National Industry Insights Report

National Overview

Australian
Industry and
Skills Committee

This document is a print friendly version of the National Overview section of the National Industry Insights Report website.

The National Overview can be viewed online at <https://nationalindustryinsights.aisc.net.au/national>.

The National Overview provides high-level analysis of industry skills needs, and the factors and trends affecting the demand for skills at a national and cross-industry level.

The overview draws on Industry Reference Committee (IRC) 2017 Skills Forecasts and Proposed Schedules of Work and supports identification of training package review and development work including opportunities for reform.

It links the cross-industry analysis on skills needs with the activities and initiatives of the Australian Industry and Skills Committee and its network of Industry Reference Committees.

Contents

Insights and highlights

Overview

This section provides a summary of the top five key priority skills identified most frequently by industry, the factors and trends which affect the demand for skills, and key initiatives underway which aim to address skills needs.

These are the **top five** skills, of eleven priority skill areas, identified by Industry Reference Committees (IRCs) in their 2017 Skills Forecasts. The skills set out in the Future skills and training: A practical resource to help identify future skills and training report have been used as a framework for organising these skill areas.

It is evident from the analysis that industry and occupational specific skills remain a priority for all industries, with some IRC Skills Forecasts identifying key technical skills in demand. Indeed, these specific skills for specific jobs remain an integral part of Australia's vocational education and training system. It is also evident that in addition to industry and occupational skills, industry also has a huge demand for cross-sector skills such as digital, business and compliance, collaboration and leadership and management skills.

Given the ever-evolving challenges that industry face due to factors such as structural change, economic cycles, changing markets and emerging technology, these transferable cross-sector skills are critical for ensuring Australia's workforce can adapt to the ever-changing environment.

For more detailed analysis on all eleven priority skill areas and industry demand please visit the Priority skills page. For more information on the factors driving demand for skills please visit the Factors and trends page, and to find out about cross-sector projects and training package development work underway, please visit the Key initiatives page.

The top five priority skills are summarised on the following pages.

Industry and occupation skills

Industry and occupation skills refer to specific skills that different IRCs have identified as being a priority for their industry. These skills vary from industry to industry and they are unpacked further on the Priority Skills page.
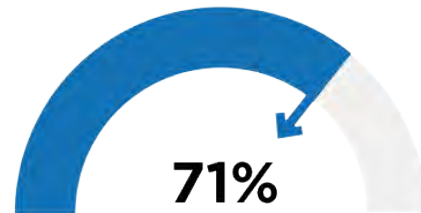
71%

of IRC Skills Forecasts identified this type of skill as a priority

PRIORITY SKILLS

Skills identified by IRCs

- Cross-industry skills and trades
- Occupation/industry-specific skills
- Understanding/use of technology

- Industry-specific knowledge, including technical, product and market-related knowledge
- Generic references to 'technical' skills.

FACTORS AND TRENDS

Driving demand for skills

- Global mobility
- Ageing population
- Changing work and career values
- Skills mismatch
- Workforce vulnerability
- Network working and producing
- Changing workplace dynamics
- Digitisation
- Artificial Intelligence and machine learning.

KEY INITIATIVES

Training package projects addressing skills needs

- Automation
- Digital skills.

Digital skills

In a world of rapid technological expansion which affects all industries, it is vital that the workforce is agile and has the skills to drive and adapt to new technologies. Digital skills include coding and programming, development and use of robotic and automation technologies, leveraging ICT skills in business, and exploring the world of cloud computing and the 'Internet of Things'.

64%
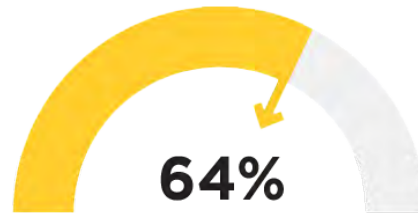
of IRC Skills Forecasts identified this skill as a priority

PRIORITY SKILLS

Skills identified by IRCs

- ICT skills
- Automation and robotics
- Electronics
- Coding/programming skills
- Application design and development

- E-learning delivery
- Using business software
- Cyber security
- Cloud computing.

FACTORS AND TRENDS

Driving demand for skills

- High speed competition
- Emerging markets
- Workforce vulnerability
- Network working and producing
- Changing workplace dynamics
- Digitisation
- Artificial Intelligence and machine learning
- Big data
- Augmented Reality and Virtual Reality
- Mobility and connectivity
- Cross-disciplinary science
- Access to quality internet.

KEY INITIATIVES

Training package projects addressing skills needs

- Automation
- Big data
- Cyber security
- Digital skills
- Supply chains.

Leadership and management skills

Leadership and management skills refers to a range of skills including people management, self-management and change management.
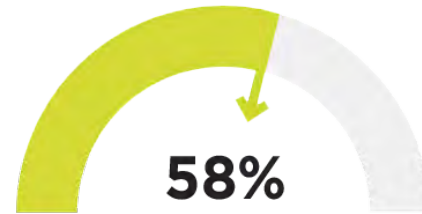
58%

of IRC Skills Forecasts identified this skill as a priority

PRIORITY SKILLS

Skills identified by IRCs

- Professionalism
- Leadership, innovation, project and change management
- Management skills

- Self-leadership (manage own time, prioritise and work autonomously).

FACTORS AND TRENDS

Driving demand for skills

- Increased participation by women and gender related disparity
- Start-up thinking
- Network working and producing
- Changing workplace dynamics
- Behavioural economics and psychology
- Mobility and connectivity.

KEY INITIATIVES

Training package projects addressing skills needs

- Supply chains
- Teamwork and communication.

Business and compliance skills

Business and compliance skills refers to the types of skills industry needs to run a business, understand relevant regulatory requirements and maintain compliance.
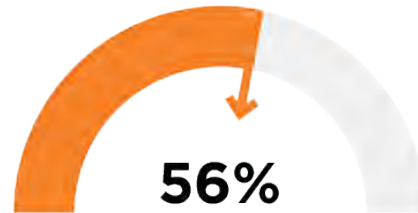
56%

of IRC Skills Forecasts identified this skill as a priority

PRIORITY SKILLS

Skills identified by IRCs

- Business process improvement
- Organisational planning and project management
- Workforce development

- Small business management
- Financial and risk management
- Supply chain and logistics
- Understanding regulatory requirements.

FACTORS AND TRENDS

Driving demand for skills

- High speed competition
- Start-up thinking
- Workforce vulnerability
- Network working and producing
- Changing workplace dynamics
- Empowered customers
- Behavioural economics and psychology
- Digitisation
- Artificial intelligence and machine learning
- Big data
- Augmented reality and virtual reality
- Mobility and connectivity
- International sustainability action
- Financial viability
- Innovation ahead of regulation
- Policy environment
- Appetite for reform.

KEY INITIATIVES

Training package projects addressing skills needs

- Big data
- Supply chains.

Collaboration skills

Those able to collaborate and share information are best able to adapt to changing markets and technologies, interact in diverse workplaces, and effectively respond to customer needs. Skills that enhance collaboration include communication and teamwork skills, relationship management, and social and cultural awareness.
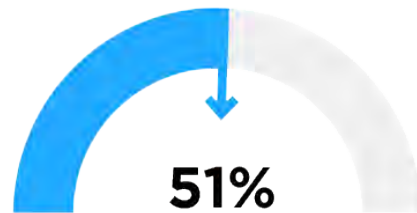
51%

of IRC Skills Forecasts identified this skill as a priority

PRIORITY SKILLS

Skills identified by IRCs

- Communication skills
- Customer service
- Conflict management
- Community engagement
- Social and interpersonal skills
- Teamwork
- Cultural and global awareness
- Emotional intelligence.

FACTORS AND TRENDS

Driving demand for skills

- Global mobility
- Emerging markets
- Network working and producing
- Changing workplace dynamics
- Knowledge-based economy
- Empowered customers
- Behavioural economics and psychology
- Mobility and connectivity
- Cross-disciplinary science.

KEY INITIATIVES

Training package projects addressing skills needs

- Work and participation bank (teamwork and communication)
- Inclusion of people with disability
- Consumer engagement through social media.

Factors and trends

Overview

This section examines some of the high-level trends and factors which influence and drive the demand for skills.

Drawing on information from the Industry Reference Committee (IRC) 2017 Skills Forecasts, this section identifies which factors are having a greater impact on different industries. The report Future skills and training: A practical resource to help identify future skills and training provides more detail on some of the factors listed and is available on the Australian Industry and Skills Committee website.

Factors identified as having the greatest impact on industry are:

ECONOMIC CONDITIONS

TRENDS IN THE LABOUR MARKET

SOCIETY AND CULTURE

BUSINESS AND ECONOMICS

TECHNOLOGY

RESOURCES AND ENVIRONMENT

POLICY AND REGULATORY

Economic conditions

Australia continues to experience growth and low unemployment. The top three contributing industries in 2017 in terms of Gross Value Added were:

• Financial and insurance services
• Construction
• Mining.

Gross Value Added (GVA)

All industries

↑ **2.2%** 2016-2017 percent change

2000

GVA - Top 3 contributing industries:

Manufacturing	🏭 12.6%
Financial and insurance services	$ 8.5%
Construction	👷 6.9%

2017

GVA - Top 3 contributing industries:

Financial and insurance services	$ 9.3%
Construction	👷 8.1%
Mining	🚛 8.0%

November 2017

Unemployment	**Underemployment**
• 5.4% overall	• 8.3% overall
• 12.3% for 15-24 year olds	• 17.8% for 15-24 year olds

Trends in the labour market

Industry employment level

High employing industries

2000 to 2017 employment level

Medium employing industries

2000 to 2017 employment level

Legend:
- Wholesale Trade
- Transport and Postal and Warehousing
- Financial and Insurance Services
- Administrative and Support Services
- Public Administration and Safety
- Other Services

Low employing industries

2000 to 2017 employment level

Legend:
- Agriculture, Forestry and Fishing
- Mining
- Electricity, Gas, Water and Waste Services
- Information Media and Telecommunications
- Rental, Hiring and Real Estate Services
- Arts and Recreation Services
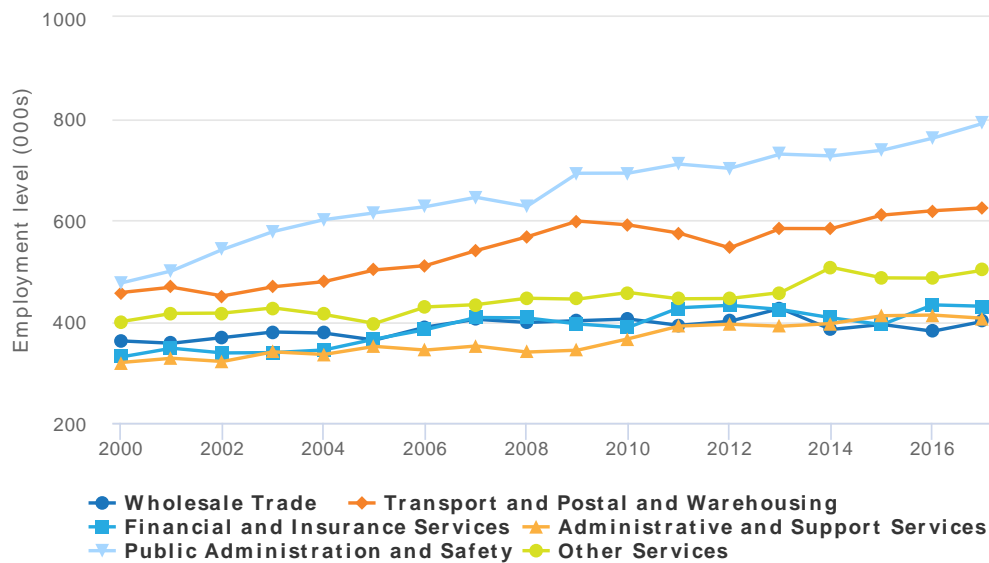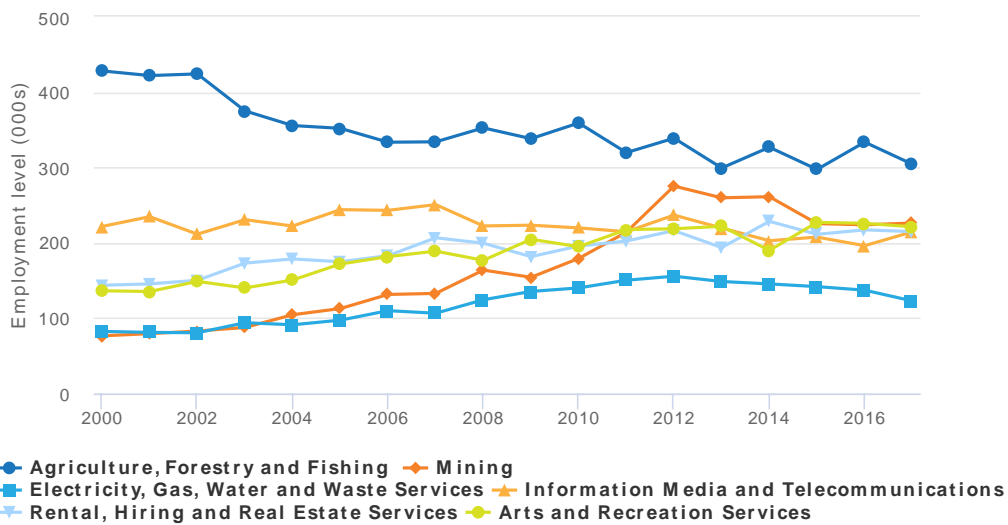
Employment has grown for the majority of industries between 2000 and 2017. The exceptions that have seen a decline in their workforce over this period are:

- Agriculture, Forestry and Fishing
- Manufacturing
- Information Media and Telecommunications.

Industry and occupation structural change

Industry change

Change in industry structure 2000–2017, May quarter, trend data, %

Percentage change between 2000 and 2017

● **Percentage change**

Occupation change

Change in occupation structure 2000–2017, May quarter, trend data, %

Percentage change between 2000 and 2017

● **Percentage change**

Employment status

Increase in part time employment status between 2000–2017 , May quarter, trend data, %

Percentage change between 2000 and 2017
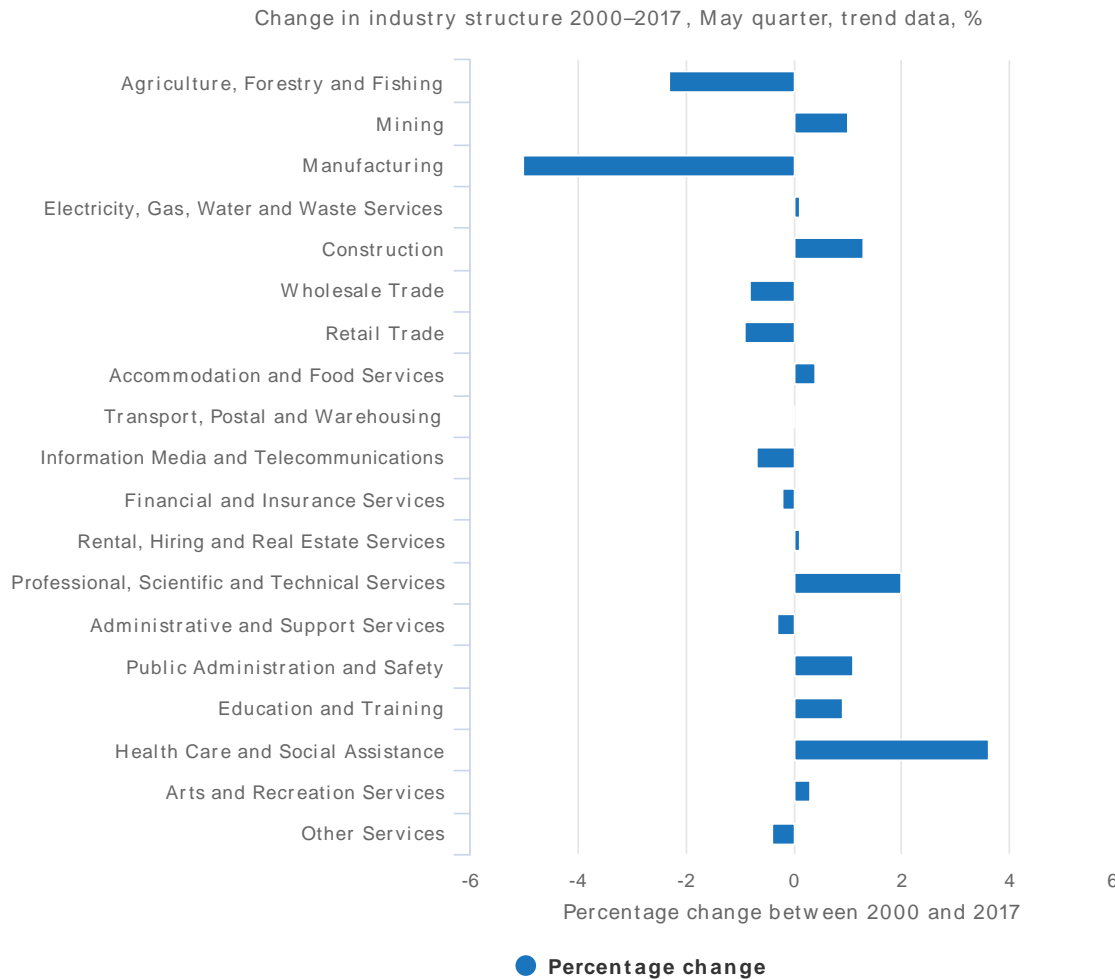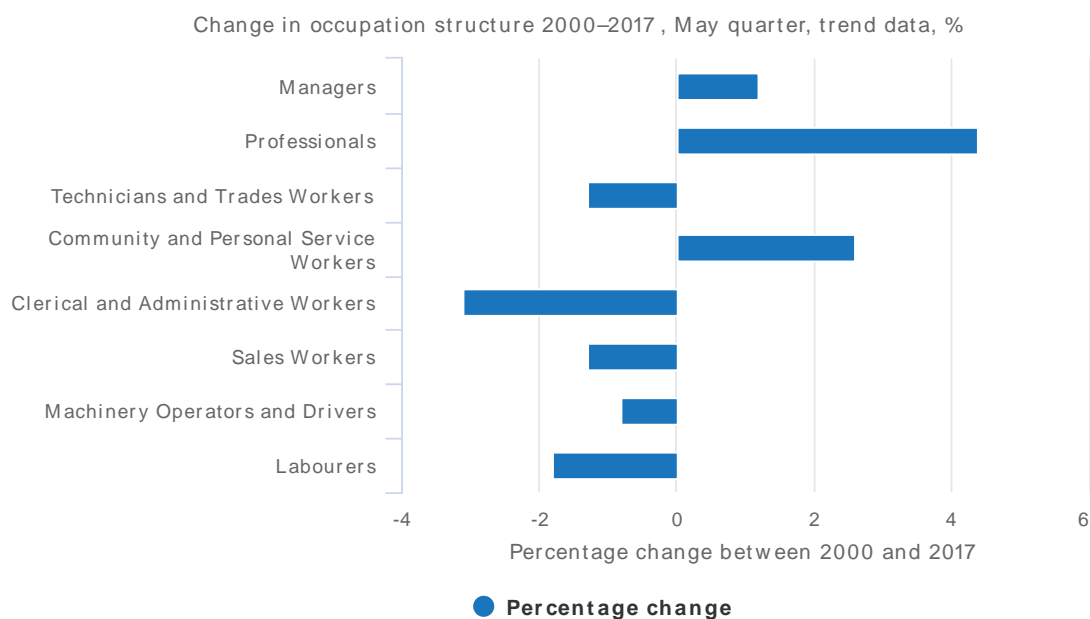
● **Percentage point change**
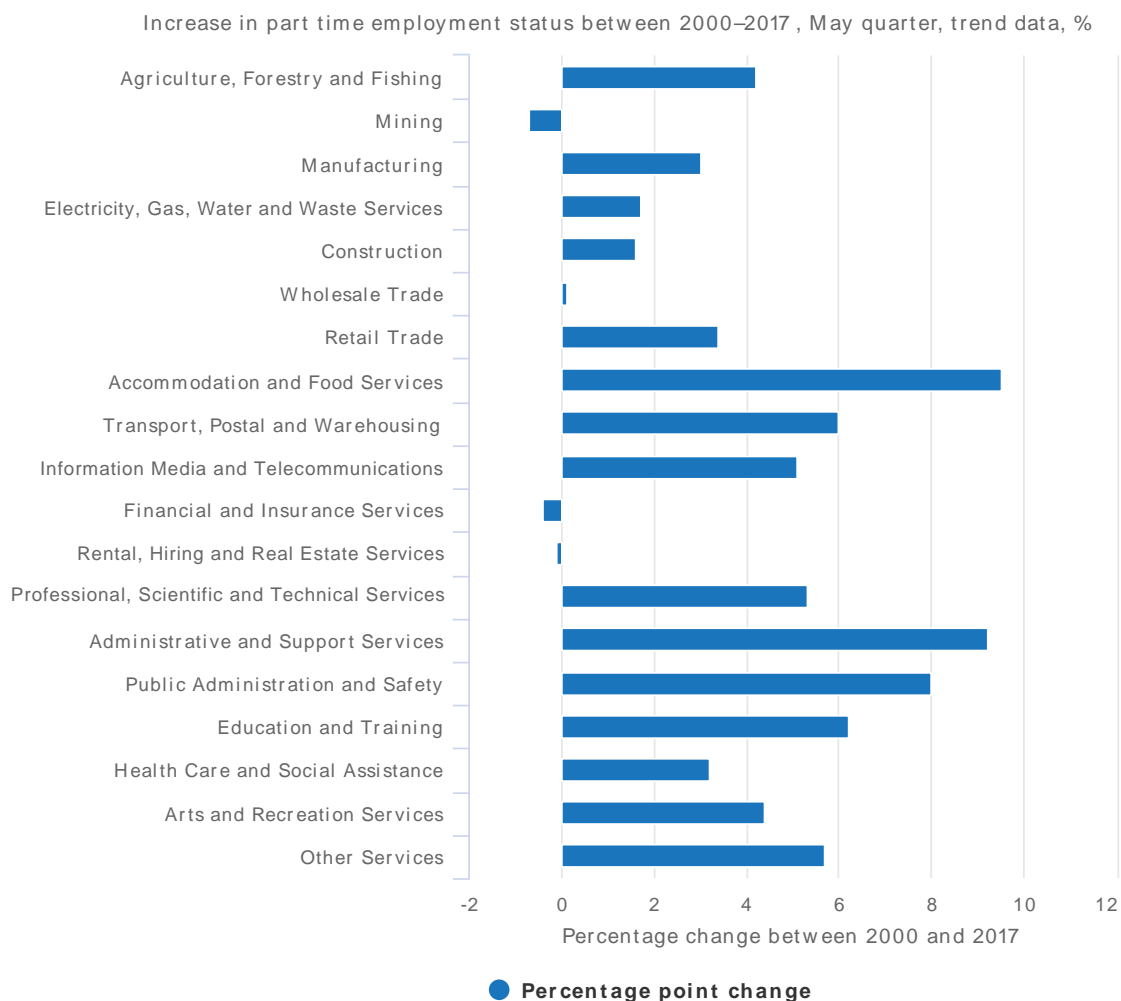
There is an evident shift in industry structure. The industries with the largest decline between 2000 and 2017 (in terms of share of total employment) were:

• Manufacturing (5.0 percentage points)
• Agriculture, Forestry and Fishing (2.3 percentage points).

The industries with the largest increases have been:

• Health Care and Social Assistance (3.6 percentage points)
• Professional, Scientific and Technical Services (2.0 percentage points)
• Construction (1.3 percentage points).

Within these three industries, some of the industry sectors with the largest growth are:

314.6% Preschool Education

195.8% Adult, Community and Other Education

157.2% Child Care Services

111.5% Architectural, Engineering and Technical Services

102.9% Computer System Design and Related Services

102.1% Allied Health Services

80.8% Building Installation Services

77.6% Residential Building Construction
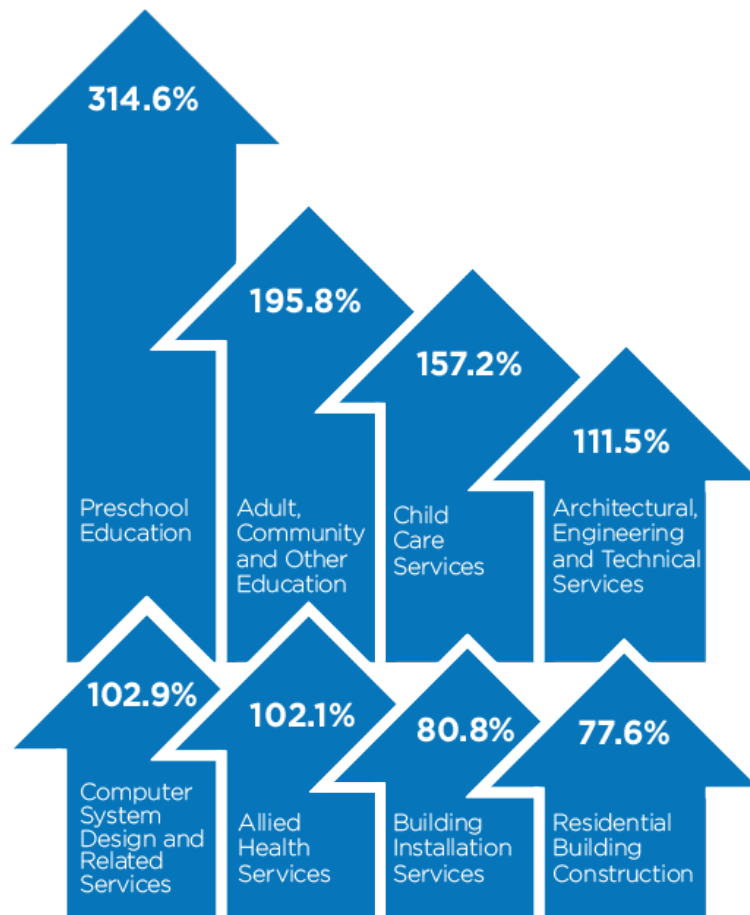
The occupational structure of the labour market has changed over the same period as well, with higher-level skills increasingly in more demand. The occupation grouping with the largest growth is Professionals (increasing their share by 4.4 percentage points). The second largest increase is Community and Personal Service Workers (increasing its share by 2.6 percentage points).

Within the Community and Personal Service Workers category, the occupations with the largest increases are:

155.7% Nursing Support and Personal Care Workers

147.8% Child Carers

118.1% Aged and Disabled Carers

97.4% Dental Assistants
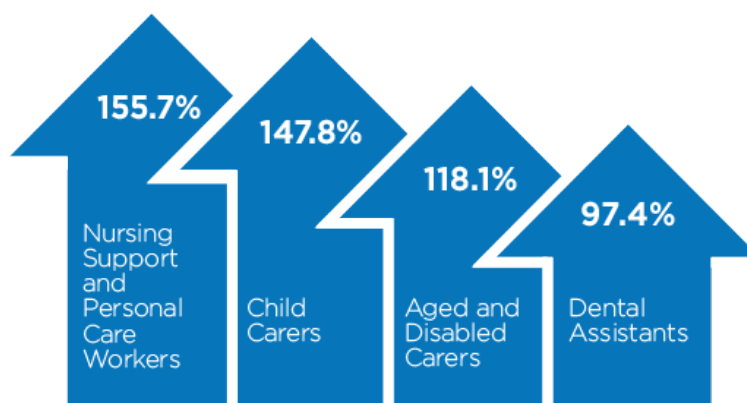
Part-time employment is also growing for the majority of industries. The industries with the largest increases in part-time employment (as a proportion of total employment between 2000 and 2017) were Accommodation and Food Services (9.5 percentage point increase), and Administrative and Support Services (9.2 percentage point increase).

Demographic trends

Australia's ageing population and workforce is affecting industries differently. In 2017, there were seven industries with around a third of the workforce aged 50 and over. Over half of Agriculture, Forestry and Fishing workers are 50 years or older (51.7%) but only 15.5% of Accommodation and Food Services workers are of that age.

Since 2000, there has been an increase in the proportion of the workforce aged 50 years and over in all industries. The industries which have seen the largest increase in the proportion of the workforce aged 50 and over are:

• Agriculture, Forestry and Fishing (16.1 percentage points)
• Public Administration and Safety (16.1 percentage points)
• Administrative and Support Services (13.2 percentage points)
• Electricity, Gas, Water and Waste Services (13.1 percentage points)
• Manufacturing (11.6 percentage points)
• Transport, Postal and Warehousing (11.0 percentage points).

Workforce age

Proportion of industry workforce aged 49 and under and 50 and over, 2017, May quarter, %

49 years and under   50 years and over

Ageing workforce

Increase in workforce aged 50 and over between 2000–2017, May quarter, trend data, %

Percentage change between 2000 and 2017
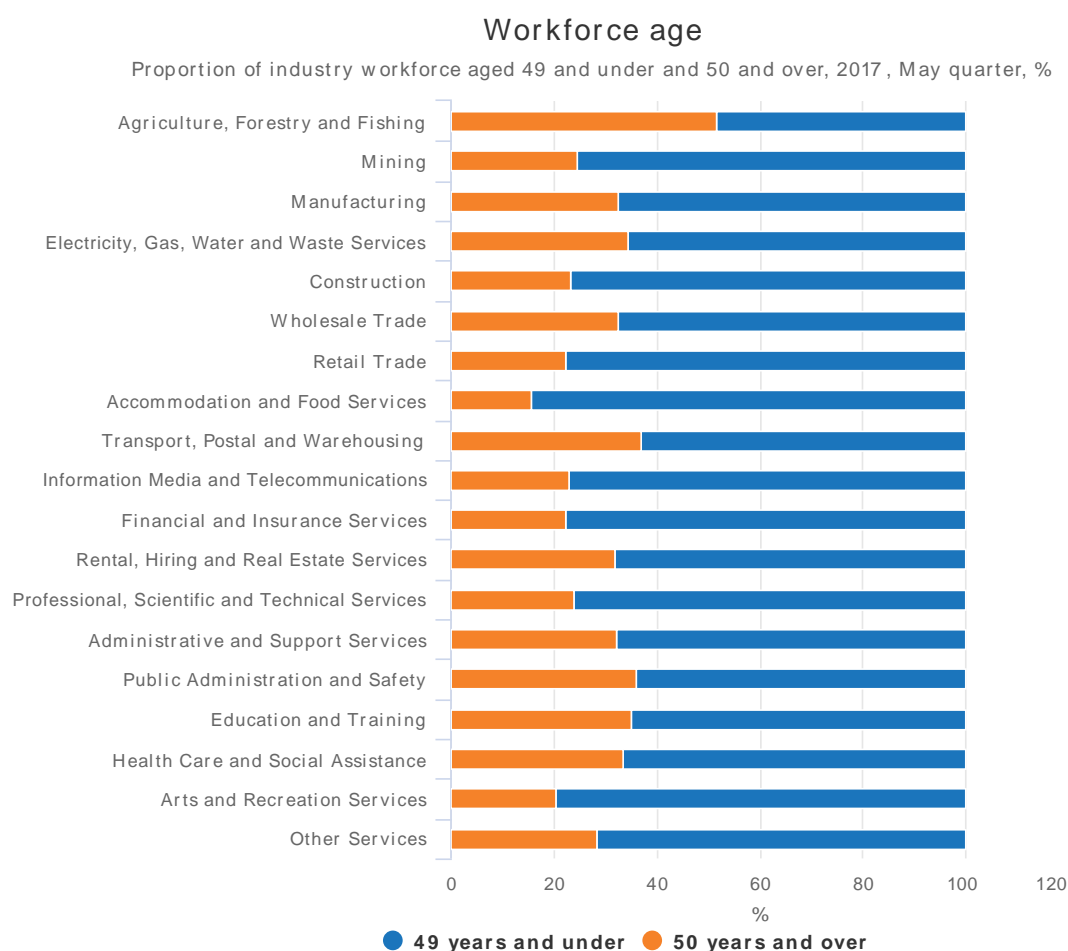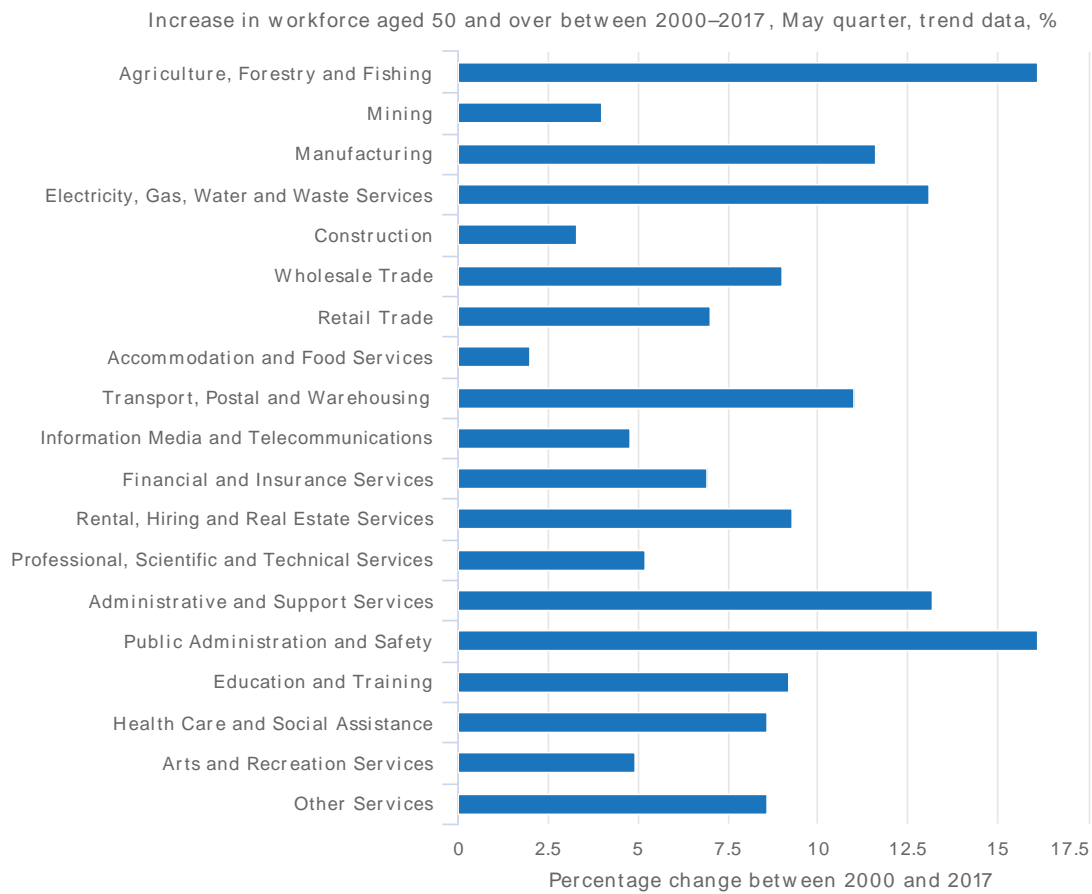
● **Percentage point difference in age 50 or more between 2017 and 2000**

Changing gender participation also varies across industry and occupation groups. For most industries, there has been little change in the proportion of the female workforce between 2000 and 2017. Industries which have seen the largest growth in the female workforce are Public Administration and Safety (10.0 percentage points) and Rental, Hiring and Real Estate Services (7.3 percentage points).

In regards to occupation groups, Managers and Professionals have seen the strongest increase in the female proportion of the workforce between 2000 and 2017 with 7.5 percentage point and 6.3 percentage point increase respectively.

Female participation in industry

Changes in female workforce 2000–2017, May quarter, trend data, %

Percentage change between 2000 and 2017

● **Percentage change**
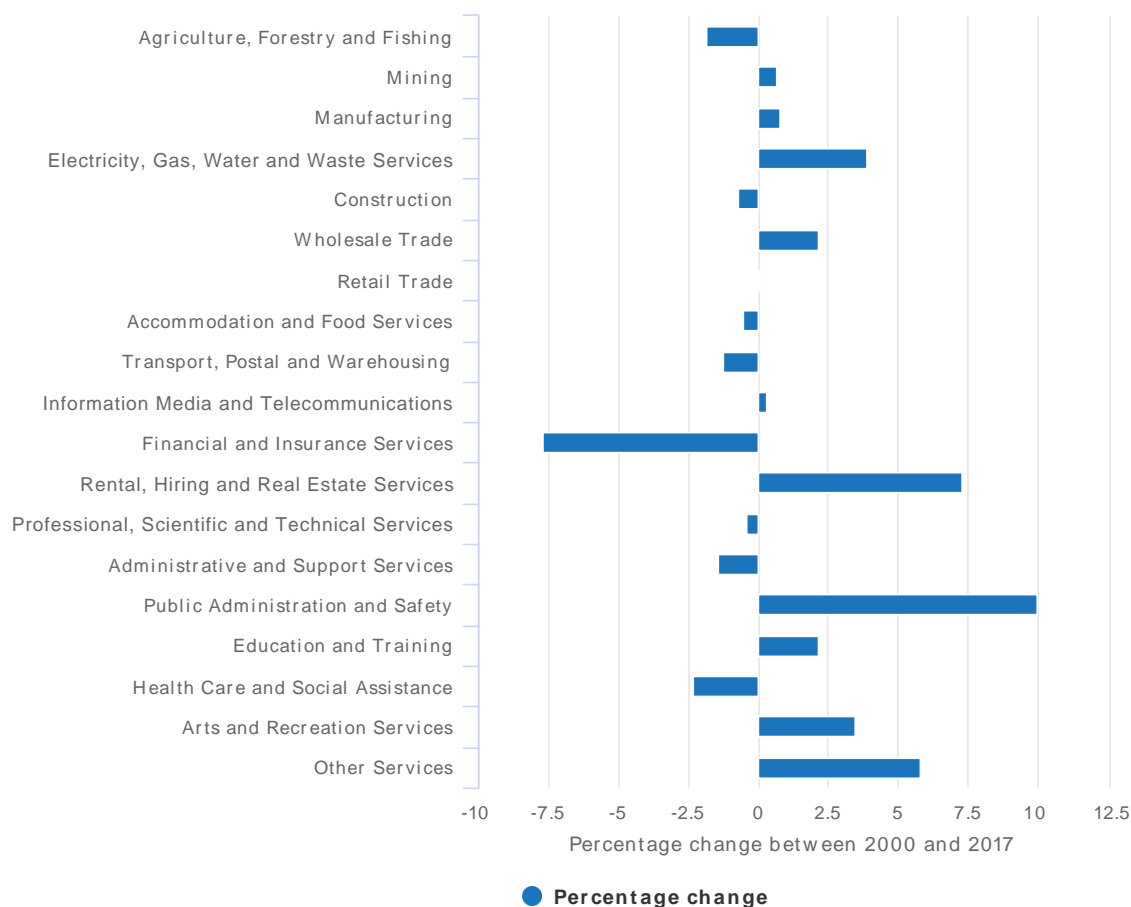
Female participation in occupations

Changes in female workforce 2000–2017, May quarter, trend data, %

Percentage change between 2000 and 2017

● **Percentage change**
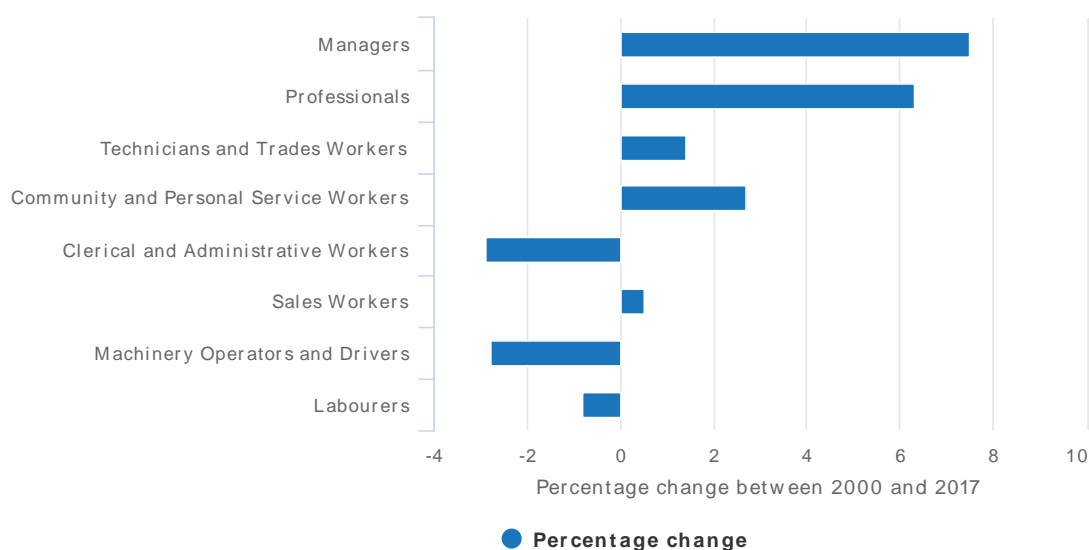
Factors influencing the demand for skills

The Miles Morgan report Future skills and training: A practical resource to help industry identify future skills and training identifies a number of factors and trends which are driving and influencing the demand for skills in Australia and internationally. The factors are grouped into five overarching clusters: Society and Culture, Business and Economics, Technology, Resources and Environment, and Policy and Regulatory. Below is a brief overview of these factors, with more detailed information available in the report.

Society and culture

This group of factors relate to changes in society and culture which have implications for the labour market and skills:

Society and culture-related factors which affect the labour market include:

• Demographic changes, such as population growth and an ageing population and their impact on the workforce and markets
• Globalisation and its impact on mobility, migration and international markets
• Changing work and career values and greater emphasis on flexible working arrangements and work/life balance and increase in part time work
• Attracting and retaining a workforce
• Suitably skilled workforce and access to suitable training
• Urbanisation and implications for regional, rural and remote areas
• Increased participation by women and gender-related disparity
• Increasing participation by equity groups.

The majority of IRC Skills Forecasts identify at least one society and culture factor which has had an impact on their industry sectors. The following industries identify multiple society and culture factors:

• Manufacturing
• Automotive
• Utilities
• Mining, Drilling and Civil Infrastructure
• Transport and Logistics
• Corrections and Public Safety
• Education
• Community Services
• Health Services
• Agriculture, Horticulture and Conservation and Land Management
• Aquaculture and Wild Catch

• Forest and Wood Products
• Food and Pharmaceutical Production (including Meat and Beverages)
• Culture and Related Industries
• Printing and Graphic Arts
• Sport and Recreation
• Tourism, Travel and Hospitality
• Government
• Information and Communications Technology
• Property Services
• Electrotechnology.

The most prominent society and culture factor is demographic changes. Around 78% of IRC Skills Forecasts report changing demographics as being a potential challenge or opportunity for industry, particularly Australia's ageing population. Many of these industries cite an ageing workforce as being a potential challenge. However the ageing population is also creating new markets and new opportunities for some industries.

Other factors which rank highly among IRC Skills Forecasts include:

• Workforce skill requirements, and challenges associated with accessing suitably skilled workforce and access to suitable training
• Globalisation and its impact on mobility, migration and international markets
• Attracting and retaining a workforce
• Issues facing regional, rural and remote areas, particularly in regards to attracting and retaining skilled employees and accessing suitable education and training.

Business and economics

This relates to trends in business and markets which influences how companies do business. Factors include:

• High speed competition and highly competitive markets
• Start-up thinking (including entrepreneurialism, freelancing and contracting)
• Emerging or changing markets
• Skills mismatch, shortages or gaps
• Workforce vulnerability (including low wages and unstable employment)
• Network working and producing and supply chain management
• Changing workplace dynamics
• Knowledge-based economy
• Empowered customers and changing customer preferences.

The majority of IRC Skills Forecasts identify business and economics factors as an issue affecting their industry sectors. The following industries identify multiple business and economics factors which impact on their industry:

• Manufacturing
• Construction, Plumbing and Services
• Electrotechnology
• Automotive
• Utilities
• Mining, Drilling and Civil Infrastructure
• Transport and Logistics
• Education
• Community Services
• Health Services
• Wholesale and Retail and Personal Services
• Agriculture, Horticulture and Conservation and Land Management
• Racing
• Pulp and Paper Manufacturing
• Food and Beverage Production (including Meat and Beverage)
• Culture and Related Industries
• Printing and Graphic Arts
• Tourism, Travel and Hospitality
• Government
• Business Services
• Financial Services
• Information and Communications Technology
• Property Services.

The most prominent business and economics factor is emerging and changing markets. Around three-quarters of IRC Skills Forecasts report emerging and changing markets are a potential challenge or opportunity for their industry. Some industries cite structural decline as being a potential challenge. However, most industries identify new markets and new opportunities.

Other business and economics factors which rank highly among IRC Skills Forecasts include:

• Empowered customers and changing customer preferences which drive new consumer-driven models and markets
• High speed competition and highly competitive markets
• Skills mismatch, shortages or gaps, including chronic skills shortages in some occupations and regions, and seasonal peaks and troughs for workers.

Emerging technology

This addresses the ever-evolving nature of technology and the implications it has for the workforce and skills needs. Key factors include:

• Emerging technologies
• Digitisation and the Internet of Things
• Artificial Intelligence (AI) and machine learning
• Automation and Robotics (including drones)
• Technologically advanced materials and products
• Augmented Reality (AR) and Virtual Reality (VR)
• Mobility and connectivity
• Big data and data analytics.

The majority of IRC Skills Forecasts identify technology factors as an issue affecting their industry sectors. The following industries identify multiple technology factors which impact on their industry:

• Manufacturing
• Construction, Plumbing and Services
• Electrotechnology
• Automotive
• Utilities
• Mining, Drilling and Civil Infrastructure
• Transport and Logistics
• Corrections and Public Safety
• Education
• Community Services
• Health Services
• Wholesale and Retail and Personal Services
• Agriculture, Horticulture and Conservation and Land Management
• Animal Care and Management

• Aquaculture and Wild Catch
• Racing
• Forest and Wood Products
• Food and Pharmaceutical Production (including Meat and Beverages)
• Culture and Related Industries
• Printing and Graphic Arts
• Sport and Recreation
• Tourism, Travel and Hospitality
• Government
• Business Services
• Financial Services
• Information and Communications Technology
• Property Services.

The most prominent technology factor is emerging technologies. Around 89% of IRC Skills Forecasts report emerging technologies as a potential challenge or opportunity for industry. Some industries cite emerging technologies as being a potential challenge for the workforce due to automation of some roles and challenges associated with upskilling. However, most industries identify emerging technologies as leading to new opportunities and improved productivity efficiencies.

Other technology factors which rank highly among IRC Skills Forecasts include:

• Automation and Robotics (including drones)
• Big data and data analysis
• Digitisation and the Internet of Things
• Technologically advanced materials and products (specific to each industry).

Resources and environment

This group of factors covers the issue of climate change, international action on sustainability, as well as access to reliable internet, and the implications of this for business, the workforce and education and training. Factors include:

• International and domestic sustainability action, driving the demand for more sustainable products and services
• Climatic weather shifts and the impact of climate change
• Improving energy efficiency
• Access to quality internet
• Financial viability
• Ethical practices
• Bioproducts
• Access to land and water resources
• Biosecurity.

Around 62% of IRC Skills Forecasts rank resources and environment factors as an issue affecting their

• Manufacturing
• Construction, Plumbing and Services
• Electrotechnology
• Automotive
• Utilities
• Mining, Drilling and Civil Infrastructure
• Transport and Logistics
• Corrections and Public Safety
• Wholesale and Retail and Personal Services
• Agriculture, Horticulture and Conservation and Land Management
• Animal Care and Management

• Aquaculture and Wild Catch
• Racing
• Forest and Wood Products
• Pulp and Paper Manufacturing
• Food and Pharmaceutical Production (including Meat and Beverages)
• Culture and Related Industries
• Sport and Recreation
• Tourism, Travel and Hospitality
• Information and Communications Technology
• Property Services.

The most prominent resources and environment factor is international and domestic sustainability action, which is driving the demand for more sustainable products and services. Around 42% of IRC Skills Forecasts report sustainability actions are a potential challenge or opportunity for industry. Some industries cite sustainability action as being a potential challenge for the industry due to changing customer expectations and changes in approaches to business operations and challenges in meeting skill requirements. However, most industries identify sustainability action as leading to new opportunities and markets.

Other resources and environment factors which are of importance to industry sectors are:

• Climatic weather shifts and the impact of climate change
• Improving energy efficiency
• Ethical practices, such as ethical treatment of animals and ethically sourcing materials and food
• Biosecurity issues
• Access to land and water resources.

Policy and regulatory

This focuses on the policy and regulatory factors which influence the demand for skills, including understanding and adhering to the regulatory environment, the policy environment and its implications for businesses and the workforce, as well as reform in the education and training sector. Factors include:

• Innovation ahead of regulation
• Policy environment
• Appetite for reform
• High and complex regulatory environment
• Safety requirements.

Around three quarters of IRC Skills Forecasts rank policy and regulatory factors as an issue affecting their industry sectors. This includes the following industries:

• Manufacturing
• Construction, Plumbing and Services
• Automotive
• Utilities
• Mining, Drilling and Civil Infrastructure
• Transport and Logistics
• Corrections and Public Safety
• Education
• Community Services
• Health Services
• Wholesale and Retail and Personal Services
• Agriculture, Horticulture and Conservation and Land Management

• Animal Care and Management
• Aquaculture and Wild Catch
• Racing
• Forest and Wood Products
• Food and Pharmaceutical Production (including Meat and Beverages)
• Culture and Related Industries
• Tourism, Travel and Hospitality
• Government
• Financial Services
• Property Services.

The most prominent factor for industry is 'high and complex regulatory environment'. Around half of IRC Skills Forecasts report that a high and complex regulatory environment is a potential challenge for industry. For most industries, a high and complex regulatory environment is part of the operational environment either specific to the industry or applied more broadly, and can include; licensed occupations, industry standards, legislation to manage and protect resources, workplace health and safety legislation, and legislation to protect consumers. Many industry sectors report the need for business and compliance skills to enable the workforce to negotiate the regulatory environment.

Other factors which are of importance to industry sectors are:

• unstable business environment and uncertainly around funding arrangements
• where industry would like to see reform in their industry, or have recently been impacted by reform.

Method and sources

Methodology

The factors and trends framework has largely been based on the factors outlined in the Miles Morgan report Future skills and training: A practical resource to help identify future skills and training, which is available on the AISC website. The report outlines a number of factors which are influencing the demand for skills in the following broad categories: society and culture, business and economics, technology, resources and the environment, policy and regulatory.

A systematic review of the Skills Forecasts from 2017 has been undertaken to identify which factors are most prevalent for the IRCs.

Employment data has also been provided to show how labour market trends have also been shaping the workforce between 2000 and 2017.

Sources

Australian Bureau of Statistics 2017, Gross Value Added (GVA) by Industry, 5204.0 – Table 5, viewed 3 March 2018 <http://www.abs.gov.au/AUSSTATS/abs@.nsf/DetailsPage/5204.02016-17?OpenDocument>

- Top three contributing industries, 2000 and 2017

Australian Bureau of Statistics 2017, Underutilised persons by Age and Sex - Trend, Seasonally adjusted and Original, 6202.0 – Table 22, viewed 2 March 2018 <http://www.abs.gov.au/AUSSTATS/abs@.nsf/DetailsPage/6202.0Jan%202018?OpenDocument>

- Unemployment November 2017 (all and 15-24 year olds)
- Underemployment November 2017 (all and 15-24 year olds)

Australian Bureau of Statistics 2017, Employed persons by Industry group of main job (ANZSIC), sex, state and territory, November 1984 onwards, 6291.0.55.003 - EQ06, viewed 1 September 2017, <http://www.abs.gov.au/AUSSTATS/abs@.nsf/DetailsPage/6291.0.55.003May%20 2017?OpenDocument>

- Employed total by ANZSIC 1 digit Industry, 2000 to 2017, May Quarter
- Employed total, percentage change by ANZSIC 1 digit Industry, between 2000 and 2017, May Quarter
- Employment status, percentage change by ANZSIC 1 digit industry, between 2000 and 2017, May Quarter
- Employed total, proportion of females in workforce, percentage change by ANZSIC 1 digit Industry, between 2000 and 2017, May Quarter

Australian Bureau of Statistics 2017, Employed persons by occupation group of main job (ANZSCO), sex, state and territory, November 1984 onwards, 6291.0.55.003 - EQ08, viewed 1 September 2017 <http://www.abs.gov.au/AUSSTATS/abs@.nsf/DetailsPage/6291.0.55.003May%20 2017?OpenDocument>

- ANZSCO 1 digit occupation, percentage change between 2000 and 2017, May Quarter
- Employed total, proportion of females in workforce, percentage change by ANZSCO 1 digit Industry, between 2000 and 2017, May Quarter

Australian Bureau of Statistics 2017, Employed persons by Age and Industry division of main job (ANZSIC), November 1984 onwards, 6291.0.55.003 – EQ12, viewed 1 September 2017 <http://www.abs.gov.au/AUSSTATS/abs@.nsf/DetailsPage/6291.0.55.003May%20 2017?OpenDocument>

- Employed total, proportion of workforce aged 49 and under and 50 and over by ANZSIC 1 digit level, 2017 May Quarter
- Employed total, proportion of the workforce aged 50 and over by ANZIC 1 digit level, percentage change difference between 2000 and 2017, May Quarter

Priority skills

Overview

This section provides a summary of the priority skills identified by the Industry Reference Committee (IRC) 2017 Skills Forecasts.

IRCs have pinpointed a variety of skills which are priorities for their industry. Drawing on the skills framework set out in the Future skills and training: A practical resource to help identify future skills and training report, these have been grouped within eleven high-level skill areas for the purposes of this analysis.

For more information on the factors driving demand for skills please visit the Factors and trends page. For information on the cross-sector projects and training package development work underway please visit the Key initiatives page.

Each page below contains a summary of the skill need, industry demand for that skill, and case studies of industry clusters and sectors with a specific need for each priority skill:

- Industry and occupation specific skills
- Digital skills
- Leadership and management skills
- Business and compliance skills
- Collaboration skills
- Social platform and marketing skills
- Foundation skills
- Analytical skills
- Adaptability and learning skills
- Sustainability and natural resource management skills
- STEM skills

An explanation of the methodology applied when drawing together this priority skills framework, and the skills ranking approach used, are detailed at the end of this section.
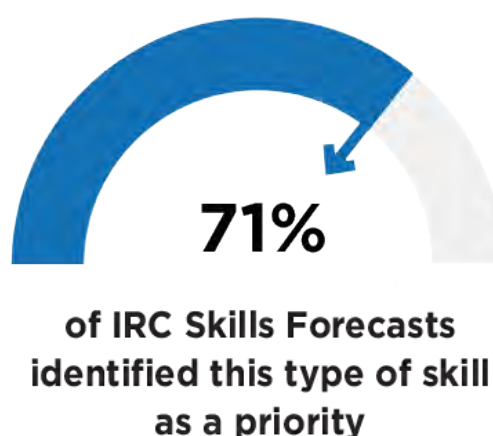
Industry and occupation skills

Overview

Industry and occupation skills refer to specific skills that different Industry Reference Committees (IRCs) have identified as being a priority for their industry.

While all industries and occupations require skills that are specific to the industry or occupation, around 70% of IRC Skills Forecasts identified specific technical skills which are a high priority. These skills vary from industry to industry. Some are specific to the context of a particular industry or occupation; others are technical skills which apply to multiple industries and occupations. The following groups of industry occupation skills and knowledge will be discussed further below:

71%

of IRC Skills Forecasts identified this type of skill as a priority

• Occupation and industry-specific skills
• Cross-industry skills and trades
• Industry knowledge
• Understanding and use of technology and equipment
• General references to 'technical' skills.

Industry skills needs

Industry and occupation-related skills were identified as a priority for industry more than any other skills type.

To understand the nature of industry and occupation-related skills further, the following sub-categories have been developed.

TOP PRIORITY

Occupation and industry-specific skills

This refers to the specific skills that IRCs identified that are unique to their industry and occupations. Around 24 IRCs identified approximately 80 occupation or industry specific priority skills. This includes skills like:

• Cathodic protection and LPG handling in the Gas Supply industry
• Commercial piloting in the Aviation industry
• Teaching skills for VET teachers
• Barbering skills in the Hairdressing industry
• Irrigation design and management in the Agriculture, Horticulture and Conservation and Land Management
• Farriery skills in the Animal Care and Management industry
• Fishing operations in the Aquaculture and Wild Catch industry
• Log sawing in the Forest and Wood Products industry
• Bioenergy and co-generation skills in the Pulp and Paper Manufacturing industry

• Food and beverage fermentation in the Food, Beverage and Pharmaceutical Product Manufacturing industry
• Handling and treating hides and skins in the Meat Processing industry
• Culinary skills in Cookery and Hospitality.

Please visit industry sector pages for more information on the specific skills for each industry and Industry Reference Committee.

Cross-industry skills and trades

This refers to specific technical skills that are important across different industries. Around nine IRCs identified approximately 20 cross-industry priority skills and trades. This includes skills like:

• Welding skills
• Electrical and electronics skills
• Plumbing skills
• Plant and machine operations, required in the Manufacturing, Utilities and Mining, Drilling and Civil Infrastructure industries
• Engineering and maintenance skills, in the Automotive and Meat Processing industries
• Logistics and warehousing.

Industry knowledge

This refers to the specific knowledge that IRCs identified as a priority for their industry. It includes knowledge of materials and products as well as knowledge of the industry sector. The following five IRCs and industry sectors identified industry knowledge as being a priority:

• Plastics, Rubber and Cablemaking Manufacturing
• Manufactured Mineral Products
• Community Pharmacy
• Printing and Graphic Arts
• Financial Services.

Understanding and use of equipment or technology

This refers to examples where IRCs identify skills that are required to use specific equipment or technology such as:

• Advanced diagnostic equipment (Automotive sector)
• Diesel fuel machinery (Automotive sector)
• Computer Aided Dispatch (Ambulance and Paramedic sector)
• Automatic Vehicle Location (Ambulance and Paramedic sector)
• Safe operation of agricultural machinery and technology (Agriculture, Horticulture and Conservation and Land Management)
• Use of geospatial technologies (Forest and Wood Products).

General references to 'technical' skills

A number of IRC Skills Forecasts refer to general 'technical' skills, which are relevant to their industry, as being a priority for their industry sector. The following seven IRC Skills Forecasts identify 'technical' skills as being a priority for their industry but specific details regarding technical skills required have not been provided:

• Electrotechnology
• Gas Supply
• Maritime
• Aviation
• Transport and Logistics
• Culture and Related Industries
• Sports and Recreation.

Whether skills are referred to specifically or more generally, it is clear there is a need for technical and occupation specific skills across all industries.

Case studies

Food and other product processing and manufacturing industries

Included in this case study are four IRC industry sectors, all of which identified specific occupation and technical skills as priorities for their workforce:

Food and Beverage Product Manufacturing

• Wine production, cellar door sales and cellar operations
• Product development and food packaging
• Food and beverage fermentation.

Pharmaceutical Product Manufacturing

• Pharmaceutical production
• Good Manufacturing Practice.

Meat Processing

• Handling and treating hides and skins
• Pest control.

Pulp and Paper Manufacturing

• Biorefining and nanotechnology skills
• Bioenergy and co-generation skills
• Automated processes for recovered paper recycling and de-inking pulp skills
• Specialist skills paper making and pulping operations skills.

These quotes, sourced from IRC Skills Forecasts, highlight industry and occupation specific skills priortised by these industries:

> *The efficient use of black liquor for the generation of heat and electricity is an opportunity for Australia. Cogeneration is increasingly used in the industry to produce steam for the mill (heat boilers) to operate processes. The steam is also used to produce electricity. Cogeneration increases the efficiency of a mill by reducing the consumption of electricity from the grid. Cogeneration of heat offers opportunities to reduce other impacts such as waste disposal costs.* (Pulp and Paper Manufacturing IRC Skills Forecast).

> *Specialised skills in the handling and treating of hides and skins. Careful handling of hides and skins during the pelt removal, trimming, fleshing and short-term preservation stages is essential for producing a high-quality product. Hides and skins being prepared for export must be intact, clean and free from contamination.* (Meat Processing IRC Skills Forecast).

> *Food and beverage fermentation. Due to low-cost entry to market and growing demand for functional fermented food and drink products; small home-based and medium-sized businesses have started to appear in greater numbers. Occupational standards are required to support the growth in industry and ensure consistent and safe products are produced.* (Food, Beverage and Pharmaceutical IRC Skills Forecast).

Animal Care and Management industry and Racing industry

Included in this case study are two IRC industry sectors which involve handling animals, Animal Care and Management and the Racing industry.

Animal Care and Management identifies the following industry and occupation specific skills as being a priority for their industry:

• Work safely around animals (infection control)
• Farriery skills
• Specialist skills in alternative animal therapies, including animal rehabilitation, physiotherapy and acupuncture
• Large animal rescue skills
• Skills in horse education.

Quotes sourced from the Animal Care and Management IRC Skills Forecast highlight these skills requirements:

> *Ability to use a range of mechanisms to minimise the risk of infection in veterinary clinics and rural businesses such as meat processors, saleyards and livestock transporters. Such mechanisms include information platforms provided by animal health surveillance programs, work practice controls, screening services and regulatory requirements for biological hazards.*

> *Knowledge of and ability to apply large animal rescue techniques in various natural or anthropogenic disasters, emergencies or accidents. Recent increases in bushfires and flood events in urban and rural areas have driven the need for expertise in dealing with large animals, e.g. cattle, horses and sheep. Fire and rescue, veterinary operations, farmers and transporters routinely deal with incidents involving large animals in rural areas. There is a need for industry workers to be properly trained.*

The **Racing industry** identifies the following industry and occupation specific skills as being a priority for their industry:

• Integrity and high quality investigation skills for racing stewards
• Racehorse breeding skills
• Skills in retraining and retiring Standardbred horses
• Racetrack maintenance skills
• Skills in incident management involving horses and greyhounds
• Skills in assessing ex-racing greyhounds for pet rehoming and foster care delivery
• Skills for racetrack staff.

This is supported by these quotes from the Racing IRC Skills Forecast:

> *Racehorse breeding skills. Knowledge of pedigrees, animal welfare issues, business management, particularly for operations owned in large partnerships, and the rules and regulations pertaining to the breeding of Thoroughbreds and Standardbreds. Ability to implement procedures for foaling down, equine nutrition and the development of the foal in line with specific standards of Australian breeding requirements to produce the 'product' that races for competitions worldwide.*

> *Skills in retraining and retiring Standardbred and Thoroughbred horses. Ability to assess, retrain and rehome harness racing horses after their racing careers have finished for use in other working environments, breeding or for personal/recreational uses.*

Digital skills

Overview

We are currently in the midst of an explosion in new technologies, which are reinventing much of the way that businesses are run. This has significant implications for the workforce, which needs to evolve and be agile in order to keep up with this technological expansion.

Digital skills, which are becoming increasingly important, and are a priority for many industries, can include coding and programming; development and use of robotic and automation technologies; leveraging ICT skills in business; and exploring the world of cloud computing and the Internet of Things.

In 2014 the UK Digital Skills Taskforce[1] considered the implications of this rapid digital change and identified four 'categories' of occupations based on their requirements for digital skills:

64%

of IRC Skills Forecasts identified this skill as a priority

- the ability to evaluate, configure/program, and use complex digital systems (46% of new jobs)
- the ability to use digital technologies to purposefully and confidently communicate, find information and purchase goods/services (37% of new jobs)
- have skills to actually build digital technology (typically software development, but including creating complex Excel macros or 3D printing data files) (10% of new jobs)
- require no digital skills (7% of new jobs).

This aligns with projections from The Foundation for Young Australians[2] who identified that in the near future approximately 90% of jobs in Australia will require computer skills.

There are currently four cross-sector projects related to the impact of technological advances on the workforce being undertaken by the Australian Industry and Skills Committee. They aim to address common skills needs, minimise duplication and consolidate existing training units. One project is looking at developing Digital Skills across industries. Another project Automation, is looking at the workforce skilling implications in relation to the use of robotics, drones and remote operation systems. The project Supply Chains is examining the implications of the major change underway across and within supply chains due to the impact of automation, robotics, big data and other new technologies. The project Cyber security is reviewing current and emerging developments in cyber security skills, particularly in relation to data confidentiality, protection and privacy, and identify related skills needs shared by multiple industry sectors.
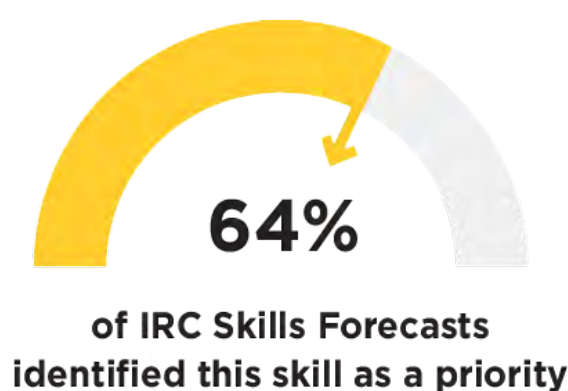
1 UK Digital Skills Taskforce 2014, Digital Skills for Tomorrow's World, <http://www.ukdigitalskills.com/wp-content/uploads/2014/07/Binder9-reduced.pdf>.
2 Foundation for Young Australians 2015, The New Work Order, retrieved from: <http://www.fya.org.au/wp-content/uploads/2015/08/fya-future-of-work-report-final-lr.pdf>.

Industry skills needs

Digital Skills are ranked as the 2nd highest-priority by industry, with 64% of individual IRC Skills Forecasts listing them as a priority for their workforce. In the IRC's ranking of generic skills, Technology was ranked 4th highest (out of 12).

RANKED 2ND

The Chemical, Hydrocarbons and Refining industry ranked digital skills the most highly (with 60% of the priority skills in their IRC Skills Forecast being digital skills).

Unsurprisingly, digital skills are also a particularly high priority for the Information and Communications Technology industry and the Aeroskills industry (in both of these industries, 40% of the priority skills in their Skills Forecasts were digital skills).

60%
of the priority skills listed by the
Chemical, Hydrocarbons and Refining Industry were
digital skills.

40%
of the priority skills listed by the
Information and Communications Technology Industry and
the **Aeroskills** Industry
were digital skills.
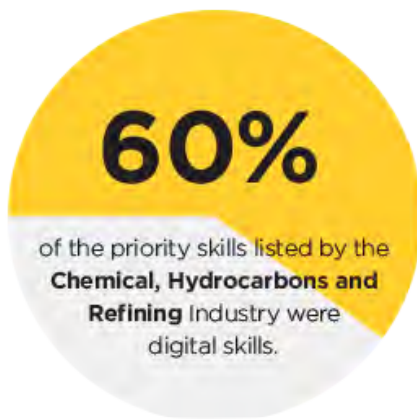
For Chemical, Hydrocarbons and Refining, these included:

• Automation
• Drone operation
• Digital literacy skills.
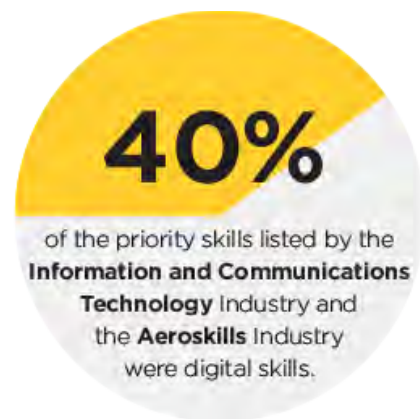
For Information and Communications Technology, these included:

• Application development
• Cloud computing
• Internet of Things
• Automation
• Data analytics
• Cyber security
• Digital and digital literacy skills.

For Aeroskills, these included:

• Digital programming
• Electronics
• Information technology.

Of the 35 industries that identified digital skills as a high priority, just over a third (35%) were interested in more general digital skills (i.e. 'Computer skills', or 'Technology and digital literacy'); while the remaining 65% sought more advanced or specific skills for their workforce (i.e. 'Big data analytics', 'Coding skills' and 'Automation/robotics').

35%	65%

● Industries prioritising <u>general</u> digital skills:

- Community Services
- Education
- Health Services
- Personal Service
- Tourism, Travel and Hospitality
- Wholesale Retail.

● Industries prioritising <u>specific</u> digital skills:

- Animal Care and Management
- Aquaculture and Wild Catch
- Australian Forest and Wood Products
- Automotive
- Electrotechnology
- Food and Beverage Production
- Government
- Information and Communications Technology
- Manufacturing
- Mining, Drilling and Civil Infrastructure
- Racing
- Sport and Recreation
- Transport
- Utilities.

Case studies

Manufacturing industry cluster

This industry grouping consists of 10 IRC industry sectors.

The following six manufacturing IRC industry sectors identified specific digital skills priorities for their workforce:

Chemical, Hydrocarbons and Refining Automation

• Digital literacy

Aeroskills

• Electronics
• Generation 3 electrical wire interconnect systems (EWIS)
• Remote monitoring
• Digital programming
• Robotics
• Data analysis

Process Manufacturing

• Digital literacy/IT skills
• Design and coding skills.

Manufacturing and Engineering

• CNC & robotic programming

Furnishing

• Technology

Manufactured Mineral Products

• Automation and robotics

These quotes, sourced from specific industry Skill Forecasts within the Manufacturing industry grouping, highlight why digital skills have been identified as a priority in these industries:

Workplace and job design are being impacted by new technologies which are revolutionising automation and requiring workers to develop new skills including digital programming, advanced electronics, robotics and data analysis and new ways of working. (Aerospace IRC Skills Forecast).

Unless the industry is able to improve the foundation skills of its workforce, there will be little opportunity to take advantage of this technology.
Workers will need sound foundation skills and various STEM skills including design and coding skills.
Computer literacy skills are considered essential. (Polymer Processing IRC Skills Forecast)

While robotics and automation in manufacturing is not new, the advent of the Internet of Things (IoT) which allows machine-to-machine communications and real-time data monitoring is driving the move to "smart manufacturing".

Increasingly jobs will require digitally literate workers who are able to analyse and respond to data provided by the machines in their workplaces. IoT will also facilitate the so-called Industry 4.0 or the fourth industrial revolution. (Manufacturing and Engineering IRC Skills Forecast).

Construction, Plumbing and Services industry

The Construction, Plumbing and Services industry identified digital literacy as one of their key workforce priorities in their IRC Skills Forecast, with a range of digital technologies identified as having "the potential to impact the job and skilling requirements for future workers". These include:

• 3D printing and production
• Prefabrication
• Building Information modelling (BIM) technologies
• Automation
• Robotics and remote operation
• Virtual reality
• Artificial intelligence.

This quote from the Construction Plumbing and Services IRC Skill Forecast highlights the need for digital skills in this industry:

> Technological change is having an increasing impact on the operations of this sector, particularly in areas such as automation, use of new products and processes (e.g. prefabrication) and the use of software to manage the construction lifecycle.

Leadership and management skills

Overview

Leadership and management skills encompass a range of skills associated with people management, self-management and change management.

Planning, problem solving and decision making are all skills which pertain to leadership and management. Supervision is another major aspect of managing and leading, as is the ability to delegate tasks to others, and to effectively manage yourself and your workload.

58%

of IRC Skills Forecasts identified this skill as a priority

Industry skills needs

Leadership and management skills are ranked as the 3rd highest-priority by industry, with nearly 58% of individual IRC Skills Forecasts listing them as a priority for their workforce.

When considering the IRC's ranking of generic skills, Managerial/ Leadership skills (which aligns directly with Leadership and management) were also ranked 5th (out of 12).

RANKED 3RD 3

40%

of the priority skills identified by the **Dental** Industry were leadership and management skills.

The leadership and management related skills identified by the Dental industry in their IRC Skills Forecast were:

• Clinical leadership
• Leadership in a dental setting.

20% of priority skills identified by the following nine industries in their Skills Forecasts were Leadership and management skills:

- Mining, Drilling and Civil infrastructure
- Community Services
- Sport and Recreation
- Wholesale Retail
- Government
- Public Safety
- Health Services
- Financial Services
- Property Services.

The majority of specific skills identified by these industries were Leadership, Management and Professionalism.

Case studies

Sports and Recreation

This industry consists of four sectors, each of which identified leadership and management as a priority for their workforce:

- Aquatic and Community Recreation
- Fitness
- Outdoor Recreation
- Sport.

All four sectors listed Managerial/Leadership skills in their top 5 generic skills needed. In addition, two of the four sectors listed leadership amongst their priority skills for their sector:

- Community Recreation
- Outdoor Recreation.

There are several challenges and opportunities in the industry which impact on the need for leadership and management skills. These include:

- increased discretionary income population growth
- a health conscious population
- the cost of operating sporting and recreation facilities
- receipt of government grants for new facilities and programs to improve sport participation rates and performance outcomes
- the gender composition of the workforce
- diversity and inclusion in sport.

These quotes from the Sports and Recreation IRC Skills Forecast illustrate the importance of leadership and management skills:

At a national level, women are under-represented in leadership positions in sport…… Good governance principles are required to increase transparency and improve gender balance for leading positions in sport.

Facilities that integrate sport and recreation with a variety of services, such as health and community service providers, are believed to be the future of the sector…..This development would see the need for recreation planners who can maximise the value to the community and facility managers equipped with the skills to manage large-scale

Government industry cluster

Both the Public Sector and Local Government Industry Reference Committees identified Leadership and management as a priority for their respective workforces.

The Local Government IRC Skills Forecast ranked Leadership as its top priority skill and Managerial/Leadership as its top generic skill. The Public Sector IRC Skills Forecast lists Management as its second top priority skill and Leadership/Management as its third top generic skill.

These quotes from Skills Forecasts within the Government industry cluster illustrate why Leadership and Management have been identified as a priority for these sectors:

> *The Local Government Qualifications Framework needs to support the career progression of individuals who require their industry knowledge and skills to be enriched with management and leadership skills. It has been noted that a more strategic approach to training and development necessary, focussed on developing in-house talent to step into leadership positions.* (Local Government IRC Industry Skills Forecast).

> *Leadership and management skills remain a training area of key priority in the public sector. Strength in leadership ensures that the public sector can adapt and evolve under sound direction.* (Public Sector IRC Industry Skills Forecast).

> *Irrespective of the way change originates, change management requires planning and structures that support impacted stakeholders in making the transition and overcoming the challenges involved. It is generally accepted that stakeholders' capacity to adapt to change decreases if they misunderstand or resist the change, causing barriers and ongoing issues. Here the role and skill of management and leadership becomes critical.* (Public Sector IRC Industry Skills Forecast).

Business and compliance skills

Overview

Business and compliance encompasses the broad range of skills required by industry to run a successful business, and to understand relevant regulatory requirements and maintain compliance.

Though there are many business skills that a successful business leader will have, key skills may include sound financial and project management skills, along with the ability to plan, and effectively manage resources. In addition, understanding the regulatory environment in which the industry is operating is necessary, to ensure that the company adheres to industry standards and rules, follows internal compliance guidelines, and maintains dialogue with regulatory bodies for the industry.

56%
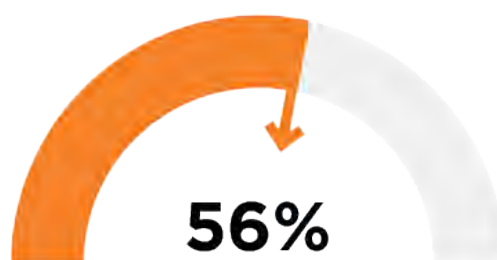
of IRC Skills Forecasts identified this skill as a priority

The project Supply Chains is examining the implications of the major change underway across and within supply chains due to the impact of automation, robotics, big data and other new technologies. The skills needed to support innovation and new technologies will be the key to the future success of industry throughout the supply chain. This project is one of nine cross-sector projects being undertaken by the Australian Industry and Skills Committee to address common skills needs, minimise duplication and consolidate existing training units.

Industry skills needs

Business and compliance skills are ranked as the 4th highest-priority by industry, with 56% of individual IRC Skills Forecasts listing them as a priority for their workforce.

RANKED 4TH

When considering the IRC's ranking of generic skills, business and compliance skills were not included as a potential category. However financial skills (which align somewhat with business and compliance skills) were included and ranked 11th (out of 12). The industries that ranked financial skills highly in their generic skill ranking were:

• Agriculture, Horticulture and Conservation and Land Management
• Local Government
• Animal Care and Management
• Financial Services.

50%

of priority skills identified by the **Australian Food, Beverage and Pharmaceutical Product Manufacturing** industry were business and compliance skills.

The business and compliance skills prioritised by the **Australian Food, Beverage and Pharmaceutical Product Manufacturing** industry included:

• Cellar door operations
• Higher-level strategic planning and management skills
• Advanced supply chain management skills
• Work health and safety and risk management
• Advanced food safety and Pharmaceutical auditing and compliance skills.

40%

of priority skills identified in the Skills Forecast for the **Australian Meat Processing** industry, were business and compliance skills.

In the Skills Forecast for the related industry, **Australian Meat Processing**, the priority business and compliance skills identified included:

• Skills to undertake Threat and Vulnerability Assessments
• Warehousing and logistics skills.

The specific type of business and compliance skills prioritised by industry clusters were split fairly evenly, with:

54%	46%

● Business skills:

• Business process skills (including Lean & Six Sigma etc)
• Organisational Planning
• Workforce Development
• Financial skills
• Business and Financial Management
• Small Business Management
• Supply Chain and Logistics
• Risk Management
• Project Management.

● Compliance skills:

• Understand Regulatory Frameworks
• Work Health and Safety
• Workplace Safety and Compliance
• Ethics and Conduct
• Skills to adapt and respond to Changing Government Policies, Industry Code of Practices and WHS Procedures.

Case studies

Transport industry cluster

This industry cluster consists of 4 IRC industry sectors, each of which identified compliance-related skills as priorities for their workforce:

• Transport and Logistics
• Maritime
• Rail
• Aviation.

Work health and safety and Compliance skills (or a combination of both) were reported in the IRC Skills Forecasts for each of these industries:

40%

of priority skills were compliance-related for both the Transport and Logistics, and

20%

of priority skills were compliance-related for the Rail sector, which identified **Work health and safety skills** as a priority.

20%

of priority skills were compliance-related for the Aviation sector, which identified **Compliance skills** as a priority.

These quotes highlight why business and compliance skills have been prioritised in the Transport industry cluster:

Any changes made to the regulatory environments in the Transport and Logistics industry directly affect the workforce, with companies requiring to upskill or retrain workers to meet these requirements… Industry have indicated that compliance, driving and WHS skills are their highest priority over the next five years. (Transport and Logistics IRC Skills Forecast).

There is an ever-present tension between meeting regulatory compliance requirements and maintaining global competitiveness in the Maritime industry. The Australian Maritime Safety Authority (AMSA) will assume responsibility for the direct provision of certification and compliance services on 1 July 2017. This will have considerable impact on the workforce, and industry have acknowledged that developing compliance skills is a priority as a result. (Maritime IRC Skills Forecast).

Safety remains a major focus for the Rail industry… Workplace health and safety was identified by industry as a priority skill for the workforce and further integration of rail compliance and regulations into the Training Package will become increasingly important. (Rail IRC Skills Forecast).

There is an increased focus on skilling requirements related to safety management systems, aviation compliance and control. (Aviation IRC Skills Forecast).

Tourism, Travel and Hospitality

16% of priority skills identified by the Tourism, Travel and Hospitality industry were business skills.

This industry is broad and encompasses a range of sub-sectors which identified business-related skills needs, including:

• Tourism
• Hospitality
• Holiday parks & resorts

All identified **Business skills** as a priority skill for their workforce.

• Travel

Identified **Business development** as a priority skill for their workforce.

• Exhibitions and events

Identified **Project management** as a priority skill for their workforce.

Only the Cookery and Catering sub-sector did not identify business and compliance skills as a priority.

These quotes illustrate the importance of business and compliance skills for the Tourism, Travel and Hospitality industry:

Industry reports ongoing need for staff development and training in basic business skills. Financial skills such as basic accounts and cost control, as well as human resources and management skills, are required across all sectors, particularly at a middle-management level as employees move from operational to supervisory and management roles.

Risk and crisis management skills and basic business skills such as financial, human resources and management skills will be of critical importance in the future tourism, travel and hospitality workforce. (Tourism, Travel and Hospitality IRC Skills Forecast)
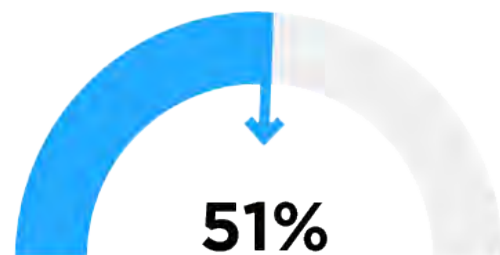
Collaboration skills

Overview

Interpersonal skills are highly sought after in many industries. Those able to collaborate and share information are best able to adapt to changing markets and technologies, interact in diverse workplaces, and effectively respond to customer needs.

As organisations become increasingly dynamic and horizontally structured, this need for collaboration impacts all types of roles. And these skills can help businesses to improve efficiency and to achieve organisational goals.

As communication and collaboration tools evolve, Australian workers will need to be skilled in new media literacies, for example communication through social media.

51%

of IRC Skills Forecasts identified this skill as a priority

Skills that enhance collaboration include communication and teamwork, relationship management, and social and cultural awareness.

There is a project underway looking at developing Team Work and Communication training to improve collaboration skills. This project is one of nine cross-sector projects being undertaken by the Australian Industry and Skills Committee to address common skills needs, minimise duplication and consolidate existing training units.

Industry skills needs

Skills for collaborating are ranked as the 5th highest-priority by industry, with 51% of individual IRC Skills Forecasts, and over half of all industry clusters listing them as a priority for their workforce.

RANKED 5TH

When considering the IRC's ranking of generic skills, Communication/Virtual collaboration/Social intelligence (which align with skills required for collaboration) were ranked 3rd highest (out of 12).

40%

of skills prioritised by these 4 industries were collaboration skills.

Collaboration skills identified by these industries in their skills forecasts included:

Aboriginal and Torres Strait Islander Health Worker

• Communication skills
• Culturally appropriate service delivery
• Teamwork skills

Children's Education and Care

• Communcation skills
• Teamwork

Community Sector and Development

• Communications skills

Corrections

• Conflict/incident management
• Interpersonal skills

33%

prioritised by the **Business Services** Industry were skills for collaborating.

Of those collaboration skills prioritised by the **Business Services** industry, some were more generic in nature:

• Communication
• Emotional intelligence and intuition
• Understanding behaviours and relationships.

While another was a more specific skill:

• Asian business 'literacy' - understanding of the Asian region, its economies, cultures and consumers.

Case studies

Heath Services and Community Services clusters

Health Services

This industry cluster consists of seven IRC industry sectors, all of which identified specific skills for collaboration, as priorities for their workforce.

Communication was the most common collaboration skill identified – with the following five industry sectors prioritising this skill:

• Aboriginal and Torres Strait Islander Health Worker
• Complementary Health
• Enrolled Nursing
• First Aid
• Technicians Support Services.

Other, more specific collaboration skills identified within the Health Services industry included:

Skills identified by the Aboriginal and Torres Strait Islander Health Worker sector were:

• Multi-disciplinary teamwork skills
• Culturally appropriate service delivery

The skill identified by the Dental sector was:

• Customer service and communication in a dental setting

Community Services

This industry cluster consists of four IRC industry sectors, all of which identified specific collaboration skills as priorities for their workforce.

• Community Sector and Development
• Client Services
• Direct Client Care and Support
• Children's Education and Care.

Again, Communication was the most common collaboration skill identified – with all four industries prioritising this skill. However another important skill for the Community Services industry cluster was Customer Service, identified as a priority by:

• Client Services
• Direct Client Care and Support.

Heath Services and Community Services clusters...

These quotes, sourced from specific industry skill forecasts which fit within the Health Services and Community Services industry clusters, highlight why collaboration skills are a priority in these industries:

Aboriginal and Torres Strait Islander Australians, generally perceive mainstream health services to be culturally unsafe environments and consequently do not seek medical attention at the initial onset of the condition... As the life expectancy of Aboriginal and/or Torres Strait Islanders increases, it will be critical that there is a skilled workforce able to provide skilled and culturally responsive care to meet their needs. (Aboriginal and Torres Strait Islander Health Worker IRC Skills Forecast).

Clients now demand a higher quality service and experience from their health care providers, forcing dental providers to develop means to better work with, engage and communicate with their clients. The multicultural and multi-faith composition of the Australian population similarly calls for dental employers to consider how they serve and interact with a diverse client base. (Dental IRC Skills Forecast).

Consumer-directed funding will have a vast impact across the health and community services sectors, influencing the way in which services are delivered, which, in turn, has an effect on workforce requirements... Frontline workers in particular will need to provide support via a person-centred approach. (Enrolled Nursing IRC Skills Forecast).

Heightened customer expectations and demands are forcing health care providers to innovate and consider how they can best serve their customer base. Clients now demand more from their health care experience, compelling organisations to develop means to better work with, engage and communicate with their clients. (Technicians Support Services IRC Skills Forecast).

Demand for personal, interpersonal, critical thinking, creativity and organisational skills (collectively referred to as 'soft skills') has risen... as these soft skills are essential for client centric workers. (Community Sector and Development IRC Skills Forecast).

Active listening, emotional intelligence and social perceptiveness skills, that is, having an awareness of the reactions of others and the reasons for those responses, are identified as being of most significance for client-centric workers. (Client Services IRC Skills Forecast).

A culture of customer service will become essential across the health and community services sectors, as clients become individual customers with greater choice and autonomy over that choice, and organisations will need to have the best interests of those customers as their clear focus. This will require an industry-wide development of workforce capacity and skills at both an individual worker and organisational level. (Direct Client Care and Support IRC Skills Forecast).

Most commonly-required skills include those such as communication, teamwork, problem solving, creativity and digital literacy... Educators require strong communication skills as they constantly interact not just with children but with the parents, as well as others in the service. (Children's Education and Care IRC Skills Forecast).

Public Safety and Corrections industries

Both the Public Safety industry and Corrections industry identified Interpersonal skills as a priority for their respective workforces. Interestingly, given the nature of the professions these industries encompass, they also prioritised Conflict/Emergency incident management.

The collaboration skills prioritised by the Public Safety industry were:

The collaboration skills prioritised by the Corrections industry were:

Quotes sourced from IRC Skill Forecasts within the Public Safety and Corrections industry clusters, demonstrate the importance of collaboration skills for these industries:

> *Industry stakeholders have stressed the need to focus on leadership, planning and incident management skills... and the need to build stronger national resilience through community engagement and education programs.* (Public Safety IRC Skills Forecast).

> *There is ongoing concern regarding the recruitment and retention of volunteers. Industry stakeholders continually cite a number of factors as key reasons for these difficulties, including:*
>
> • *personal and individual costs, both time and monetary to train, or to become trainers*
>
> • *shortage of trainers and the unmet demand for training*
>
> • *lack of online training and other interactive methodologies.*
>
> (Public Safety IRC Skills Forecast).

> *Corrections officers require a broad range of skills to work with people from various backgrounds or to manage inmates with complex issues, such as mental illness... Industry have demonstrated that the development of conflict and incident management skills, as well as interpersonal skills is their highest priority over the next three to five years.* (Corrections IRC Skills Forecast).

Social platform and marketing skills

Overview

Approaches to customer service, marketing and communication are evolving, with social platforms increasing in prevalence. The workforce will need to become skilled in new media literacies, in order to engage with customers and achieve sales and marketing targets.

There is a current project underway looking at developing Consumer Engagement through Social and Online Media to improve social platform & marketing skills. This project is one of nine cross-sector projects being undertaken by the Australian Industry and Skills Committee to address common skills needs, minimise duplication and consolidate existing training units.

36%
of IRC Skills Forecasts identified this skill as a priority
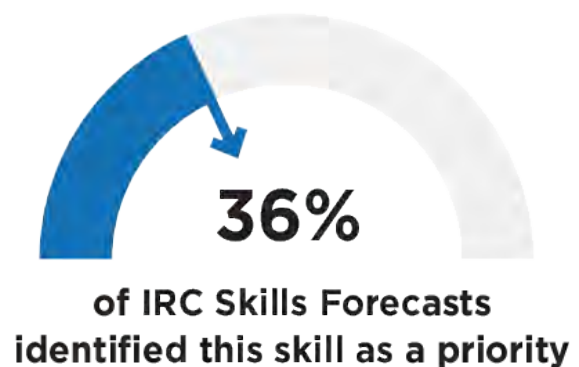
Industry skills needs

Social Platform & Marketing skills are ranked as the 6th highest-priority by industry, with over 36% of individual IRC Skills Forecasts identifying these skills as a priority for their workforce.

RANKED 6TH

When considering the IRC's ranking of generic skills, Customer Service/Marketing (which aligns with Social Platform & Marketing skills) was also ranked 6th (out of 12).

The following industries identified Social Platform and Marketing skills as a priority in their IRC Skills Forecasts:

- Aquaculture and Wild Catch
- Australian Food, Beverage and Pharmaceutical Product Manufacturing
- Automotive
- Business Services
- Client Services
- Community Sector and Development
- Complementary Health
- Culture and Related Industries
- Dental
- Direct Client Care and Support
- Enrolled Nursing
- Furnishing
- Information and Communications Technology
- Local Government
- Printing and Graphic Arts
- Public Safety
- Public Sector
- Pulp and Paper Manufacturing
- Sport and Recreation
- Sustainability
- Technicians Support Services
- Textiles, Clothing and Footwear
- Tourism, Travel and Hospitality
- Wholesale and Retail and Personal Services.

With the following skill areas identified as priorities:

Sales/Marketing   Customer Service   Social Media   Community engagement

Case studies

Wholesale, Retail and Personal Services

The Wholesale, Retail and Personal Services identifies industry encompasses a range of sectors. The Retail and Wholesale, Floristry, and Funeral Services sectors specifically identified customer service and engagement as a priority for their workforces, however, throughout the Skills Forecast these skills were also connected to the Community Pharmacy, Hairdressing and Beauty sectors.

These quotes from the Wholesale, Retail and Personal Services IRC Skills Forecast highlight why customer service, and social platform and marketing skills are a priority in this industry:

The retail industry is recognised for the significant role it plays in providing many young Australians with their first job and a suite of highly transferable skills, such as communication, teamwork, customer service and conflict resolution.

The ability to market online has become a significant factor for business success. Social media platforms and online engagement strategies are now an integral component of online engagement efforts. Social media is key because marketing is no longer a one-way communication from business to customer: it is about a broader notion of 'engagement' or 'conversations' to build relationships with customers and clients. Employers have embraced social media as a way to stay in touch with their customers and give potential new clients access to customer testimonials and information about products and services. The uptake of social media means highly-developed digital literacy skills are essential. Businesses need to not only possess the skill for engaging online, but also understand the potential reach and benefit of social engagement. In addition, employers must have the ability to manage social media crises and problems that have the potential to cause irreversible damage to business reputations.

Business Services

Although not explicitly listed in the 'priority skills' section of their IRC Skills Forecast, the Business Services industry identified the ability to engage with customers online as essential for their workforce. This aligns closely with two of the priority skills which were identified by this industry: communication skills and ability to embrace new technologies.

Quotes from the Business Services IRC Skills Forecast highlight why social platform skills are important for this workforce:

> Digital technology is altering the way consumers are interacting with business, with consumers seeking to engage with businesses online.

> There is strong demand for new fields of customer engagement such as social media management and digital engagement, with a focus upon customer experience.

> Consumers are becoming more connected, consuming services and shopping online... Consumers are also seeking to engage with businesses and brands online beyond a purely commercial relationship. The PwC report 'Connected retail', found that consumers reward brands who provide personalised service and will seek to engage with brands that are seen to have a purpose beyond selling products. This is leading to an increased focus on customer engagement and experience.
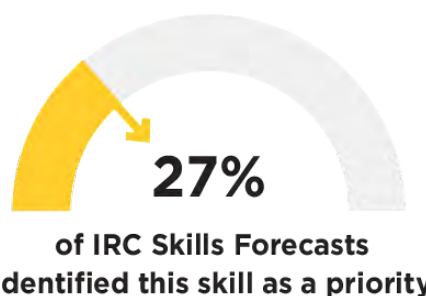
Foundation skills

Overview

Strong foundational skills, namely literacy and numeracy skills, but also including digital and financial literacy, are extremely important for most jobs in the knowledge economy.

Foundation skills underpin the productivity of Australia's workforce and are instrumental in ensuring workers have the ability to upskill.

Training for foundation skills is undertaken through the Foundation Skills Training Package which is developed by the Education Industry Reference Committee.

27%
of IRC Skills Forecasts identified this skill as a priority

Recent feedback from industry and providers indicated that currently the Foundation Skills Training Package is failing to provide foundation skills to learners, and the Training Package is currently being reviewed in an attempt to address this.

Industry skills needs

Foundation skills ranked as the equal 7th highest-priority by industry, with 27% of individual IRC Skills Forecasts listing them as a priority for their workforce.

RANKED 7TH

When considering the IRC's ranking of generic skills, Language, Literacy and Numeracy (LLN) skills also ranked 7th highest (out of 12).

While not highly ranked across all industries, foundation skills are a high priority for a handful of industries.

Industries which prioritised foundation skills include:

• Recreational Vehicles
• Construction, Plumbing and Services
• Textiles, clothing and footwear
• Mining, Drilling and Civil Infrastructure
• Community Sector and Development
• Laboratory Operations
• Children's Education and Care
• Aboriginal and Torres Strait Islander Health Worker
• Ambulance and Paramedics
• First Aid
• Property Services.

Case studies

Automotive

According to the Skills Forecasts, the Automotive industry consists of 11 industry sectors (and five IRCs), which identify foundation skills as a priority for their workforce. Industry sectors include:

- Automotive – Cross sector
- Automotive – Manufacturing (bus, truck, trailer)
- Automotive – Manufacturing (passenger)
- Automotive – Mechanical and specialisation
- Automotive – Electrical
- Automotive – Mechanical Heavy Vehicle
- Automotive – Vehicle body repair
- Automotive – Sales, parts, admin and management
- Automotive – Bicycle
- Automotive – Marine
- Automotive – Outdoor Power Equipment.
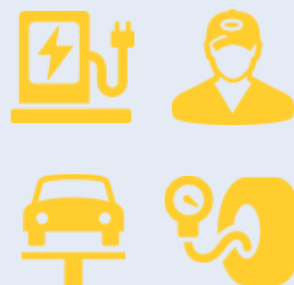
These quotes from the Automotive IRC Skills Forecast highlight why foundation skills are a priority in these industry sectors:

> In the changing landscape of the automotive industry, new graduates and the pre-existing workforce require strong foundation skills such as language, literacy, numeracy, employability and digital fluency, to enable them to adapt to the changing industry environment.

> Foundation skills, such as language, literacy, numeracy, employability and digital fluency were listed as emerging skills for nearly all sectors in the industry (excluding manufacturing passenger). These skills assist new participants in the industry to improve and existing participants to adapt to the changing industry environment. Digital literacy is of particular importance with increased automation of functionality and vehicle capability affecting numerous sectors within the industry.

Property Services

This case study covers Property services, which includes the following sectors:

• Waste collection, treatment, and disposal services
• Property operations and real estate services
• Architectural, engineering and technical services
• Building cleaning, pest control and gardening services
• Public order and safety
• Fire protection inspection and testing
• Swimming pool and spa servicing
• Facility management
• Strata management
• Access consulting.

The Building cleaning, pest control and gardening services and Public order and safety sectors have a demand for foundation skills.

Quotes sourced from the Property Services IRC Skills Forecast show why foundation skills have been prioritised:

Due to the high number of migrants and underqualified workers employed in this sector (public order and safety), LLN and customer service deficiencies are an area of concern for industry and stakeholders.

A major source of students and employees in the cleaning sector is migrants and international students. Language, literacy and numeracy (LLN) and WHS are an important focus because of the differing language and cultural standards in this sub-sector.

Embedding LLN skills in the training package are a priority.

Analytical skills

Overview

Data is becoming increasingly available, with 'big data' derived from online activity, sensors, the 'Internet of Things', new analytical tools, and artificial intelligence.

Workers in almost all industries, and across most roles, will be expected to use available data to derive value from it and improving products and services. This may require the ability to analyse and present raw data or to interpret data analysis and apply findings.

While data analytical skills are increasingly important, other skills such as data management, information literacy, problem-solving, critical thinking skills and creative thinking skills are also required by industries.

27%

of IRC Skills Forecasts identified this skill as a priority

The project Big Data is reviewing current and emerging developments in big data skills, particularly in relation to data management, data analytics and data-driven decision-making, and identify related skills needs shared by multiple industry sectors. This project is one of nine cross-sector projects being undertaken by the Australian Industry and Skills Committee to address common skills needs, minimise duplication and consolidate existing training units.

Industry skills needs

Analytical skills ranked as the equal 7th highest-priority by industry, with 27% of individual IRC Skills Forecasts listing them as a priority for their workforce.

RANKED 7TH

When considering the IRC's ranking of generic skills, Design mindset/Thinking critically ranked 1st and Data analysis ranked 9th (out of 12).

While not highly ranked across all industries, analytical skills are a high priority for a handful of industries.

Industries which prioritised analytical skills include:

- Chemical Hydrocarbons and Refining
- Sustainability
- Construction and Plumbing Services
- Culture and Related Industries
- Printing and Graphic Arts
- Ambulance and Paramedics
- First Aid
- Enrolled Nursing
- Public Sector
- Business Services
- Financial Services
- Information and Communication Technologies
- Property Services.

Case studies

Mining, Drilling and Civil Infrastructure

The Mining, Drilling and Civil Infrastructure industry consists of five industry sectors which identified analytical skills as a top priority for their workforce. Industry sectors include:

- Coal mining
- Drilling
- Metalliferous mining
- Extractive industries
- Civil infrastructure.

All sectors identified the need for analytical skills in the workforce to better predict future demand of particular resources and optimise current production.

This is highlighted in the following quote from the Mining, Drilling and Civil Infrastructure IRC Skills Forecast:

> With the push toward productivity and efficiency, workers in the Mining, Drilling and Civil Infrastructure sector will need the ability to prioritise, collect and analyse data, in order to identify the best way forward. Strong analytical skills and an understanding of key factors driving value in their business will enable workers in the industry to make the right decisions.

Financial Services

The Financial Services industry consists of a number of industry sectors which identified analytical skills as a priority for their workforce. Industry sectors include:

- Banking
- Mortgage broking
- Financial markets
- Financial planning and advice
- Insurance
- Superannuation
- Accounting and bookkeeping
- Mercantile agents
- Trust administration.

All sectors identified the need for analytical skills in the workforce to better understand the needs of the client or improve internal operations in the business.

These quotes sourced from the Financial Services IRC Skills Forecasts highlight why analytical skills are a priority in these sectors:

> Increased demand for customer centric roles, including the use of data analytics to customise financial products to better deliver to customers, remote customer assistance with technologies, and managerial roles.

> Analytical skills and the ability to understand, clean and utilise big data to give companies a competitive edge and produce better, customised consumer products.

Adaptability and learning skills

Overview

In a world where skills will constantly need to adapt to new technologies and job requirements, people will need to be taught skills that enhance their ability to adapt to new situations and acquire new skills.

As the world of work becomes more flexible, workers are expected to take more responsibility for their skills development.

Some of the ways in which industry need workers to be adaptable include:

• Showing awareness of changes in the industry
• Showing resilience and embracing change
• Being adaptable in a changing industry, changing environments and changing markets
• Adapting to new technologies and new ways of doing business
• Showing a proficiency and willingness to learn
• Being engaged in career development and planning
• Maintaining skill relevancy, upskilling and multi-skilling
• Responding to situations flexibly and innovatively
• Showing innovation and creativity
• Being entrepreneurial.

20%
of IRC Skills Forecasts identified this skill as a priority

Industry skills needs

Adaptability and learning skills ranked as the 9th highest-priority by industry, with 20% of individual IRC Skills Forecasts listing them as a priority for their workforce.

RANKED 9TH

When considering the IRC's ranking of generic skills, Learning agility/Information literacy/Intellectual autonomy and self-management ranked 2nd (out of 12).

While not highly ranked across all industries, adaptability and learning skills are a high priority for a handful of industries.

Industries which prioritised adaptability and learning skills include:

• Printing and Graphic Arts
• Transport and Logistics
• Education
• Chemical Hydrocarbons and Refining
• ESI Generation
• EST Transmission, Distribution and Rail
• Gas Supply
• Client Services
• Direct Client Care and Support.

Case studies

Education (VET teacher training)

The Education industry (VET teacher training) identifies ongoing reform in the VET sector as one of the key challenges facing the industry. The Education IRC suggests that VET professionals must be adaptable and resilient to succeed in the changing environment.

Quotes sourced from the Education IRC Skill Forecast show why adaptability and learning skills are a priority in this industry:

> VET professionals must continue to embrace change if they are to be successful in this fluid regulatory, technological and economic environment. The workforce's ability to understand the implications of change and adapt their working style accordingly will be critical to the teaching of high quality and current education and training.

> Constant change can also lead to a high degree of stress and uncertainty. Resilience is an important part of embracing change, especially the ability to be cognisant of the stresses of other workers and learners and cooperate to make it through change together.

Culture and Related industries

The Culture and Related industry consists of a number of industry sectors which identified adaptability skills as a priority for their workforce. Industry sectors include:

- Dance and musical theatre
- Dance teaching
- Technical live production
- Music
- Broadcast technology
- Technical screen and media production
- Design
- Visual arts
- Arts administration and support
- Event and venue management
- Galleries and museums.

Adaptability and learning skills are needed in the Culture and Related industries workforce to enable workers to compete in changing markets.

This is demonstrated in the following quotes from the Culture and Related Industries IRC Skills Forecast:

> Employers need employees who are agile and have critical thinking skills so that they are able to compete in a changing market and to see new opportunities as they arise.

> Ability to be creative and adaptable and to use problem solving skills in difficult situations. This includes agile thinking and active processing capabilities as well as the ability to apply up to date technologies and ideas to any problem at hand.

Printing and Graphic Arts

The Printing and Graphic Arts industry identifies adaptability and learning skills as a priority for their workforce.

Adaptability and learning skills are needed in the Printing and Graphic Arts workforce to enable workers to combat a static and tradition driven workforce. Traditional print and design workers need to be able to operate in a multi-channel environment, including having awareness of industry trends and data availability, collaboration and creative and critical thinking.

These quotes from the Printing and Graphic Arts IRC Skills Forecast highlight why adaptability and learning skills have been prioritised in this industry:

> Different parts of the sector are contracting, growing or transforming in response to external forces. An understanding of the broad industry and trends, as well as the ability to research and analyse new information will allow workers to keep up to date with movements. Increased awareness industry changes and conditions by workers is likely to lead to adaptability and sustainability of the industry itself.

> An ability to plan one's own career (or own business) in a changing industry environment by self-assessing skills and planning development and progression. For entry level workers this is the ability to assess and find the best place for themselves in the market. At higher levels it may be about creating that market for the service they can provide.

> Technology is changing the way that printing and graphic arts services are delivered. The industry composition of what those services are is also adapting with some sub-sectors contracting and others innovating in to new spaces. Structural change in the sector means that printing and graphic arts graduates will need adaptability and flexibility skills, to respond to change and embrace new roles and technologies.

> Agility, together with problem solving skills, will make workers more open and able to understand new technologies, and their associated applications and benefits to their specific field. This will enable the sector to harness the possibilities of technological change.

Sustainability and Natural Resource Management skills

Overview

Sustainability and Natural Resource Management skills are an increasing priority for many industries. Australia has committed to reducing carbon emissions and combatting climate change, particularly since committing to the Paris Agreement in 2015/2016. In an effort to deal with the effects of climate change and improve sustainability, there is an increasing need for sustainability and natural resource management skills.

The 2009 Green Skills Agreement included 'green skills' in training packages, and this emphasis on sustainability skills is continuing with the current project on Environmental Sustainability Skills which is aiming to identify duplication and gaps in sustainability skills which span industries. This project is one of nine cross-sector projects being undertaken by the Australian Industry and Skills Committee to address common skills needs, minimise duplication and consolidate existing training units.

20%

of IRC Skills Forecasts identified this skill as a priority

Industry skills needs

Skills for sustainability and natural resource management ranked as the equal 9th highest-priority by industry, with 20% of individual IRC Skills Forecasts listing them as a priority for their workforce.

RANKED 9TH

When considering the IRC's ranking of generic skills, Environmental Sustainability ranked 10th highest (out of 12).

While not highly ranked across all industries, sustainability and natural resource management skills are a high priority for a handful of industries.

Industries which prioritised sustainability and natural resource management skills include:

- Recreational Vehicles
- Electrotechnology
- Sustainability
- Furnishing

- Manufactured Mineral Products
- ESI Generation
- ESI Transmission, Distribution and Rail.

Types of skills identified by these industries include:

- Environmental sustainability
- Green skills
- Renewable energy storage
- Renewable technology

- Resource management
- Advanced skills in carbon farming.

Case studies

Utilities and Electrotechnology

The utilities industry consists of four IRC industry sectors, several of which identified specific sustainability and natural resource management skills, as priorities for their workforce. These industry sectors are:

• Electricity Supply Industry (ESI) – Generation
• Electricity Supply Industry (ESI) – Transmission, Distribution and Rail
• Water
• Gas Supply.

In particular, the Water industry has strong demand for water resource management skills, and the ESI Generation industry has a growing need for renewable energy generation skills. Similarly, the electrotechnology industry has huge demand for renewable energy storage skills.

These quotes are from specific industry Skill Forecasts which fit within the utilities industry. They highlight why sustainability and natural resource management skills are a priority in these industries:

The industry faces future challenges with an increased focus on renewable energy supported by Government policies that promote renewable energy generation. As further research into Carbon Capture and Storage is conducted, these technologies will influence the required skills for this sector. (ESI Generation IRC).

The impacts of climate change are already being felt in Australia as we see more extreme weather conditions with longer and more intense bushfire seasons, more severe and unpredictable wet seasons, warmer global temperatures and extreme drought. These weather patterns require proactive management of water resources to ensure that resources are monitored and available regardless of the challenges presented by climate variables. The critical impact of climate change and drought has been noted by industry; revised water demand models and solution-based strategies with a focus on assets will prove vital in effective management of this issue. As governments plan for and implement changes to combat climate change and drought, the operating environment will be required to evolve, having a flow-on effect to the workforce skill requirements. A focus on the development of planning and forecasting skills will be required. (Water IRC).

A number of energy efficiency initiatives are being introduced by the Federal and State Governments to encourage the uptake of technologies such as solar PV, battery storage and electric vehicles. These initiatives will create an unprecedented demand for electrotechnology workers with skills in energy efficiency technologies. The announcement of the Clean Energy Innovation Fund aims to drive this change and many new jobs are expected to emerge. The design and installation of such products will shape much of the electrotechnology sectors over the coming years. The integration of renewable energy into established distribution networks will also be a priority. (Electrotechnology IRC).

Primary industries: Agriculture, Horticulture and Conservation and Land Management, Aquaculture and Wild Catch and Forest and Wood Products

This case study covers the following industry sectors, all of which identify sustainability and natural resource management skills as a priority for their industry:

• Agriculture, Horticulture and Conservation and Land Management
• Aquaculture and Wild Catch
• Forest and Wood Products.

All the industry sectors have a demand for natural resource management skills to help manage the effect of climate change and resource availability. These skills are also complemented with skills in technology and supply-chain management to improve efficiencies and optimise available resources.

Quotes from IRC Skill Forecasts which fit within this case study, highlight why sustainability and natural resource management skills have been prioritised in these industries:

> *Renewing skills in Carbon Farming. Climate change and its effects on the agricultural crops, which create both challenges and opportunities for many producers to capitalise on technology (i.e. biotechnology) and increase collaboration in supply chains. These partnerships will aim to support the development of more resilient crop varieties and large-scale farming systems. The challenge for individual farmers is to capitalise on technology that supports decision making to develop large-scale farming systems for increased productivity, efficiency and optimisation of available resource utilisation.* (Agriculture, Horticulture and Conservation and Land Management IRC).

> *Climate change is a challenge that fisheries and aquaculture operators will have to increasingly deal with if they are to maintain or improve the current levels of productivity. Trends in multidisciplinary approaches to natural resource management, which emerge from the need to provide solutions to environmental issues created by operational expansion across the industry. Environmental management and sustainability practices need to be strengthened through capability development.* (Aquaculture IRC).

> *Climate variability and frequent events of extreme weather conditions due to global warming have various implications on the industry and its value chain. Climate conditions cause concerns relating to log availability, investment opportunities, and demand for wood products. Improved skills to minimise the environmental footprint of log harvesting.* (Forestry and Wood Products IRC).
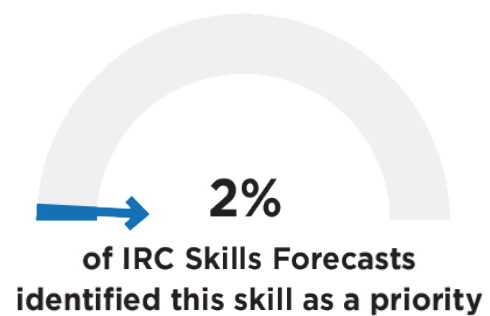
STEM skills

Overview

Strong STEM skills, (science, engineering, technology and mathematics) are extremely important for the knowledge economy.

While often associated with the university sector, the report Australia's STEM Workforce released by the Office of the Chief Scientist on Australia's STEM workforce shows that the vocational education and training (VET) sector provides more than two thirds of Australia's STEM workforce.

However, different industries have different levels of STEM needs and more work needs to be done with the relevant Training Packages to specify realistic standards for STEM related competency requirements.

2%
of IRC Skills Forecasts identified this skill as a priority

Industry skills needs

STEM skills ranked as the 11th highest-priority by industry, with only 2% of individual IRC Skills Forecasts listing them as a priority for their workforce.

RANKED 11TH

When considering the IRC's ranking of generic skills, STEM skills ranked 8th highest (out of 12).

While not ranked as a priority, STEM-related skills are touched upon throughout a handful of IRC Skill Forecasts, particularly where digital skills are referenced.

The industry that identified STEM skills as a priority in their IRC Skills Forecast is:

• Recreational Vehicles.

![Case study icon]

Case study

Manufacturing

The manufacturing industry consists of 10 industry sectors which have a demand for STEM skills including:

- Manufacturing and Engineering
- Plastics, Rubber and Cablemaking
- Recreational Vehicles and Process Manufacturing
- Sustainability
- Textiles, Clothing and Footwear
- Furnishing
- Manufactured Mineral Products
- Aeroskills
- Chemical, Hydrocarbons and Refining
- Laboratory Operations.

Quotes from various IRC Skills Forecasts which fit within the Manufacturing industry cluster show why STEM skills are a priority in these industry sectors:

Compounding the challenge of attracting new entrants is the challenge of low foundation skills and STEM skills. It is acknowledged by stakeholders that the occupations in the industry are becoming increasingly technology-driven and require new entrants to have strong foundation skills and STEM skills. Increasingly school leavers being directed into vocational pathways lack STEM skills as there is little understanding within the school system of the STEM requirements for vocational pathways. The report released by the Chief Scientist on Australia's STEM workforce shows that the Vocational Education and Training (VET) sector provides more than two thirds of Australia's STEM workforce. Manufacturing is one of the top five industries employing STEM graduates, employing 10% of the STEM workforce. It is clear that more work needs to be done with the relevant Training Packages to specify realistic standards for STEM related competency requirements. (Manufacturing and Engineering IRC).

STEM (science, technology, engineering and mathematics) skills and foundation, language, literacy and numeracy skills are essential prerequisites for most new industry roles and may limit the pool of people able to undertake polymer processing qualifications; new job entrants lacking the basic skills and knowledge to succeed in the industry, including: the required science, technology, engineering and mathematics (stem) skills, foundation skills and hand skills. (Aeroskills).

The Laboratory Operations Training Package is utilised across many industries as can been seen by the range of challenges and opportunities identified by stakeholders. As such stakeholders are concerned that attracting new entrants to the sector with adequate foundation skills (including LLN) and STEM skills is vital. The National Innovation and Science Agenda (NISA) with its focus on increasing the STEM skills of Australian students and promoting STEM careers for women is viewed by stakeholders as a significant opportunity for the sector. Together with the release of the National Curricula for Science and Mathematics8 and the development of a National Curriculum for Technologies9, the sector is seeing opportunities for growth in the school education sector as well as a potential supply of new entrant workers for the laboratory sector in general. Stakeholders note that the sector may struggle to find new entrants, with both the ageing laboratory technicians in the education sector and lack of current laboratory technical staff moving into teaching positions being of concern. (Laboratory Operations IRC).

Priority skills

Methodology

The priority skills framework has largely been based on and adapted from the skills outlined in the Skills chapter of the Miles Morgan report Future skills and training: A practical resource to help identify future skills and training, which is available on the AISC website. The report outlines a series of skills that workers need to be effective in Australia's future workplace.

Additional priority skills areas have been created, in instances where IRC Skills Forecasts have consistently identified certain skills needs, which aren't adequately catered for by the Miles Morgan skills categories (for example, Leadership and Management skills, and Business and Compliance skills).

Eleven priority skills areas have been created:

• Industry and occupation specific skills (technical skills)
• Digital skills (i.e. new technologies, robotics and automation, big data, and cyber security)
• Leadership and management skills (i.e. leadership of self and others)
• Business and compliance skills (i.e. small business skills, and regulatory compliance)
• Collaboration skills (i.e. interpersonal skills, communication, and teamwork)
• Social platform and marketing skills (i.e. social media, marketing and customer service)
• Foundation skills (i.e. language, literacy and numeracy, including digital literacy)
• Analytical skills (i.e. data analysis, critical and creative thinking, and problem solving)
• Adaptability and learning skills (i.e. innovation, flexibility, and multiskilling)
• Sustainability and natural resource management skills (i.e. green skills)
• STEM skills (Science, Technology, Engineering and Mathematics).

Each area represents a range of relevant 'free-text' examples of more specific skills, requested by IRCs. For example, IRC demand for 'small business skills', 'business management' and 'compliance skills' in the Skills Outlook chapter of their Skills Forecast are captured within the 'Business and compliance skills' area. Best judgement was used to allocate 'free-text' responses to the most appropriate skill area from the list above.

The priority skill area 'industry and occupation specific skills' has been created to capture all the specific and technical skills IRCs have identified which are relevant to their industry or occupation.

Skills ranking

A systematic review of the Skills Forecasts from 2017 has been undertaken to identify which priority skills areas are most prevalent for the IRCs. More specifically, priority skills identified in the Skills Outlook chapter of each IRC Skills Forecast have been counted and ranked. Rankings are based on the proportion of all Skills Forecasts which identify and prioritise skills within a specific skill area. For example, a Skills Forecast may refer multiple times to different 'digital skills' in the Skills Outlook chapter (i.e. coding skills, digital literacy, and automation), but this is only counted once, against the 'Digital skills' area.

The priority skills area appearing in the most IRC Skills Forecasts was ranked 1st, while the skills area prioritised the least in IRC Skills Forecasts ranked 11th.

The case studies that are presented in each Priority Skills page are intended to provide more information about IRC or industry demand for a specific skill (and more detail about why that skill is a priority for that particular industry).

Generic skills, which have been ranked by IRCs in the Skills Outlook chapter of their Skills Forecasts, have also been considered, in relation to priority skill rankings.

However the focus of the Priority Skills pages is primarily on the skills listed as priorities by the IRCs. These generic skills align closely with the priority skills developed independently for this resource and have been referred to where appropriate throughout the Priority Skills pages (for example, presenting the relative rankings of aligned generic and priority skills areas – i.e. the ranking of 'Communication/Virtual collaboration/Social intelligence' and 'Collaboration skills').

Key initiatives

Overview

This section provides information on, and links to activities and initiatives of the Australian Industry and Skills Committee and its network of Industry Reference Committees (IRCs).

This includes cross-sector projects currently underway and other training package review and development initiatives. The cross-sector projects aim to address common skills needs, minimise duplication of units, consolidate existing units and remove units that are no longer being used. Projects include:

Automation

Examines the workforce skilling implications and identifies related skills needs shared by multiple industry sectors in relation to the use of robotics, drones and remote operation systems.

For more information and an update on progress visit the Skills Impact website.

Big data

Reviews current and emerging developments in big data skills, particularly in relation to data management, data analytics and data-driven decision-making, and identifies related skills needs shared by multiple industry sectors.

For more information and an update on progress visit the PwC's Skills for Australia website.

Digital skills

Looks across a number of Training Packages to identify qualifications, skill sets and units of competency impacted by digital analytic/diagnostic skills, additive manufacturing (3D printing) skills, and programming/coding skills.

For more information and an update on progress visit the Innovation and Business Skills Australia website.

Cyber security

Reviews current and emerging developments in cyber security skills, particularly in relation to data confidentiality, protection and privacy, and identify related skills needs shared by multiple industry sectors.

For more information and an update on progress visit the PwC's Skills for Australia website.

Supply chains

Examines the implications of the major change underway across and within supply chains due to the impact of automation, robotics, big data and other new technologies. The addition of disruptive technologies has only increased the need of supply chain related industries to become innovative and seek new practices to increase efficiency, meet consumer demands and become more competitive. The skills needed to support innovation and new technologies will be the key to the future success of industry throughout the supply chain.

For more information and an update on progress visit the Australian Industry Standards website.

Environmental sustainability

Reviews current and emerging developments in environmental sustainability skills, the skills required to support transition to a sustainable economy. The project examines workforce skilling implications and identify related skills needs shared by multiple industry sectors in relation to environmentally sustainable products, manufacturing and waste processes, and sustainable energy production.

For more information and an update on progress visit the Skills Impact website.

Teamwork and communication

Looks to understand industry support for developing common teamwork and communication units to be used across multiple industry sectors.

For more information and an update on progress visit the Skills for Australia website.

Inclusion of people with disability

Investigates how Australia's VET system can be improved to build the capability of educators and employers to better support people with disability.

For more information and an update on progress visit the Skills for Australia website.

Consumer engagement via online and social media

Aims to identify the common skills needs of industries in relation to consumer engagement through online and social media in order to inform the update and/or development of future Training Package products.

For more information and an update on progress visit the SkillsIQ website.

Other projects

The National Schedule details the training package review and development work currently underway and commissioned by the Australian Industry and Skills Committee (AISC) following advice from its network of Industry Reference Committees (IRCs).

For more information on AISC initiatives and any recent announcements please visit the AISC website.