics Canada’s latest Census from 2021. While high level insights based on age and persons with disabilities is included, data for non-binary gender groups are not available at this level of granularity.