The Future of the Manufacturing Labour Force in Canada

CME/CSTEC NATIONAL MANUFACTURING LABOUR MARKET INFORMATION REPORT
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Prepared by Prism Economics & Analysis for:
Canadian Manufacturers & Exporters (CM) &
Canadian Skills Training & Employment Coalition (CSTEC)
Background to the Labour Market Information Research Project

The National Manufacturing Labour Market National 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 28 years ago as a joint venture between the Canadian Steel Industry and the Steelworkers Union. CSTEC brought together employers, labour, government and educational institutions to address a range of skills and human resources issues important to the steel industry. 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 broad 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. There are five key issues that need to be addressed in order to create improved LMI. The first issue is regionality. 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 projected with sensitivity to 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.

The fundamental goal of the CME/CSTEC LMI project 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 are calibrated to take account of locally generated data. These forecasts will provide the analytical insight needed to support strategic human resources planning.
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This report provides an analysis of the labour needs of the manufacturing industry in Canada for the next 5 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 first and most comprehensive labour market study at this level of detail (i.e., regional, sectoral, and occupational).

The 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 necessarily impact the hiring strategies of manufacturing hiring managers during the next decade. In addition, the report notes differences in terms of demographics across regions that generate distinctive challenges for each manufacturing hub.

Most regions in Canada are expected to experience a recruitment gap in acquiring the skills they need -- unless there is disruptive technological change, or a material shift in global trade patterns that impacts total manufacturing output. The first and ubiquitous finding of the research program concerns the demographic composition of the manufacturing labour force in every region covered in this report: the manufacturing labour force is older than the Canadian labour force overall. Skilled trades and technical occupations highly demanded in the manufacturing industry are filled by individuals who have been in their profession for a longer period of time than the average worker. These workers bring their experience and their skills into the workplace, making them invaluable assets to their companies. However, a noteworthy portion of these workers are expected to retire during the next 10 years, taking their skills and experience with them. How to replace an aging manufacturing workforce with younger generations will be a key challenge facing the manufacturing industry.

Retirements are projected to make up the majority of the manufacturing demand for skilled labour during the next decade. Although the manufacturing industry is experiencing output growth and is expected to continue its growth in the near future, productivity increases stemming from automation and technological improvements will put a cap on the expansion labour demand. Replacement demand will be the key driver of the hiring requirement in the manufacturing industry.

Another recruitment challenge valid for all regions is the competition from other industries in hiring individuals with specific skills. Industries like construction, utilities, and resources extraction are competing with manufacturing for skilled labour and technical know-how. Some of these industries have higher compensation levels than the manufacturing industry, even when the latter pays above average wages. Manufacturing managers will need to find other incentives to bring skilled workers into their industry in general, and their specific company in particular.

Competition from other industries is particularly acute for skilled and technical occupations. The projected recruitment gaps for each region suggest that skilled trades occupations, and technicians and technologists make up the majority of labour needs of manufacturing companies. Although low skilled positions may
occasionally be needed by certain companies at certain points in time, these positions have historically been easier to fill. Skilled trades and technical occupations are harder to find due to required skill levels and training and are in high demand from multiple industries.

In addition to these commonalities, there are significant regional differences in demographic factors and manufacturing outlook. For instance, the demographic composition of the Sault Ste. Marie region is vastly different from the Regina-Saskatoon region. The former can be characterized by an older workforce with a relatively lower level of new entrants (i.e., younger generations entering the workforce) and in-migration (i.e., inter-provincial migration and international migration) whereas Regina-Saskatoon is projected to enjoy a high level of new entrants and in-migration during the next few years.

The Alberta regions of Calgary and Edmonton have special labour market conditions of their own, experiencing high levels of competition and wage pressure from the oil industry. This creates notable recruitment challenges to the manufacturing industry in times of resource booms and output expansion, and offsetting challenges in times of resource contraction. The manufacturing industries in Hamilton and Sault Ste. Marie and the surrounding regional economies are highly dependent on the steel industry’s economic outlook. The current commodity price collapse has had a big impact on the manufacturing sectors of these regions which predominantly use steel as their raw material. These factors significantly affect the recruitment challenges facing the manufacturing industry in each region, described in greater detail in the regional profiles section.

These highlights from the research program indicate that there is a need for an industry-wide response to the recruitment challenges facing the manufacturing industry during the next decade. Steps that can be taken to ensure the industry has the skill requirements it needs include the following strategies:

- Industry, government and academia can establish an interactive process to review and discuss these projections and plan steps to mitigate the effects of demographic change.
- Additional research can be done to evaluate the impact on these projections and the effects of potential disruptive technological change, or a material shift in global trade patterns.
- Training consortia across manufacturing businesses may be established on a regional basis to overcome the lack of post-secondary training on industry-specific topics and pool trainees and resources.
- Special training programs can be developed to fill the most severe shortages. Funding for these programs can be requested from governmental bodies interested in engaging employers in training to avoid labour shortages.
- An image campaign for the manufacturing industry can be launched to communicate the new, high-tech aspects of the industry to younger generations who may have an outdated perspective.
- Manufacturing businesses may also train their current employees in order to improve productivity. Employees can especially benefit from using machinery more effectively which could significantly increase output per worker.
- Ongoing LMI research with Regional Industry Committee involvement may increase awareness of the LMI needs of the industry in real time and help plan for projected labour shortages.
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 use Statistics Canada datasets as bases 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 resource needs. Effective and actionable human resource 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).
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 conducted an LMI research program between August 2014 and October 2015. During this period, an employer survey was conducted, regional industry committees were convened and consulted, labour demand and supply models were developed and forecasts were estimated. Regional reports were generated, shared and validated with manufacturing employers through the Regional Industry Committees. The CME/CSTEC National Manufacturing LMI Report summarizes the results of these research components and gives an overview of the findings at the national 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 2014, over 20% of manufacturing workers were over 54 years old.

FIGURE 1  AGING MANUFACTURING WORKFORCE

![Graph showing the aging trend of the 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 and 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. The employer survey results show that the majority of employers from almost all regions predict growth over the next three years. Respondents were very optimistic about the future of their business. The only exception was Calgary with 45% of employers expressing that they expected growth. The Peel-Halton region was another outlier due to its large number of employers who expected a decline in their output during the next three years. In total, 61% of manufacturing employers said their company would grow.
5. Survey results also show that the decline in oil prices has impacted the manufacturing industry in most regions. Many manufacturing businesses depend on the oil industry as their major client. They supply the necessary machinery to the oil industry to extract and transport oil. The decline of oil prices 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 Industrial 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 predominantly automated and technical skills are almost always necessary to operate CNC (Computer numerical control) machinery. These changes and the new high-tech work environment are not well understood by younger generations. This new, clean, and technological 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. 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.

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1 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.
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
- Welders and related machine operators
- Construction millwrights and industrial mechanics
- Industrial electricians
- Tool and die makers
- Mechanical engineering technologists and technicians
- Industrial engineering and manufacturing technologists and technicians
- Electrical and electronics engineering technologists and technicians

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.

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. Younger generations 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 in modern times. The manufacturing industry should develop ways to change the perceptual barriers around 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 an 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 all of the regions covered in this report. However, employers in some regions such as Windsor and Sudbury more frequently reported that they experienced immediate and persistent challenges whereas Montreal, London, and Halifax 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.
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 and 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 Halifax 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 of the companies in these sectors and the perception that some of these industries may offer better working environments.

5. **Resource dependence:** Some of these regions such as Sault Ste. Marie and Hamilton have had economies that largely depended on resource extraction and global markets as their customers (i.e., steel in the case of these) for a long time. Although these regions are slowly emerging from their resource dependence by developing a wider economic base (especially the case in Hamilton), their manufacturing industries still predominantly depend on the price for their principal commodity. Further, this commodity (steel) is also an input material for related industries in the region. As a result, the economic fluctuations in the commodity markets that bring the prices down affect these regions’ manufacturing sectors accordingly. 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 to a certain extent, Vancouver regions supply the oil and gas industry. 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 regional analyses that follow.
The CME/CSTEC Manufacturing LMI Project followed a triangular methodology which allowed for 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 484 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 methodologies used in this report consists of regional industrial committees (RICs) which had the purpose of validating the findings of the survey and testing the predictions of 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 Findings By Region

Greater Toronto Area

The Greater Toronto Area (GTA) region encapsulates Greater Toronto, York, and Durham. Workforce demographics and a positive growth outlook raise the potential for a hiring requirement of over 30,590 workers by 2020, over 16% of the current workforce. Although a large portion of the requirement can be supplied by new entrants, the replacement of the ageing workforce will pose challenges in the replacement of experience and acquired skills.

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 sheet metal workers, electrical and electronics engineers, 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 electrical and electronics engineers, metal trades supervisors, industrial electricians, carpenters, and industrial sewing machine operators.

FIGURE 6 2016 - 2020 GTA 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

Source: Prism Economics and Analysis, 2015
The following charts display the 5-year forecast of the total manufacturing employment and manufacturing GDP growth rate in the region.

**Hamilton-Niagara**

The manufacturing industry in the Hamilton-Niagara region is impacted by the difficulties faced by the steel industry. The region has become less dependent on the steel industry as it diversified its economy. However, the manufacturing industry is still predominantly steel-oriented: manufacturing employment is concentrated in primary metallic products, transportation equipment, and industrial machinery production. The region faces a potential hiring requirement of over 6,630 workers by 2020, 17% of the current workforce. This requirement will largely depend on the replacement of the older manufacturing workforce of the region and not new hires.

**FIGURE 7** GTA MANUFACTURING GDP GROWTH RATE AND EMPLOYMENT FORECAST

**FIGURE 8** 2014 - 2020 HAMILTON-NIAGARA WORKFORCE HIRING REQUIREMENT

Source: Prism Economics and Analysis, 2015
The reasons behind recruitment challenges are fourfold:

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

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 by competing industries and higher wages offered in some cases (e.g., utilities and mining).

3. 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 construction millwrights, computer networking technicians, pipefitters, drafting technologists, and industrial electricians.

The following charts display the 5-year forecast of the total manufacturing employment and manufacturing GDP growth rate in the region.

**FIGURE 9  HAMILTON-NIAGARA MANUFACTURING GDP GROWTH RATE AND EMPLOYMENT FORECAST**

![Graph showing GDP and employment forecast for Hamilton-Niagara](image)

Source: Prism Economics and Analysis, 2015

**Sault Ste. Marie**

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. 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 950 workers making up 18% of the current workforce is expected during the next 5 years in the manufacturing industry if steel prices recover and demand for steel picks up in the medium run. Attracting new workers to meet this potential hiring requirement could pose challenges for local employers. 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-sectors. Some occupations will be harder to fill across the manufacturing industry in the region including mechanical engineering technologists and technicians, industrial engineering and manufacturing technologists and technicians, computer network technicians, steamfitters, and carpenters.²

The following charts display the 5-year forecast of the total manufacturing employment and manufacturing GDP growth rate in the region.

² Significant changes can be expected in Sault Ste. Marie as a result of recent volatility in international steel prices which will be reflected in subsequent forecasts and reports.
Regina-Saskatoon

The Regina-Saskatoon Region’s manufacturing labour force is younger relative to other regions. As a result, retirements are not expected to pose challenges to workforce succession. The manufacturing hiring requirement is expected to remain around 1,789 workers by 2020, approximately 11% of the current workforce. The region differs significantly from other regions because no recruitment gap is expected during the forecast period in the manufacturing labour market. Regina-Saskatoon’s manufacturing industry is based on a more diverse portfolio of resources than Alberta’s because it resources such as potash and uranium. Even with the current low commodity prices, the resource diversity of the region is expected to contribute to a growing manufacturing sector in the medium run.

Although their 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 tool and die makers, mechanical trades supervisors, transport truck drivers, construction millwrights and industrial mechanics.

The following chart displays the 8-year forecast of the total manufacturing employment in the region.
Winnipeg

The Winnipeg Region’s manufacturing sector is one of the oldest manufacturing bases 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 5,100 workers by 2020, approximately 15% of the current workforce. This is largely due to the aging manufacturing workforce. The following chart demonstrates the large difference in age between the manufacturing workforce and the total working age population.

FIGURE 14 2014 - 2020 WINNIPEG WORKFORCE HIRING REQUIREMENT

Source: Prism Economics and Analysis, 2015
In addition to an older workforce and despite positive natural population growth, in-migration from other provinces or 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 mechanical engineering technologists and technicians, industrial engineering and manufacturing technologists and technicians, tool and die makers, sheet metal workers, and carpenters.

**FIGURE 15** WINNIPEG MANUFACTURING GDP GROWTH RATE AND EMPLOYMENT FORECAST

Source: Prism Economics and Analysis, 2015

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Calgary

The sectors within Calgary’s manufacturing industry are experiencing varying levels of output growth due to the downturn of the oil industry. While machinery and primary metal manufacturing industries experienced lower sales compared to the previous year, in 2015 the food manufacturing industry experienced 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 run. 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 8,460 workers by 2020 according to our model. 21% 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.

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3 Monthly Survey of Manufacturing, September 2015, Statistics Canada
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 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.

**FIGURE 16 2014 - 2020 CALGARY WORKFORCE HIRING REQUIREMENT**

Source: Prism Economics and Analysis, 2015

**FIGURE 17 CALGARY MANUFACTURING GDP GROWTH RATE AND EMPLOYMENT FORECAST**

Source: Prism Economics and Analysis, 2015
Edmonton

The largest manufacturing sector in Edmonton is the fabricated metal industry whose main consumer is the construction industry. 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 8,330 workers by 2020, about 20% of the current workforce.

**FIGURE 18** 2014 - 2020 EDMONTON WORKFORCE HIRING REQUIREMENT

The manufacturing industry is expected to expand its output in Edmonton if the exchange rate holds its current state 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 2018 and 2019 are expected to experience tighter labour markets. After 2019, labour markets will loosen as the demand for new workers in manufacturing will plateau.

**FIGURE 19** EDMONTON MANUFACTURING GDP GROWTH RATE AND EMPLOYMENT FORECAST

Source: Prism Economics and Analysis, 2015
With the economic slowdown, Edmonton also started to receive less inter-provincial and international migration. Although this could generate labour shortages in the short-run, the recovering economy will eventually attract more people into 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 the oil and gas industry for work (when that industry recovers). Wages tend to be higher in that industry, making it even more difficult to incentivize workers to choose manufacturing.

**Vancouver**

Vancouver area manufacturing is expected to strengthen, raising workforce demand requirements. While new entrants to the workforce are expected to meet almost 42% of the total hiring requirement (replacement demand and expansion demand combined), a recruitment gap of an additional 10,127 workers will be required between 2015 and 2020. 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.

**FIGURE 20  2014 - 2023 VANCOUVER WORKFORCE HIRING REQUIREMENT**

Vancouver is expected to expand its economic output in 2015 more than other regions covered in this report. This growth will largely be the result of the expanding manufacturing sector. Particularly, 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 2014.

These developments point to a healthy and growing manufacturing sector in Vancouver. The following chart displays Prism’s 5-year forecast of the total manufacturing employment in the region, which is projected to increase until 2019 and then revert to a slightly declining path afterwards.
Halifax

Greater Halifax region manufacturers may experience growing recruitment challenges due to the 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 recruitment gap of over 984 workers between 2015 and 2020. Halifax as a distinctly older manufacturing workforce compared to other regions. Nova Scotia’s population grew only by 3% during the last 25 years and natural population growth is in decline. The region’s workforce requirements will increasingly depend on interprovincial migration and immigration.
Aware of the large demographic challenge, Halifax has been working with the federal government to expedite the immigration process of applicants. The federal government has agreed to give Nova Scotia additional quotas for fast tracking existing immigration applications. While these developments will not completely eliminate the shortage of skilled labour, they may alleviate the potential recruitment gap expected in the medium run in the manufacturing industry.

At the occupational level, the manufacturing industry in the Halifax region will be particularly challenged to find construction millwrights, transport industrial electricians, machinists and machining and tooling inspectors, steamfitters, pipelayers and sprinkler system installers during the next decade.

**FIGURE 23  HALIFAX MANUFACTURING GDP GROWTH RATE AND EMPLOYMENT FORECAST**

Source: Prism Economics and Analysis, 2015

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**London**

The London region’s main manufacturing employer is the transportation equipment industry which includes automobile makers and their supporting industries. With the recovery of the auto industry and the increasing U.S. demand for cars, the region is expected to grow its manufacturing output during the next 5 years. The manufacturing industry may add new jobs during this period if productivity gains do not outweigh the need for more manpower. The larger portion of the hiring requirement will be replacement demand as a large share of the manufacturing workforce in the region may retire during the next 5 years.
The London manufacturing industry may experience recruitment challenges that can reach a hiring requirement of over 4,180 workers by 2020, approximately 15% of the current workforce if retirements happen at the expected rate. The region is expected to be particularly challenged to find mechanical engineers, motor vehicle assemblers, machinists and machining and tooling inspectors, and tool and die makers as the manufacturing industry expands during the next few years.

In the manufacturing employer survey conducted in the region, almost all of the employer respondents reported at least some level of recruitment challenges for at least one occupation they were trying to fill.

The above chart displays the historical and 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 numbers display 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 auto parts businesses due to higher demand
- Favorable CAD-USD exchange rate for exports

**Peel-Halton**

The Peel-Halton region’s manufacturing employment is concentrated in three sectors: transportation equipment, food, and fabricated metal manufacturing. If the auto industry continues to enjoy high sales as it has in 2015, the region may experience an expansion in the manufacturing workforce that can reach over 3,000 new hires during the next 5 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 a technological shock affecting productivity, the region’s manufacturing may encounter a hiring requirement of about 19,300 workers by 2020, approximately 16% of the current workforce. The Peel-Halton region may be particularly challenged to find construction millwrights, motor vehicle assemblers, machinists and machining and tooling inspectors, and welders.

**FIGURE 26** 2014 - 2020 PEEL-HALTON WORKFORCE HIRING REQUIREMENT

Source: Prism Economics and Analysis, 2015
The Peel-Halton manufacturing sector nearly recovered from all the losses of the great recession of 2008. Although this economic recovery was not matched by employment levels due to increases in worker productivity and automation, employment is expected to expand during the next few years to supply the output growth’s workforce needs.

**FIGURE 27 PEEL-HALTON MANUFACTURING GDP GROWTH RATE AND EMPLOYMENT FORECAST**

**Waterloo-Guelph**

The Waterloo-Guelph region covers the Kitchener, Cambridge, Waterloo, and Guelph census divisions. The top manufacturing employers in the region are the transportation equipment, food, and computer and electronic products manufacturing industries. Even though the region is expected to have a large pool of new entrants to the economy, the manufacturing industry employs a relatively older workforce who may retire at a faster pace, generating labour shortages.

In the absence of sufficient in-migration (including both inter-provincial migration and international migration), the region may experience modest recruitment challenges in the manufacturing industry, facing a hiring requirement of over 9,880 workers by 2020, 14% of the current workforce. Manufacturing hiring managers will be particularly challenged to find construction millwrights, sheet metal workers, machinists and machining and tooling inspectors, and welders and related machine operators.
Waterloo-Guelph is projected to experience less labour market tightness due to the large number of new entrants to the economy in the next decade. The manufacturing employer survey conducted in the region identified three specific recruitment challenges facing the industry:

- High turnover due to non-competitive wage structure
- Retiring experienced workforce (tenured employees, leaders, managers, supervisors)
- Difficulty in training younger workers

The next figures display the employment and GDP growth forecasts for the region.
Windsor

In Windsor, the transportation equipment sector employs the large majority of the manufacturing workforce. Latest data from Statistics Canada suggest that the region suffered from a high unemployment rate in 2015. However, the manufacturing industry’s strong performance helped the creation of new jobs in the region. 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 4,470 workers by 2020, 15% 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 construction millwrights, industrial electricians, machinists and machining and tooling inspectors, and motor vehicle assemblers.

FIGURE 30 2014 - 2020 WINDSOR WORKFORCE HIRING REQUIREMENT

Similar to the 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 60% of Windsor region manufacturing employers are experiencing immediate and persistent challenges in filling needed positions, a share much higher than any other region covered in this report.
Sudbury

The Sudbury region’s main manufacturing industry employers include machinery, fabricated metal products, and primary metal. Due to low commodity prices, these sectors have not enjoyed the output expansion of other sectors such as the auto industry. Therefore, labour needs will largely depend on these sectors’ economic performance during the next few years. The manufacturing industry may experience recruitment challenges if these sectors join the auto industry in its expansion and the older workforce retires at the expected rate. The industry may face a hiring requirement of over 428 workers by 2020, 14% of the current workforce. Manufacturing hiring managers will be particularly challenged to find construction millwrights, transport truck drivers, machinists and machining and tooling inspectors, and welders and related machine operators.

FIGURE 31  WINDSOR MANUFACTURING GDP GROWTH RATE AND EMPLOYMENT FORECAST

FIGURE 32  2014-2023 SUDBURY WORKFORCE HIRING REQUIREMENT
Sudbury is a relatively smaller region compared to others and manufacturing employment is only 4% of total employment in the region. As a region which does not attract much migration, Sudbury’s manufacturing sector may find it especially difficult to recruit skilled workers. In Sudbury, 40% employer survey respondents expressed they were facing immediate and persistent recruitment challenges. Sudbury manufacturing employers cited the following issues when asked about the kinds of labour market challenges they have been facing:

- Finding electronic system technologists and engineers
- Finding welders/fabricators
- Finding employees with good basic math and communications skills who are willing to work with the public, produce hard goods (and meet the physical demands that requires) and use computer and print technology
- Attracting skilled labour
- Finding qualified, skilled labour
- Finding individuals with specialized skills and keeping them from leaving for bigger businesses

**FIGURE 33  SUDBURY MANUFACTURING GDP GROWTH RATE AND EMPLOYMENT FORECAST**

Montreal

The Montreal region’s top manufacturing employers are the transportation equipment, food, and chemical products sectors. The manufacturing labour force in Greater Montreal is relatively old compared to 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 31,540 workers by 2020, 14% of the current workforce. Manufacturing hiring managers will be particularly challenged to find sheet metal workers, transport truck drivers, machinists and machining and tooling inspectors, and industrial sewing machine operators.
The recruitment gap facing Montreal is alleviated by the large number of new entrants to the region and to the manufacturing industry. If the region is able to attract net migration composed of individuals with manufacturing-related skills, the recruitment gap may diminish significantly.

**FIGURE 34  2014 - 2023 MONTREAL WORKFORCE HIRING REQUIREMENT**

![Diagram showing 2014-2023 Montreal workforce hiring requirements](image)

**FIGURE 35  MONTREAL MANUFACTURING GDP GROWTH RATE AND EMPLOYMENT FORECAST**

![Diagram showing Montreal manufacturing GDP growth rate and employment forecast](image)
Survey Results

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 483 responses were collected from manufacturing employers. The results are consistent with the LMI model and the RICs conducted for this project.

Perceived Growth Over the Last Three Years

Survey respondents were asked about their company’s growth performance during the last three years. 50% of companies said they have grown. This percentage was much larger in Windsor (82%), Regina-Saskatoon (63%) and Waterloo-Guelph (63%) regions.

FIGURE 36  THINKING ABOUT YOUR BUSINESS OVER THE LAST THREE YEARS, WOULD YOU SAY THAT BUSINESS HAS GROWN, DECLINED OR STAYED THE SAME?

Source: Prism Economics and Analysis, Manufacturing Employers’ Survey, 2015
NV: no value
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. 42% of employers chose “4” or “5”, the highest levels of impact, for the role of workforce requirements. Manufacturing employers believe that meeting their workforce requirements is an important factor in achieving their company’s growth goals.

FIGURE 37

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

45% of manufacturing employers expressed that they were facing persistent or chronic recruitment challenges at the time of the survey. An additional 38% said they faced occasional challenges. Only 17% 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 express lower levels of 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.

For millwrights, immediate and persistent challenges (the highest level of recruitment challenges) nearly doubles when wages are below average. 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.
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 40  RECRUITMENT CHALLENGES BY OCCUPATION: SKILLED TRADES

<table>
<thead>
<tr>
<th>Occupation</th>
<th>Number of respondents facing recruitment challenges</th>
<th>Percent of Responses facing recruitment challenges</th>
</tr>
</thead>
<tbody>
<tr>
<td>Machinists and machining and tooling inspectors</td>
<td>85</td>
<td>13.2%</td>
</tr>
<tr>
<td>Welders and related machine operators</td>
<td>58</td>
<td>9.0%</td>
</tr>
<tr>
<td>Supervisors, machining, metal forming, shaping trades</td>
<td>53</td>
<td>8.2%</td>
</tr>
<tr>
<td>Construction millwrights and industrial mechanics</td>
<td>52</td>
<td>8.1%</td>
</tr>
<tr>
<td>Industrial electricians</td>
<td>51</td>
<td>7.9%</td>
</tr>
<tr>
<td>Tool and die makers</td>
<td>37</td>
<td>5.8%</td>
</tr>
<tr>
<td>Supervisors, electrical trades</td>
<td>33</td>
<td>5.1%</td>
</tr>
<tr>
<td>Structural metal and platework fabricators and fitters</td>
<td>30</td>
<td>4.7%</td>
</tr>
<tr>
<td>Supervisors, other construction trades, installers, repairers and servicers</td>
<td>22</td>
<td>3.4%</td>
</tr>
<tr>
<td>Electricians (except industrial and power system)</td>
<td>19</td>
<td>3.0%</td>
</tr>
<tr>
<td>Supervisors, mechanic trades</td>
<td>18</td>
<td>2.8%</td>
</tr>
<tr>
<td>Heavy-duty equipment mechanics</td>
<td>18</td>
<td>2.8%</td>
</tr>
<tr>
<td>Cabinetmakers</td>
<td>15</td>
<td>2.3%</td>
</tr>
<tr>
<td>Carpenters</td>
<td>14</td>
<td>2.2%</td>
</tr>
<tr>
<td>Supervisors, carpentry trades</td>
<td>12</td>
<td>1.9%</td>
</tr>
<tr>
<td>Sheet metal workers</td>
<td>12</td>
<td>1.9%</td>
</tr>
<tr>
<td>Steamfitters, pipefitters and sprinkler system installers</td>
<td>11</td>
<td>1.7%</td>
</tr>
<tr>
<td>Crane operators</td>
<td>11</td>
<td>1.7%</td>
</tr>
<tr>
<td>Supervisors, printing and related occupations</td>
<td>10</td>
<td>1.6%</td>
</tr>
<tr>
<td>Contractors and supervisors, pipefitting trades</td>
<td>9</td>
<td>1.4%</td>
</tr>
<tr>
<td>Power system electricians</td>
<td>7</td>
<td>1.1%</td>
</tr>
<tr>
<td>Gas fitters</td>
<td>7</td>
<td>1.1%</td>
</tr>
<tr>
<td>Heavy equipment operators (except crane)</td>
<td>7</td>
<td>1.1%</td>
</tr>
<tr>
<td>Boilermakers</td>
<td>6</td>
<td>0.9%</td>
</tr>
<tr>
<td>Ironworkers</td>
<td>6</td>
<td>0.9%</td>
</tr>
<tr>
<td>Telecommunications line and cable workers</td>
<td>6</td>
<td>0.9%</td>
</tr>
<tr>
<td>Supervisors, heavy equipment operator crews</td>
<td>6</td>
<td>0.9%</td>
</tr>
<tr>
<td>Electrical power line and cable workers</td>
<td>5</td>
<td>0.8%</td>
</tr>
<tr>
<td>Telecommunications installation and repair workers</td>
<td>5</td>
<td>0.8%</td>
</tr>
<tr>
<td>Plumbers</td>
<td>5</td>
<td>0.8%</td>
</tr>
<tr>
<td>Supervisors, railway transport operations</td>
<td>5</td>
<td>0.8%</td>
</tr>
<tr>
<td>Cable television service and maintenance technicians</td>
<td>4</td>
<td>0.6%</td>
</tr>
<tr>
<td>Supervisors, motor transport and other ground transit operators</td>
<td>4</td>
<td>0.6%</td>
</tr>
<tr>
<td>Total Responses*</td>
<td>643</td>
<td>100%</td>
</tr>
</tbody>
</table>

*Note: Multiple responses permitted

Source: Prism Economics and Analysis, Manufacturing Employers’ Survey, 2015
### FIGURE 41  RECRUITMENT CHALLENGES BY OCCUPATION: TECHNICAL OCCUPATIONS

<table>
<thead>
<tr>
<th>Occupation</th>
<th>Number of respondents facing recruitment challenges</th>
<th>Percent of Responses facing recruitment challenges</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mechanical engineering technologists and technicians</td>
<td>52</td>
<td>13.9%</td>
</tr>
<tr>
<td>Industrial engineering and manufacturing technologists and technicians</td>
<td>37</td>
<td>9.9%</td>
</tr>
<tr>
<td>Electrical and electronics engineering technologists and technicians</td>
<td>34</td>
<td>9.1%</td>
</tr>
<tr>
<td>Drafting technologists and technicians</td>
<td>24</td>
<td>6.4%</td>
</tr>
<tr>
<td>Non-destructive testers and inspection technicians</td>
<td>20</td>
<td>5.4%</td>
</tr>
<tr>
<td>Industrial instrument technicians and mechanics</td>
<td>17</td>
<td>4.6%</td>
</tr>
<tr>
<td>Computer network technicians</td>
<td>17</td>
<td>4.6%</td>
</tr>
<tr>
<td>Electronic service technicians (household and business equipment)</td>
<td>14</td>
<td>3.8%</td>
</tr>
<tr>
<td>Chemical technologists and technicians</td>
<td>13</td>
<td>3.5%</td>
</tr>
<tr>
<td>Construction estimators</td>
<td>13</td>
<td>3.5%</td>
</tr>
<tr>
<td>Industrial designers</td>
<td>13</td>
<td>3.5%</td>
</tr>
<tr>
<td>Civil engineering technologists and technicians</td>
<td>11</td>
<td>2.9%</td>
</tr>
<tr>
<td>User support technicians</td>
<td>10</td>
<td>2.7%</td>
</tr>
<tr>
<td>Aircraft instrument, electrical and avionics mechanics, technicians and inspectors</td>
<td>9</td>
<td>2.4%</td>
</tr>
<tr>
<td>Architectural technologists and technicians</td>
<td>9</td>
<td>2.4%</td>
</tr>
<tr>
<td>Engineering inspectors and regulatory officers</td>
<td>9</td>
<td>2.4%</td>
</tr>
<tr>
<td>Information systems testing technicians</td>
<td>9</td>
<td>2.4%</td>
</tr>
<tr>
<td>Technical occupations in geomatics and meteorology</td>
<td>7</td>
<td>1.9%</td>
</tr>
<tr>
<td>Inspectors in public and environmental health and occupational health and safety</td>
<td>7</td>
<td>1.9%</td>
</tr>
<tr>
<td>Geological and mineral technologists and technicians</td>
<td>6</td>
<td>1.6%</td>
</tr>
<tr>
<td>Biological technologists and technicians</td>
<td>6</td>
<td>1.6%</td>
</tr>
<tr>
<td>Agricultural and fish products inspectors</td>
<td>6</td>
<td>1.6%</td>
</tr>
<tr>
<td>Forestry technologists and technicians</td>
<td>6</td>
<td>1.6%</td>
</tr>
<tr>
<td>Conservation and fishery officers</td>
<td>6</td>
<td>1.6%</td>
</tr>
<tr>
<td>Landscape and horticulture technicians and specialists</td>
<td>6</td>
<td>1.6%</td>
</tr>
<tr>
<td>Land survey technologists and technicians</td>
<td>6</td>
<td>1.6%</td>
</tr>
<tr>
<td>Construction inspectors</td>
<td>6</td>
<td>1.6%</td>
</tr>
<tr>
<td><strong>Total Responses</strong></td>
<td><strong>373</strong></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>

*Note: Multiple responses permitted*

The above tables establish that employers find some positions more challenging to fill than others. At the top of the skilled trades list, machinists and machining and tooling inspectors posed recruitment challenges for 85 employers.
Among technical occupations, mechanical engineering technologists and technicians were the hardest positions to fill with 52 of employers expressing difficulties (14% of respondents).

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. The next round of the CME/CSTEC Manufacturing LMI Project hopes to delve deeper into these causal relationships.

**Employer Satisfaction With Candidates**

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

- Specific desired skills
- Work experience
- Specific qualifications
- Salary or wage expectations.

Employers ranked their satisfaction levels with the options “not satisfied”, “somewhat satisfied”, and “very satisfied”.

**Figure 42**  
**Employer Satisfaction With Candidates**

<table>
<thead>
<tr>
<th>Category</th>
<th>Not satisfied</th>
<th>Somewhat satisfied</th>
<th>Very satisfied</th>
<th>NV</th>
</tr>
</thead>
<tbody>
<tr>
<td>Salary or wage expectations</td>
<td>16.3%</td>
<td>47.3%</td>
<td>9.9%</td>
<td>26.4%</td>
</tr>
<tr>
<td>Specific qualifications</td>
<td>22.5%</td>
<td>42.8%</td>
<td>10.7%</td>
<td>24.0%</td>
</tr>
<tr>
<td>Work experience</td>
<td>19.6%</td>
<td>46.7%</td>
<td>11.6%</td>
<td>22.1%</td>
</tr>
<tr>
<td>Specific desired skills</td>
<td>22.5%</td>
<td>45.0%</td>
<td>10.7%</td>
<td>21.7%</td>
</tr>
</tbody>
</table>

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

The responses show that the majority of employers are satisfied with the qualifications, experience, skills, and salary expectations of the candidate pool. However, a significant portion of respondents (22.5%) also expressed that they are not satisfied with the specific qualifications and skills of the candidates. 16% of them are not satisfied with salary expectations and 19.6% are not satisfied with the work experience of 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:

- “Applicants from the oil & gas industry have very high expectations when it comes to total compensation.”
- “Basic reading and arithmetical skills. Ability/willingness to follow instructions. Ability/willingness to stay focused. Punctuality.”
- “Because we are a highly specialized company we have problems finding qualified and skilled people for many of our positions.”
- “Difficult to find the right mix of skills and experience.”
- “I find it’s not so much [a] skill set that’s lacking but often other personal attributes such as flexibility with shifts, attitude towards work, ability to get along with coworkers, etc. The candidates who are the best fit in terms of personality and skill set often are immigrants, and with that often comes language barriers.”

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).

<table>
<thead>
<tr>
<th>Occupation</th>
<th>Wages</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Millwrights</td>
<td>$ 28.9</td>
<td>149</td>
</tr>
<tr>
<td>Millwrights $ 26.6 /hour</td>
<td>143</td>
<td></td>
</tr>
<tr>
<td>Electricians $ 30.4 /hour</td>
<td>116</td>
<td></td>
</tr>
<tr>
<td>Tool and die makers $ 26.9 /hour</td>
<td>65</td>
<td></td>
</tr>
<tr>
<td>Industrial engineering and manufacturing technologists $ 64,603 /year</td>
<td>93</td>
<td></td>
</tr>
<tr>
<td>Electrical and electronics engineering technologists $ 68,113 /year</td>
<td>59</td>
<td></td>
</tr>
<tr>
<td>Chemical technologists $ 56,626 /year</td>
<td>22</td>
<td></td>
</tr>
<tr>
<td>Mechanical engineering technologists $ 64,051 /year</td>
<td>86</td>
<td></td>
</tr>
</tbody>
</table>

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

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 transferring knowledge
- Hiring and retaining skilled workers
- Ensuring our workforce is versatile, flexible and able to take on new challenges as the company grows and changes; also accommodating an aging workforce in physically demanding occupations
- Retaining people, skilled trades are slowly becoming a scarce commodity and soon enough the bigger companies will be offering large sums of money to get those skilled people
- Recruiting for semi-skilled labour and retention
- Good leadership, organizational effectiveness, recruitment and development
- Attracting and retaining applicable skills & experience at competitive wages
- 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.
Conclusions 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 over-arching 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 also highly demanded 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.

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:

- Improving the forecasts taking into account expected technological shifts and resulting productivity enhancements in manufacturing
- Enhancing the supply side analysis to include suggestions on the labour supply that could potentially replace retiring skilled trades workers
- Understanding the role of the immigrant workforce in manufacturing and employer perceptions on the differences between the local and imported workforce
- Exploring the uses of in-house training further on closing the skills gap
• Exploring the uses of in-house training further on closing the skills gap
• Introducing a labour component to the survey: interviewing the retiring workforce to explore their intentions and timelines for retirement, succession planning, and training younger generations as well as surveying the younger manufacturing workforce to understand what attracts them to these jobs
• Expanding the scope of the project to other manufacturing centres in Canada
• A new and expanded focus on generating employer-led solution sessions, also involving unions and the government
• Understanding the effects of outsourcing on the manufacturing workforce and re-estimating the manufacturing workforce after taking into account the outsourced workforce as part of the manufacturing workforce.
Methodology

The Regional Manufacturing Employers Survey

The CME/CSTEC Manufacturing LMI Project includes a manufacturing employers’ survey that was completed by a total of 484 employers across 15 regions as of October 19th, 2015. The distribution of respondents by region is summarized in the table below.

<table>
<thead>
<tr>
<th>Region</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Calgary</td>
<td>20</td>
<td>4.1%</td>
</tr>
<tr>
<td>Edmonton</td>
<td>21</td>
<td>4.3%</td>
</tr>
<tr>
<td>GTA</td>
<td>91</td>
<td>18.8%</td>
</tr>
<tr>
<td>Halifax</td>
<td>35</td>
<td>7.2%</td>
</tr>
<tr>
<td>Hamilton</td>
<td>38</td>
<td>7.9%</td>
</tr>
<tr>
<td>Kitchener-Waterloo-Guelph-Cambridge</td>
<td>60</td>
<td>12.4%</td>
</tr>
<tr>
<td>London</td>
<td>28</td>
<td>5.8%</td>
</tr>
<tr>
<td>Montreal</td>
<td>47</td>
<td>9.7%</td>
</tr>
<tr>
<td>Peel-Halton</td>
<td>6</td>
<td>1.2%</td>
</tr>
<tr>
<td>Regina-Saskatoon</td>
<td>24</td>
<td>5.0%</td>
</tr>
<tr>
<td>Sault Ste. Marie</td>
<td>10</td>
<td>2.1%</td>
</tr>
<tr>
<td>Sudbury</td>
<td>10</td>
<td>2.1%</td>
</tr>
<tr>
<td>Vancouver</td>
<td>17</td>
<td>3.5%</td>
</tr>
<tr>
<td>Windsor</td>
<td>34</td>
<td>7.0%</td>
</tr>
<tr>
<td>Winnipeg</td>
<td>42</td>
<td>8.7%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>483</strong></td>
<td><strong>100.0%</strong></td>
</tr>
</tbody>
</table>

Note: One respondent did not report their specific region.
Source: Prism Economics and Analysis, Manufacturing Employers’ Survey, 2015

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 (11.6%) were large companies employing more than 500 workers.

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4 The percentages may not add up to 100% due to rounding
Over 43% 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.

**FIGURE 45**  SURVEY RESPONDENTS BY COMPANY SIZE

<table>
<thead>
<tr>
<th>Company Size</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>1</td>
<td>0.2%</td>
</tr>
<tr>
<td>1 to 4</td>
<td>27</td>
<td>5.6%</td>
</tr>
<tr>
<td>5 to 9</td>
<td>21</td>
<td>4.3%</td>
</tr>
<tr>
<td>10 to 19</td>
<td>45</td>
<td>9.3%</td>
</tr>
<tr>
<td>20 to 49</td>
<td>97</td>
<td>20.1%</td>
</tr>
<tr>
<td>50 to 99</td>
<td>78</td>
<td>16.1%</td>
</tr>
<tr>
<td>100 to 199</td>
<td>78</td>
<td>16.1%</td>
</tr>
<tr>
<td>200 to 499</td>
<td>70</td>
<td>14.5%</td>
</tr>
<tr>
<td>&gt;500</td>
<td>56</td>
<td>11.6%</td>
</tr>
<tr>
<td>NV</td>
<td>10</td>
<td>2.1%</td>
</tr>
<tr>
<td>Total</td>
<td>483</td>
<td>100.0%</td>
</tr>
</tbody>
</table>

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

The percentages may not add up to 100% due to rounding.

**FIGURE 46**  SURVEY RESPONDENTS BY POSITION HELD

<table>
<thead>
<tr>
<th>Position</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Administrator</td>
<td>71</td>
<td>14.7%</td>
</tr>
<tr>
<td>CEO</td>
<td>96</td>
<td>19.9%</td>
</tr>
<tr>
<td>Human Resources</td>
<td>194</td>
<td>40.2%</td>
</tr>
<tr>
<td>Senior Executive</td>
<td>112</td>
<td>23.2%</td>
</tr>
<tr>
<td>NV</td>
<td>10</td>
<td>2.1%</td>
</tr>
<tr>
<td>Total</td>
<td>483</td>
<td>100.0%</td>
</tr>
</tbody>
</table>

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

5  The percentages may not add up to 100% due to rounding.
6  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 47**  SURVEY RESPONDENTS BY MANUFACTURING SECTOR

<table>
<thead>
<tr>
<th>Manufacturing Sector</th>
<th># of Companies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Food</td>
<td>30</td>
</tr>
<tr>
<td>Beverage</td>
<td>11</td>
</tr>
<tr>
<td>Textile Mills</td>
<td>5</td>
</tr>
<tr>
<td>Textile Product Mills</td>
<td>8</td>
</tr>
<tr>
<td>Clothing</td>
<td>9</td>
</tr>
<tr>
<td>Wood</td>
<td>23</td>
</tr>
<tr>
<td>Paper</td>
<td>11</td>
</tr>
<tr>
<td>Printing</td>
<td>20</td>
</tr>
<tr>
<td>Petroleum and Coal</td>
<td>6</td>
</tr>
<tr>
<td>Chemical</td>
<td>11</td>
</tr>
<tr>
<td>Plastic and Rubber</td>
<td>42</td>
</tr>
<tr>
<td>Non-metallic Mineral</td>
<td>5</td>
</tr>
<tr>
<td>Primary Metal</td>
<td>49</td>
</tr>
<tr>
<td>Fabricated Metal</td>
<td>134</td>
</tr>
<tr>
<td>Machinery</td>
<td>55</td>
</tr>
<tr>
<td>Computer and Electronics</td>
<td>11</td>
</tr>
<tr>
<td>Electrical Equipment</td>
<td>29</td>
</tr>
<tr>
<td>Transportation Equipment</td>
<td>24</td>
</tr>
<tr>
<td>Furniture</td>
<td>21</td>
</tr>
<tr>
<td>Miscellaneous</td>
<td>45</td>
</tr>
<tr>
<td>Other</td>
<td>102</td>
</tr>
</tbody>
</table>

Source: Prism Economics and Analysis, Manufacturing Employers’ Survey, 2015
Manufacturing Labour Demand and Supply Forecasts

The CME labour market information system developed by Prism Economics uses a demand and a supply model that provides 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 48** 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></td>
</tr>
<tr>
<td>13 Material handlers</td>
<td></td>
</tr>
<tr>
<td>14 Transport truck drivers</td>
<td></td>
</tr>
</tbody>
</table>

**Skilled Occupations in Manufacturing**

1 Manufacturing managers
2 Motor vehicle assemblers, inspectors and testers
3 Plastics processing machine operators
4 Process control and machine operators
5 Labourers in manufacturing and processing

**FIGURE 49** DEMAND AND SUPPLY FORECASTS

Source: Prism Economics and Analysis, 2015
Regional Industry Committees

This CME/CSTEC Manufacturing LMI Project recognizes the importance of reaching out to, and establishing a relationship with, 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 the providers of real-time labour market information specific 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 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 50  FLOWCHART REPRESENTING THE DATA VALIDATION PROCESS

Source: Prism Economics and Analysis, 2015