The Future of the Manufacturing Labour Force in Canada
This report was prepared for the project “Regional Labour Market Information to Address Skills and Human Resources Issues in the Manufacturing Sector”. This project is sponsored by the Canadian Manufacturers & Exporters and the Canadian Skills Training and Employment Coalition.

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Prepared by Prism Economics & Analysis for:
Canadian Manufacturers & Exporters (CME) &
Canadian Skills Training & Employment Coalition (CSTEC)
The National Manufacturing Labour Market Research Report is sponsored by the Canadian Skills Training and Employment Coalition (CSTEC) and by the Canadian Manufacturers and Exporters (CME).

CSTEC was originally founded 29 years ago as a joint venture between the Canadian Steel Industry and the Steelworkers Union. Today the Canadian Skills Training and Employment Coalition is an enabler of innovative, multi-stakeholder solutions to training related problems faced by employers and unions within the broader manufacturing, mining and forestry sectors. The organization focuses on a range of training issues related to workplace and essential skills training, apprenticeship and technical training, needs assessments, occupational standards, labour market information, labour adjustment and career enhancement for young people and the unemployed. CSTEC promotes joint consultation and understanding between industry and labour on non-collective bargaining issues. The organization successfully works in union and non-union workplaces, and has assisted employers and unions in setting up joint workplace training committees and adjustment committees.

Canadian Manufacturers & Exporters (CME) is Canada's largest trade and industry association. It represents businesses in all sectors of manufacturing and exporting activity across Canada. Its mandate is to promote the competitiveness of Canadian manufacturers and the success of Canada's goods and services exporters in markets around the world. It focuses on the issues that are most critical to their members: manufacturing competitiveness, US business opportunities, international markets, people and skills, energy and the environment.

CME directly represents more than 10,000 companies coast-to-coast, and – through various initiatives such as the Canadian Manufacturing Coalition – reaches more than 100,000 businesses engaged in manufacturing, exporting, and service related industries.

Both CSTEC and CME undertook this study because they believed that currently available labour market information (LMI) could be improved and made more relevant to manufacturers. Providing manufacturers with high quality and relevant data enables them to identify ways to address shortages in skilled trades and technicians that might exist today or might be anticipated in the future.

Five key issues need to be addressed in order to create improved LMI. The first issue is regional labour market information. Since the labour markets relevant to manufacturing employers are predominantly regional, LMI needs to be conducted at the regional level to be meaningful. Second, because upcoming retirements present labour market challenges, occupational forecasts need to be sensitive to regional demographics. Third, LMI needs to be current and regularly updated to reflect the changes in markets and labour force in a timely manner. Fourth, both CSTEC and CME wanted to explore the relationship between recruitment challenges and differences in wage structures. Finally, CSTEC and CME wanted to engage employers in an interactive process of discussing LMI research priorities and validating results, and in a discussion about how to address any skills shortages that exist today or might be anticipated in the future.

The goal of CSTEC/CME is to combine these aspects of rigorous LMI into a single project. The first objective is to generate LMI that is regional, focused on skill needs in the manufacturing sector, current, and that is shaped and validated through dialogue with regional manufacturing employers. The second objective is to provide supply/demand forecasts that are rigorous, grounded and calibrated to take account of locally generated data. These forecasts will provide the analytical insight needed to support strategic human resources planning. The third objective is to engage employers regionally in a discussion about steps that might be taken to address any skills shortages identified by the LMI.
In large part due to the results of the Regional Manufacturing LMI project, the CME has indicated a desire to use the regional employer networks built in 15 regions during the operation of the project as a platform to increase the hiring of apprentices and students with training related to the skilled occupations that are forecast to be in short supply.
# TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>The Labour Market Information Research Project</td>
<td>3</td>
</tr>
<tr>
<td>EXECUTIVE SUMMARY</td>
<td>7</td>
</tr>
<tr>
<td>INTRODUCTION</td>
<td>9</td>
</tr>
<tr>
<td>METHODOLOGY</td>
<td>11</td>
</tr>
<tr>
<td>KEY HIGHLIGHTS FROM THE RESEARCH</td>
<td>12</td>
</tr>
<tr>
<td>KEY FINDINGS BY REGION</td>
<td>20</td>
</tr>
<tr>
<td>Regional Comparisons</td>
<td>20</td>
</tr>
<tr>
<td>Calgary</td>
<td>22</td>
</tr>
<tr>
<td>Edmonton</td>
<td>23</td>
</tr>
<tr>
<td>Greater Toronto Area</td>
<td>25</td>
</tr>
<tr>
<td>Halifax</td>
<td>26</td>
</tr>
<tr>
<td>Hamilton-Niagara</td>
<td>28</td>
</tr>
<tr>
<td>Kitchener-Waterloo-Guelph</td>
<td>30</td>
</tr>
<tr>
<td>London</td>
<td>32</td>
</tr>
<tr>
<td>Montreal</td>
<td>34</td>
</tr>
<tr>
<td>Peel-Halton</td>
<td>35</td>
</tr>
<tr>
<td>Regina-Saskatoon</td>
<td>37</td>
</tr>
<tr>
<td>Sault Ste. Marie</td>
<td>38</td>
</tr>
<tr>
<td>Sudbury</td>
<td>40</td>
</tr>
<tr>
<td>Vancouver</td>
<td>41</td>
</tr>
<tr>
<td>Windsor</td>
<td>43</td>
</tr>
<tr>
<td>Winnipeg</td>
<td>45</td>
</tr>
<tr>
<td>SURVEY RESULTS</td>
<td>47</td>
</tr>
<tr>
<td>ISSUES AND CONSIDERATIONS FROM THE REGIONAL COMMITTEES</td>
<td>57</td>
</tr>
<tr>
<td>CONCLUSIONS, POTENTIAL ACTION TO ADDRESS SHORTAGES AND FUTURE RESEARCH</td>
<td>61</td>
</tr>
<tr>
<td>APPENDIX: METHODOLOGY</td>
<td>63</td>
</tr>
</tbody>
</table>
This report provides an analysis of the labour needs of the manufacturing industry in Canada for the next 5 and 10 years. It develops a baseline projection of the labour requirements of Canadian manufacturing by occupation. The analysis covers the top 15 manufacturing regions across Canada and the main manufacturing sectors in these regions. This is the most comprehensive labour market study at this level of detail (i.e., regional, sectoral, and occupational). The 2016 edition is the second year for this research and analysis.

Canada's manufacturing regions are buffeted by specific and often unique factors. The manufacturers in each region across the country are focused on different industries and a variety of markets. These differences pose distinct challenges. But they also contain common factors and attributes that have been identified through this research and validated through the Regional Industry Committees comprised of local manufacturers in each region.

Nearly every region will need to overcome a recruitment gap to sustain their production and to grow. The total recruitment gap in all 15 regions is over 129,000 workers.

The model used in this study predicts that the demand for skilled workers in the manufacturing sector will surpass the supply in 14 of the regions over the next 10 years. As expansion and replacement demand increases beyond the supply of new entrants, these regions will face significant recruitment gaps.

Manufacturing workers across the country are older than the overall labour force of the region. Virtually all of manufacturing regions have to address the effects of an aging workforce despite widely divergent growth and output outlooks across Canada. Key manufacturing occupations are staffed by older workers who will be leaving the workforce over the next decade. Replacing them is the most important human resources problem for manufacturers across the country. Four essential occupations provide the greatest hiring challenges:

- Machinists
- Millwrights and Industrial mechanics
- Welders
- Manufacturing managers

Regions with growing manufacturing output will see slower job growth. Productivity improvements gained through investments in automation and technological advances will slow employment increases. Skilled trades and technical occupations that are in high demand in the manufacturing industry are comprised of an older workforce with notably fewer workers in the younger and middle age groups. As these workers retire in the next 10 years, the manufacturing industry will have to look elsewhere. Filling these skilled positions with younger workers and providing them with the technical capabilities required for a complex production process is the key challenge for manufacturers. Retired workers will be replaced by fewer younger skilled workers who have the higher level of technical skills and education needed for the greater complexity of advanced manufacturing.
Competition for technically skilled workers will play a major role in many regions.

Occupations such as senior managers, industrial electricians, sheet metal workers, welders and machine operators, are highly sought after in other industries such as construction, utilities, and professional services. Faster growth rates and higher wages in competing industries (e.g., utilities, professional services, and oil and gas) make it harder for manufacturers to attract skilled workers. Some occupations are harder to fill across the manufacturing industry and the country due to low supply. These occupations face a relatively low number of young people entering the occupation and have a lengthy education and training path to acquire the technical skills needed.

In-migration from other regions, provinces and internationally will be essential to maintain the skilled workforce.

Recruitment challenges may be exacerbated by unpredictable levels of in-migration. Several regions depend critically on their propensity to receive migrants from other provinces and from outside the manufacturing industry labour force to fill many manufacturing positions during the next decade. This issue is less acute during downturns but when the regional economy returns to growth, manufacturers will be in competition for labour with higher paying industries.

Regional Industry Committee Highlights

Manufacturing employers are the primary stakeholders for the Manufacturing Regional Labour market project and their involvement is crucial for developing robust labour market forecasts and actionable labour market intelligence. Regional Industry Committees (RIC) were developed in all 15 regions for the purpose of engaging manufacturing sector stakeholders in the labour market research process. The RICs provided qualitative labour market information, validated the projections of the labour forecast model, and developed possible solutions to labour market challenges in the region. Highlights from the Regional Industry Committees include:

1. The RICs validated the outputs of the labour forecast model and provided additional LMI that was used to further calibrate the forecasts
2. The RICs provided recommendations to fill the gaps in the labour market identified by this research. These recommendations include:
   - Align training with skills requirements by building partnerships between the manufacturing sector and postsecondary education to encourage the
   - Bring new workers into manufacturing by better collaboration between service organizations, government agencies, and the manufacturing sector to ease their integration into the workforce.
   - Encourage more youth to pursue technical training for careers in manufacturing to create the skilled workforce of the future.
   - Use labour market information effectively to inform decision making of all stakeholders
   - Maintain, improve, and promote the use of labour market information for the manufacturing sector.

3. The Canadian Manufacturers & Exporters is considering using the regional forecasts and the regional employer networks as a platform to begin addressing any skills shortages identified in the LMI. This results from the RIC validation of the findings and the dialogue with employers engaged in the regional industry committees established during the project. The CME wants to develop and implement a regional consortia approach to increase work-integrated-learning opportunities in the manufacturing sector. Occupational skills gaps identified by the model for each region will be prioritized and additional resources and/or additional program support will be sought by the CME to help the regional employer consortia close these identified skill gaps.
The CME/CSTEC Manufacturing Labour Market Information (LMI) Project was initiated to fill important gaps in labour market research: to provide regional and occupational specificity with an employer focus and data cross-validation. Most labour market research in Canada uses Statistics Canada datasets as the basis for analysis and forecasts. However, the Labour Force Survey, which is the main and most comprehensive data source for LMI, does not have the level of detail required to yield in-depth information at the regional and occupational level that is needed and demanded by local employers. Moreover, often outdated Statistics Canada data are used exclusively without cross-validation from other data sources or through original data collection exercises.

Another labour market dimension which is not captured by Statistics Canada data is the increasing level of workforce outsourcing in the manufacturing industry. Companies are increasingly contracting out specialized skills such as human resources, information technology, logistics, and engineering. This leads to an apparent and overstated decline in the manufacturing workforce as measured by the Labour Force Survey and the National Household Survey. Although it appears as though the manufacturing workforce has been declining precipitously, in reality, the decline is, at least partly, a function of the domestic outsourcing trend. The larger labour force and supply chain impacts of the manufacturing industry need to be studied in greater detail and the share of the outsourced manufacturing workforce needs to be measured for a fuller picture of the current state of the manufacturing workforce in Canada.

These gaps in current LMI research are among the main reasons the manufacturing industry cannot effectively plan its human resources needs. Effective and actionable human resources information is necessary for manufacturers to obtain the skills they need to achieve production and investment objectives. Aware of this issue, the CME/CSTEC Manufacturing LMI Project is intended to generate reliable, sector-specific, region-specific, and occupation-specific labour market forecasts for the manufacturing industry, with input from the manufacturing industry. The reasons why this level of specificity matters are fourfold:

- The labour markets that are relevant to manufacturing employers are predominantly regional. Employers strongly prefer hiring employees from their own region; hiring from outside is often costly.
- Occupational forecasts are conducted in terms of occupations with no nuancing for skills. As a result, manufacturing employers are often told that there is an ample supply of labour when their experience shows that this is not the case.
- The issue of skills is particularly acute in understanding the supply and demand for skilled trades and technicians and technologist occupations. These technical occupations require years of training and experience to develop highly skilled practitioners. Anticipating the requirements for skilled trades and technicians and technologists in manufacturing industries becomes important in order to implement new technology into manufacturing and achieving output and productivity goals.
- Manufacturing sub-sectors are at different stages of technological advancement. As a result, non-sectoral labour market information leads to inaccurate conclusions about the needs of individual manufacturing sub-sectors (e.g., automotive, printing, fabricated metal manufacturing).
This 2016 report provides key insights into the manufacturing labour force from an analysis of three primary sources. The results of a manufacturing employer survey, feedback from regional industrial committees in each region, and the economic model developed for this project. These insights are valid across regions and will inform the hiring strategies of manufacturing hiring managers during the next decade. In addition, the report highlights clear differences in terms of demographics and outlooks across regions that generate distinctive challenges for each manufacturing hub.

In addition to generating LMI that is regional, focused on skill needs in the manufacturing sector, current, and validated by regional manufacturing employers, the project also aimed at developing supply/demand forecasts that are rigorous and which have been re-calibrated to take account of locally generated data. These forecasts provide the analytical insight needed to support strategic human resources planning.

To our knowledge, this is the first manufacturing LMI project that:

1. Developed Supply/Demand LMI forecasts at the occupational level using input from regional employers
2. Used a supply side model that reflects the specific demographics of the manufacturing industry workforce
3. Collected occupational employment, training, labour shortages, and wage data from the regional employers at the occupational level.

The CME/CSTEC Manufacturing LMI Project also build Regional Industry Committees (RICs) in each region. The RICs validated the LMI results and discussed potential actions that might be taken to address identified skills gaps.

The CME/CSTEC Manufacturing LMI Project conducted an LMI research program between August 2014 and December 2016. During this period, two iterations of the research program were conducted. In both 2015 and 2016, an employer survey was conducted, RICs were convened and consulted, labour demand and supply models were developed, and forecasts were estimated for each region. Regional reports were generated, shared and validated with manufacturing employers through the Regional Industry Committees.

This is the second CME/CSTEC National Manufacturing LMI Report. This second report summarizes the results of these research components and gives an overview of the findings at the national level. The report also identifies lessons learned from the project and provides recommendations on how to improve future LMI projects and how to address identified skills gaps.
The CME/CSTEC Manufacturing LMI Project followed a triangular methodology which utilized checks to confirm the newly collected data. The three-pronged approach allowed for the validation of the results of each component and a cross-check for real-time changes. The three research approaches used in this study are:

- Regional manufacturing employers survey
- Manufacturing labour demand and supply baseline projections by region, occupation, and sector
- Regional industry committees validating the first two components of the research in real-time.

The regional manufacturing employers’ survey collected responses from 352 manufacturing employers across 15 regions. It covered a variety of company sizes and industries. The majority of respondents were senior executives, CEOs or human resources managers.

In addition to the survey, Prism developed baseline projections for each region at the regional and occupational level in the absence of disruptive technological changes. These projections enable the industry to better understand the human resources impacts of potential disruptive technological changes, should they occur. These disruptive changes can be incorporated into the next iterations model to understand the impact of potential new technologies in the manufacturing industry.

The third part of the research methodology used in this report consists of regional industrial committees (RICs) which had the purpose of validating the findings of the survey and testing the baseline projections of the demand and supply model. RICs have been established and validations conducted in each of the fifteen regions across Canada within the scope of this project. RICs have been very successful in generating regional employer engagement and discussion around labour market issues and the importance for human resources planning in the manufacturing industry. RICs also presented opportunities for employers to cooperate on addressing labour market shortages and other common issues. Ultimately, RICs allowed the CME/CSTEC Manufacturing LMI Project to achieve one of its main goals of making employers a key component of labour market research at the regional level.
**Key Highlights From the Research**

The research program of the CME/CSTEC Manufacturing LMI Project comprises a three-prong approach to the generation of robust LMI and forecasts: the employer survey, the labour demand and supply models, and the regional industry committees. This three-pronged methodological approach and data validation processes ensured that data collected from various sources were consistent and valid.

The research program revealed certain findings that were consistent across employers, regions, and manufacturing sectors.

**Common themes and findings**

Several common themes emerged from the research components that were valid for all regions. These themes are indicators of the current state of the manufacturing labour force in Canada:

1. The outsourcing of specific skills (e.g., human resources, information technology, and engineering) is becoming increasingly common in the manufacturing industry. Outsourcing refers to the external provision of services that were previously provided in-house. The outsourcing trend has had a large effect on estimates of the manufacturing workforce, which appears to have declined significantly over the last decade. A notable portion of this “decline” can be attributed to outsourcing, which is still work generated by the manufacturing industry.

2. The manufacturing industry employs an older workforce than other industries’ workforces. The next decade will be a challenging time for employers to replace existing experienced, highly-skilled workers. The chart below demonstrates the manufacturing workforce’s aging trend: the share of manufacturing workers who are 55 years old or older surpassed the same share in other industries in 2013. In 2015, almost 22% of manufacturing workers were over 54 years old, compared to about 20% for the overall workforce. This trend has been observed in virtually all of 15 manufacturing regions across Canada.

![Figure 1: Aging Manufacturing Workforce](source: Statistics Canada, Table 282-0008)
3. Manufacturing is in competition with other industries for many of the same technical occupations and skills, especially skilled trades, technicians and technologists. These other industries (e.g., construction, utilities, oil and gas, professional services), may offer better incentives, or may be perceived to be more attractive than manufacturing by prospective workers. One factor fueling recruitment challenges in the manufacturing industry is the level of compensation and benefits other industries may offer.

4. Results from the employer survey conducted for this research show that the majority of employers from almost all regions expect their businesses to grow over the next three years. Respondents were very optimistic about the future of their business. The exceptions were in the Calgary, Regina and Sudbury regions where fewer than half the employers stated that they expected growth.¹ In total, 75% of manufacturing employers said their company would grow over the next three years. This contrasts with the survey conducted in 2015 when 61% of manufacturing employers expected their company to grow. Growth expectations in five regions are well above the national average.

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¹ Note: There were too few survey respondents from Montreal to report separately for comparison purposes. The Montreal responses are included in regional and national totals.
5. Survey results also show that the decline in oil prices continues to impact the manufacturing industry in the Calgary, Edmonton and Regina. Manufacturing industries in other areas that service oil and gas as their major client have also been affected. They supply the necessary machinery and fabricated products needed to extract and transport oil. The decline of oil prices has lowered the demand for manufactured goods and was significant enough to stall the growth generated by an otherwise expanding manufacturing output due to the favorable exchange rate and higher demand from the U.S.

6. Regional Industry Committees and conversations with manufacturing managers revealed that the manufacturing industry has become more technologically advanced and modernized during the last few decades. The current manufacturing workplace looks very different from the traditional manufacturing factories. The workflow is often automated. Digitization and robotics are being adopted throughout manufacturing industries. Technical skills are necessary to operate CNC (Computer numerical control) machinery, robotics and integrated production process machinery. The new high-technology work environment is not well known by younger people. This transformation of the manufacturing work environment needs to be communicated to potential future employees as a positive feature of the modern manufacturing industry.

7. All regions need to reach outside their local area through in-migration (i.e., inter-provincial and international migration) to ensure that the manufacturing labour demand is met. If current levels of local labour supply were to remain the same, the manufacturing industry would not be able to fulfill its workforce needs during the next decade.\(^2\) As all regions rely on migration, inter and intra-provincial mobility and especially immigration will become increasingly crucial in meeting manufacturing recruitment challenges. There are various factors that impede the efficient integration of immigrants into the workforce (e.g., language barriers, workplace cultural adaptation, and Canada-specific skills). Manufacturing employers need to anticipate and develop solutions to these issues today if they want to address tomorrow’s recruitment issues.

8. Recruitment challenges faced by the manufacturing industry are varied and specific to individual occupations. A number of specific roles and occupations pose issues in almost all of the regions. These occupations include:

- Machinists and machining and tooling inspectors
- Industrial electricians
- Supervisors of machining, metal forming, shaping and erecting trades and related occupations
- Manufacturing managers
- Millwrights and industrial mechanics
- Mechanical engineering technologists and technicians
- Electrical and electronics engineering technologists and technicians
- Drafting technologists and technicians
- Industrial engineering and manufacturing technologists and technicians
- Welders

Solutions put forward to tackle recruitment challenges for these occupations need to be targeted and tailored to each occupation. Therefore, supply/demand forecasts and derived gap measures need to be calculated at the occupational level.

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\(^2\) The exception is the Regina-Saskatoon region which is experiencing a labour surplus. However this does not mean that all positions in the manufacturing industry will be filled at all times. There will be occasional shortages that may require in-migration.
9. The occupations posing recruitment challenges for the manufacturing industry are predominantly in the skilled trades and technical categories. Although there are other industries with skills shortages across Canada, manufacturers face distinct issues with the skilled trades and technical occupations: a low supply of new entrants. Young people in Canada are reluctant to choose skilled trades as a viable career option. Youth increasingly prefer postsecondary education at the university and college level. They are either not aware of the existence of these jobs or they are simply not encouraged to think of skilled trades as a viable career path. Their perception of the work environment does not reflect the high-technology reality in much of manufacturing. The manufacturing industry should develop ways to change the awareness of these occupations and make them more attractive for younger generations.

10. The Canadian manufacturing industry has been experiencing an output recovery since the economic downturn of 2009. However, this recovery was not matched with a commensurate increase in employment. The widening of the wedge between manufacturing output and employment since 2009 can be seen in the figure below. The driving force behind the widening gap between employment and output is productivity increases fuelled by a large increase in manufacturing investment during the same time period. Labour shortages are inextricably linked to productivity increases and technological shifts affecting the industry. The investment trends in Canadian manufacturing point to a large increase in productivity in the future, which could significantly reduce the labour needs expected from demographic trends.

**FIGURE 4** MANUFACTURING OUTPUT AND EMPLOYMENT TRENDS, 1991 - 2013

11. Survey results indicate that recruitment challenges are experienced in almost all of the regions covered in this report. Employers in some regions such as Windsor, London, Kitchener-Waterloo and Hamilton more frequently reported that they experienced immediate and chronic challenges whereas Calgary, Edmonton, Regina, Sault Ste. Marie and Toronto employers predominantly reported occasional or no challenges. Although employers in all regions are affected by hiring requirements that are difficult to fill, notable differences exist across regions.
12. The survey results show that women are hired into manufacturing positions by about 40% of survey respondents, 6% of whom always hire women and another 34% hire women often for their job openings. On the other side of the spectrum, 2% of respondents never hire women while 14% rarely do. The largest category of respondents, 43% sometimes hire women into manufacturing.
The participation of women in the manufacturing workforce varies considerably based on the industry and the occupation. Women continue to be heavily represented in certain, traditional, occupations. Women comprise 90% of employment of the Industrial sewing machine operators. Women are heavily represented in processing and production occupations, especially in the food and beverage industry where they hold positions like labourers in food and beverage (50%), process control and machine operators in food and beverage (30%), as well as other labourers in processing and manufacturing (46%). Notably, several highly skilled technicians and technologists occupations have relatively high female employment, like chemical with almost half being female (48%), information systems testing (24%), drafting (21%) and industrial engineering and manufacturing (21%) technicians and technologists.
Region-specific findings

Although the themes identified above are common to regions across Canada, some manufacturing regions face unique challenges. Here are some region-specific recruitment challenges that require special attention:

1. **Remoteness:** Regions such as Sault Ste. Marie and Sudbury are fairly remote locations distant from large urban centres that tend to attract more immigrants to experience population growth. This makes it especially difficult for these regions, which have stagnant or declining populations, to meet their manufacturing workforce needs.

2. **Exceptionally older population:** Regions such as Sault Ste. Marie and Sudbury have a comparatively older demographic profile than other regions and experience slower population growth, and attract fewer immigrants. Manufacturers in these regions are confronted with dual demand and supply side challenges simultaneously. The scale of the recruitment challenges in these regions will be greater, due to the large number of retirements, and the recruitment pool to replace them is much shallower.

3. **Proximity to the oil and gas industries:** Regions such as Calgary and Edmonton are directly affected by the boom and bust cycles of the oil and gas industry. The fluctuating nature of this industry makes the labour force needed by the manufacturing industry less accessible for two reasons: higher wages paid in the oil and gas industry and the inaccessibility of skilled labour in periods of output expansion.

4. **More employment options to choose from in big cities:** Regions such as the GTA, Vancouver, and Montreal offer a wide range of employment opportunities for young people entering the workforce. Professional service industries and construction often attract younger skilled workers at a higher rate than manufacturing, contributing to the industry’s recruitment challenges. This is due to higher wages paid by some companies in these sectors and the perceptions that they offer better working environments.

5. **Resource dependence:** Some of these regions such as Calgary, Edmonton, Regina, Sault Ste. Marie and Hamilton have economies that depend on customers in resource extraction and global markets (i.e., oil and gas, mining, and steel). Although a few of these regions are slowly emerging from their resource dependence by developing a wider economic base (especially in the case of Hamilton), their manufacturing industries still predominantly depend on the price of their principal commodity. Manufacturing inputs for resource extraction, such as steel for oil and gas and mining, follow the economic fluctuations in the commodity markets that bring the prices down and drive manufacturing output changes. A troubled steel industry may have negative effects on the manufacturing industries that use steel as raw material such as fabricated metal, machinery, and transportation equipment sectors.

Similarly, manufacturing in the Calgary, Edmonton, and Regina regions supply the oil and gas and mining industries. The decline in oil prices and the subsequent downturn faced by the oil industry have had a negative impact on the manufacturing businesses that provide manufactured goods for the extraction and transportation of natural resources. As the oil industry recovers, the supplier manufacturing businesses will expand their output accordingly.

These regional differences are analyzed in further detail in the following chapter of this report.
Regional Comparisons

Looking at the top 15 manufacturing regions across Canada, the Windsor region has the highest share of GDP attributable to manufacturing at 26%, followed closely by Kitchener-Waterloo-Guelph (24%). Five regions are clustered together with shares in the mid-teens: Sault Ste. Marie (17%), Peel-Halton (16%), London (15%), Hamilton-Niagara (14%) and Montreal (13%). In the other regions, manufacturing makes up a lower proportion of total GDP, with Halifax being the lowest at 4%.

This pattern for shares of GDP is repeated closely with the shares of regional employment that is attributable to manufacturing in each of these regions, with Kitchener-Waterloo-Guelph in the top position at 20% and Windsor at 19%. This region is followed by Peel-Halton (14%), Sault Ste. Marie (12%), London (11%), Montreal (11%), Winnipeg (10%) and Hamilton-Niagara (10%).

The lower share of employment relative to GDP can be explained by the generally high value added nature of manufacturing activity whereby output is higher per manufacturing employee than many other industries. The relative size and importance of manufacturing in these regions presents challenges for manufacturers insofar as the pool of available labour and skills is more the limited the larger the manufacturing share in the regional economy.

FIGURE 8  MANUFACTURING SHARE OF REGIONAL GDP, 2016 ($2007 MILLIONS)
The 15 manufacturing regions play a significant part in the economies of the respective provinces. The Regina-Saskatoon region comprises 68% of total manufacturing GDP and employment in Saskatchewan; Winnipeg comprises 66% of Manitoba’s manufacturing GDP and employment. Manufacturing in Vancouver and Montreal comprise 57% and 50% respectively in their provinces. The Ontario regions in this study together comprise approximately 72% of manufacturing GDP and employment.
Calgary’s manufacturing industry is experiencing significant negative effects from the downturn of the oil industry. While machinery, primary metal manufacturing, and petroleum products industries have had considerably lower sales over the last several years, in 2016 the food manufacturing industry continued to experience higher sales. Overall, manufacturing sectors which are not closely linked to the oil industry are doing better and are expected to grow their output in the medium term. The effects of the favorable US-Canadian dollar exchange rate are expected to contribute more to the growth in manufacturing output during the next year.

The GDP growth of these manufacturing sectors may contribute to a potential hiring requirement of over 8,600 workers by 2025, 22% of the current manufacturing workforce. The hiring requirement may not occur at this level if the demand for manufactured goods does not respond to the favorable exchange rate and the Canadian economy remains flat for the next few years.

**FIGURE 11 2016 - 2025 CALGARY WORKFORCE HIRING REQUIREMENT**

New entrants: individuals entering the workforce for the first time as they reach the working age
Recruitment Gap: the additional supply change from other regions or industries needed to meet labour force requirements
Replacement demand: workers needed to replace the retiring or exiting workforce
Expansion demand: workers needed to cover the increase the new workforce needed

One of the main reasons behind the recruitment challenge is the ever-changing oil market’s impact on the regional economy. Competition from the oil and gas industry for occupations such as sheet metal workers, electrical and electronics engineers, industrial mechanics, and process control and machine operators has generated difficulties.

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3 The Statistics Canada, CANSIM, Table 304-0015
for the manufacturing sector. Although the oil and gas industry is currently going through an economic downturn due to low oil prices, it is expected to recover during the next 5 years, producing hiring challenges for the manufacturing industry as potentially higher wages in oil and gas create competition for scarce skills. Manufacturing output and employment are expected to return to growth in 2017 through to 2020 when employment will begin to decline.

**Edmonton**

The largest manufacturing sector in Edmonton is the fabricated metal industry whose main consumers are the construction industry and the oil and gas industry, both of which are experiencing significant downturns. With the favorable US-Canadian dollar exchange rate, manufacturing in Edmonton experienced growth despite the slowing down of the oil industry. If the manufacturing sector continues its expansion during the next five years and retirements occur as expected, the region may experience recruitment challenges in the manufacturing industry, facing a **hiring requirement of around 8,500 workers by 2025**, about 21% of the current workforce.
The manufacturing industry is expected to expand its output in Edmonton if the exchange rate holds its current levels or falls further and the U.S. demand increases. In the case of no major technological shifts and unexpected productivity increases, hiring of new workers may accelerate to put pressure on labour supply. The years 2017 and 2020 are expected to experience tighter labour markets. After 2020, labour markets will loosen as the demand for new workers in manufacturing will plateau.

The manufacturing industry is expected to expand its output in Edmonton if the exchange rate holds its current levels or falls further and the U.S. demand increases. In the case of no major technological shifts and unexpected productivity increases, hiring of new workers may accelerate to put pressure on labour supply. The years 2017 and 2020 are expected to experience tighter labour markets. After 2020, labour markets will loosen as the demand for new workers in manufacturing will plateau.

### Figure 13
2016 - 2025 EDMONTON WORKFORCE HIRING REQUIREMENT

![Graph showing workforce hiring requirement from 2016 to 2025](image)

Source: Prism Economics and Analysis, 2016

### Figure 14
EDMONTON MANUFACTURING GDP GROWTH RATE AND EMPLOYMENT FORECAST

![Graph showing GDP growth and employment forecast from 2015 to 2025](image)

Source: Prism Economics and Analysis, 2016
With the economic slowdown in oil and gas, Edmonton is receiving less inter-provincial and international migration. This is not expected to generate labour shortages in the short-run, although once the economy recovers and oil and gas investment returns, eventually more people will need to be attracted to the region. The challenge facing the manufacturing industry in Edmonton will be attracting the new skilled workers to manufacturing, and diverting the new workforce from choosing work in the oil and gas industry (when that industry recovers). Wages tend to be higher in oil and gas, making it even more difficult to attract and retain workers to in manufacturing.

**Greater Toronto Area**

The Greater Toronto Area (GTA) region comprises Greater Toronto, York, and Durham. Workforce demographics and a positive growth outlook raise the potential for a hiring requirement of over 63,000 workers by 2025, over 34% of the current workforce. Although a large portion of the hiring requirement can be supplied by new entrants, replacing the ageing workforce will pose challenges in attaining the level of experience and acquired skills.

**Figure 15** 2016 - 2025 GTA Workforce Hiring Requirement

The reasons behind this recruitment gap is threefold:

1. A large demographic challenge: the manufacturing workforce is older than the overall labour force of the region.
2. Competition from other industries: occupations such as welders, mechanical engineers, sheet metal workers and industrial mechanics are also highly demanded in other industries such as construction, utilities, and professional services.
3. Occupational characteristics: the GTA will be particularly challenged to find industrial electricians, machinists and machining and tooling inspectors, tool and die makers, welders, mechanical trades supervisors, millwrights and industrial mechanics, and computer network technicians.
The following charts display the 10-year forecast of the total manufacturing employment and manufacturing GDP growth rate in the region. Employment growth is expected to fall and shrink after 2020 as productivity improvements outpace output growth.

**FIGURE 16 GTA MANUFACTURING GDP GROWTH RATE AND EMPLOYMENT FORECAST**

Halifax

Greater Halifax region manufacturers will experience significant growth in output over the next decade as a result of the very large government expenditures on shipbuilding in the region. Growth in output will be accompanied by significant recruitment challenges due to two factors, the investment in shipbuilding projects that are coming on stream and a simultaneous large number of age-related exits projected from the local labour force. Assuming the industry can continue to attract its historical share of young entrants to the workforce, manufacturing faces a hiring requirement of 5,200 workers between 2016 and 2025, about 60% of the workforce in 2015. This hiring requirement is by far the highest proportion of the workforce in the country. Halifax has a somewhat older manufacturing workforce compared to other regions. Nova Scotia’s population grew only by 1.7% during the last 15 years, one of the lowest in Canada. The region’s workforce requirements will increasingly depend on interprovincial migration and immigration. Furthermore, significant growth in manufacturing output adds a large expansion demand to employment requirements.
Aware of the large demographic challenge, Nova Scotia has been working with the federal government to expedite the immigration process for applicants. The federal government has agreed to give Nova Scotia an increase in the allocation for the Nova Scotia Nominee Program, nearly doubling the allocation from 2014. While this development will not completely eliminate the shortage of skilled labour, it may alleviate the potential recruitment gap expected in the medium run in the manufacturing sector.

The Halifax region is one of the few in the country that will have recruitment challenges in the medium term. At the occupational level, the manufacturing industry in the Halifax region will be particularly challenged to find machinists, welders, manufacturing managers, ironworkers, steamfitters, pipefitters, millwrights, industrial mechanics and industrial electricians during the next decade. In some of these occupations, retirements are expected to affect more than 75% of the current workforce.
The Future of the Manufacturing Labour Force in Canada

Hamilton-Niagara

The manufacturing industry in the Hamilton-Niagara region has been severely impacted by the difficulties faced by the steel industry. The region has become less dependent on the steel industry as it diversified its economy into health care and education. However, the manufacturing industry is still predominantly steel-oriented: manufacturing employment is concentrated in primary and fabricated metal products, transportation equipment, and industrial machinery production, as well as food and beverages. The region faces a potential hiring requirement of over 13,350 workers by 2025, 36% of the current workforce. This requirement will largely consist of the replacement of the older manufacturing workforce of the region and not new hires.
The reasons behind this recruitment gap is threefold:

1. In Hamilton-Niagara, approximately one in five manufacturing workers are over the age of 55, indicating they will likely retire in the next 10 years. The high ratio of retiring workforce to the younger workforce will impose recruitment challenges to obtain the people and the skill levels needed.

2. Competition from other industries such as construction, utilities, and professional services will make it difficult for manufacturing to hire the needed skilled labour. Recruitment challenges will be exacerbated due to faster growth rates experienced, and higher wages, offered by competing industries in some cases (e.g., utilities).

3. Occupational dependence on net migration: Hamilton-Niagara’s recruitment challenges are intensified by a low birth rate. The region will critically depend on net migration to fill many manufacturing positions during the next few years.

4. Occupational characteristics: some occupations are harder to fill across the manufacturing industry and the country due to low supply. The Hamilton-Niagara region will be particularly challenged to find machinists; industrial electricians; tool and die makers; welders; supervisors in machining, electrical trades and telecommunications; millwrights and industrial mechanics; and steamfitters and pipefitters.

The following charts display the 10-year forecast of the total manufacturing employment and manufacturing GDP growth rate in the region.
The Future of the Manufacturing Labour Force in Canada

**Methodology**

Kitchener-Waterloo-Guelph region covering the Kitchener, Cambridge, Waterloo, and Guelph census divisions is a major manufacturing hub with manufacturing comprising 24% of GDP and employing almost 70,000 workers. The top manufacturing employers in the region are the transportation equipment, computer and electronic products, food, fabricated metal products and machinery manufacturing sectors. Even though the region is expected to have a large pool of new entrants to the economy, the manufacturing industry employs a slightly older workforce who may retire at a faster pace, perhaps generating labour challenges in some occupations.

The region may experience modest recruitment challenges in the manufacturing industry, with a hiring requirement of over 21,800 workers by 2025, 30% of the current workforce. Manufacturing hiring managers will be particularly challenged to find manufacturing managers, plastic processing machine operators, millwrights and industrial mechanics, welders and machine operators, machinists, motor vehicle assemblers, as well as production labourers and material handlers.

**Figure 20** Hamilton-Niagara Manufacturing GDP Growth Rate and Employment Forecast

Source: Prism Economics and Analysis, 2016

Kitchener-Waterloo-Guelph

The Kitchener-Waterloo-Guelph region covering the Kitchener, Cambridge, Waterloo, and Guelph census divisions is a major manufacturing hub with manufacturing comprising 24% of GDP and employing almost 70,000 workers. The top manufacturing employers in the region are the transportation equipment, computer and electronic products, food, fabricated metal products and machinery manufacturing sectors. Even though the region is expected to have a large pool of new entrants to the economy, the manufacturing industry employs a slightly older workforce who may retire at a faster pace, perhaps generating labour challenges in some occupations.

The region may experience modest recruitment challenges in the manufacturing industry, with a hiring requirement of over 21,800 workers by 2025, 30% of the current workforce. Manufacturing hiring managers will be particularly challenged to find manufacturing managers, plastic processing machine operators, millwrights and industrial mechanics, welders and machine operators, machinists, motor vehicle assemblers, as well as production labourers and material handlers.
Kitchener-Waterloo-Guelph is expected to experience less labour market tightness due to the large number of new entrants to the economy expected in the next decade which could meet almost 60% of the workforce hiring requirements. The manufacturing employer survey conducted in the region identified three specific recruitment challenges facing the industry:

1. Lack of sector-specific work experience
2. Lack of specific skills and abilities
3. Occupational High salary/wage expectations

The next figures display the employment and GDP growth forecasts for the region.
The London region’s main manufacturing employer is the transportation equipment industry which includes defense vehicles, automobile parts and their supporting industries. With the recovery of the auto industry and the increasing U.S. demand for cars, manufacturing output in the region is expected to grow modestly during the next 5 years. The manufacturing industry may add new jobs during this period but, in the subsequent period, productivity gains could outweigh employment growth. The larger portion of the hiring requirement will be replacement demand as 30% of the manufacturing workforce in the region is expected to retire during the next 10 years.
The London manufacturing industry may experience recruitment challenges that can reach a hiring requirement of over 8,300 workers by 2025. The region is expected to be particularly challenged to find motor vehicle assemblers, manufacturing managers, millwrights and industrial mechanics, and production workers as the manufacturing industry expands during the next few years. In the manufacturing employer survey conducted in the London region, about 89% of responding manufacturing employers reported that they are experiencing recruitment challenges.

![Figure 23: 2016-2025 London Workforce Hiring Requirement](source: Prism Economics and Analysis, 2016)

![Figure 24: London Manufacturing GDP Growth Rate and Employment Forecast](source: Prism Economics and Analysis, 2016)
The Future of the Manufacturing Labour Force in Canada

Methodology

Montreal

Montreal is a major hub for manufacturing in Canada, employing about 220,000 workers and providing 13% of the region’s GDP. The Montreal region’s top manufacturing employers are the transportation equipment, food, chemicals, fabricated metal products, and machinery sectors. The manufacturing labour force in Greater Montreal is moderately older than the rest of the regional labour force. The aging manufacturing workforce is increasingly putting pressure on hiring managers. The industry may experience recruitment challenges if retirements occur as expected and in-migration does not reach sufficient levels. The region may be facing a hiring requirement of over 71,000 workers by 2025, 32% of the current workforce. Manufacturing hiring managers will be particularly challenged to find industrial sewing machine operators, senior managers and manufacturing managers, machinists, process control, machine operators and production workers in food and beverage, and labourers in manufacturing.

The above chart shows the forecast data for manufacturing employment in the London region. London was, and continues to be, a major manufacturing hub in Canada although the manufacturing industry has shed almost 30% of its employment during the last decade. The forecast provides a more optimistic scenario where the region will expand its employment level during the next few years. The reasons behind this positive outlook include:

- Strong North American auto sales and other transportation equipment
- Expansion of value added transportation equipment businesses due to higher demand
- Favorable CAD-USD exchange rate for exports

Montreal

Montreal is a major hub for manufacturing in Canada, employing about 220,000 workers and providing 13% of the region’s GDP. The Montreal region’s top manufacturing employers are the transportation equipment, food, chemicals, fabricated metal products, and machinery sectors. The manufacturing labour force in Greater Montreal is moderately older than the rest of the regional labour force. The aging manufacturing workforce is increasingly putting pressure on hiring managers. The industry may experience recruitment challenges if retirements occur as expected and in-migration does not reach sufficient levels. The region may be facing a hiring requirement of over 71,000 workers by 2025, 32% of the current workforce. Manufacturing hiring managers will be particularly challenged to find industrial sewing machine operators, senior managers and manufacturing managers, machinists, process control, machine operators and production workers in food and beverage, and labourers in manufacturing.
The recruitment gap facing Montreal is partially alleviated by the large number of new entrants to the region and to the manufacturing industry. Nonetheless, a recruitment gap of about 35,000 remains over the next decade that will have to be filled by attracting net in-migration of individuals with manufacturing-related skills from other industries and other regions.

**FIGURE 26 MONTREAL MANUFACTURING GDP GROWTH RATE AND EMPLOYMENT FORECAST**

![Montreal Manufacturing GDP Growth Rate and Employment Forecast](source)

**Peel-Halton**

The Peel-Halton region’s manufacturing employment is concentrated in three sectors: transportation equipment, food, machinery and fabricated metal manufacturing. Manufacturing represents a 16% of GDP in the Peel-Halton region in 2016 and employed 114,000 workers. If the automotive industry continues to enjoy high sales, as it has in 2015 and 2016, the region may experience an expansion in the manufacturing workforce of almost 5,000 new hires during the next 10 years.

The Peel-Halton manufacturing industry may face recruitment challenges if the industry cannot attract more than its historic share of the new labour force entrants and retirements follow their expected pattern. In the absence of technological shifts affecting productivity, the region’s manufacturing may encounter a hiring requirement of about 38,700 workers by 2025, approximately 34% of the current workforce. The Peel-Halton region may be particularly challenged to find motor vehicle assemblers, manufacturing managers, millwrights and industrial mechanics, welders and machine operators, and machinists, as well as production labourers.
The Peel-Halton manufacturing sector has not returned to previous employment levels from all the losses of the great recession of 2008-09. Although the economic recovery since then has not matched previous employment levels due to increases in worker productivity and automation, employment is expected to expand during the next few years to supply workforce needs coming from increased output.

Source: Prism Economics and Analysis, 2016

Source: Prism Economics and Analysis, 2016
Regina-Saskatoon

The Regina-Saskatoon Region’s manufacturing labour force is younger relative to almost all other manufacturing regions across Canada. As a result, retirements are not expected to pose challenges to workforce succession. The manufacturing hiring requirement is expected to remain around 850 workers by 2025, approximately 6% of the current workforce which is a relatively low proportion of the workforce. The region differs significantly from other regions because no recruitment gap is expected during the forecast period in the manufacturing labour market. Exits due to retirements and net out-mobility are expected to reduce the manufacturing labour force by 2,300 over the forecast period. Regina-Saskatoon’s manufacturing industry is based on a more diverse portfolio of resources, including potash and uranium, than Alberta’s. Even with the current low commodity prices, the resource diversity of the region is expected to contribute to growing manufacturing output in the medium run, albeit with a lower employment level.

Although the hiring requirements can be met by new entrants to the labour force, minor shocks to the economy or shifts in the youth industry preference can tip the scale. Manufacturing hiring managers in the region are faced with some harder-to-fill occupations such as manufacturing managers, industrial sewing machine operators, transport truck drivers, and millwrights and industrial mechanics.

The following chart displays the 10-year forecast of the total manufacturing employment in the region.
The Sault Ste. Marie region has one of the oldest manufacturing workforces in Canada, largely due to the long-term and imposing presence of the steel industry. The steel industry has experienced considerable volatility over the last 15 years with layoffs and few new hires to replenish the aging workforce. Declining steel prices and the economic difficulties faced by Essar Steel Algoma has had a large negative impact on the region’s economy. A hiring requirement of almost 1,750 workers making up 35% of the current workforce is expected during the next 10 years if steel prices recover, demand for steel picks up in the medium run, and primary steel producers in the city return to full operation. Attracting new workers to meet this potential hiring requirement could pose challenges for local employers, particularly in light of the volatility and uncertainty in the primary metal industry. A rapidly aging population and low levels of net migration may make it more difficult to find young generations of skilled workers and technologists for the manufacturing industry in Sault Ste. Marie.
The largest employer in the region is the primary metal sub-sector. Some occupations will be harder to fill across the manufacturing industry in the region including manufacturing managers, machinists and machining and tooling inspectors, welders, millwrights and industrial mechanics, and labourers in wood and pulp and paper.\footnote{Significant changes can be expected in Sault Ste. Marie as a result of declines in international steel prices and resulting impacts on the solvency of steel producers in the city. The forecast and projections here assume that primary steel companies in Sault Ste. Marie emerge from current difficulties and return to production. A potential shutdown of these companies would result in an oversupply of all of the related occupations.}

The following charts display the 10-year forecast of the total manufacturing employment and manufacturing GDP growth rate in the region.

\textbf{FIGURE 31} \hspace{1cm} 2016 - 2025 SAULT STE. MARIE WORKFORCE HIRING REQUIREMENT

\begin{figure}
\centering
\includegraphics[width=\textwidth]{fig31.png}
\caption{2016 - 2025 SAULT STE. MARIE WORKFORCE HIRING REQUIREMENT}
\end{figure}

\begin{itemize}
\item Recruitment Gap
\item New Entrants
\item Expansion Demand
\item Replacement Demand
\end{itemize}

Source: Prism Economics and Analysis, 2016

\textbf{FIGURE 32} \hspace{1cm} SAULT STE. MARIE MANUFACTURING GDP GROWTH RATE AND EMPLOYMENT FORECAST

\begin{figure}
\centering
\includegraphics[width=\textwidth]{fig32.png}
\caption{SAULT STE. MARIE MANUFACTURING GDP GROWTH RATE AND EMPLOYMENT FORECAST}
\end{figure}

Source: Prism Economics and Analysis, 2016
The Sudbury region’s main manufacturing industry employers include machinery, fabricated metal products, primary metal and non-metallic mineral products. Manufacturing’s 5% share comprises a relatively low proportion of the GDP of the region; employing about 2,800 people. Due to persistently low commodity prices, these sectors have not enjoyed the output expansion of other manufacturing sectors such as the auto industry. As a result, labour needs will largely depend on the economic performance of these industries during the next few years which in turn depend on prices for industrial commodities.

The manufacturing industry may experience recruitment challenges if these sectors return to growth and the older workforce retires at the expected rate. The industry may face a hiring requirement of over 820 workers by 2025, 28% of the current workforce. Manufacturing hiring managers will be particularly challenged to find construction millwrights, machinists, welders and machine operators, and manufacturing managers.

Because Sudbury does not attract much in-migration or immigration, Sudbury’s manufacturing sector may find it especially difficult to recruit skilled workers. At the moment, only 20% of northern Ontario’s employer survey respondents reported that they were facing immediate and chronic recruitment challenges.

Sudbury manufacturing employers cited the following occupations when asked about the kinds of labour market challenges they have been facing:

- Finding structural metal and platework fabricators
- Welders and related machine operators
- Electricians
- Drafting technologists and technicians.
Growth in manufacturing output and employment are expected to take place until 2019 when growth will moderate and employment will fall slightly to return to about current levels.

**FIGURE 34**  SUDBURY MANUFACTURING GDP GROWTH RATE AND EMPLOYMENT FORECAST

Vancouver area manufacturing is expected to continue its current healthy growth, raising workforce demand requirements may strain the industry’s capacity to grow. The workforce hiring requirement is expected to be almost 22,000 over the next decade. While new entrants to the workforce are expected to meet 63% of the total hiring requirement (replacement demand and expansion demand combined), a recruitment gap of an additional 9,500 workers will be required between 2016 and 2025. Vancouver area manufacturers will need to compete with employers from other sectors to attract their share of interprovincial and international migrants which are expected to arrive in the region over the next decade.
Vancouver is expected to maintain its growth in economic output in 2016 more than other regions covered in this report. This growth will be in good measure the result of the expanding manufacturing sector. In particular, the ship-building sector will expand its output significantly during the next few years due to new contracts acquired from the federal government. Another major manufacturing sector poised for fast growth is food manufacturing, which made up 19% of manufacturing sector employment in 2016, the largest individual manufacturing sub-sector.

These developments point to a healthy and growing manufacturing sector in Vancouver. The following chart displays Prism’s 10-year forecast of the total manufacturing employment in the region, which is projected to increase until 2019 and then decline afterwards as growth in manufacturing output slows.
In Windsor, the transportation equipment sector employs the large majority of the manufacturing workforce. Manufacturing comprises a very high 26% of the GDP of the region in 2016 and employs almost 28,000 people. The latest data from Statistics Canada suggest that the very high unemployment rate that the region suffered from has reversed to the current relatively low rates in 2016. The manufacturing industry’s strong performance aided the creation of new jobs in the region during this period. If the U.S.-Canadian dollar exchange rate continues to remain favorable and the U.S. demand for automobiles remains high, the Windsor manufacturing industry may experience recruitment challenges. The industry may encounter a hiring requirement of over 8650 workers by 2025, 31% of the current workforce, if retirements occur at the expected pace and new entrants follow their historical path. Manufacturing hiring managers may be particularly challenged to find process control and machine operators, motor vehicle assemblers, millwrights and industrial mechanics, transport truck drivers, production labourers, and manufacturing managers.
Similar to the Kitchener-Waterloo-Guelph region, Windsor will likely benefit from a large number of new entrants to the economy. This will help reduce the recruitment gap. Nonetheless, the region may face challenges to find the needed workforce depending on migration and demand levels from competing industries.

Survey results show that 59% of Windsor region manufacturing employers are experiencing immediate and chronic challenges in filling needed positions, a share much higher than any other region covered in this report. Top occupations that they identified as posing significant recruitment challenges are:

1. Machinists and machining and tooling inspectors.
2. Tool and die makers
3. Supervisors of machining and metal forming
4. Electrical and electronics engineering technicians and technologists.

Source: Prism Economics and Analysis, 2016
The Winnipeg Region’s manufacturing sector is one of the oldest manufacturing concentrations in Canada, predominantly composed of food and non-alcoholic beverages, primary metallic products, and transportation equipment industries. Due to the older workforce in these industries, the replacement demand in Winnipeg will be relatively higher, creating recruitment challenges in the manufacturing industry. The region may potentially face a hiring requirement of over 10,500 workers by 2025, approximately 30% of the current workforce. Sustained output growth in manufacturing is expected to be accompanied by much slower employment growth.
In addition to an older workforce and despite positive natural population growth, in-migration of an additional 6,700 workers from other industries, other provinces and international migration may be required to meet regional workforce requirements. Winnipeg’s recruitment challenges are exacerbated by the lack of sustained net migration. The region will be particularly challenged to find motor vehicle assemblers, manufacturing managers, welders and machine operators, labourers in food and beverages, process control and machine operators, machinists, and furniture assemblers.

**FIGURE 40** WINNIPEG MANUFACTURING GDP GROWTH RATE AND EMPLOYMENT FORECAST

Source: Prism Economics and Analysis, 2016
The employer survey results from each region were partially reported in the above regional profiles. This section summarizes the main findings of the survey at the national level. A total of 352 responses were collected from manufacturing employers. The results are consistent with the LMI model forecasts and they were validated by the Regional Industry Committees.

Perceived Growth Over the Last Three Years

Survey respondents were asked about their company’s growth performance during the last year. 50% of companies said they have grown. This percentage was much larger in Peel-Halton (71%), Windsor (65%), London (65%), Halifax (60%), Vancouver (56%) and Waterloo-Guelph (54%) regions.

**FIGURE 41** THINKING ABOUT YOUR BUSINESS OVER THE LAST THREE YEARS, WOULD YOU SAY THAT BUSINESS HAS GROWN, DECLINED OR STAYED THE SAME?

![Survey Results Chart]

Effects of Workforce Requirements on Company Growth

Respondents were asked to rate the importance of “workforce requirements” (i.e., recruiting and retaining workers) in their company’s future growth. More than half (51%) of employers identified workforce requirements as having significant or very significant impact, the highest levels of impact, on their company’s future growth. Meeting their workforce requirements is an important factor for manufacturing employers to achieving their company’s growth goals. In several regions, like Kitchener-Waterloo, Toronto, and Windsor, workforce requirements loom more significant. On the opposite end of the spectrum, employers in Calgary, Edmonton and Montreal see workforce requirements as having some or little or no impact on future growth.

Figure 42

PLEASE RATE WORKFORCE REQUIREMENTS ON A SCALE FROM 1 TO 5 IN TERMS OF THEIR IMPACT ON YOUR COMPANY’S FUTURE GROWTH

Source: Prism Economics and Analysis, Manufacturing Employers’ Survey, 2015

Recruitment Challenges

When asking manufacturing employers whether they faced challenges meeting their workforce requirements, 41% of reported that they were facing immediate or chronic recruitment challenges at the time of the survey. An additional 46% said they faced occasional challenges. Only 14% of employers reported that they faced no recruitment challenges.
When wages are cross-tabulated with recruitment challenges, the results show that companies paying above average wages tend to report fewer recruitment challenges than companies paying below average wages. Four skilled trades occupations were identified in the survey as representative occupations, at least one of which is likely to be found in most manufacturing facilities: millwrights, machinists, electricians, and tool and die makers. All four skilled trades occupations display the same pattern of a larger percentage of responses citing immediate and persistent, and chronic recruitment challenges when wages are below the national average.

Employers reported that they did not experience immediate and persistent challenges in recruiting for millwrights—the highest level of recruitment challenges. However, 30% of responding employers paying above average wages did report chronic recruitment challenges compared to 50% who pay below average wages. For machinists, the differences are less pronounced but still favor the higher wage category. Overall, these results imply that paying higher wages can alleviate recruitment challenges to a great extent. However, even with higher wages, employers express at least some occasional challenges in finding the skilled workers that they need.

Interestingly, the pattern just described does not seem to apply for tool and die makers and industrial electricians. More respondents who pay above average wage who hire tool and die makers face immediate and chronic recruitment challenges (65%) than those who pay below average wages (48%). For industrial electricians, whether the employer pays above or below average wages does not appear to make a difference to the degree that employers have recruitment challenges.
Recruitment Challenges By Occupation

Survey respondents were also asked about the recruitment challenges they face with the occupations they hire in the manufacturing industry. These occupations were selected based on the existing manufacturing workforce and they include skilled trades and technical professions. Figure 40 shows the recruitment challenges for skilled trades; and Figure 41 shows the recruitment challenges for technicians and technologists.
FIGURE 45 RECRUITMENT CHALLENGES BY OCCUPATION: SKILLED TRADES

<table>
<thead>
<tr>
<th>Occupation</th>
<th># of Respondents who employ</th>
<th># with recruiting and retaining challenge</th>
<th>% with a challenge</th>
</tr>
</thead>
<tbody>
<tr>
<td>Machinists and machining and tooling inspectors</td>
<td>136</td>
<td>61</td>
<td>45%</td>
</tr>
<tr>
<td>Industrial electricians</td>
<td>93</td>
<td>49</td>
<td>53%</td>
</tr>
<tr>
<td>Supervisors of machining, metal forming, shaping and erecting trades and related occupations</td>
<td>144</td>
<td>47</td>
<td>33%</td>
</tr>
<tr>
<td>Construction millwrights and industrial mechanics</td>
<td>88</td>
<td>44</td>
<td>50%</td>
</tr>
<tr>
<td>Welders and related machine operators</td>
<td>130</td>
<td>36</td>
<td>28%</td>
</tr>
<tr>
<td>Tool and die makers</td>
<td>51</td>
<td>26</td>
<td>51%</td>
</tr>
<tr>
<td>Structural metal and platework fabricators and fitters</td>
<td>49</td>
<td>21</td>
<td>43%</td>
</tr>
<tr>
<td>Supervisors of mechanic trades</td>
<td>63</td>
<td>17</td>
<td>27%</td>
</tr>
<tr>
<td>Electricians (except industrial and power system)</td>
<td>39</td>
<td>13</td>
<td>33%</td>
</tr>
<tr>
<td>Supervisors of other construction trades, installers, repairers and servicers</td>
<td>22</td>
<td>12</td>
<td>55%</td>
</tr>
<tr>
<td>Supervisors of electrical trades and telecommunication occupations</td>
<td>71</td>
<td>11</td>
<td>15%</td>
</tr>
<tr>
<td>Steamfitters, pipefitters and sprinkler system installers</td>
<td>18</td>
<td>9</td>
<td>50%</td>
</tr>
<tr>
<td>Crane operators</td>
<td>30</td>
<td>9</td>
<td>30%</td>
</tr>
<tr>
<td>Sheet metal workers</td>
<td>33</td>
<td>8</td>
<td>24%</td>
</tr>
<tr>
<td>Supervisors of carpentry trades</td>
<td>14</td>
<td>6</td>
<td>43%</td>
</tr>
<tr>
<td>Carpenters</td>
<td>13</td>
<td>5</td>
<td>38%</td>
</tr>
<tr>
<td>Plumbers</td>
<td>13</td>
<td>4</td>
<td>31%</td>
</tr>
<tr>
<td>Supervisors of pipefitting trades</td>
<td>18</td>
<td>4</td>
<td>22%</td>
</tr>
</tbody>
</table>

Note: Multiples responses from some employers
The above tables show that employers find some positions more challenging to fill than others. At the top of the skilled trades list, machinists posed recruitment challenges for 45% of respondents employing them. Over 50% of employers employing supervisors, tool and die makers, and pipe trades reported challenges in recruiting and retaining these occupations. Among technical occupations, positions for mechanical engineering technologists and technicians were the hardest positions to fill with 30% of these employers expressing difficulties. About 40% of employers hiring electrical and electronics technicians reported challenges.

Further research is needed to understand why these positions are especially hard to fill (e.g., low supply, lack of regional training facilities, demographic challenges) and what about these positions make them harder to fill (e.g., special skills requirements, experience needs that are not fulfilled by existing pool of candidates). These questions were briefly explored with a survey asking about employer satisfaction with new hire candidates.
**Employer Satisfaction With Youth Candidates**

Employers were asked how satisfied they were with the skilled trades and technician pool of candidates. This question had six dimensions:

- Overall satisfaction
- Willingness to learn/progress
- Work ethic/attitude
- Industry specific knowledge
- Level of skill
- Level of training

The responses show that the majority of employers are satisfied overall with the youth that they hire; specifically employers are satisfied with youth candidates’ willingness to learn and progress, and their work ethic and attitudes. A noteworthy portion of respondents (37%) reported that they are not satisfied with the industry-specific knowledge of youth candidates, 23% were not satisfied with their level of skills, and 19% are not satisfied with their level of training.

**FIGURE 47  EMPLOYER SATISFACTION WITH YOUTH CANDIDATES**

Employers were also probed to comment on the kinds of specific skills or qualifications representing recruitment challenges. Some responses are provided in the accompanying box.

*Employers’ comments on skills, qualifications and recruitment challenges:*

- “Working with finding replacements for an aging workforce... collaboration between different generations (i.e. Gen Y vs Baby Boomers)”
- “Lots of people are looking for work but once oil and gas recovers, many will return to the patch; we cannot compete with the high wages paid.”
- “Finding certified and qualified red seal journeymen HD/CT Mechanics. There are not enough of them in our geographical location to meet the demand of the marketplace.”
- “We also struggle to find experienced drafting and engineering personnel and have resorted for Foreign Worker recruitment to keep up with demand.”
- “Finding enough skilled trades people to be able to take advantage of growth opportunities. Finding people is our #1 challenge.”
- “Growth is still possible through innovation, strategic partnerships and exporting our goods and know-how, these are the areas where HR needs will be required.”
Wages

Employers were also asked about the wages they pay to specific occupations that are commonly hired in manufacturing. The table below reports the average wages for these occupations and the number of respondents who expressed a wage level (column N). Interestingly, average wages these occupations have a narrow range, with the four skilled trades having wages from $26 to almost $30 per hour, and the four technician and technologist occupations having salaries ranging from about $60 thousand to just above $64 thousand per year.

**FIGURE 49  SURVEY RESULTS ON WAGES**

<table>
<thead>
<tr>
<th>Occupation</th>
<th>Wages</th>
<th>$/hour</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Millwrights and industrial mechanics</td>
<td>$29.42</td>
<td>$/hour</td>
<td>145</td>
</tr>
<tr>
<td>Machinists and machining and tooling inspectors</td>
<td>$26.63</td>
<td>$/hour</td>
<td>132</td>
</tr>
<tr>
<td>Electricians</td>
<td>$29.91</td>
<td>$/hour</td>
<td>107</td>
</tr>
<tr>
<td>Tool and die makers</td>
<td>$26.14</td>
<td>$/hour</td>
<td>59</td>
</tr>
<tr>
<td>Industrial engineering and manufacturing technologists and technicians</td>
<td>$63,948</td>
<td>Annual Salary ($)</td>
<td>121</td>
</tr>
<tr>
<td>Electrical and electronics engineering technologists and technicians</td>
<td>$63,048</td>
<td>Annual Salary ($)</td>
<td>78</td>
</tr>
<tr>
<td>Chemical technologists and technicians</td>
<td>$60,639</td>
<td>Annual Salary ($)</td>
<td>30</td>
</tr>
<tr>
<td>Mechanical engineering technologists and technicians</td>
<td>$64,249</td>
<td>Annual Salary ($)</td>
<td>108</td>
</tr>
</tbody>
</table>


Final Comments

Survey respondents were given the opportunity to report on their greatest human resources challenge in the next five years. Here are some of the most cited topics and challenges:

Aging workforce and succession planning
- Aging workforce and transferring knowledge accumulated through years of experience
- Maintaining the necessary skills in the unionized workforce
- Succession planning and retention
- Balancing retirement and new staff who need to be trained without doubling up on staff
- Succession planning and supervisor training to suit the next generation
- Good leadership, organizational effectiveness, recruitment and development
- Attracting and retaining applicable skills & experience at competitive wages
Final Comments continued

Aging workforce and succession planning—continued

- Trying to find individuals that take pride in manufacturing
- Finding skilled workers while trying to maintain low wages
- Bringing on the new generation and meshing them with the older generation
- Getting workforce to adapt to changing environment
- Demographic changes will produce significant skills shortages in lower skilled job classifications
- Lowering turnover rates - finding and keeping "good fit" employees
- Hiring apprentices, training them, retaining them
- Competition with other companies to obtain the right candidate with the right qualifications & skills
- Recruiting leaders to fill the management roles (production manager, production supervisor level) who have great leadership and business acumen and who can effectively manage operations.

Wages

- Finding young people willing to begin at the bottom and do an apprenticeship
- Finding enough skilled trades people to take advantage of growth opportunities
- Finding qualified journeypersons at competitive wages
- Lack of entry level workers with the level of skills required
- Recruiting into a perceived higher cost of living area
- Finding people with the technical engineering skills and experience required
- Quick hiring and orientation to meet market recovery
- Finding production people for plants in remote locations
- Finding skilled labour and experienced drafting and engineering personnel; need to resort to Foreign Worker recruitment

Retention

- Hiring and retaining skilled workers
- Challenges due to growth to hire and retain educated and experienced professionals
- Calling back people who have been laid off when the business returns to growth
- Retaining new staff once they are trained and certified while maintaining competitive wages with current staff

Managing Growth

- Do not expect employment increases but growth is possible through innovation, strategic partnerships and greater exports
Issues and Considerations from the Regional Industry Committees

Manufacturing employers are the primary stakeholders for the Manufacturing Regional Labour market project and their involvement was crucial for developing robust labour market forecasts and actionable labour market intelligence. Regional Industry Committees were developed in all 15 regions for the purpose of engaging manufacturing sector stakeholders in the labour market research process. The regional industry committees are comprised of manufacturing employers, postsecondary education institutions, labour unions, government agencies, economic developers, and other non-government organizations (NGOs). Over 180 companies, intuitions, and organizations participated and compose the fifteen regional industry committees. The core activities of the RICs are to provide qualitative labour market information, validate the projections of the labour forecast model, come up with possible solutions to labour market challenges in each region, and to assist in the knowledge dissemination process. In addition, if there is sufficient interest among stakeholders to cooperate in developing and implementing a plan to address any skills shortages identified by the labour forecast models, the RICs could provide a platform for such efforts.

The Regional Industry Committees in the 15 regions confirmed the labour market outlook presented for their specific region. Participants at these meetings raised a number of issues and considerations about the manufacturing regional labour market that they experience. Three issues in particular were raised at these meetings that effect manufacturing employers.

The main issue that employers raised related to recruitment and retention of technical skills. Specifically, employers reported that they faced challenges in finding some of the highly technical skills that they require. Many of the recommendations from the RICs relate to increasing the supply of certain skilled tradespersons and technicians. The problem is more acute when employers are looking for specific skill sets related to their manufacturing process. This matter was raised in the context of how technological changes makes it necessary for educational institutions to develop new programs to address this type of shortage. The RIC members agreed that additional programs in specialized manufacturing occupations are needed.

Another issue raised by the RICs concerned recruiting recent immigrants into manufacturing and the difficulty around integration of these individuals into the manufacturing work environment. The recruitment challenge appears to be that unskilled immigrants are able to find employment more easily in other industries, such as hospitality. Newcomers exhibit a preference for other sectors because entry-level manufacturing wages are not substantially higher than elsewhere and shift work is often required. Recent immigrants that do work in manufacturing are often hard to integrate into the manufacturing workplace due to language problems. For example, supervisors often struggle to communicate workplace requirements effectively to workers who do not speak English or French. This issue can be further compounded when attempting to integrate groups of immigrants from different countries who speak different foreign languages.

The third issue was the difficulty in recruiting young people into manufacturing from high schools, colleges and universities. The lack of familiarity with manufacturing among young people, and higher wages and salaries in competing industries were cited as the reasons for this. The RICs, informed by the labour forecast model, recognized that the demographics of their workforce make youth integration a central issue. The replacement demand for their existing workforce will be the primary driver of the regional recruitment gap. Encouraging more youth to pursue careers in manufacturing will be vital to maintain a healthy manufacturing labour market.
Regional Industry Committee Recommendations

The manufacturing labour market is facing several issues as outlined by the regional labour forecast model and the feedback from the regional industry committees. The RICs have a thorough understanding of these challenges and issues; however, concrete plans to solve them need to be developed. These recommendations were brought up by many of the RICs. The list is representative of the feedback from all 15 regions.

1. **Align training with skills requirements** through building broad partnerships between the manufacturing sector and postsecondary education.
   
   a. Employers need to provide feedback on the quality and content of training programs so that education can improve the employability of their graduates.
   b. Employers should provide work-integrated-learning opportunities to post-secondary students so that students can gain industry experience and have a better sense of the career opportunities offered in the manufacturing sector.
   c. Where regional gaps in educational capacity exist, employers should work with local colleges and universities to help build this capacity.
   d. When possible, employers with similar needs can establish training consortia that reduce the cost of training and give them a stronger voice when working with the government or post-secondary institutions.

2. **Integrate newcomers more effectively into the workforce** through collaboration between service providing organizations, government agencies, and the manufacturing sector.
   
   a. Employers can convey the expected level of language requirements for entry level careers in manufacturing to language training organizations.
   b. Employers can help language training providers develop curriculum that integrates key words and phrases from the manufacturing sector so that training programs teach newcomers how to communicate effectively in a manufacturing environment.
   c. Settlement and orientation service providers can explain the potential career growth in manufacturing to newcomers so that they understand there is more opportunity for higher wages in manufacturing than in competing sectors such as hospitality.
   d. Employers can provide training to their English/French speaking staff so that they know how to communicate effectively with individuals who have limited abilities in the languages of Canada.

3. **Encourage more youth to pursue technical training for careers in manufacturing** to create the skilled workforce of the future.
   
   a. Employers can showcase the opportunities that exist by hosting facility tours to high school classes.
   b. Employers can speak to youth during career days and career fairs.
   c. Ensure that youth have opportunities to explore technical skills by providing shop and tech courses at the high school level.
   d. Manufacturers should provide work-integrated-learning placements to senior high school students and student enrolled in technical training at colleges and universities.
   e. Manufacturing employers can increase their own internal capacity for training to meet their need for highly specialized skills that cannot be practically taught in publicly funded institutions. Governments can provide grants and subsidies to offset the costs of this training.
4. **Use labour market information more effectively** to inform decision making of all stakeholders.
   
a. Youth, parents, guardians, and educators can use manufacturing specific LMI to learn where the job opportunities are and where they are going to be. This information can be used to inform investments in education and training.

   b. Employers can use LMI to determine the types of skills that are available and the shortages that exist in the labour market. They can use this information to guide their human resources planning, capital investments, and alter management practices to more fully utilize the skillset of the existing labour market.

   c. Postsecondary institutions can use LMI to guide their course offerings and make adjustments to their programs so that graduates’ skillsets are in-line with the needs of industry.

   d. Governments can use LMI to develop policies and programs that ensure individuals pursue education and training that enables them to develop the skillset needed by the current and future labour market.

5. **Governments should invest in the development, validation, and dissemination of LMI** so that stakeholders have the information they need to make prudent decisions.

   a. Maintain, continuously improve, and promote the use of existing sources of labour market information.

   b. Forecast the impact of disruptive technologies, such as automation, artificial intelligence, Internet of Things, on the demand for skilled labour.

   c. Include gender based analysis into regional forecasts.

   d. Measure the extent to which by including self-employment, skills outsourcing, and contracted services are impacting the manufacturing labour market.

   e. Build other economic indicators (especially exchange rates) into forecasting model and consider “upside” and “downside” analysis.

   f. Aggregate regional results into provincial analysis or subsector analysis to engage additional stakeholders.

   g. Promote the use of regional LMI by additional stakeholders including secondary school, college and universities, local NGOs, and local governments.

   h. RICs can facilitate dialogue between diverse stakeholders, and industry members are especially interested in working more closely with postsecondary education.
Conclusions, Potential Action to Address Shortages and Future Research

The CME/CSTEC Manufacturing LMI Project was initiated to fill labour market information gaps on several fronts:

- Regional level LMI
- Sectoral LMI
- Employer-focused LMI
- Occupational LMI
- Multi-method LMI (i.e., survey, consultation, and econometric modeling)
- LMI that takes into account both labour demand and labour supply to estimate forecasts, hiring requirements, and recruitment gaps

To date and to our knowledge, no other LMI project has combined the above aspects of robust research programs to generate LMI that is reliable, up-to-date, and employer-oriented. This methodology and diversification of data sources allowed cross-validation of the results and ensured their robustness.

The final research results reveal some overarching patterns across regions regarding the labour markets facing the Canadian manufacturing industry. The main findings can be summarized as follows:

- **The manufacturing workforce is older than the overall labour force of Canada.** As these workers retire in the next 10 years, the manufacturing industry is projected to have difficulty filling skilled trades and technical positions.
- **Several key occupations in manufacturing are highly in demand** in other industries such as construction, utilities, and professional services. It will be especially difficult to attract those workers due to faster growth rates experienced by competing industries and higher wages offered in some cases (e.g., utilities and mining).
- **Some occupations are harder to fill** across the manufacturing industry due to lower supply, fewer training options, regional characteristics, and required skill levels. This is dependent on the manufacturing sub-sector’s requirements and existing workers’ ability to learn new skills at the workplace. The lack of certain occupational skills will pose challenges for manufacturing employers in finding the right workforce.

Potential solutions to these recruitment challenges include increasing training and apprenticeship in the workplace, advocating for increases in government support for training, promoting manufacturing as a career option, and establishing training consortia. Since so many of the recommendations from the RICs involve manufacturers, post-secondary institutions and other stakeholders cooperating regionally to address these challenges, the CME and CSTEC should consider using the RICs created by this project as a platform for encouraging such collaboration.
Future research should focus on exploring these results both in terms of breadth and depth. The following research topics should be considered as next steps furthering the CME/CSTEC Manufacturing LMI Project:

- **Gender** – are there differences in the proportion of women in skilled trades and technical occupations and can attracting more women to these occupations help alleviate the recruitment gaps?

- **Changing nature of the manufacturing workplace** – How is outsourcing impacting manufacturers as they devolve certain processes and use more self-employed workers?

- **Changing nature of the manufacturing technology** – How is technological change affecting the size of the workforce, the occupational requirements, and the demand for problem solving skills? What is the impact of technological change on productivity in the workplace?

- **Role of immigration in solving shortages** – Are manufacturers able to use immigration to alleviate skills shortages? What are the best practices for hiring and employing immigrants, such as the best practices for adjusting to customs and accommodation?

- **Role of youth in manufacturing** – How can manufacturers better hire, employ and train youth more effectively into skilled and technical occupations?
The Regional Manufacturing Employers Survey

The CME/CSTEC Manufacturing LMI Project includes a manufacturing employers’ survey that was completed by a total of 352 employers across 15 regions. The distribution of respondents by region is summarized in the table below.

### FIGURE 50 SURVEY RESPONDENTS BY REGION

<table>
<thead>
<tr>
<th>Region</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Calgary</td>
<td>7</td>
<td>2%</td>
</tr>
<tr>
<td>Edmonton</td>
<td>12</td>
<td>3%</td>
</tr>
<tr>
<td>Regina</td>
<td>13</td>
<td>4%</td>
</tr>
<tr>
<td>Vancouver</td>
<td>27</td>
<td>8%</td>
</tr>
<tr>
<td>Windsor</td>
<td>20</td>
<td>6%</td>
</tr>
<tr>
<td>London</td>
<td>26</td>
<td>7%</td>
</tr>
<tr>
<td>Montreal</td>
<td>3</td>
<td>1%</td>
</tr>
<tr>
<td>Halifax</td>
<td>42</td>
<td>12%</td>
</tr>
<tr>
<td>Peel-Halton</td>
<td>32</td>
<td>9%</td>
</tr>
<tr>
<td>Toronto</td>
<td>14</td>
<td>4%</td>
</tr>
<tr>
<td>Sudbury</td>
<td>11</td>
<td>3%</td>
</tr>
<tr>
<td>Sault Ste. Marie</td>
<td>9</td>
<td>3%</td>
</tr>
<tr>
<td>Kitchener-Waterloo</td>
<td>100</td>
<td>29%</td>
</tr>
<tr>
<td>Winnipeg</td>
<td>15</td>
<td>4%</td>
</tr>
<tr>
<td>Hamilton</td>
<td>18</td>
<td>5%</td>
</tr>
<tr>
<td>Total</td>
<td>349</td>
<td>100%</td>
</tr>
</tbody>
</table>

Note: Three respondents were from outside of these regions.


In addition to the regional variation, the survey aimed to cover a wide range of company sizes, from companies with no additional employees than the owner to companies which employ more than 500 workers. The majority of respondents were mid-sized companies employing 20 to 200 employees. A significant portion of respondents (13%) were large companies employing more than 500 workers.
Over 42% of respondents were either CEOs or senior executives. Over 40% of respondents were human resources professionals. The positions held by the respondents demonstrate a high level of engagement by manufacturing companies.


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**FIGURE 51** SURVEY RESPONDENTS BY COMPANY SIZE

<table>
<thead>
<tr>
<th>Company Size</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 to 4</td>
<td>9</td>
<td>3%</td>
</tr>
<tr>
<td>5 to 9</td>
<td>13</td>
<td>4%</td>
</tr>
<tr>
<td>10 to 19</td>
<td>31</td>
<td>9%</td>
</tr>
<tr>
<td>20 to 49</td>
<td>59</td>
<td>17%</td>
</tr>
<tr>
<td>50 to 99</td>
<td>87</td>
<td>25%</td>
</tr>
<tr>
<td>100 to 199</td>
<td>56</td>
<td>16%</td>
</tr>
<tr>
<td>200 to 499</td>
<td>49</td>
<td>14%</td>
</tr>
<tr>
<td>500+</td>
<td>47</td>
<td>13%</td>
</tr>
<tr>
<td>NV</td>
<td>1</td>
<td>0%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>352</strong></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>


---

**FIGURE 52** SURVEY RESPONDENTS BY POSITION HELD

<table>
<thead>
<tr>
<th>Position</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>CEO</td>
<td>60</td>
<td>17%</td>
</tr>
<tr>
<td>Senior Executive</td>
<td>89</td>
<td>25%</td>
</tr>
<tr>
<td>Human Resources Manager</td>
<td>142</td>
<td>40%</td>
</tr>
<tr>
<td>Administrator</td>
<td>55</td>
<td>16%</td>
</tr>
<tr>
<td>NV</td>
<td>6</td>
<td>2%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>352</strong></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>


---

5 Ibid.
The survey also covered a variety of manufacturing industries ranging from food to transportation equipment manufacturing. The range of covered industries ensured that the survey captured a representation from the manufacturing sector as a whole. The total number of companies displayed in Figure 47 surpasses the total number of companies surveyed because several respondents were active in multiple manufacturing industries. Most companies operated in the fabricated metal manufacturing sector with 134 responses. It is important to note that a significant number of respondents (102) checked the “other” box because their manufacturing sector did not fit into any of the below categories.

**FIGURE 53  SURVEY RESPONDENTS BY MANUFACTURING SECTOR**

<table>
<thead>
<tr>
<th>Manufacturing Sector</th>
<th># of Companies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Food manufacturing</td>
<td>28</td>
</tr>
<tr>
<td>Beverage manufacturing</td>
<td>6</td>
</tr>
<tr>
<td>Textile product mills</td>
<td>2</td>
</tr>
<tr>
<td>Clothing manufacturing</td>
<td>6</td>
</tr>
<tr>
<td>Leather and allied product manufacturing</td>
<td>2</td>
</tr>
<tr>
<td>Wood product manufacturing</td>
<td>15</td>
</tr>
<tr>
<td>Paper manufacturing</td>
<td>3</td>
</tr>
<tr>
<td>Printing and related support activities</td>
<td>14</td>
</tr>
<tr>
<td>Petroleum and coal product manufacturing</td>
<td>8</td>
</tr>
<tr>
<td>Chemical manufacturing</td>
<td>9</td>
</tr>
<tr>
<td>Plastics and rubber product manufacturing</td>
<td>35</td>
</tr>
<tr>
<td>Non-metallic mineral product manufacturing</td>
<td>4</td>
</tr>
<tr>
<td>Primary metal manufacturing</td>
<td>35</td>
</tr>
<tr>
<td>Fabricated metal product manufacturing</td>
<td>93</td>
</tr>
<tr>
<td>Machinery manufacturing</td>
<td>48</td>
</tr>
<tr>
<td>Computer and electronic product manufacturing</td>
<td>15</td>
</tr>
<tr>
<td>Electrical equipment, appliance and component manufacturing</td>
<td>27</td>
</tr>
<tr>
<td>Transportation equipment manufacturing</td>
<td>15</td>
</tr>
<tr>
<td>Furniture and related product manufacturing</td>
<td>5</td>
</tr>
<tr>
<td>Miscellaneous manufacturing</td>
<td>36</td>
</tr>
<tr>
<td>Other (e.g., contract manufacturing)</td>
<td>72</td>
</tr>
</tbody>
</table>

Manufacturing Labour Demand and Supply Forecasts

The CME/CSTEC labour market information system, developed by Prism Economics, uses a demand and a supply model that provide labour market forecasts for the manufacturing sector for each of the fifteen regions. The model takes into account variables that capture the economic, social, demographic, and sectoral circumstances of each region. The demand model predominantly relies on the macroeconomic variables that determine the demand for the mix of manufactured goods in each region, which in turn determine the need for additional labour. The supply model predominantly relies on demographics and participation rates to estimate the supply of labour in a particular region.

The supply and demand models are focused on providing an understanding of the skills needs of companies in the manufacturing sector and how those needs are evolving, with particular emphasis on skilled trades and technicians/technologists. The supply and demand model tracks forty-five individual occupations: fourteen skilled trades occupations; ten engineering, technician and technologist occupations; and five key skilled occupations. Although production occupations (like assemblers, machine operators and labourers) are important for manufacturing operations, these occupations typically require lesser skill levels and lesser training. The supply and demand model does track these latter occupations for the purpose of putting together the entire labour force requirements of manufacturing. The emphasis and attention of the modeling and the analysis is upon the technical skills of the industry, which are harder to obtain and sometimes not available in the regional labour market.

The labour demand model first estimates the expansion demand - the requirements related to changes in manufacturing output. The second component of the labour demand model is the replacement demand, which is the workforce requirements attributed to age related workforce retirements and exits. This is by far the larger category of labour needs. The manufacturing workforce in most regions is older than the overall Canadian workforce. Retirements over the next ten years will continue to accelerate increasing recruitment challenges for individuals with specific skills and qualifications.

The labour supply side of the model tracks three supply components: new entrants, unemployment and net in-mobility. New entrants refer to individuals entering the workforce for the first time. The number of new entrants available to the manufacturing industry is a function of regional demographics and the industry’s historical share of new entrants compared to other industries. Unemployment is the number of available workers actively seeking employment. Net in-mobility measures the additional supply change from other regions or industries needed to meet labour force requirements. Workers drawn from other markets might include immigrants or inter-provincial migrants. In other words, net in-mobility is the residual category that captures the remaining demand for workers after retirements and new entrants are taken into account. Together unemployment and net in-mobility serve as measures of labour market tightness. When labour demand exceeds labour supply, unemployment falls and additional demands are met through net in-mobility. A strong in-mobility requirement signals employers will need to recruit from other markets to meet requirements.

The demand and supply components come together to generate the labour outlooks for each region. The differential between the demand and the supply of labour determines the number of workers needed by the manufacturing industry during the next 10 years. These forecasts are developed separately for each region and each occupation. The final stage of the analysis provides measures of labour market conditions in the form of market ranks for individual occupations in each region.
FIGURE 54  THE SKILLED OCCUPATIONS TRACKED BY THE SUPPLY AND DEMAND MODELS

<table>
<thead>
<tr>
<th>SKILLED TRADES</th>
<th>ENGINEERS AND TECHNOLOGISTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Supervisors, machining, metal forming</td>
<td>1 Mechanical engineers</td>
</tr>
<tr>
<td>2 Supervisors, mechanic trades</td>
<td>2 Electrical and electronics engineers</td>
</tr>
<tr>
<td>3 Supervisors, other construction trades</td>
<td>3 Industrial and manufacturing engineers</td>
</tr>
<tr>
<td>4 Machinists and machining and tooling inspectors</td>
<td>4 Chemical technologists and technicians</td>
</tr>
<tr>
<td>5 Tool and die makers</td>
<td>5 Mechanical engineering technologists and technicians</td>
</tr>
<tr>
<td>6 Sheet metal workers</td>
<td>6 Industrial engineering and manufacturing technologists and technicians</td>
</tr>
<tr>
<td>7 Structural metal and platework fabricators and fitters</td>
<td>7 Electrical and electronics engineering technologists and technicians</td>
</tr>
<tr>
<td>8 Welders and related machine operators</td>
<td>8 Industrial instrument technicians and mechanics</td>
</tr>
<tr>
<td>9 Industrial electricians</td>
<td>9 Drafting technologists and technicians</td>
</tr>
<tr>
<td>10 Plumbers Steamfitters, pipefitters</td>
<td>10 Computer network technicians</td>
</tr>
<tr>
<td>11 Carpenters</td>
<td></td>
</tr>
<tr>
<td>12 Construction millwrights and industrial mechanics</td>
<td>1 Manufacturing managers</td>
</tr>
<tr>
<td>13 Material handlers</td>
<td>2 Motor vehicle assemblers, inspectors and testers</td>
</tr>
<tr>
<td>14 Transport truck drivers</td>
<td>3 Plastics processing machine operators</td>
</tr>
<tr>
<td></td>
<td>4 Process control and machine operators</td>
</tr>
<tr>
<td></td>
<td>5 Labourers in manufacturing and processing</td>
</tr>
</tbody>
</table>


FIGURE 55  DEMAND AND SUPPLY FORECASTS

Source: Prism Economics and Analysis, 2016
Regional Industry Committees

This CME/CSTEC Manufacturing LMI Project recognizes the importance of reaching out to, and establishing a relationship with, manufacturing employers. Employer input is a key factor in developing labour market forecasts at the regional and occupational level. Manufacturing employers experience the labour market each time they seek to hire professional, technical and production workers. Employers are well positioned to provide real-time labour market information that is relevant to their regions and specific to the high-demand occupations in those regions.

Regional Industry Committees (RICs) composed of industry employers and associations, employees and unions, educational institutions, governments, and community clusters were established in each region to review and validate the results of the labour market forecasts, and to provide feedback. This feedback was used to re-calibrate projections to fit real-time information. This methodology allowed the CME/CSTEC Manufacturing LMI Project to be one of the most current and robust LMI research projects in the country.

The flowchart below displays the process through which data from the models and the employer survey are validated with the RICs. First, the survey results and the labour market forecasts are compared and contrasted to reveal any discrepancies regarding labour market indicators. Occupational and regional forecasts are cross-checked against survey results, to identify regional discrepancies. If there are no large inconsistencies, both the survey and modeling results are presented to the RICs to receive first-hand feedback and validation. If the RICs agree with the results, the validation process is complete and regional reports are generated.

If the survey results display findings dissimilar to the model predictions, the models are adjusted to include real-time (survey) and regional data until they become consistent with the employers’ input. Once consistency is achieved, the results are presented to the RICs for a final round of validation. RICs provide input that allows us to calibrate the results and regional reports are prepared as a result of this data triangulation and validation process.
FIGURE 56  FLOWCHART REPRESENTING THE DATA VALIDATION PROCESS

Source: Prism Economics and Analysis, 2016
This report was prepared for the project “Regional Labour Market Information to Address Skills and Human Resources Issues in the Manufacturing Sector”. This project is sponsored by the Canadian Manufacturers & Exporters and the Canadian Skills Training and Employment Coalition.

This project is funded by the Government of Canada’s Sectoral Initiatives Program. The opinions and interpretations in this publication are those of the author and do not necessarily reflect those of the Government of Canada.

The Future of the Manufacturing Labour Force in Canada

CME/CSTEC NATIONAL MANUFACTURING LABOUR MARKET INFORMATION REPORT

Prepared by Prism Economics & Analysis for:
Canadian Manufacturers & Exporters (CM) &
Canadian Skills Training & Employment Coalition (CSTEC)