RESOURCE INDUSTRY TRAINING COUNCIL

INDUSTRY DEVELOPMENTS AND WORKFORCE CHALLENGES

PROFESSIONAL, SCIENTIFIC AND TECHNICAL SERVICES
LABORATORY OPERATIONS

This is a diverse cluster of sectors which has a university education/vocational education and training bias and is therefore sensitive to the level of public resourcing.

Laboratory Operations covers a vast and highly diverse sector of industries and specializations. At its' core, the sector is a service industry undertaking the testing and analysis of physical matter or data under a contractual arrangement with clients. The sector can loosely be divided into four overlapping divisions, with many larger organizations offering multiple services spanning the following divisions:

1. Materials Testing Services – safety and quality testing for a variety of downstream applications and industries including construction, mining, manufacturing, and machinery wholesalers[1].
2. Environmental Services – scientific testing services to agricultural, mining, manufacturing, construction, weather, food/beverage, sewerage, forestry, and forensic services (excluding pathology)[2].
3. Pathology Services – operate pathology laboratories (human or animal health), conducting analysis for health management, disease detection and illness prevention/treatment[3,4].
4. Scientific Research Services – research activities related to new product development and innovation largely in agriculture, biology, physical, data science, and social sciences[5].

For the most part, the revenue of the sector is critically tied to the volatility and profitability of the industries its operations support (e.g. agriculture/food production, mining, construction, manufacturing, equipment wholesalers, scientific research), with a latter portion driven by other legislative and compliance requirements (e.g. pollution monitoring, forensic services)[1-5]. Approximately 25-50% of laboratory industry revenue is subsequently spent on labour[1-5], with an industry need for specialist skills driving an increase in wages as a proportion of revenue growth in all divisions, except veterinary services[1-5]. To support the labour intensive industry and efficiently respond to volatility in client demand, the sector offers many part-time and casual positions.

The sector is highly regulated and subject to compliance with numerous health, safety, and performance standards monitored by external regulators (e.g. National Association of Testing and Accreditation (NATA)) and Government bodies (Environmental Protection Agency). Consequently, the sector is dominated by a University qualified workforce, of which an ample supply exists in the labour market for entry level positions. However, demand for specialist talent in niche occupations remains high. With sustained production of University graduates, it

[1] IBIS WORLD - Materials Testing Services in Australia, Industry Report OD5111, accessed July 2nd 2020
[2] IBIS WORLD - Environmental Science Services in Australia, Industry Report M6925, accessed July 2nd 2020
[3] IBIS WORLD - Pathology Services in Australia, Industry Report Q8521, accessed July 2nd 2020
[4] IBIS WORLD - Veterinary Laboratory Testing Services in Australia, Industry Report OD4218, accessed July 2nd 2020
[5] IBIS WORLD - Scientific Research Services in Australia, Industry Report M6910, accessed July 2nd 2020

is unlikely the supply of entry-level talent will diminish. However, underemployment is a factor for consideration, and VET qualified applicants are often crowded out of the market. In contrast, pockets of the sector have high use of VET training pathways, e.g. materials testing and mining services, with many organizations offering a traineeship pathway to higher skilled laboratory positions from an unskilled or low skilled workforce.

In relation to VET, with material changes to statutory fees, payroll tax exemptions, traineeship eligibility and incentives in WA, and driven in part by the cyclical nature of the resources sector, many employers were unable to support the numbers of trainees they previously had in Laboratory Operations training, resulting in largely declining enrolments[6]. More recently, an imperative to further expand the local pipeline of talent exists, largely stimulated in sectors currently supplementing their workforces with employees from outside WA (e.g. Construction Materials Testing Services).

Demand for Construction Materials Testing Services has been supported by national COVID-19 related stimulus packages driving investment in residential, commercial, and civil infrastructure construction projects, alongside on-going investment in mining industrial construction. However, a WA shortage of the skilled and experienced workforce able to complete signatory duties under NATA contractual agreements has been exacerbated by the COVID-19 pandemic and resulting border closures. Housing costs during quarantine for the specialist inter-state workforce, internal wage competition, and increased training costs to replace some inter-state workers, have increased operating costs for businesses. Smaller operators are particularly impacted having a reduced capability to compete with the large budgets and economies of scope and scale offered by the larger multinational and multidisciplinary laboratories, reduced capability to invest in new equipment and engage in wage competition, and thus remain competitive for major project rights.

On this backdrop of financial constraints alongside increased skills demand, the addition of the Certificate III in Laboratory Skills and Certificate IV in Laboratory Techniques to the *Lower Fees, Local Skills initiative* and the Priority Industry Training list is welcomed to help build the local talent pool. However, an immediate need to import experienced workers with critical skills remains, and organizations are exploring relocation incentive options for experienced workers.

Within WA, the mining industry is a significant contributor to demand for laboratory services, particularly for materials testing and environmental science services[7,8]. In this context, a resources appetite for further exploration and industry expansion subsists, supporting laboratory support services within asset procurement, exploration, geotechnical modelling, survey and systems design, and construction materials testing. The impact of COVID-19 on associated site access restrictions and economic uncertainty, have deferred some project and exploration activity which may impact laboratory services. However, State Government intervention strategies enabling continued resource sector operations and other strategies targeted at supporting exploration, are indirectly supporting the sector. Thus far, minimal impact has been reported as a result of COVID-19 restrictions, although concerns have been raised for the ability of the minerals laboratory sector to continue replenishing the pool of low or unskilled labour required to maintain operations, particularly in regional areas and those employers reliant on international workforces similar to the agriculture sector.

[6] DTWD – PES ITCRITC Data Cube – Apprentices and Trainees in training, accessed July 31st 2020
[7] IBIS WORLD - Environmental Science Services in Australia, Industry Report M6925, accessed July 2nd 2020
[8] IBIS WORLD - Materials Testing Services in Australia, Industry Report OD5111, accessed July 2nd 2020

The supporting operations of the pathology laboratories recruit from an entry level talent pool largely derived from University graduates, and demand for services have remained relatively stable throughout the COVID-19 period. The bulk of revenue for this industry is supported by the medical referrals from doctors' visits[9]. During the COVID-19 pandemic, sample flow-through from GP referrals ground to a halt, however, sample receivals from clinics and hospitals conducting COVID-related analyses filled the void. The spike in demand for COVID-related testing did lead to some early recruitment, however this was minor, with laboratory staff largely experiencing a translocation of duties to microbiological and molecular COVID analyses, supported by in-house training. With the re-opening of the local economy and resumption of GP visits and other medical testing, it is expected some staff which transitioned to COVID testing will resume their prior duties, however partly due to the early recruitment, no workforce shortage is expected. The exception lies in regional locations, where pathology collection staff may complete a broader range of duties, including some laboratory analysis. The VET pathway (Certificate IV in Laboratory techniques) is a viable pathway for upskilling these workers, however, cost of training is an on-going issue with a large portion of these workers occupying casual positions which are ineligible for subsidized traineeship funding.

Automation will continue to have an impact on the industry over the short to medium term as service providers seek to gain the efficiencies automation delivers to remain competitive.

The Process Manufacturing, Recreational Vehicle and Laboratory Industry Reference Committee[10] identifies a key challenge facing the industry arises from the introduction of automation into the laboratory environment. It was noted that while automation replaces the need for manual processes and lower level skills, higher order skills are needed to manage new technology. Some parts of the industry are employing university graduates, due to an oversupply, rather than Vocational Education and Training (VET) graduates, in these new higher-level skill positions – which in turn creates challenges given the lack of applied learning in many university qualifications. The resources sector, specifically large-scale iron ore miners, have had automated resource sector sampling and analysis processes in place for a number of years.

Internationally, increasingly clinical laboratories are transitioning to total automation solutions. Innovative instrument features such as automated quality control and calibration, sophisticated vision systems, intelligent sample management and test scheduling, and bidirectional magnetic sample transport technology are replacing routine tasks and allowing technicians to focus on more highly skilled tasks. [11]

INDUSTRY WORKFORCE PRIORITIES

With 80% of minerals laboratories expected to have automation capability by 2030[12], the need to upskill laboratory workers to operate autonomous machinery and work safely in an autonomous environment remains apparent. Laboratory technicians specializing in sample preparation, sample analyst, and quality control roles are likely to spend less time on repetitive, manual tasks and more time on monitoring multiple systems, troubleshooting equipment and processes, interpreting results, and ensuring the integrity of large batches of

[9] IBIS WORLD - Pathology Services in Australia, Industry Report Q8521, accessed July 2nd 2020
[10] MSL Laboratory Operations Training Package, Skills Forecast and Proposed Schedule of Work 2018-2022:pg 1
[11] ww.mlo-online.com/information-technology/automation/laboratory-automation-is-no-longer-optional/2019
[12] AlphaBeta - Skilling Pathways – supporting automation in the resources sector, report commissioned by RITC, 2020

samples are maintained[13]. Senior laboratory technicians, quality control staff, and laboratory managers will require additional skills in autonomous results verification, data analytics, robotic safety and the identification of hazards (e.g. laser classification), and critical thinking[12]. Additionally, an opportunity exists to upskill existing employees to undertake basic autonomous equipment maintenance. To address these priorities, some entry-level qualifications have started to incorporate autonomation units of competency (e.g. MSL974029 Operate an autonomous mineral analysis system), however an opportunity exists to include more automation modules into existing training packages. However, on-the-job training will become increasingly valued, due to the expected inability of the majority of training providers to maintain up to date technology for teaching and learning purposes.

The development of specialist skills is another workforce priority facing many divisions of the laboratory sector with a need to attract and further develop specialist skills within laboratory workers noted in the mineral industry (including battery minerals), and forensic services unrelated to pathology. The Process Manufacturing, Recreational Vehicle and Laboratory Industry Reference Committee identified an opportunity for extractive metallurgical technicians to have specialist skills in process flow operations to support the battery minerals industry[14], and the RITC are furthering recommendations for a fire-assay qualification or skill set to support other metallurgical skill demand. These presented mineral skilling opportunities could be achieved through a VET pathway, however the specialist skills to support the forensic analysis of evidence for court cases are best achieved through a Bachelor or postgraduate research qualification.

The establishment of a broader WA talent pool for the Construction Materials Testing industry has emerged as a priority area throughout the COVID-19 pandemic. Whilst the specialist skills and experience required restrict the recruitment of existing Construction Materials Technicians capable of completing NATA signatory duties, an opportunity exists for industry investment in new pathways to attract and support new workers through VET qualifications to higher positions of employment. The *Lower Fees, Local Skills initiative*, will aid this recruitment by lowering training costs and incentivizing traineeship uptake for new market entrants. An imperative to continually upskill existing workers at a sustainable cost remains.

Within regional and remote areas, a priority for pathology collectors able to complete a range of laboratory analyses to support local operations is apparent. However, the cost of training from a supervision and travel perspective, and existing rigidities regarding traineeship funding are challenging existing pathways and new, innovative approach is required. Financial support for senior staff to oversee staff training, and the financial support of regional or remote workers to travel to metropolitan locations for training have been proposed as two options to support regional workforce development. In addition, the demand for remote and regional pathology and laboratory services is subject to greater volatility than metropolitan areas, particularly from a COVID perspective. As such, local staff are often employed in casual arrangements which are more responsive to the needs of the industry. The opening of funded training pathways to support existing pathology collectors and new market entrants operating in casual employment arrangements, have been recommended to further incentivize upskilling pathways and traineeship uptake.

[13] AlphaBeta - Skilling Pathways – supporting automation in the resources sector, report commissioned by RITC, 2020

[14] MSL Laboratory Operations Training Package, Skills Forecast and Proposed Schedule of Work 2019-2023.