

Navigating the Talent Landscape: Labour Market Information Shaping the Biomanufacturing Workforce

Prepared by
CASTL in partnership with BioTalent Canada and Future Skills Centre

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CASTL
adMare Academy Partner

Table of Contents

Introduction 5
Findings At-a-Glance 6
Workforce Outlook 8
    Key Takeaways 8
Current Demand 11
Talent Supply 13
Diversity and Inclusion 15
Summary and Recommendations 17

About CASTL



The Canadian Alliance for Skills and Training in Life Sciences (CASTL) is Canada's biomanufacturing training partner, dedicated to developing skilled talent to drive the country's thriving life sciences sector. With state-of-the-art, GMP-simulated facilities from coast to coast (in Charlottetown, PE; Montreal QC, and Vancouver, BC), CASTL delivers hands-on, industry-informed training alongside flexible online learning. As Canada's exclusive provider of National Institute for Bioprocessing Research and Training (NIBRT) programs, CASTL offers world-class education with support from adMare BioInnovations and its adMare Academy, shaping the next generation of life sciences professionals.

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About BioTalent Canada



BioTalent Canada supports the people behind life-changing science. Trusted as the go-to source for labour market intelligence, BioTalent Canada guides bio-economy stakeholders with evidence-based data and industry-driven standards. BioTalent Canada, as a workforce development council, is focused on igniting the industry's brainpower, bridging the gap between job-ready talent and employers, and ensuring the long-term agility, resiliency, and sustainability of one of Canada's most vital sectors.

BioTalent™MC Canada



Introduction

The bioeconomy will require 65,000 additional workers by 2029. Recent updates from BioTalent Canada, focusing specifically on biomanufacturing, have estimated that the number of additional biomanufacturing workers required by 2029 will exceed 16,000.[1]

Setting the Context

Canada's biomanufacturing sector is growing rapidly, driven by innovation and increasing demand for domestic production. However, workforce shortages and skills gaps threaten the industry's ability to seize these opportunities. Addressing these challenges requires a coordinated effort among stakeholders to expand training pipelines, adopt inclusive hiring practices, and leverage untapped talent pools.

Purpose of the Report

This study synthesizes findings focused on three key themes:

1. **Future-Ready:** Developing Key Competencies for Canada's Biomanufacturing Workforce: Focused on skill gaps and training priorities
2. **Navigating the Talent Landscape:** Labour Market Information Shaping the Biomanufacturing Workforce
3. **Emerging Technologies Report:** Exploring the Role of AI and Industry 5.0 in Biomanufacturing Skills and Training

Together, these reports highlight actionable insights to guide the future workforce strategy of Canada's biomanufacturing sector.

Key Objective

To ensure biomanufacturing in Canada achieves sustainable growth by building a skilled, diverse and adaptable workforce.

[1] *BioTalent Canada, Close-up on the Bio-economy: National Report*, 2024. Available at: biotalent.ca (Accessed February 27, 2025).

Findings At-a-Glance

WORKFORCE EXPANSION

74%

hiring planned, with **53%** workforce increase anticipated.

ROLE FOCUS

50%

of hires will be manufacturing/ production technicians.

BARRIERS

Financial and time constraints hinder access to training.

DIVERSITY

One-third of employers have fully implemented DEI policies.

SUPPLY ISSUES

Reliance on hiring from within the industry perpetuates talent shortages.

Demand for Talent

74% of biomanufacturing employers are planning to expand their workforce in the next three years while 10% anticipate hiring new employees for retirements. Employers project an average **53% increase** in workforce size.

Role-specific growth: Manufacturing/production technicians and laboratory technicians will account for **50% of all new hires**, making these the most in-demand roles in the sector.

Employers report challenges meeting workforce demand due to skills shortages and turnover, emphasizing the need for expanded training initiatives and workforce development.

Diversity and Inclusion Progress

Approximately 33% of employers report having fully implemented DEI strategies, while others are at varying levels of implementation, including those just beginning to adopt a strategy and those who have yet to start.

Talent Supply Challenges

Employers rely primarily on hiring from other companies within the industry (52%) and recent post-secondary graduates (48%). However, challenges with **retention and turnover** influence demand and underscore the importance of expanding training efforts and diversifying talent sources.

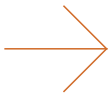
Barriers: Many post-secondary graduates lack practical, hands-on experience, while internationally educated professionals face credential recognition challenges.

Opportunities: Addressing these gaps through targeted training and inclusion strategies can expand the talent pool and reduce reliance on intra-industry hires.



Barriers to Training

- **Access to Effective Training** remains a significant challenge for many employers.
- **Financial Constraints:** Many smaller firms struggle to allocate resources for training without affecting day-to-day operations.
- **Program Availability:** Employers report a lack of accessible programs tailored to the specific needs of biomanufacturing, such as advanced GMP training and clean room protocols.



> *"The main challenges are financial constraints and time. We don't have constant revenue flow from contracts, so we need to be strategic about when we train staff."* - Industry Representative



Workforce Outlook

Strong Demand for Growth

The biomanufacturing sector is projected to grow significantly, with **74% of employers planning to hire new staff** within the next three years. This hiring demand aligns with a **53% increase in workforce size**, driven by innovation and expanded production capacity. **Figure 1: Projected Workforce Growth** (see p.9) illustrates the overall hiring trends anticipated across the sector, highlighting areas of growth and increased demand for skilled professionals.

Additionally, workforce expansion varies by company size, with hiring proportions distributed across small, medium, and large organizations. This distribution is detailed in **figure 2: Average Proportion of Anticipated New Hires Based on Current Full-Time Equivalent (FTEs) in the Next Three Years by Company Size (Companies Hiring for Growth)** (see p.10).

- **Key Roles in Demand:** Half of all new hires will be manufacturing/ production technicians and laboratory technicians, critical to supporting production expansion.

Employer Insights:

> *"In my opinion, there will be an increase in demand in the coming years... industry is booming. We have more positions available, but we are lacking trained staff."*

> *"I think the pandemic was a big eye opener for Canada in general, when we realized that we don't really do manufacturing at all, and we're trying to bring in so much more of the manufacturing here, which I think we're only just waiting for the next pandemic. So, I don't see the demand dropping off any time soon."*

Replacement Hiring Challenges

Turnover and retirements contribute significantly to workforce pressures, creating an ongoing need for replacement hiring and accounting for **35% of total anticipated hiring over the next three years**. Employers also report internal movement within companies as a challenge, particularly in technician roles, where retaining skilled workers remains a persistent issue. These factors further emphasize the importance of addressing retention and workforce readiness.

> *"Turnover and retirements are key factors driving demand for replacement hires, as highlighted by 35% of anticipated hiring focused on these roles."*
>
> *"The demand has been cyclical...but it's likely to pick up again in the coming years."*

EMPLOYMENT OUTLOOK FOR THE NEXT THREE YEARS

Figure 1

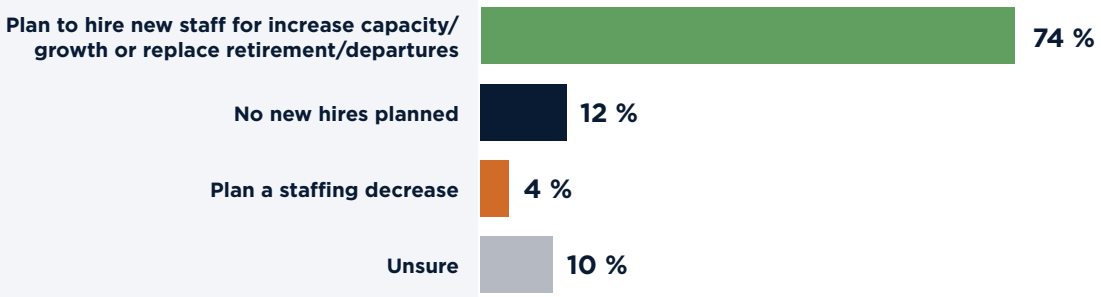


Figure 1 illustrates the anticipated increase in workforce size over the next three to five years, showing how hiring demand aligns with production and innovation needs.

AVERAGE PROPORTION OF ANTICIPATED NEW HIRES BASED ON CURRENT FTEs IN UPCOMING THREE YEARS BY COMPANY SIZE (COMPANIES HIRING FOR GROWTH)

Figure 2

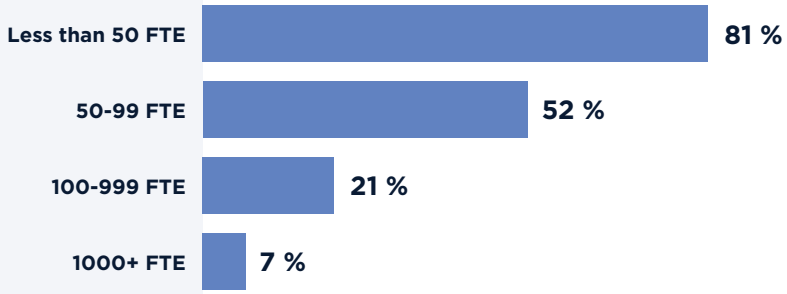


Figure 2 illustrates the proportion of anticipated hiring for new positions, segmented by company size, within the next three years. It highlights the distribution of hiring efforts across small, medium, and large organizations, showcasing growth-oriented hiring patterns.



Current Demand

The biomanufacturing sector faces significant demand for skilled workers, with manufacturing/production technicians and laboratory technicians accounting for **50% of new hires** over the next three to five years. These roles are critical to maintaining and scaling production, particularly in a sector driven by innovation and regulatory compliance.

Key Skills in Demand

Employers consistently prioritize a mix of technical expertise and hands-on experience for new hires. The most sought-after skills include:

- **Good Manufacturing Practices (GMP):** Critical for 80% of employers to ensure compliance and production quality.
- **Laboratory Techniques:** Valued by 70% of employers, covering skills like assay development and equipment calibration.

Despite these priorities, employers report that many candidates lack practical experience in these areas, particularly new graduates entering the workforce.

The Hands-On Experience Gap

A recurring challenge for employers is bridging the gap between academic knowledge and real-world application. Many recent graduates are well-versed in theoretical concepts but lack the hands-on skills needed to operate specialized equipment, navigate clean room procedures, or meet rigorous documentation requirements.

Employer Insight:

Employers report that while graduates possess strong theoretical knowledge, many lack the hands-on experience required for immediate readiness in production roles.

Future Workforce Needs

Looking ahead, the industry anticipates growing demand for advanced skills in emerging fields like cell and gene therapy, automation, and bioprocessing. These areas will require targeted training programs to ensure the workforce is prepared for the sector's evolving needs.

NEW POSITIONS AND REPLACEMENT HIRES BY OCCUPATION

Figure 3

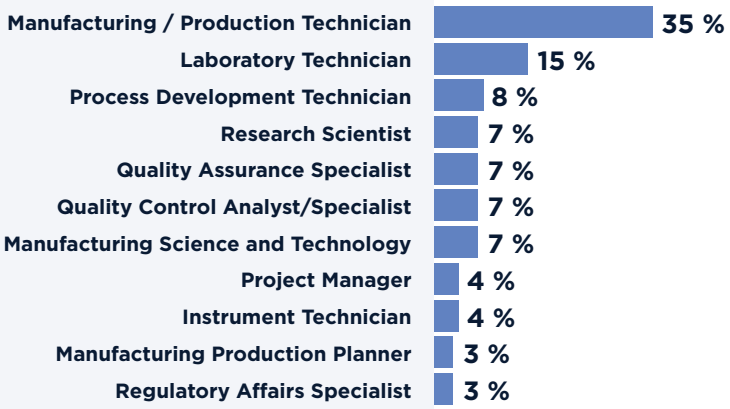


Figure 3 illustrates the percentage breakdown of new positions and replacement hires by occupation. The chart highlights the planned hiring for various roles, such as Manufacturing/Production Technician, Laboratory Technician, and Research Scientist, among others. The percentages represent the share of hiring plans within each occupation, focusing on both new hires and replacements for turnover across different job categories.



Talent Supply

Hiring from within the industry accounts for **52%** of new hires, while **48%** come from recent post-secondary graduates. However, this approach does not sufficiently expand the talent pool or address long-term workforce needs. As shown in *Figure 4: Talent Sources*, reliance on these limited pipelines provides an opportunity to explore broader recruitment strategies.

Challenges

- **Reliance on Intra-industry Hires:** Competing for the same talent limits workforce growth.
- **Graduate Gaps:** Practical readiness remains a significant issue for new hires, requiring months of additional training.

Opportunities

- **International Talent:** Credential recognition and integration support could unlock a valuable resource.
- **Adjacent Industries:** Workers from sectors like pharmaceuticals or food production have transferable skills that could address short-term needs with targeted training.
- **Competency-based Training:** Investing in competency-based training to enhance skills within the potential workforce can help create a pipeline of work-ready talent.

Key Takeaway

Expanding and diversifying the talent pipeline is essential for sustainable growth, reducing reliance on internal hires and addressing skill gaps.

TOP SOURCES OF TALENT SUPPLY

Figure 4

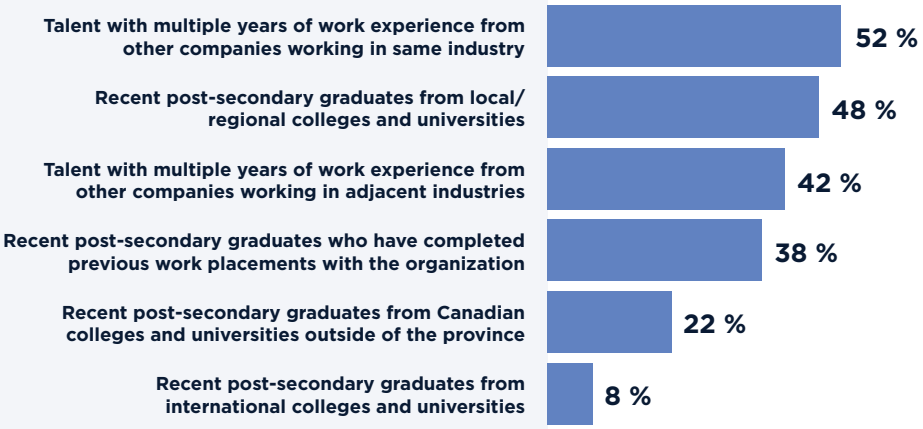


Figure 3 illustrates the preferred sources of talent for organizations, with experienced talent from the same industry and local/regional graduates being the most favoured.



Diversity and Inclusion

Employers have made varying levels of progress in implementing Diversity, Equity, and Inclusion (DEI) initiatives. While **33% of employers** report fully implementing DEI policies, others are at earlier stages of adoption, as illustrated in *Figure 5: DEI Progress Across Employers*.

Barriers to Adoption

- **Resource Constraints:** Smaller companies often lack the budget or personnel to prioritize DEI.
- **Policy to Practice:** Translating DEI strategies into daily operations remains a common struggle.

Opportunities

Expanding DEI across the sector requires:

- Scalable strategies tailored to small and medium enterprises (SMEs).
- Collaborations with industry groups to share resources and best practices.

Key Takeaway

DEI is a critical component of workforce development, and targeted support can help smaller organizations integrate inclusive practices effectively.

ORGANIZATION STAGE IN IMPLEMENTING DEI PRINCIPLES

Figure 5

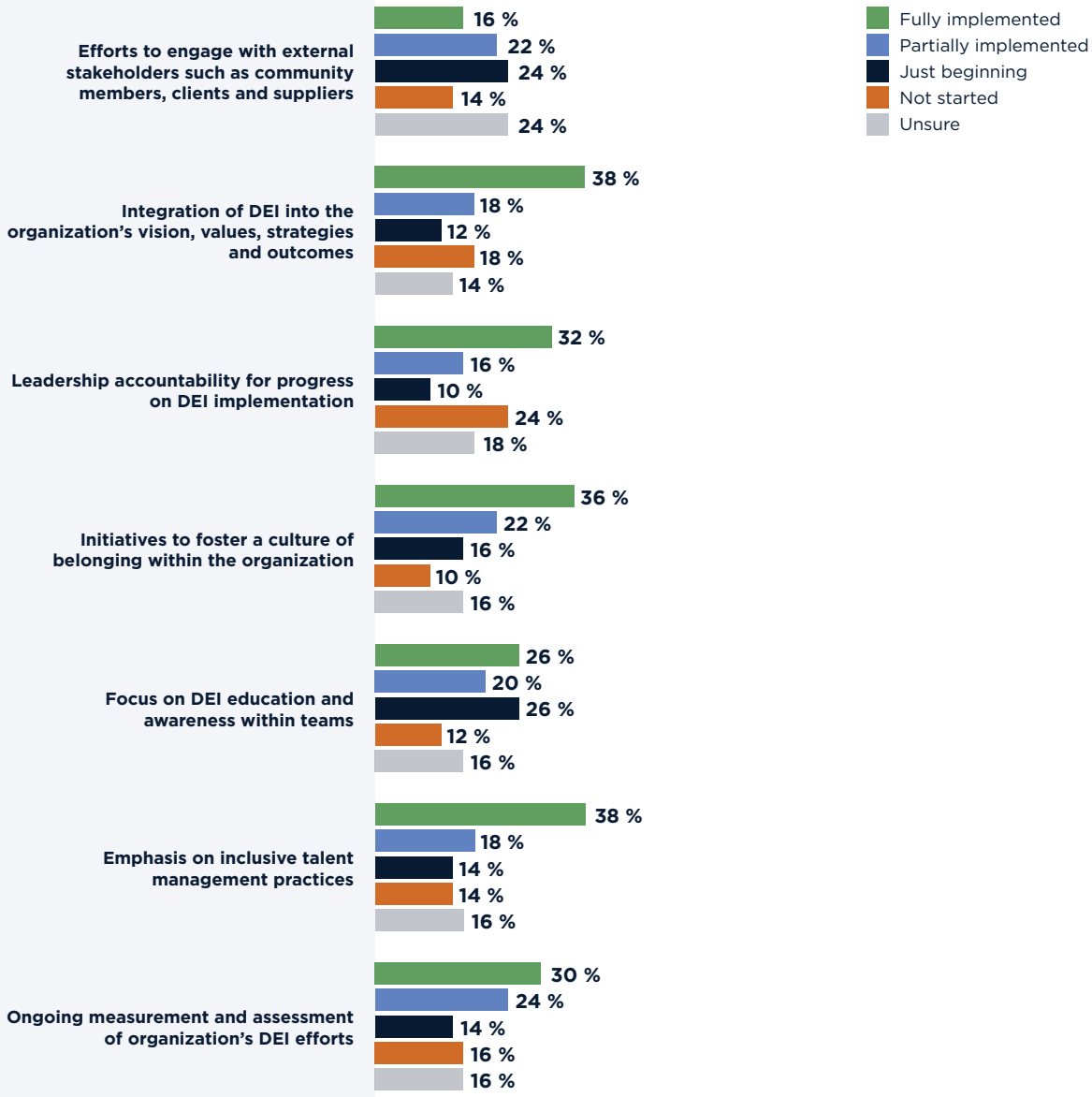


Figure 5 illustrates the percentage of employers with fully implemented, partially implemented, and not yet started DEI strategies.



Summary and Recommendations

The findings in this report emphasize the need to address talent shortages in Canada's biomanufacturing sector through targeted training initiatives and a broader talent strategy. Without action, the sector risks stalling its growth due to limited workforce availability and reliance on hiring from within the sector and adjacent industries.

Key Messages

1. **Meeting Training Needs**

The demand for training, particularly at intermediate and advanced levels, is high across the industry. Employers are seeking lab workers with practical skills who can apply academic learning in real-world settings, such as clean rooms. These in-demand skills often require extensive on-the-job training, which is resource-intensive for employers. As a result, employers prefer a combination of online learning and in-person, hands-on instruction focused on practical skills.

2. **Increasing National Collaboration**

Collaboration between industry, government, and training organizations is seen as crucial for addressing Canadian biomanufacturing's workforce needs. Many employers emphasized the need for shared training facilities and stronger partnerships to pool resources and reduce costs. There is also potential for collaboration on curriculum development to ensure that training programs are aligned with industry needs.

3. **Tapping Into Diverse Talent Pools**

Employers must broaden their recruitment strategies to include internationally educated professionals and workers from adjacent industries like pharmaceuticals and food production. Reducing barriers like credential recognition will unlock significant untapped potential.

4. **Reducing Reliance on Intra-Industry Hiring**

Over-reliance on hiring from within the industry perpetuates workforce shortages. Building a robust talent pipeline by training new workers from relevant adjacent industries or recent post-secondary graduates is the only sustainable solution.

Gathering the Data

This report is based on comprehensive data collection from surveys and interviews conducted among Canadian biomanufacturing employers. Methodology included:

1. Employer Survey:
Responses from 50 employers provided quantitative insights into workforce challenges, hiring trends, and skills gaps.

2. In-depth Interviews:
Semi-structured interviews with 15 employers added qualitative context, highlighting real-world challenges and potential solutions.

These insights offer a clear roadmap for addressing workforce gaps, driving innovation, and ensuring the sector's long-term competitiveness.

Acknowledgements

CASTL extends its thanks to the 50 industry employers who contributed to this research. Special thanks to BioTalent Canada for their partnership in addressing workforce challenges.

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About Future Skills Centre

Future Skills Centre (FSC) is a forward-thinking centre for research and collaboration dedicated to driving innovation in skills development so that everyone in Canada can be prepared for the future of work. We partner with policymakers, researchers, practitioners, employers, and labour groups, and post-secondary institutions to solve pressing labour market challenges and ensure that everyone can benefit from relevant lifelong learning opportunities. FSC is founded by a consortium whose members are Toronto Metropolitan University, Blueprint, and The Conference Board of Canada, and is funded by the Government of Canada's Future Skills Program.

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