August 2021

Demand & Impacts on Tech & Digital Skills

An ACS Technical White Paper

Louise Smith
Director Workforce Development & Education

Foreword

ACS' *Demand & Impacts on Tech & Digital Skills White Paper 2021* offers current state analysis of the directions taken with tech and digital skills in Australia. ACS provided a first view of how skills were being used in tech and digital roles in December 2013 with the publication of the *ICT Skills White Paper - Common Job Profiles and Skills Mobility* and has been using industry intelligence to refresh that data since. *Technology & Digital Skills White Paper* brings a fresh focus to the contemporary Australian technology and digital skills picture using data from the recent *ACS Tech & Digital Skills' Survey 2020.*

The ongoing strong demand for ICT/technology workers and skills is consistent with the role that digital technologies continue to play in driving Australia's economic growth. The increased digitisation of Australian businesses' operations across all sectors of the economy has resulted in a greater reliance on the technical skills and capabilities within ICT to drive this change.

Digitisation of Australian businesses is driven by the way businesses adapt and, in response to COVID-19 adoption, has resulted in retailers embracing e-commerce, schools and higher education providers transitioned to online learning, and Australian workers almost twice as likely to work from home in February 2021, compared to March 2020[i]. Despite the serious national and international economic and employment impacts of the global COVID-19 pandemic, the demand in technology has lead to demand in digital infrastructure and services which are enabled by technology workers.

ACS' *Demand & Impacts on Tech & Digital Skills White Paper* provides a stocktake and profiling for 90 tech and digital job roles, and a detailed examination of the digital workforce trends, skills and capabilities increasingly needed across the economy. Tech and digital workers need the right skills and capabilities to meet the demands of Australian businesses; the *Demand & Impacts on Tech & Digital Skills White Paper* focuses on the top five skills in demand for tech and digital job roles described against Skills Framework for the Information Age (SFIA)[ii] and informed by the results from the *ACS Tech & Digital Skills Survey 2020.*

The analysis within this White Paper adds rigour to skills benchmarking for ICT and digital professionals in the Australian context, and technology-rich organisations using SFIA, the globally recognised capability framework. SFIA is used by ACS and other international ICT professional associations to identify the technical and non-technical skills that make up ICT and technology roles.

Thanks to the ACS Workforce Development team for the industry-intelligence and research into skills and capabilities for the ICT and technology workforce. We look forward to ACS' *Demand & Impacts on Tech & Digital Skills White Paper* providing valuable insights into the question of what skills are expected for ICT, tech and digital roles and occupations in Australia.

Contents

Introduction

> Despite the health and economic crisis, the ICT & technology workforce grew by 33,400, to 805,525 workers representing an annual increase of 4.3% while other professional industries grew by 1.3% over the same period and the overall number of people employed in Australia shrank by 1.7%.[iii]

In this context the *ACS Tech & Digital Skills Survey 2020* was conducted through July and August 2020 with more than 1700 respondents. The survey results provided data that underpin the analysis of ICT and technology roles and skills presented in this Paper that are woven through Australia's technology landscape.

A specialised report produced for ACS by FÆTHM - *Technology Impacts on the Australian Workforce*, released in March 2020 suggested there is much to be considered, and planned for, to achieve the projected growth of technology workers and especially to regrow Australia's economy post the COVID-19 pandemic.

A core feature of ACS' services is enabling partner organisations, and technology professionals, to plan for future technologies which, according the FÆTHM report, has business automation taking place at a rate considerably faster than had been expected. Recognising now that automation, as well as augmentation, of roles is the immediate future, allows organisations and technology professionals to face forward and strategically shift their skills trajectory. With technology jobs set to increase from around 750,000 (in 2019), to 1.2m in 2035[iv], rather than following a BAU path, the information on technology skills and roles provided in this Paper, enables longer-term development and transition to support assertive forward business planning.

Technology Impacts on the Australian Workforce reports that automation and tech augmentation are going to affect 36% of the Australian workforce over the next 15 years, investigating and understanding the 'where to' for professionals in tech and digital roles in all industries in Australia, is especially important – this Paper intends to assist with that thinking and planning.

To follow, in an area in which ACS takes a close interest, *Technology Impacts on the Australian Workforce* reports that augmentation and automation will have a disproportionate effect on women in technology roles. That the number of women in the digital and technology workforce remains at best 30%, is confirmed by the *ACS Tech & Digital Skills Survey 2020*, with women respondents being 20%.

Over the next 15 years, an additional 5.3 million new jobs could be added to the Australian economy with 22% of these being jobs required to support technology adoption and implementation. Health Care and Social Assistance will be the industry with the highest job growth rate, while Finance and Insurance Services will have the highest proportion of new technology jobs[v]. Access to skills (businesses), jobs (tech and digital professionals) and wealth creation (both) are possible with a clear look at the future.

ICT & TECHNOLOGY WORKFORCE GREW BY

33,400 to

805,525

REPRESENTING AN ANNUAL INCREASE OF

4.3%

This outlook suggests that the better understood the skills position of businesses, their roles and the striving of tech and digital professionals, the better placed all will be to meet, move with and drive the new future where automation and augmentation are the normal.

Drawing from a range of sources, the Australian Bureau of Statistics (ABS):

> Unlike most other industries, IMT[vi] reported a fall of 10.8% in EBITDA (Earnings before interest, taxes, depreciation, and amortization), down $2.1b in 2018-19, compared with 2017-18.
>
> The $2.1b decline in EBITDA was driven by the Telecommunications Services and Broadcasting (except internet) subdivisions which reported falls of $1.8b and $1.1b respectively.
>
> This was partially offset by the Internet service providers, web search portals and data processing services subdivision which saw a rise of $809m in EBITDA.
>
> Although employment declined slightly 1,000 people (down 0.6%), wages and salaries increased 6.2% ($951m), driven by Telecommunications services which reported a rise of 13.7% ($932m).

A new piece of work, the Australian Skills Classification, was published by the National Skills Commission on 18 March 2021. The Classification uses the ANZSCO[vii] occupation descriptions to which it allocates core competencies, identifies related specialist tasks, assigns a level of proficiency (low, medium, high) and associates technology tools used when completing the specialist tasks. The Classification is a significant resource across Australian industries and, while important in how it is used by a range of agencies SFIA, with its specific attention to the skills needed for tech and digital roles, deepens the understanding of skills with the application of its six categories in which technology and digital skills operate and identifying up to seven Levels of Responsibility.

01

Key Insights | Roles & Skills Overview

ACS - DEMAND & IMPACTS ON TECH & DIGITAL SKILLS WHITE PAPER 2021

CURRENT STATE

TOP 5 OF 22 STREAMS

Growth & demand for tech & digital skills in:

- Design & development
- Systems administration
- Data, big data & data science
- Security - cyber, systems & information
- Business analysis

TOP 5 INDUSTRIES

The greatest ## tech workers are in:

- Information, Media & Telecommunications (31%)
- Professional, Scientific & Technical Services (14%)
- Financial & Insurance Services (11%)
- Education & Training - Adult, Community & Other Education (9%)
- Health Care & Social Assistance (5%)

TOP 15 SKILLS

Most used tech/digital skills:

- Programming/software development
- Specialist advice
- Testing
- Strategic planning
- Relationship Management
- Methods and tools
- Business analysis
- Systems design
- Business process improvement
- Software design
- Analytics
- Data modelling and design
- Performance management
- Solution architecture
- Consultancy

HIGHEST DEMAND ROLES

Transition to 2035 - after augmentation & automation (in 000s)

- Software Developers, Systems Software - 66.2
- Software Developers, Applications - 65.7
- Data Engineers - 48.5
- Process Improvement Analysts - 46.5
- Data Scientists - 44.5

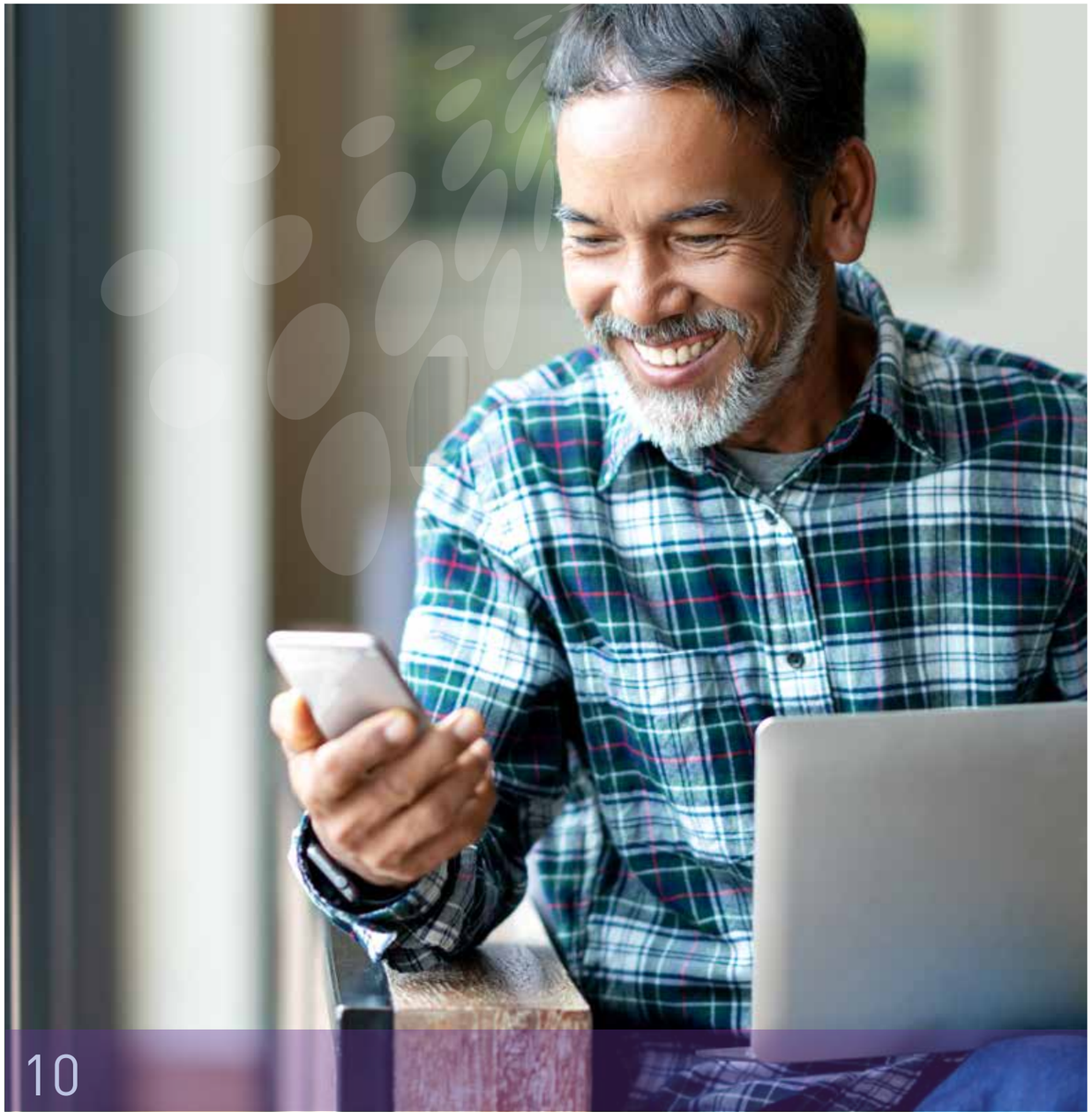
TOP 15 OF 100 ROLES

Topline tech/digital roles:

- Business Analyst
- Developer/Programmer
- Systems Administrator
- Software Engineer
- Data Analyst
- General Manager
- Security Analyst
- Project Manager
- FullStack Developer
- Solution Architect
- Test Analyst
- ICT/IT consultant
- Service Delivery/Operations Manager
- Academic
- Program Manager

Figure 1: Key Metrics, Roles & Skills Overview

02



Impact & Demand of the Tech & Digital Workforce

Looking at the impact on digital and technology industries, roles/occupations and skills – and providing models of the most common, the most influential and the more niche roles and skills allows:

- Tech and digital professionals to focus their career plans to future skills in demand
- Businesses to consider their current skills base and how that will need to change to meet future directions
- Educators to understand the skills movements needed and provide products and services that support skills uplift or movement to other technologies or pathways
- Advocates on future skills directions for tech and digital roles, and the industries to which these skills and roles are now integral
- Adoption of a wider perspective and more thoughtful look at diversity objectives; for example, the need for data on tech and digital professionals from non-English speaking backgrounds, and the extent to which women are taking up technology careers

In working out demand for technology workers in Australian industries, we look closely at the future. While somewhat ironic, looking closely to the future is exactly what *Technology Impacts on the Australian Workforce* reports.

Focussing to 2035, FÆTHM'S *Technology Impacts on the Australian Workforce* identifies that skills in several tech and digital roles will be redundant – not immediately - but surely. It is a truism that not all industries, businesses and individual technology and digital professionals are 'fast' adopters, we are all however eventually adopters.

Imagine highly regarded and high operating professionals - who never envisaged needing to substantially use technology and digital devices in their professional lives having, in a restricted COVID-19 environment, worked and socialised from home using many digital channels. This group have become adopters at 60 to 80 years of age. Never more has the statement 'things change' really meant that, as has the technology to enable and support (or even allow) the change.

This paper looks at specifics that are having, or will shortly have, impacts more deeply and widely than many of us would have imagined. It also recognises the core economic, industry and business drivers against which ACS delivers services to its individual members and professional partner organisations:

- Australia's growing digital economy and the impacts of automation and augmentation across industries, technology roles and the industries within which they sit
- Where diversity differences are most visible with women continuing to work at approximately 30% of men in tech and digital roles
- The very sharp and the everyday – this is why we are differentiating roles and related skills – by providing signals about the skills that are most used in the important, but everyday roles, as well as identifying the roles using newer, growth technologies and related niche skills

While the growth in tech and digital roles is well documented, *ACS' Information Age* (March 2020) lined up immediate jobs and skills demand against SEEK data from a number of frontline tech businesses:

> *Growth rates in Information & Communication Technology industry in the fortnight ending 14 February 2020 are strong, up 16.3% nationally, continuing on from a 10.2% rise in the previous fortnight, Seek reports. ACS has seen a significant increase in demand, up 25%. Growth is also occurring in Victoria (+22%), Queensland (+20%), New South Wales (+19%), and South Australia (+16%).*
>
> *Further, a cloud computing services firm specifically reported tight supply of Salesforce Engineers and Cloud Architects, with an absolute lack of people at all levels of the Salesforce ecosystem, particularly in the mid to top levels.*

The implementation of SFIA is work undertaken by ACS with its professional partners to benchmark and plan the uplift of skills used across roles that are primarily, but not exclusively, technology roles. Increasingly across ACS' professional partnerships the applicability of SFIA, with its five core competencies and 102+ specialist skill descriptors, is being used to support organisations to take advantage of the robust skills identification for benchmarking their current and future skills states.

In this context the National Skills Commission's Australian Skills Classification landed (18 March 2021). The Classification allocates core competencies, specialist tasks, a level of proficiency (low, medium, high) to existing ANZSCO described occupations, and associates technology tools used for completing the specialist tasks. The Classification is powerful in its reach right across Australian industries. However, for technology skills and roles (across all industries) SFIA, being a competency framework with two decades of evolution of skills descriptors, provides a deeper view of the application of tech and digital skills to roles in the Australian and international contexts.

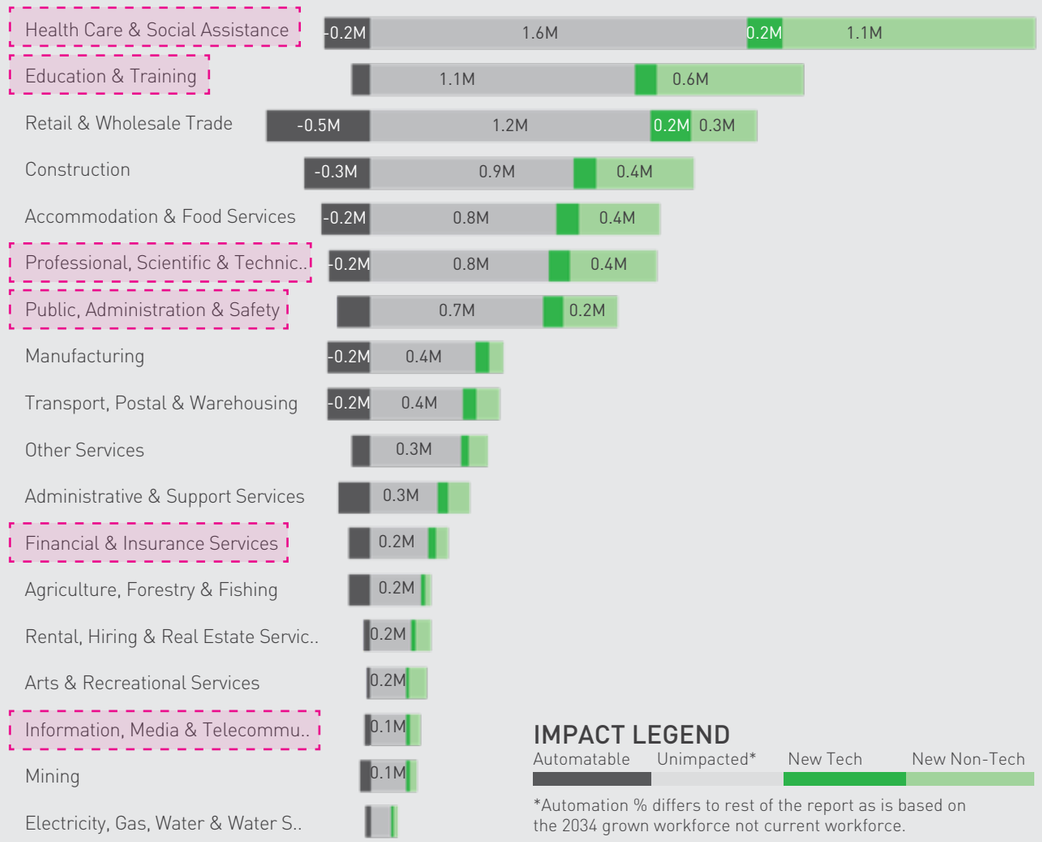
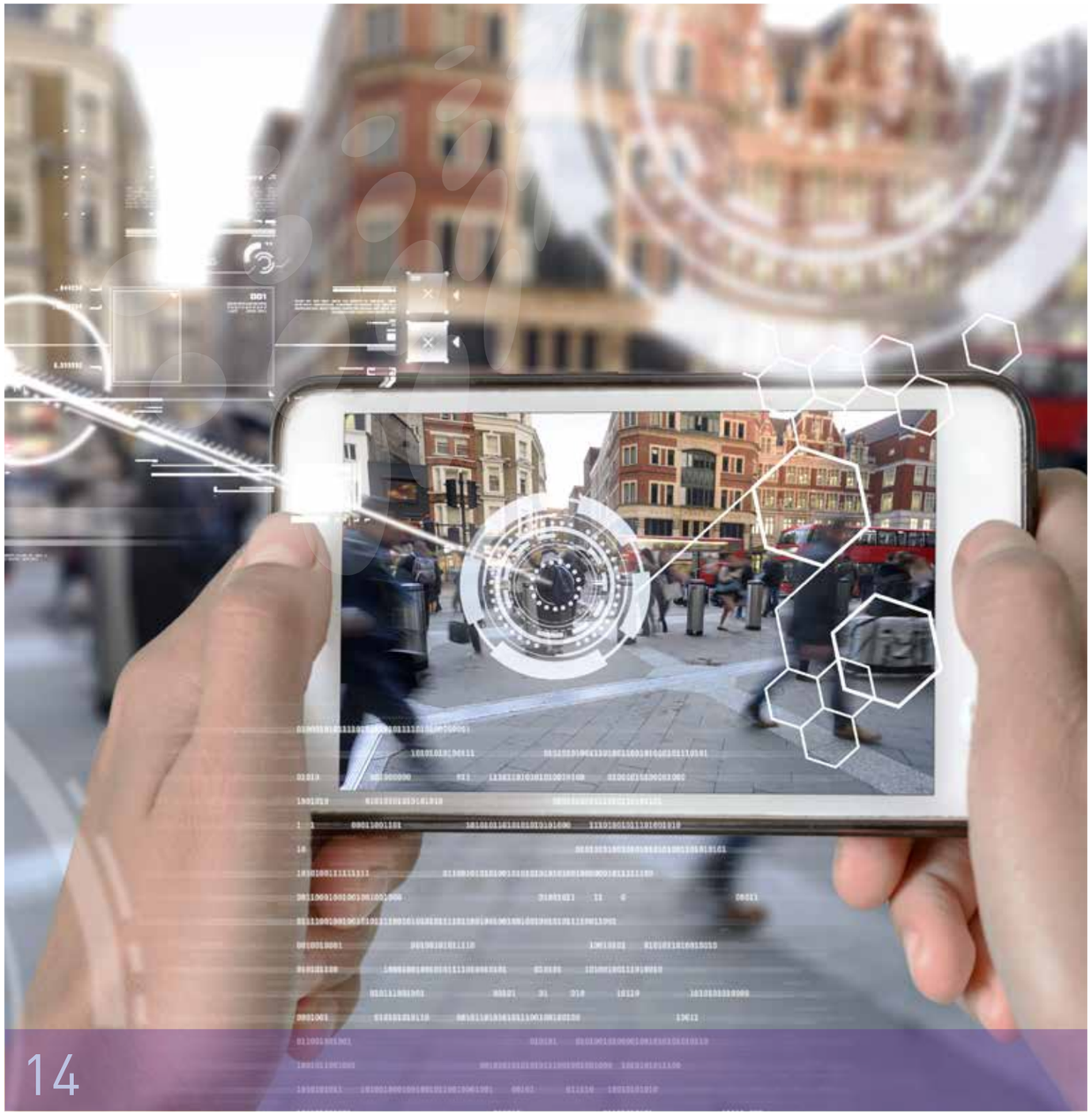


Figure 2: Technology Adoption and Implementation, *ACS Technology Impacts on the Australian Workforce 2020*

03



Where to with Technology Skills & Roles - Automation & Augmentation

> The *Technology Impacts on the Australian Workforce* report states that 'technology adoption and implementation could lead to an additional 1.2 million new technology jobs by 2034'[viii] – a good thing.

While the industry benefits of increasing demand for technology jobs is recognised, there is nevertheless pain in these messages – across all Australian industries - centring around job losses and changes as a result of automation and augmentation, and transition to new technology roles.

The figure below shows the top 18 roles (across Australia's 18 industries) in highest in demand by 2035 – with data aggregated from the *Technology Impacts on the Australian Workforce* report[ix].

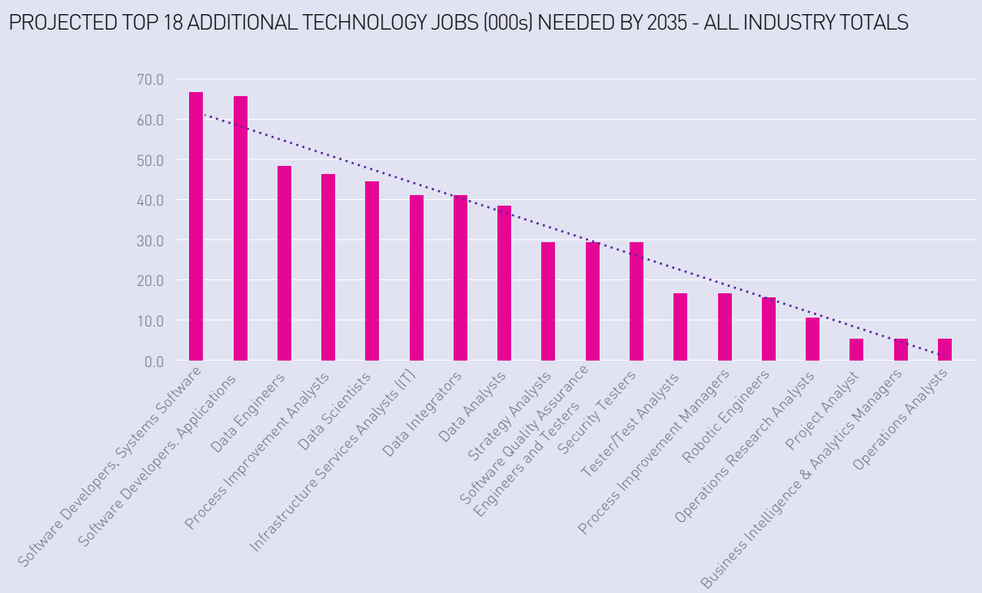


Figure 3: *Technology Impacts on the Australian Workforce*, March 2020

When this data is cross referenced to the most reported roles and related skills from the *ACS Tech & Digital Skills Survey* 2020, we are able to suggest the domains and roles that are currently well positioned to transition to the 2035 roles – these are shown in Table 1 and give details of translation to the roles reported in this Paper, enabling tracking from roles in demand to related skills.

For example, FÆTHM'S Security Testers map to the *ACS Demand & Impacts on Tech & Digital Skills White Paper* role of Security Analyst, the top skills for this role are Information security, Security administration, Analytics, Strategic planning, Information governance – with the related skills reported covering up to 30 distinct skills.

The skills profiles of the top 90 tech and digital roles are available in ***Appendix 1***, with *Table 1* providing a guide on skills transition options. Using this cross-referencing process also displays data on future skills directions that can be used by technology professionals in their skills and career planning.

FÆTHM – Top Projected Growth Roles	ACS Tech & Digital White Paper Roles	ACS Defined Career Stream
Software Developer, Systems Software	Software Architect	Design & Development
Software Developer, Applications	Software Engineer	Design & Development
Data Engineer	Data Engineer	Data, Big Data & Data Science
Process Improvement Analyst	Innovation Manager	Product Management, StartUps, Innovation
Data Scientist	Data Scientist	Data, Big Data & Data Science
Infrastructure Services Analyst (IT)	Service Delivery/Operations Manager	Service Delivery & Management
Data Integrator	Data Engineer	Data, Big Data & Data Science
Data Analyst	Data Analyst	Data, Big Data & Data Science
Strategic Analyst	Service Risk Manager	Service Delivery & Management
Software Quality Assurance Engineer & Tester	Quality Analyst Test Assurance Officer	Governance & Quality Management Testing
Security Tester	Security Analyst	Security – Cyber, Systems & Information
Tester/Test Analyst	Test Analyst	Testing
Process Improvement Manager	Enterprise Architect	Digital Transformation
Robotic Engineer	Machine Learning Engineer	AI, Machine Learning, Robotics
Operations Research Analyst	Service Delivery/Operations Manager	Service Delivery & Management
Project Analyst	Business Analyst	Project, Program, Portfolio Management
Business Intelligence & Analytics Manager	Analyst Relations Manager	Blockchain
Operations Analyst	Business Analyst	Project, Program, Portfolio Management

Table 1: Mapping of FÆTHM Top Roles to *ACS Demand & Impacts on Tech & Digital Skills White Paper* roles

Under the headlines of five industries - where the majority of technology roles and professionals are working, the predicted automation and (technology) augmentation impacts are considered in:

- Information, Media and Telecommunications (with Professional, Scientific and Technical Services)
- Financial Services
- Education and Training, and
- Healthcare and Social Services

The following references are extracts from the *Technology Impacts on the Australian Workforce* report unless otherwise labelled.[ix] In addition to Table 1 above, and using these extracts, the figures over the coming pages combine with data from the *ACS Tech & Digital Skills Survey 2020*, make visible the skills that will support role transitions from this point to 15 years forward.

The legend immediately below refers to figures that show both automation and augmentation exposure:

IMPACT LEGEND

Unimpacted % Augmentable % Automatable %

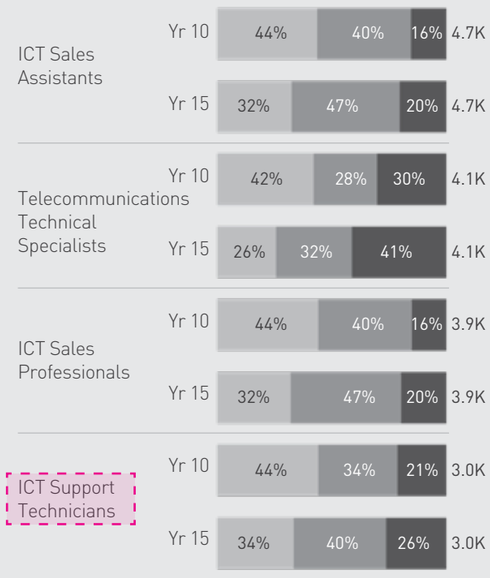
INFORMATION, MEDIA & TELECOMMUNICATIONS, COMBINED WITH PROFESSIONAL, SCIENTIFIC & TECHNICAL SERVICES

In terms of the standard identification of industries (ANZSIC – the Australian and New Zealand Standard Industry Classification), most people in tech and digital roles sit across two areas – firstly Information, Media and Telecommunications and secondly the Technical Services component of Professional, Scientific and Technical Services.

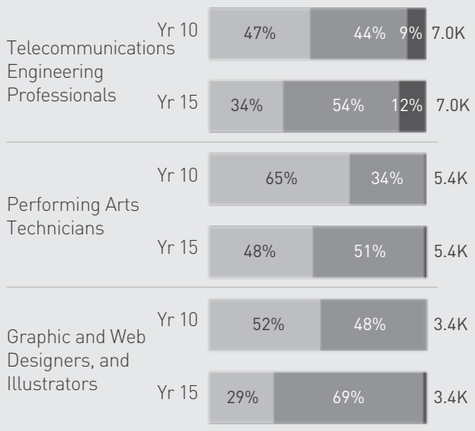
Information, media and telecommunications

TOP 5 TECHNOLOGIES AFFECTING THIS INDUSTRY AT YEAR 15

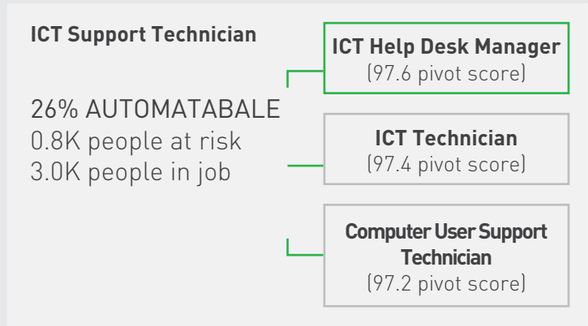
JOBS MOST EXPOSED TO AUTOMATION



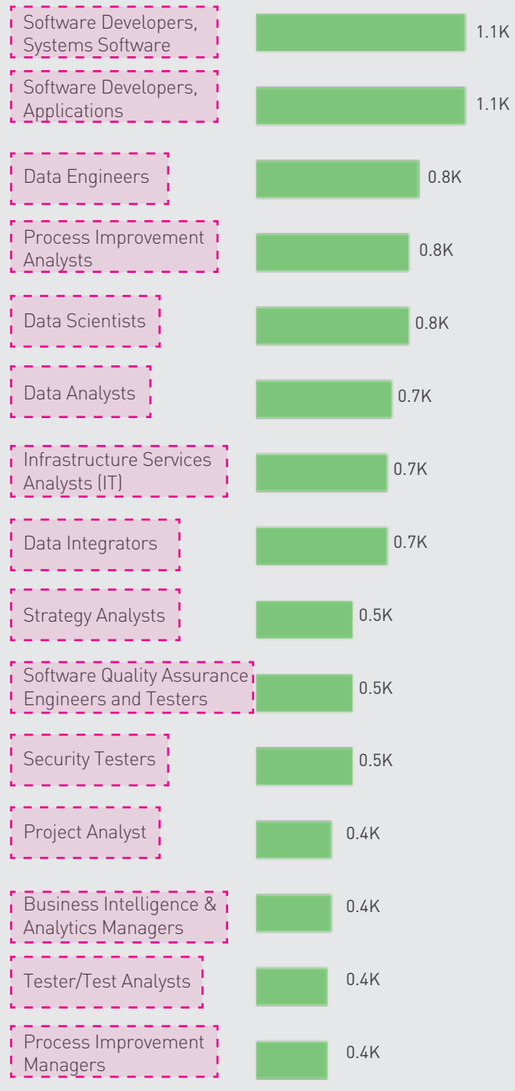
JOBS MOST EXPOSED TO AUGMENTATION



An example of tech and digital reskilling – from ICT Support Technician to three suggested technology roles: ICT HelpDesk Manager, ICT Technician or Computer User Support Technician. The relevant profiles - see ***Appendix 1*** are in the Service Delivery & Management career stream.



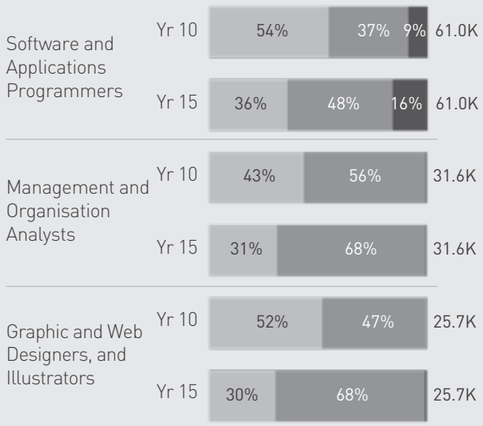
ADDITIONAL TECH JOBS REQUIRED (top 15)



Professional, scientific and technical services

TOP 5 TECHNOLOGIES AFFECTING THIS INDUSTRY AT YEAR 15

JOBS MOST EXPOSED TO AUGMENTATION

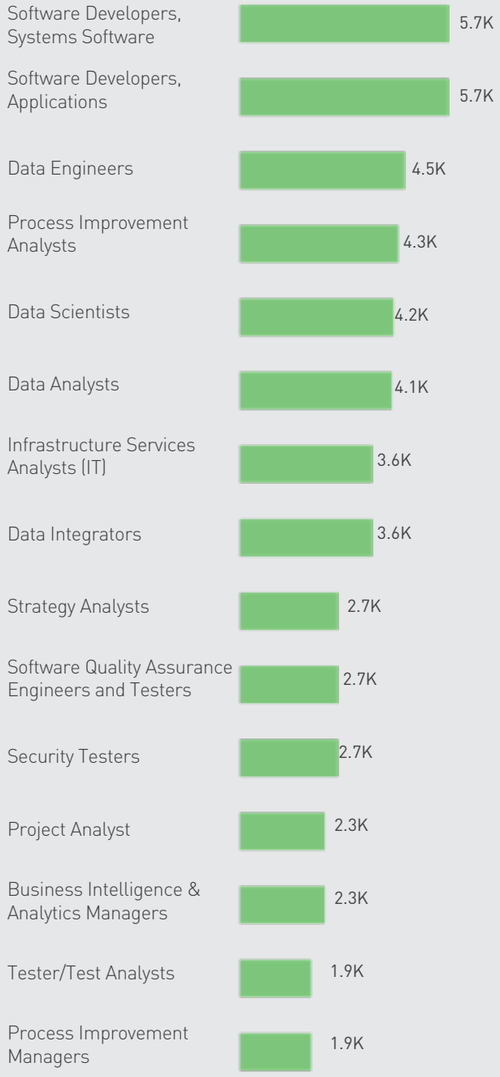


ICT Business & Systems Analyst

31% AUTOMATABALE
3.7K people at risk
11.7K people in job

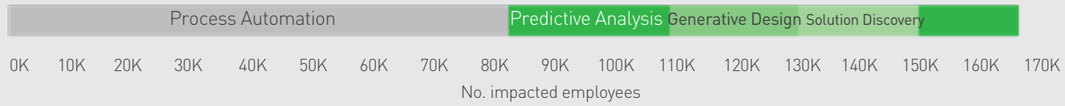
- **Information & Organisation Prof.** (97.0 pivot score)
- **Infrastructure Services Analyst (IT)** (96.2 pivot score)
- **Cyber Security Analyst** (95.7 pivot score)

ADDITIONAL TECH JOBS REQUIRED (top 15)

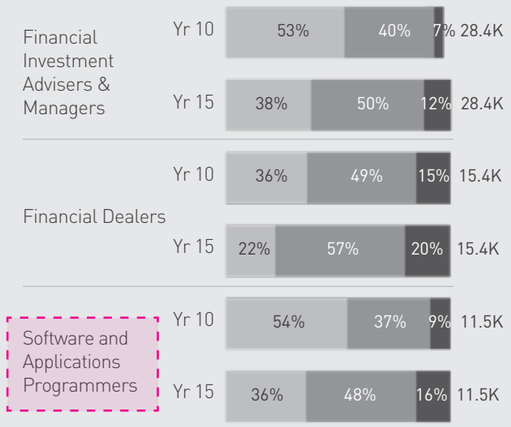


FINANCIAL SERVICES

TOP 5 TECHNOLOGIES AFFECTING THIS INDUSTRY AT YEAR 15



JOBS MOST EXPOSED TO AUGMENTATION



Insurance, Money Market & Statistical Clerks

53% AUTOMATABALE
13.9K people at risk
26.2K people in job

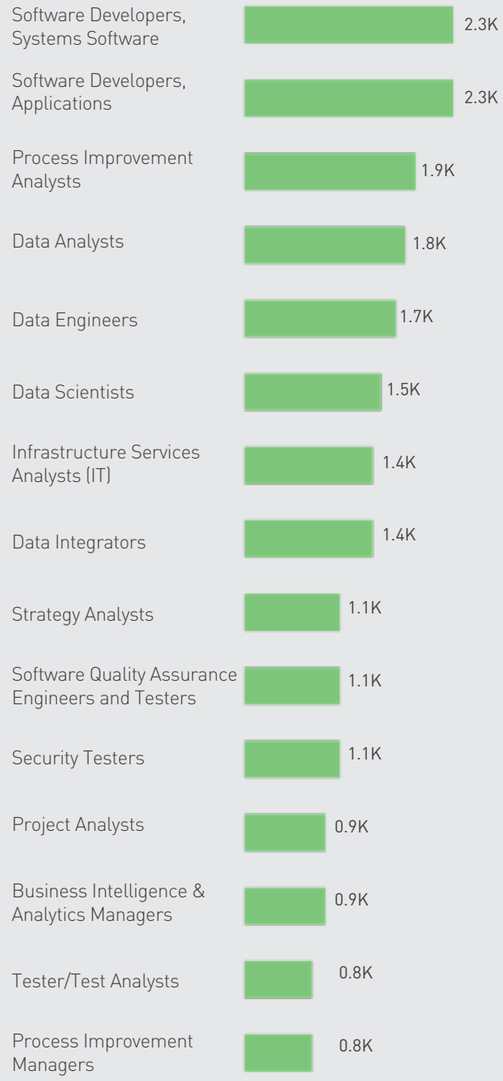
- **Cyber Security Analyst** (55.6 pivot score)
- **Infrastructure Services Analyst (IT)** (52.3 pivot score)
- **ICT Sales Professional** (46.3 pivot score)

Bank Workers

49% AUTOMATABALE
30.4K people at risk
61.8K people in job

- **Beauty Therapist** (90.0 pivot score)
- **Visual Merchandiser** (79.3 pivot score)
- **Cyber Security Analyst** (67.8 pivot score)

ADDITIONAL TECH JOBS REQUIRED (top 15)



EDUCATION AND TRAINING

TOP 5 TECHNOLOGIES AFFECTING THIS INDUSTRY AT YEAR 15

Gallery, Library & Museum Technician

31% AUTOMATABALE
1.2K people at risk
4K people in job

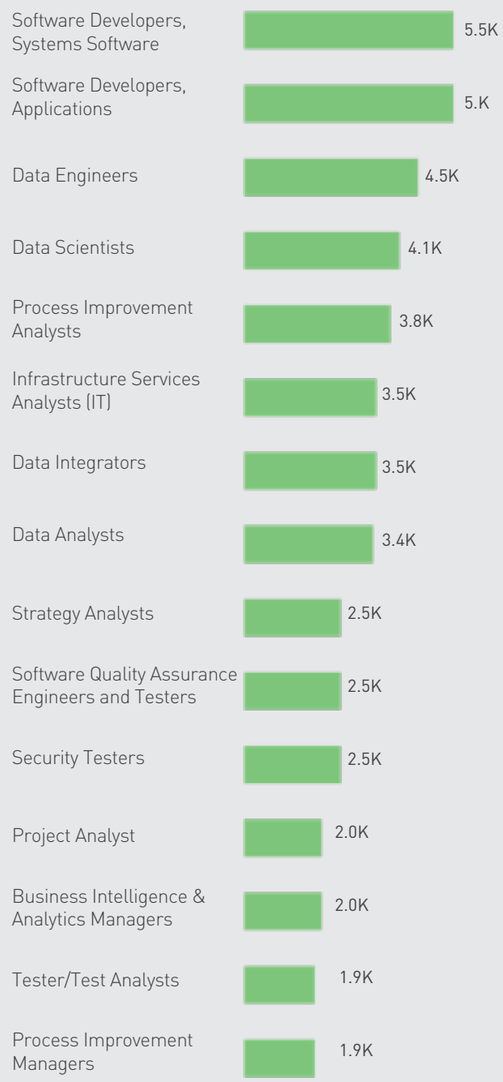
- **Film & Video Editor** (66.5 pivot score)
- **Cyber Security Analyst** (61.9 pivot score)
- **ICT Security Consultant** (59.0 pivot score)

Science Technician

28% AUTOMATABALE
1.1K people at risk
3.8K people in job

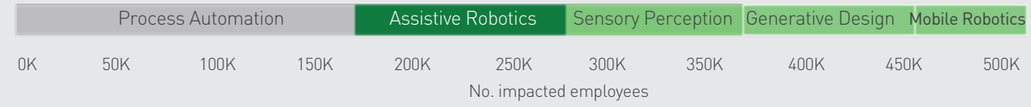
- **Zoologist & Wildlife Biologist** (92.2 pivot score)
- **Water Resource Specialist** (85.1 pivot score)
- **Security Management Specialist** (78.1 pivot score)

ADDITIONAL TECH JOBS REQUIRED (top 15)



HEALTH CARE & SOCIAL ASSISTANCE

TOP 5 TECHNOLOGIES AFFECTING THIS INDUSTRY AT YEAR 15



Keyboard Operator

45% AUTOMATABALE
4.1K people at risk
10.1K people in job

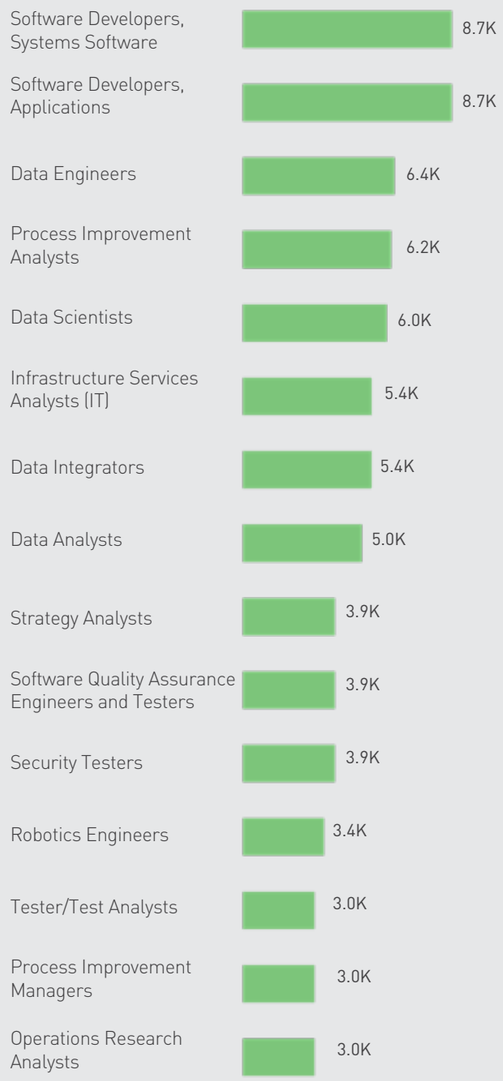
- **Cyber Security Analyst** (74.8 pivot score)
- **Info. & Organisation Professional** (74.1 pivot score)
- **ICT Security Consultant** (73.8 pivot score)

Medical Laboratory Scientist

31% AUTOMATABALE
4.3K people at risk
13.9K people in job

- **Diagnostic Medical Sonographer** (90.5 pivot score)
- **Theatre Nurses in Robotic Surgery** (80.7 pivot score)
- **Cyber Security Analyst** (72.9 pivot score)

ADDITIONAL TECH JOBS REQUIRED (top 15)



04

Streams or Domains

For businesses reliant on tech and digital skills, and those working in these businesses, pathways are a feature of an individual's professional career journey or progression. At the high level, there are two drivers of ACS' workforce skills and capability projects: ensuring the future fit of available skills and 'retention' of the workforce. It is not news that the cost to commence and onboard a new starter is significantly higher than reconceiving an existing staff member and their skills – it needs to make economic and efficiency sense to bring in new people.

Identifying streams of tech and digital work within a business allows the business to more strategically consider internal mobility and skills uplift, as well as defensible decisions on recruitment. Skills and career streams or pathways, also called job corridors[ix] are an increasingly obvious way to conceptualise and structure skills acquisition.

The top five career streams are:

- Design & development
- Systems administration
- Data, big data & data science
- Security – cyber, systems & information
- Business analysis

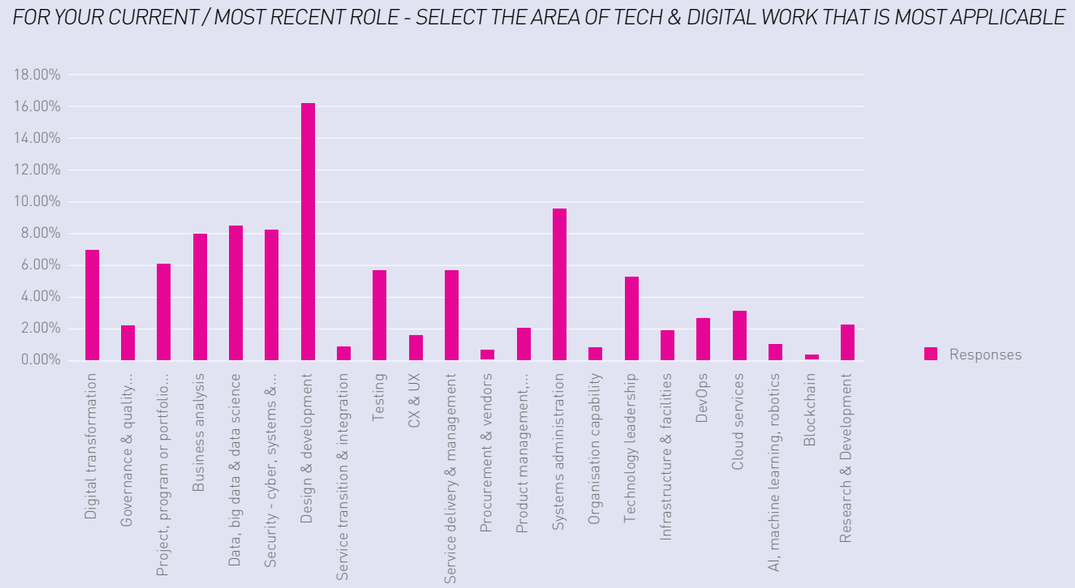


Figure 4: *ACS Tech & Digital Skills Survey 2020* - Technology Stream (pathway, job corridor) number selected

A significant outcome from the *ACS Tech & Digital Skills Survey 2020* is confirmation of the technical streams in which many of the survey respondents work; a future consideration is in what stream they and their businesses need them. For example, using the insights from the *Technology Impacts on the Australian Workforce* report we know that Telecommunications Technical Specialists and ICT Support Technicians roles are respectively 41% and 26% automatable. The *ACS Tech & Digital Skills Survey 2020* data can be used by businesses and IT professionals to pivot those roles into future demand such as Testers, Test Analysts, Security Testers, Data Integrators or Analysts – with specific skills development such as Testing, Data management, Programming/software development, Data visualisation and User experience analysis among others.

McKinsey also speaks to this challenge of the streams in which the future roles and skills will be located with an example in financial services, highlighted here from their article *Rewriting the rules: Digital and AI powered underwriting in life insurance*[x].

> The recent COVID-19 lockdowns and ongoing physical-distancing protocols reinforce the need to rethink underwriting. More than ever, insurance companies must address customer and agent frustration with the still lengthy, high-touch, manual process.

If we investigate the role destination of the Financial Services stream from *ACS Tech & Digital Skills Survey 2020*, we see that they are going firstly to Design & development (18.6%), secondly to Data (14.5%), then to Business analysis (9.6%) and equally to Security and Testing (7.8%), followed by Systems Administration (7.2%) and AI, Machine learning and robotics (1.8%).

05

Industries where Technology Professionals are Working

Typically, tech and digital occupations or roles have been located approximately 50% within the ICT industries and 50% in other industries. The *ACS Tech & Digital Skills Survey 2020* shows some shift in this metric with 45% of respondents being from the ICT industries – the combined Information, Media & Telecommunications and Professional, Scientific & Technical Services - that are referred to in *ACS Australia's Digital Pulse 2021* as the technology workforce.

The makeup of technology occupations reported in *ACS Australia's Digital Pulse 2021* varies at this point from the *ACS Tech & Digital Skills Survey 2020*. In the Survey, the remaining 55% of occupations are from other industries lead by Financial and Insurance Services, Education, Health and Social Services and Retail; the remaining industry makeup reported in *ACS Australia's Digital Pulse 2021* is led by the non-technology remainder of Professional, Scientific and Technical Services then Financial and Insurance Services and Public Administration and Safety (including Defence), showing the latter is underrepresented in the *ACS Tech & Digital Skills Survey 2020*.

This leaning into industries other than technology is not unexpected given the deep reliance on, and uptake of, tech and digital processes and services by other industries. Through workforce development activities with its professional partners, ACS sees similar distributions in the technology industries, financial services, education, manufacturing and utilities.

The top five reported industries are:

1. Information, Media & Telecommunications [31%]
2. Professional, Scientific & Technical Services [14%]
3. Financial & Insurance Services [11%]
4. Education & Training - Adult, Community & Other Education [9%]
5. Health Care & Social Assistance [5%]

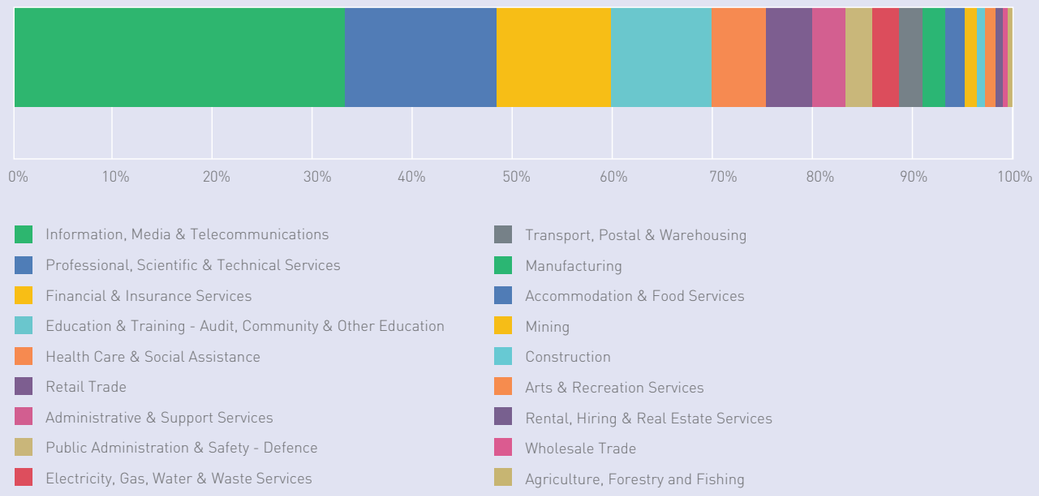


Figure 5: *ACS Tech & Digital Skills Survey 2020* – Industry selected

06

Top 15 Roles & Skills

ACS members have been the vital source of information and data on the topline roles and skills currently in use. Using role and skills data from industry intelligence, and from the *ACS Tech & Digital Skills Survey 2020*, the top 15 roles and related skills have been identified and described against SFIA.

Each of these 15 roles are listed with related skills in Appendix 1| 90 Tech and Digital Roles.

The following table identifies the fifteen top reported roles, the career streams within which they sit and the percentage of that stream each role makes up.

Features of the most reported roles and related skills:

- Four of the top fifteen roles are in the Design & Development stream – Developer/ Programmer, Software Engineer, FullStack Developer and Solution Architect
- Two of the top fifteen roles are in the Project, Program, Portfolio Management stream - Project Manager, Program Manager

Top 15 Roles	# Responses	Career Stream	% of Stream
Business Analyst	116	Business Analysis	94
Developer/Programmer	103	Design & Development	38
Systems Administrator	74	Systems Administration	50
Software Engineer	71	Design & Development	26
Data Analyst	60	Data, Big Data & Data Science	47
General Manager	43	Technology Leadership	52
Security Analyst	43	Security - Cyber, Systems, Information	40
Project Manager	42	Project, Program, Portfolio Management	41
Full Stack Developer	41	Design & Development	15
Solution Architect	38	Design & Development	14
Test Analyst	37	Testing	42
ICT/IT Consultant	36	Digital Transformation	47
Service Delivery/Operations Manager	36	Service Delivery & Management	53
Academic	35	Research & Development	90
Program Manager	35	Project, Program, Portfolio Management	34

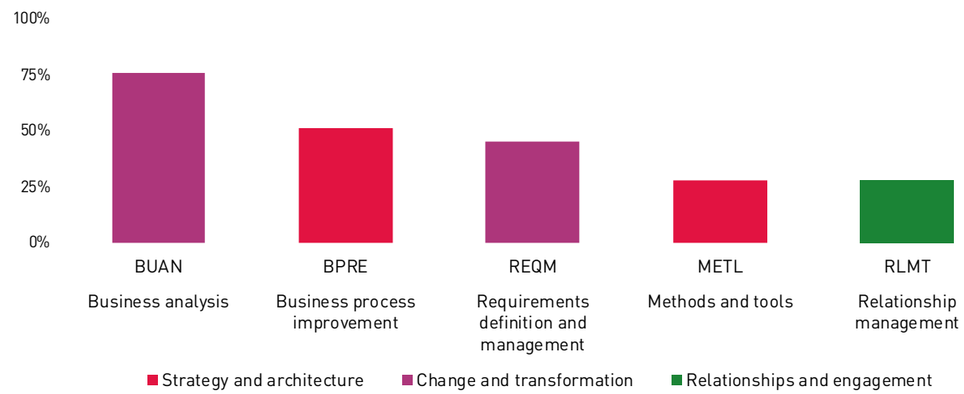
Table 2: *ACS Tech & Digital Skills Survey 2020* – Most reported roles

The following pages show the top 15 reported roles and the top five skills for each role.

BUSINESS ANALYST

The following five skills are the highest reported by 116 respondents against the Business Analyst role:

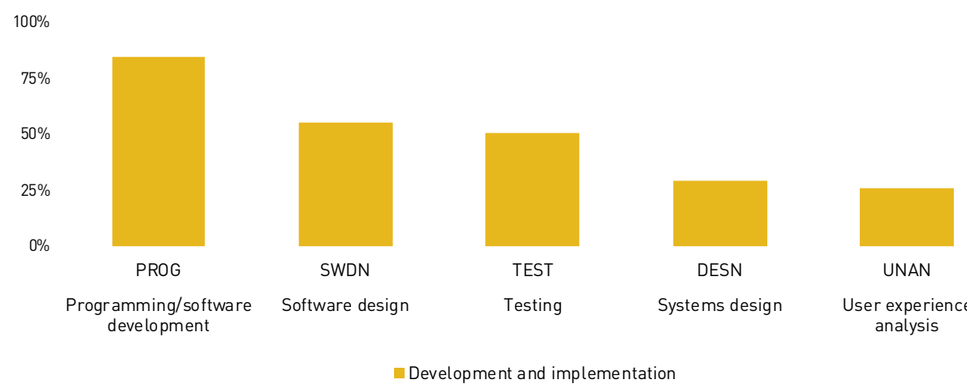
SFIA Level 5



DEVELOPER/PROGRAMMER

The following five skills are the highest reported by 103 respondents against the Developer/Programmer role:

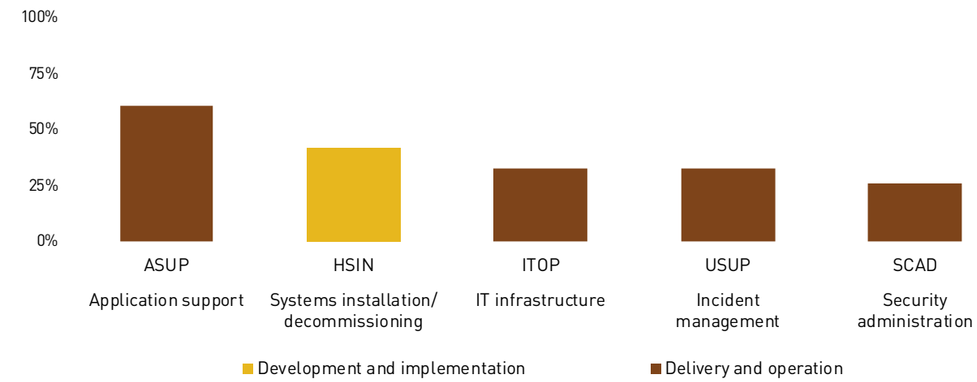
SFIA Level 4



SYSTEMS ADMINISTRATOR

The following five skills are the highest reported by 74 respondents against the Systems Administrator role:

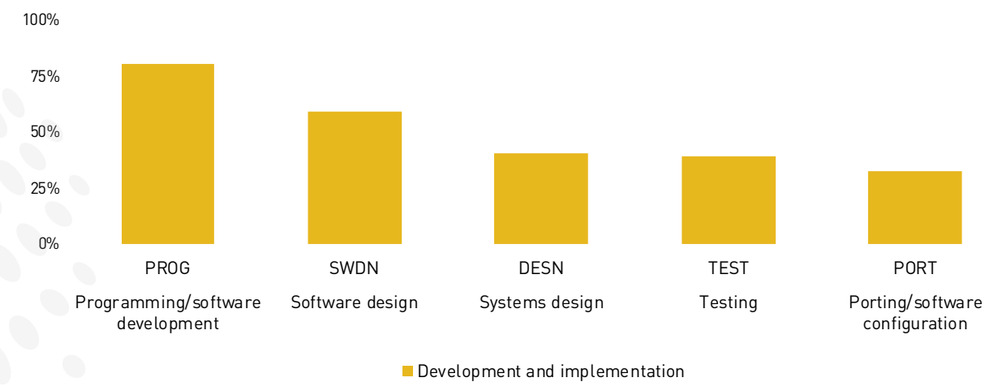
SFIA Level 4



SOFTWARE ENGINEER

The following five skills are the highest reported by 71 respondents against the Software Engineer role:

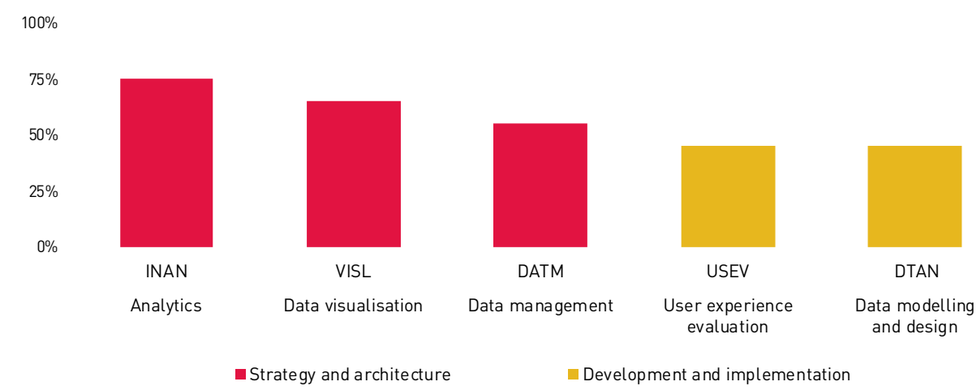
SFIA Level 5



DATA ANALYST

The following five skills are the highest reported by 60 respondents against the Data Analyst role:

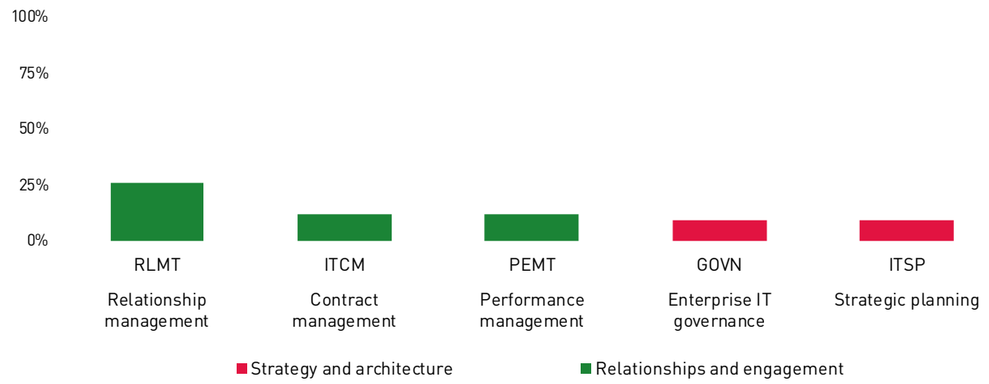
SFIA Level 4



GENERAL MANAGER

The following five skills are the highest reported by 43 respondents against the General Manager role:

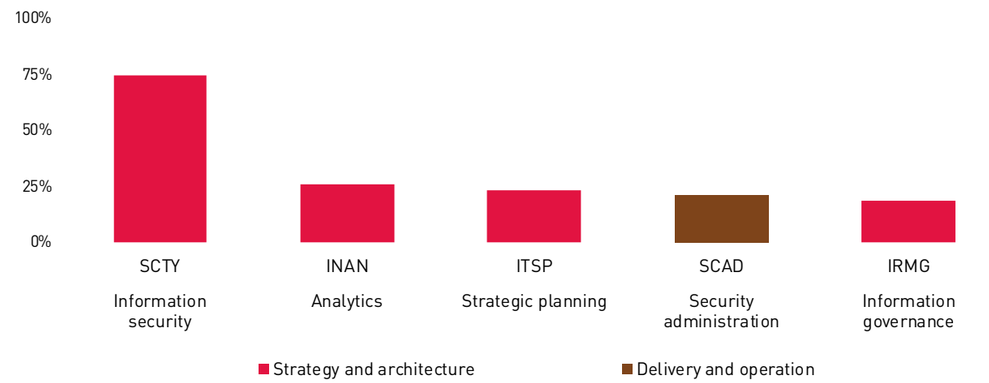
SFIA Level 6



SECURITY ANALYST

The following five skills are the highest reported by 43 respondents against the Security Analyst role:

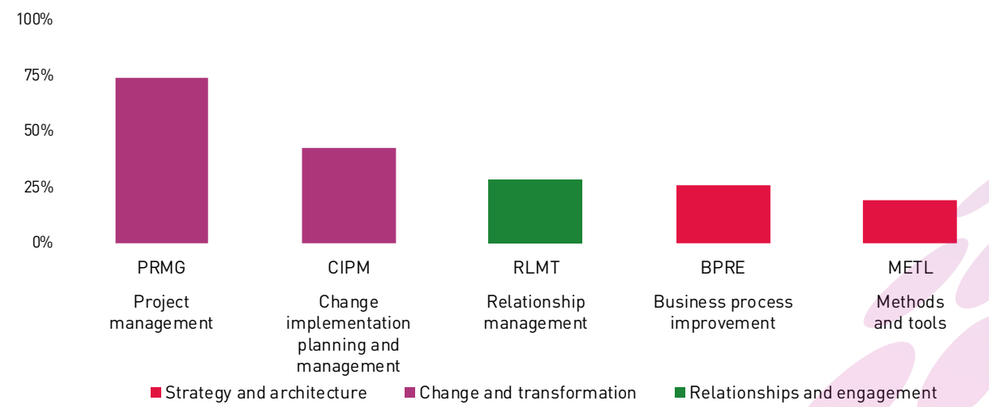
SFIA Level 4



PROJECT MANAGER

The following five skills are the highest reported by 42 respondents against the Project Manager role:

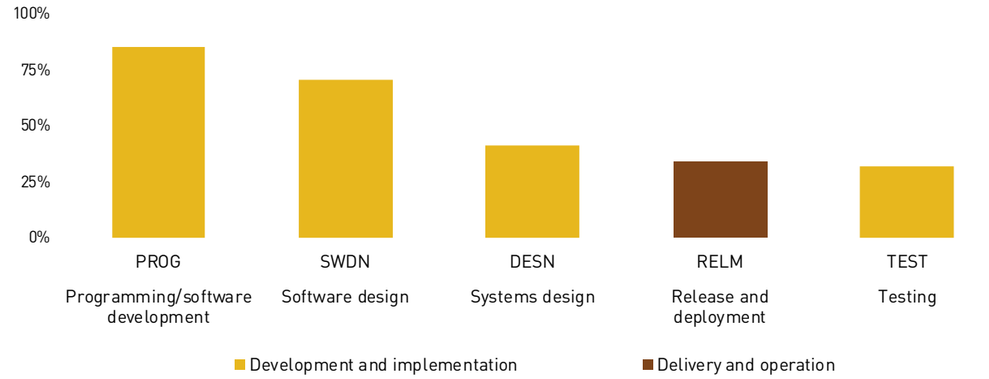
SFIA Level 5



FULLSTACK DEVELOPER

The following five skills are the highest reported by 41 respondents against the FullStack Developer role:

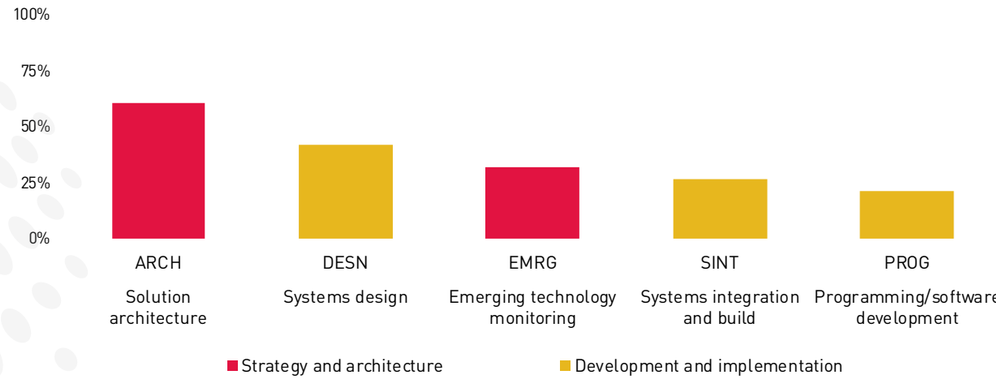
SFIA Level 4



SOLUTION ARCHITECT

The following five skills are the highest reported by 38 respondents against the Solution Architect role:

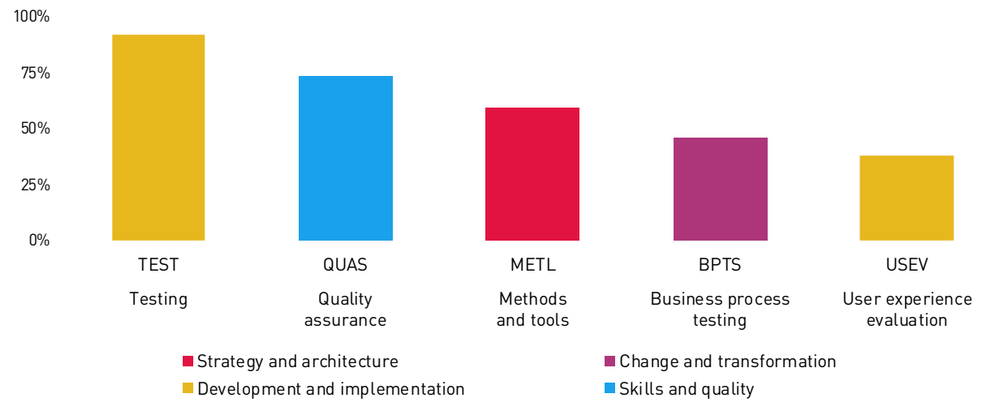
SFIA Level 5



TEST ANALYST

The following five skills are the highest reported by 37 respondents against the Test Analyst role:

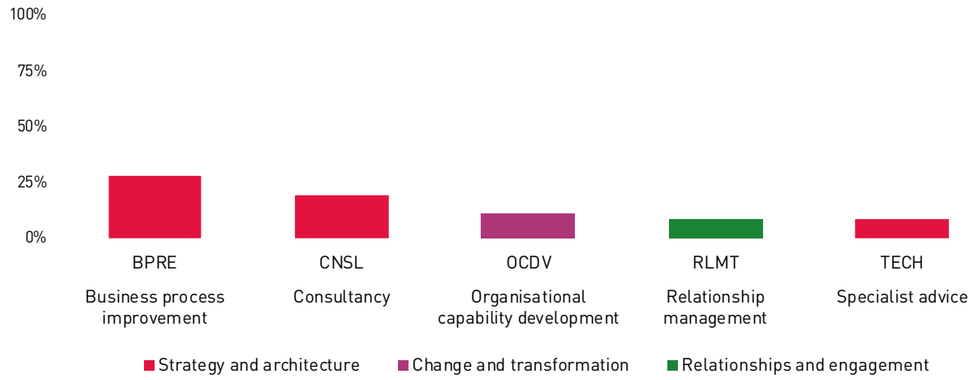
SFIA Level 4



ICT/IT CONSULTANT

The following five skills are the highest reported by 36 respondents against the ICT/IT Consultant role:

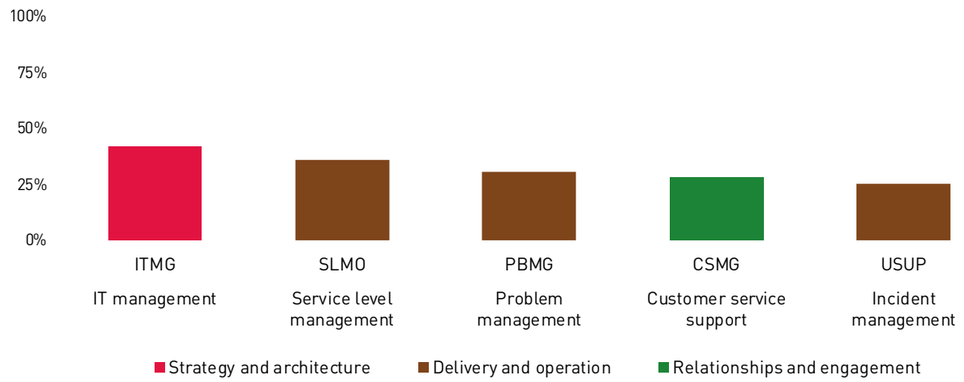
SFIA Level 5



SERVICE DELIVERY/OPERATIONS MANAGER

The following five skills are the highest reported by 36 respondents against the Service Delivery/ Operations Manager role.

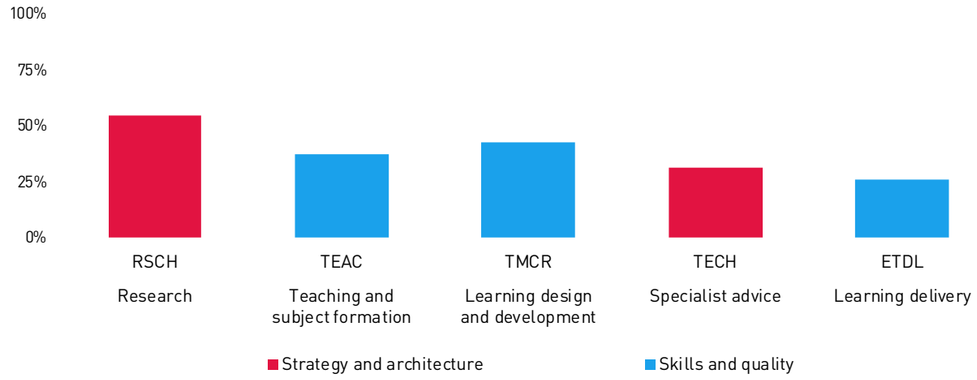
SFIA Level 5



ACADEMIC

The following five skills are the highest reported by 35 respondents against the Academic role:

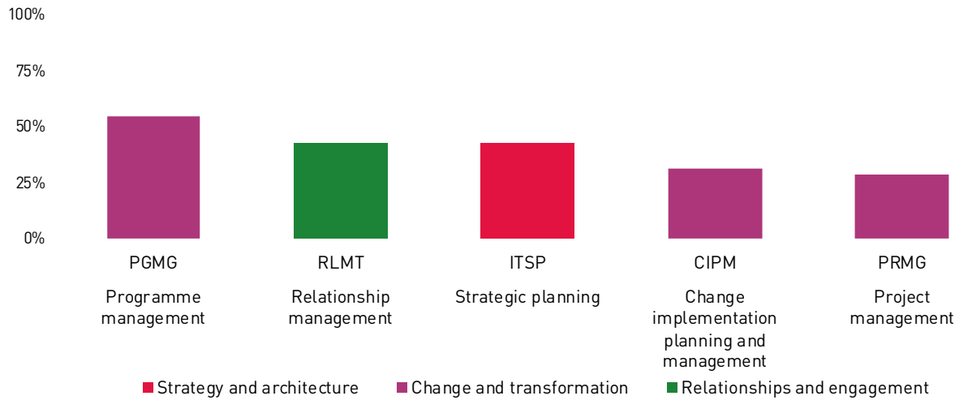
SFIA Level 5



PROGRAM MANAGER

The following five skills are the highest reported by 35 respondents against the Program Manager role:

SFIA Level 6



07

Most Reported Skills Across 90 Roles

The skills reported by respondents to the *ACS Tech & Digital Skills Survey 2020* are translated below into SFIA skills, with 97 of 102 SFIA 7 skills having been reported.

MOST TO LEAST REPORTED SKILLS

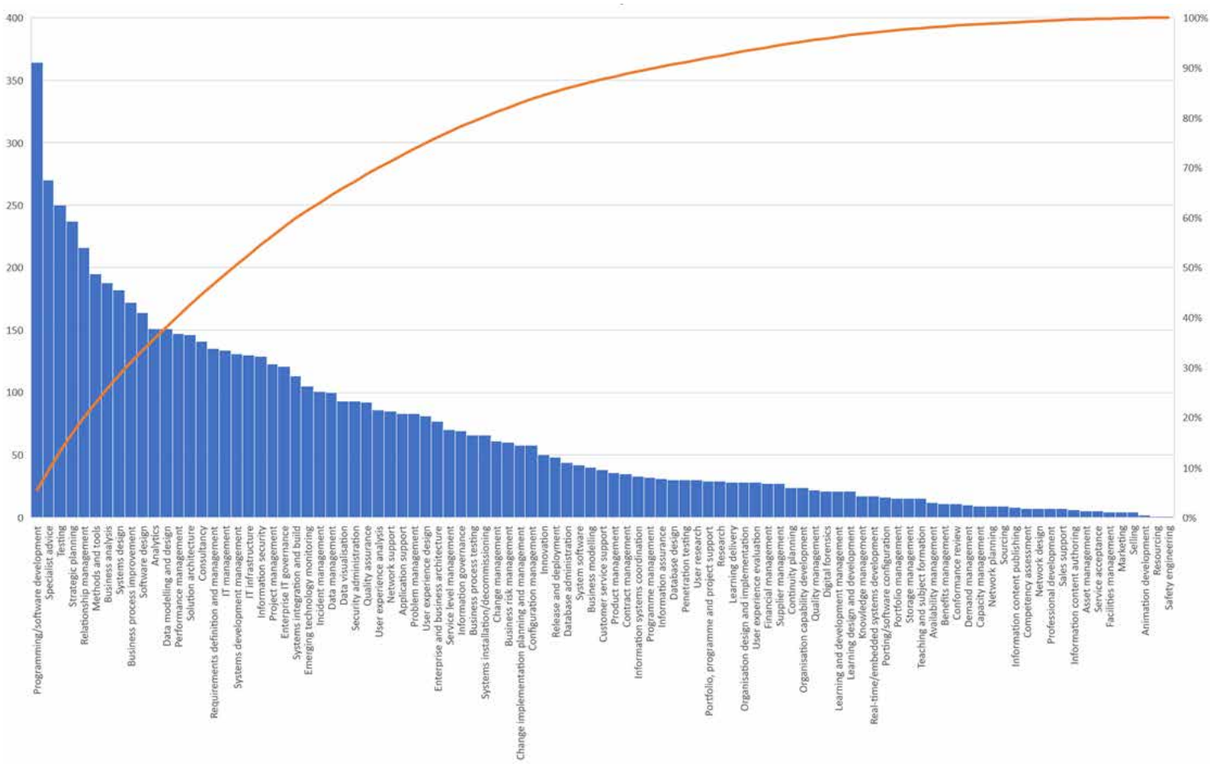


Figure 6: *ACS Tech & Digital Skills Survey 2020* – Most to least reported skills

08

Skills Profiles of Top 90 Roles

The skills profiles of the top 90 roles, reported in the *ACS Tech & Digital Skills Survey 2020*, by career stream are recorded in ***Appendix 1***. As presented, each stream figure shows the skills related to the roles – most to least. For these top 90 tech and digital roles they are reported in:

- the pathway, **stream** or domain in which the role is working or operating
- the **roles** within the stream
- the **skills** related to each role

The way to use the information in ***Appendix 1*** follows with **AI, Machine Learning, Robotics** as an example below:

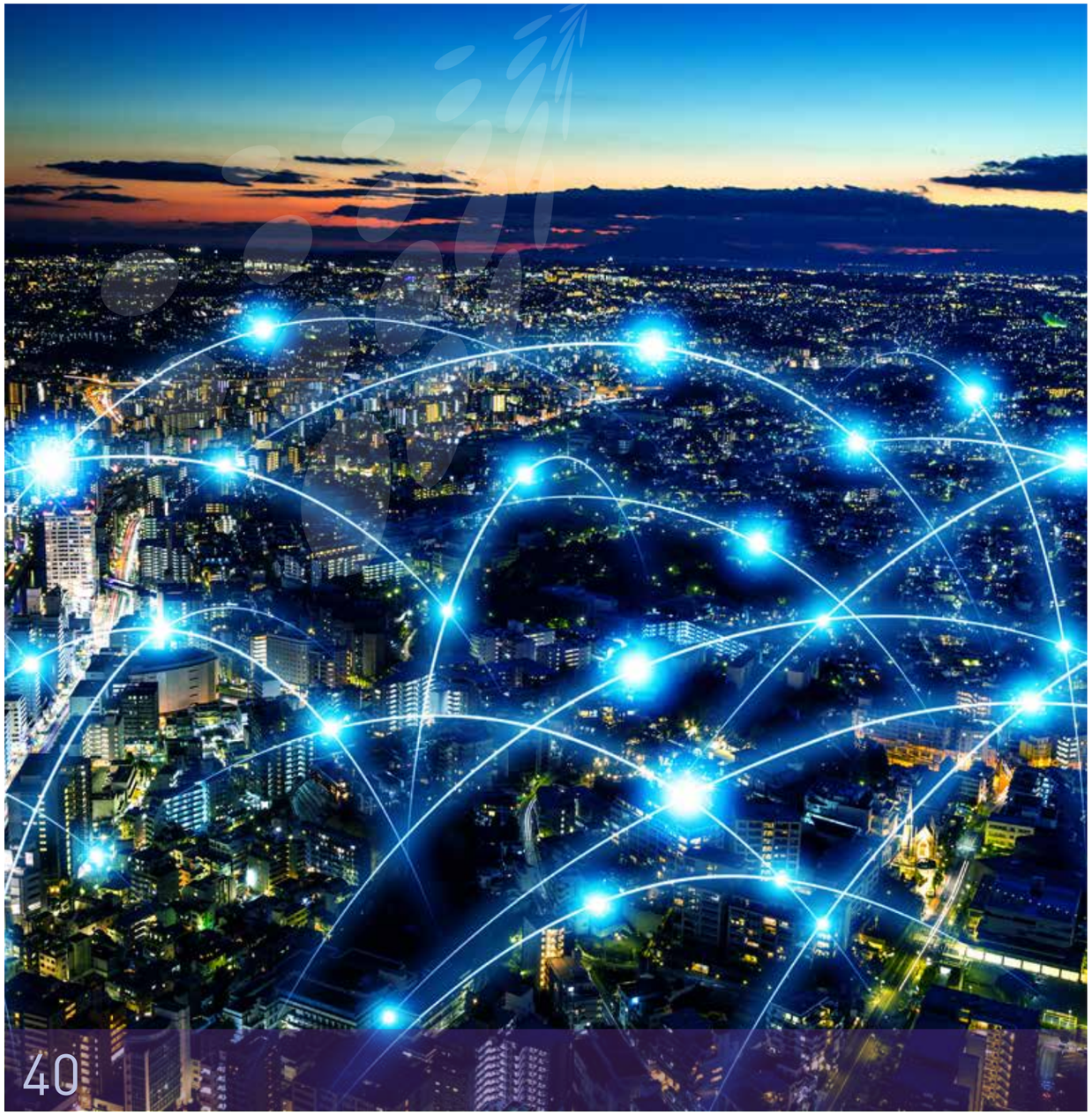
Pathway | Stream:	AI, Machine Learning, Robotics
Roles within the stream:	Robotics Technician
	Robotics Automation/Developer
	Machine learning engineer
	Deep learning engineer
	Algorithm developer
	AI decision-maker
Skills related to each role:	Robotics Technician
	Programming/software development
	Release and deployment
	Problem management
	Systems software
	Real-time/embedded systems development

Continuing with the Robotics Technician example, if a person in this role wanted to transition to a Robotics – Developer/Automation role, the data provided here suggests they would need to upskill to the following skills:

Robotics Technician → Robotics – Developer/Automation	Skills required
	Software design
	Specialist advice
	Porting/software configuration
	Testing

In addition, the links to skills in demand, taking account of the automation/augmentation considerations raised in the *Technology Impacts on the Australian Workforce* report and reference to *Table 1 Mapping of FÆTHM Top Roles to ACS Demand & Impacts on Tech & Digital Skills White Paper roles*, allow an even more targeted approach to deliberate, forward-looking skills acquisition.

09



Operating Levels & SFIA Responsibility Level Mapping

Understanding the operating levels that prevail ensures we have two key pieces of information - the Levels of Responsibility related to the skills and the roles, as well as the top reported responsibility levels. Further in this paper, and at ***Appendix 2***, there is commentary on the most reported skills by operating level. This information gives a deeper understanding of the level at which key skills are operating and helps us to consider the future likely operating level/s at which the skills will be needed. The operating levels advised in *ACS Tech & Digital Skills Survey 2020* are:

- Technical specialists (SMEs)
- Graduate*[1]
- Leadership – technical
- Technical applied
- Leadership – team
- Leadership – organisation
- Entry – non-graduate
- Leadership – large organisation/industry

Mapping of the Survey operating levels to the seven SFIA Levels of Responsibility is as follows:

Operating Level	SFIA Level of Responsibility
Entry – non-graduate	SFIA Level 1 / 2
Graduate*	SFIA Level 3
Technical applied	SFIA Level 4
Technical specialists (SMEs)	SFIA Level 5
Leadership – technical	SFIA Level 5
Leadership – team	SFIA Level 5 / 6
Leadership – organisation	SFIA Level 6 / 7
Leadership – large organisation/industry	SFIA Level 7

Table 3: *ACS Tech & Digital Skills Survey 2020* - Operating Level mapping to SFIA Level of Responsibility

When mapped to SFIA Levels of Responsibility the following shows the operating level numbers are thinner at the lower and higher ends, with the bulk of those in technical roles dominating: Technical - Specialist (SME) is followed by Leadership – Technical, Technical – Applied and then Leadership –Team.

***Graduate** – this Table and the following two Figures show the Graduate 'operating level' as the second highest reported in the *ACS Tech & Digital Skills Survey 2020*. When this category is adjusted to exclude non-working graduates, the operating level becomes third lowest, ahead of Leadership - Large organisation / industry and Entry (non-graduate). This adjustment reflects more accurately the recognised industry entry point into tech and digital roles.

% DISTRIBUTION OF OPERATING LEVELS

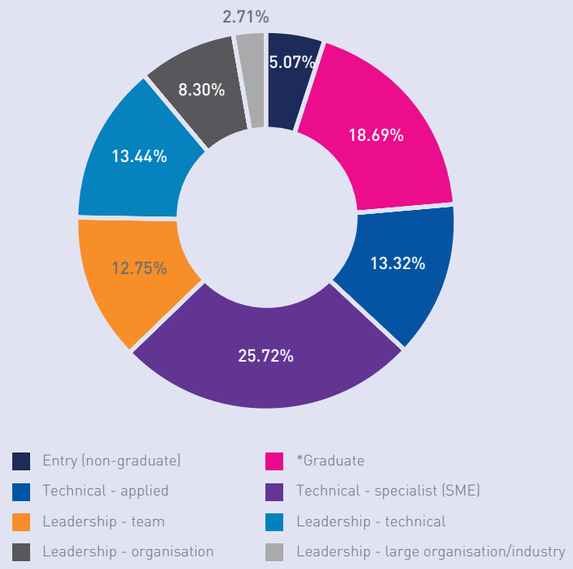


Figure 7: *ACS Tech & Digital Skills Survey 2020* – Percent distribution of respondents across eight operating levels

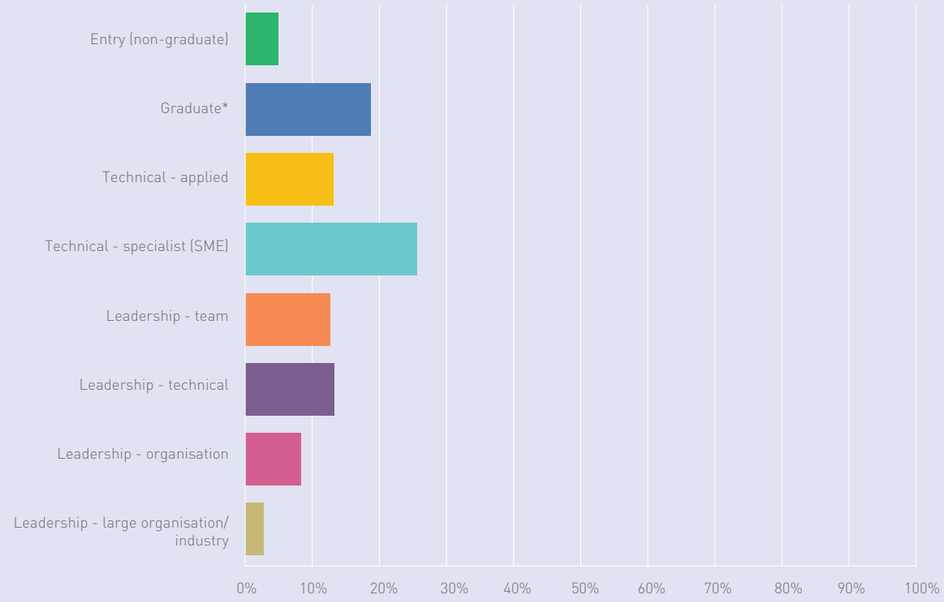


Figure 8: *ACS Tech & Digital Skills Survey 2020* - Distribution of respondents across operating levels

TOP FIVE REPORTED OPERATING LEVELS

1. Technical - Specialist (SME) **25%**
2. Leadership – Technical **13%**
3. Technical – Applied **13%**
4. Leadership – Team **13%**
5. Graduate (working)* **11%**

NUMBER AND % OF SFIA SKILLS (OUT OF 97) ALIGNED TO EACH OPERATING LEVEL

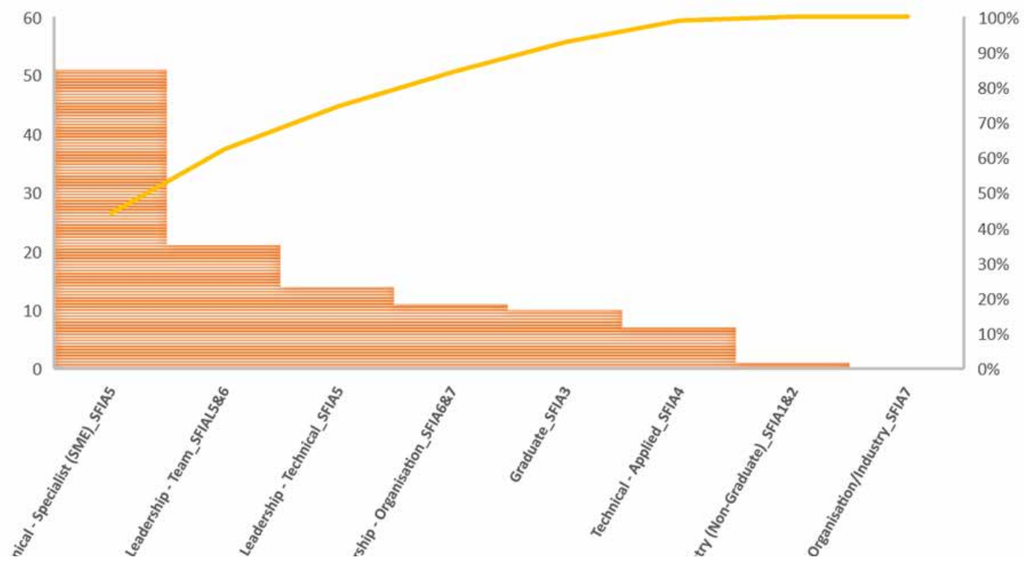


Figure 9: *ACS Tech & Digital Skills Survey 2020* - Number and % of SFIA skills (out of 97) aligned to each Operating Level

Following from the earlier introduction to the operating levels, understanding the alignment of the operating levels with the specific, most-reported skills allows organisations and individuals to track between current and future skills destinations.

Appendix 2 shows, for each Operating Level (and mapped SFIA Level of Responsibility) the SFIA skills that have been most reported. The eight figures provided - Figure App 2.1 - 2.8 - show for each operating level:

- the most to least reported Level of Responsibility
- the most to least reported SFIA skills against each Level of Responsibility

In ***Appendix 2***, the top 15 most reported skills for each operating level are highlighted text, making these skills more visible. For four of the eight operating levels the first (most reported) skill is Programming/software development reflecting the technical nature of these operating levels:

- Technical - Specialist (SME) & SFIA L5, Leadership - Technical & SFIA L5, Technical - Applied & SFIA L4, Graduate & SFIA L3

Whereas, for three of the remaining operating levels, with non-technical leadership responsibilities, Relationship management and Strategic planning were in the top four skills:

- Leadership - Team & SFIA L5|6, Relationship management then Strategic planning
- Leadership - Organisation & SFIA L6|7, Strategic planning then Relationship management
- Leadership – Large Organisation/Industry – SFIA L7, Strategic planning, Enterprise IT governance, Consultancy and Relationship management

The standout here is the non-graduate entry level where, typically, a technical focus could be expected. The most reported skill is Analytics:

- Entry (Non-graduate) & SFIA L1|2, Analytics then Programming/software development

10

Area of Tech & Digital Work (Technical Stream) that is most Applicable?

When asked which of the 22 technical streams were most applicable respondents to the *ACS Tech & Digital Skills Survey 2020* identified the following:

1. Design & development, 16%
2. Data, big data & data science, 10%
3. Systems administration, 8%
4. Business analysis, 8%
5. Security – cyber, systems & information, 8%

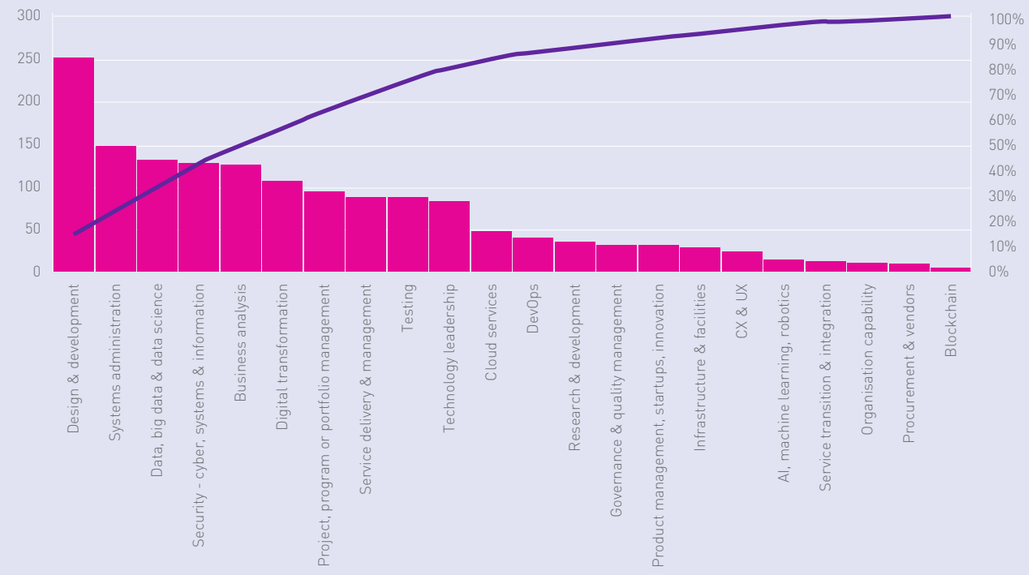


Figure 10: *ACS Tech & Digital Skills Survey 2020* – Technical Stream selected by respondents (most to least)

Using the Figure above, with the Design & Development stream being the most reported, professionals in this technical stream are able to have some confidence in demand for their roles for some time, according to the *Technology Impacts on the Australian Workforce* report (see p6).

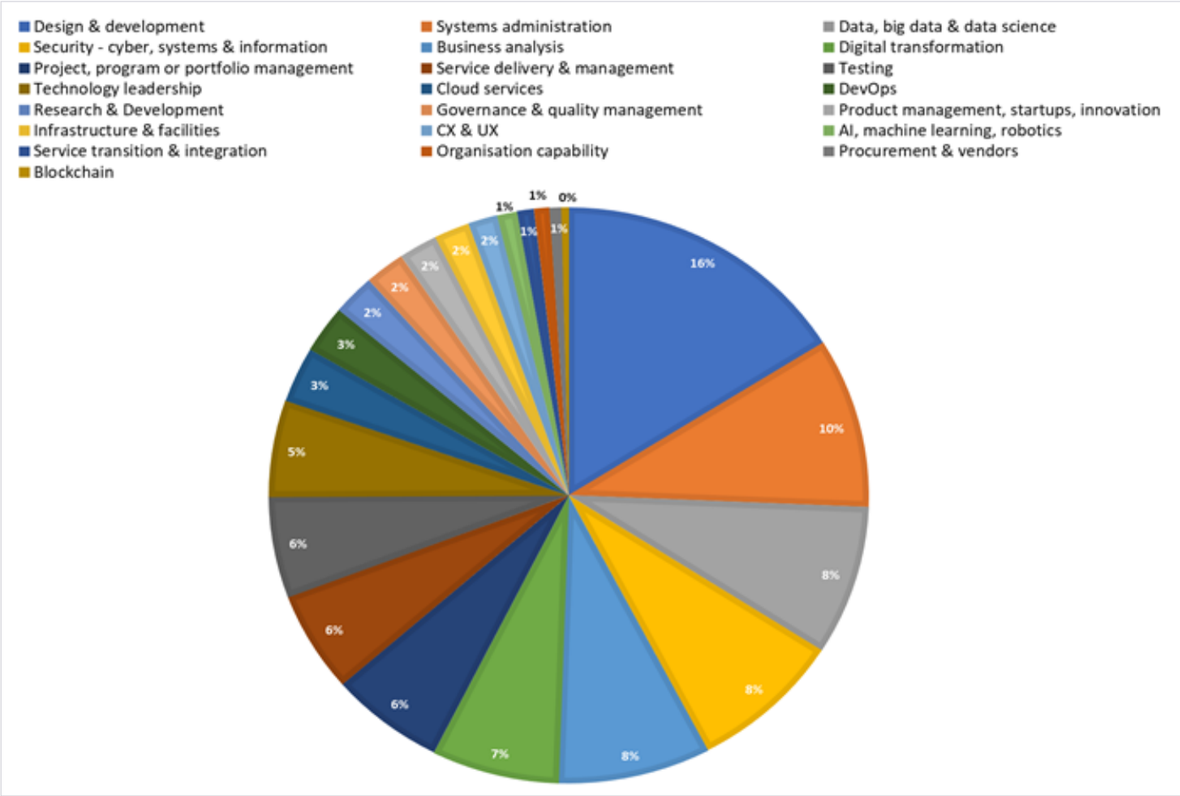


Figure 11: *ACS Tech & Digital Skills Survey 2020* – Technical Stream selected by respondents (%)

ROLE TITLE/S

The figure below shows the range of titles respondents used to describe their roles. While not significant in data terms some of these titles are more well-known than others and reflect trends in naming conventions for tech and digital roles.

Figure 12: *ACS Tech & Digital Skills Survey 2020* – Word Cloud graphic of role titles reported

11

Other Demographics

Several demographics were collected by the *ACS Tech & Digital Skills Survey 2020*. ACS particularly wanted to know the extent to which the gender of respondents was consistent with other data, the highest education outcome, the degree of experience (shown in the data as the number of years in tech and digital roles) and the other countries of origin, were represented. This data is a pool of wealth to understand:

1. Who makes up Australia's current technology workforce, and
2. The domestic and international recruitment pools, on which Australia can focus.

GENDER FEATURES

Looking at the representation of female and male respondents in the *ACS Tech & Digital Skills Survey 2020*, the gender breakdown across tech and digital roles is consistent with those reported in *ACS Digital Pulse 2021*[xi] approximately two thirds male and one third female. The option not to identify gender was offered and can be seen in the 'Gender by Work Stream' figure that also follows represented by 'Prefer not to say'.

GENDER OF RESPONDENTS

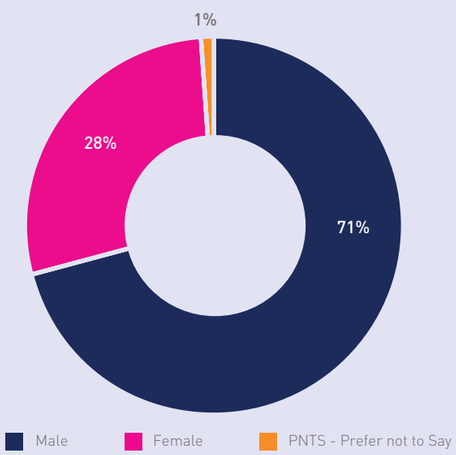


Figure 13: *ACS Tech & Digital Skills Survey 2020* – Respondents by Gender

A different perspective now available following the *ACS Tech & Digital Skills Survey 2020* are the career streams in which the genders are concentrated. Given the two thirds male, one third female breakdown of survey responses and general industry data[xii] the streams where this general picture is different present themselves as challenges to industry, educators and tech and digital professionals themselves.

Career streams where female and male are approximately equal (50:50):

- Business analysis
- Testing
- Research and development
- Procurement and vendors

Another aspect of this data, suggesting an higher awareness of the issue of gender across tech and digital roles, is the highest non-reporting of gender in the Governance and Quality Management career stream – see blue line representing the category 'X' in the following figure.

The Infrastructure and facilities career stream sees the balance dip almost entirely towards men, and eight of 22 streams having 20% or less women reported.

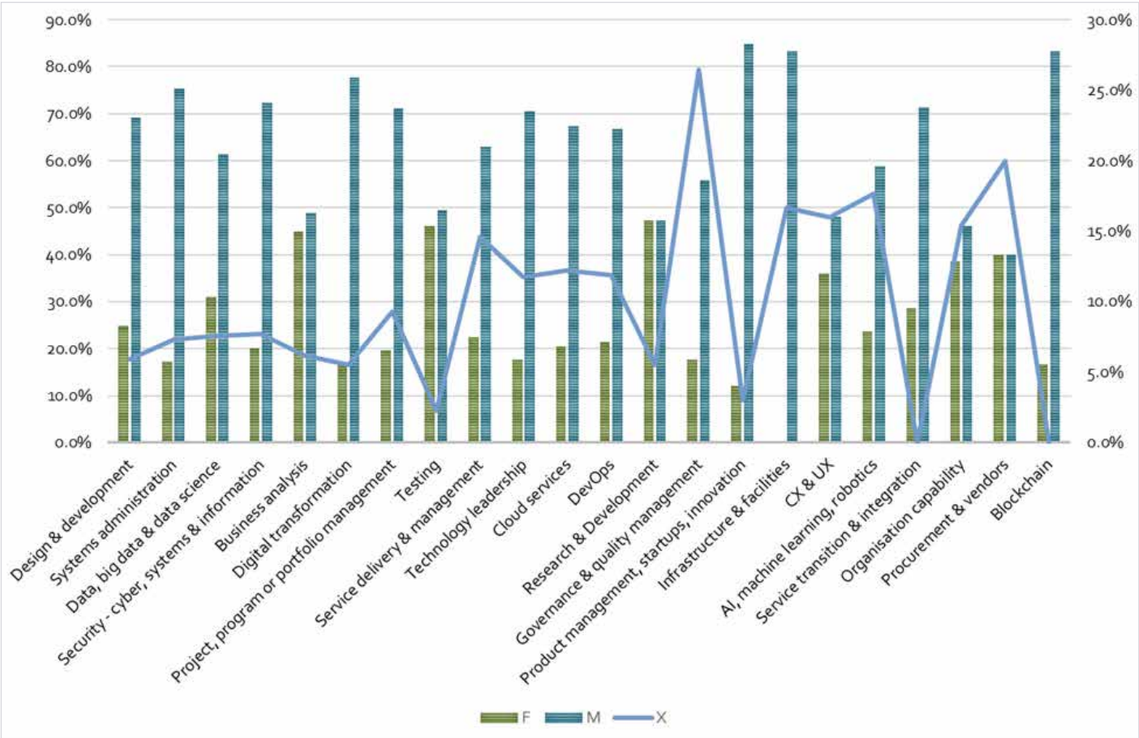


Figure 14: *ACS Tech & Digital Skills Survey 2020* – Gender by Work Stream

Technology Impacts on the Australian Workforce report identifies that, based on the existing gender breakdown of tech and digital roles, in some industries where women are concentrated in more automatable roles for example, customer service and administration; men by comparison are concentrated in more augmentable roles for example, senior management or technical roles:

- 65% - Financial Services and Professional, Scientific, Technical Services
- 60% - Information, Media and Telecommunications
- 60% - Education & Training
- 46% - Health Care and Social Assistance
- 50% - whichever way these figures are cut, the impact on people in tech and digital roles will be significant – less than Health Care & Social Assistance, Education & Training – but still significant and substantial. While these figures will make any business leader or organisation development professional sit up, the flip side is being able to drive specific and targeted programs at recruiting and upskilling women in positions of opportunity.

HIGHEST LEVEL OF EDUCATION ACHIEVED

The greatest number of respondents (39%) reported holding an undergraduate degree, closely followed by a Masters or PhD (37%) – making a very significant proportion of respondents (76%). Those who reported a vocational qualification made up a total of 7% - 5% with vocational Diplomas and 2% with vocational certificates.

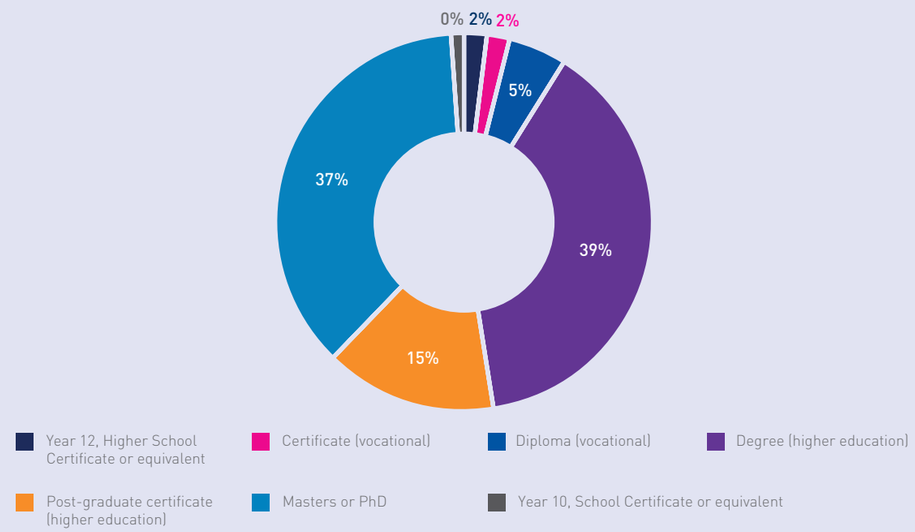


Figure 15: *ACS Tech & Digital Skills Survey 2020* – Respondents by Highest level of Education

NUMBER OF YEARS IN TECH AND DIGITAL ROLES

The *ACS Tech & Digital Skills Survey 2020* showed that the highest number of respondents were in the middle or height of their tech and digital careers, with those at the start of their careers, between 0 and 2 years in tech and digital roles, being next most numerous.

Respondents in the very experienced groups make up 49.1% - with 10-20 years being 29.6% and 21+ years being 19.5%.

For tech and digital professionals in the first ten years of their careers, the majority of the respondents to the *ACS Tech & Digital Skills Survey 2020* (50.9%), changes in roles and skills was required due to innovation and change effects, including automation and augmentation, and will be strongly in play by the time they reach their career maturity at 10-20 years.

NUMBER OF YEARS IN TECH & DIGITAL ROLES

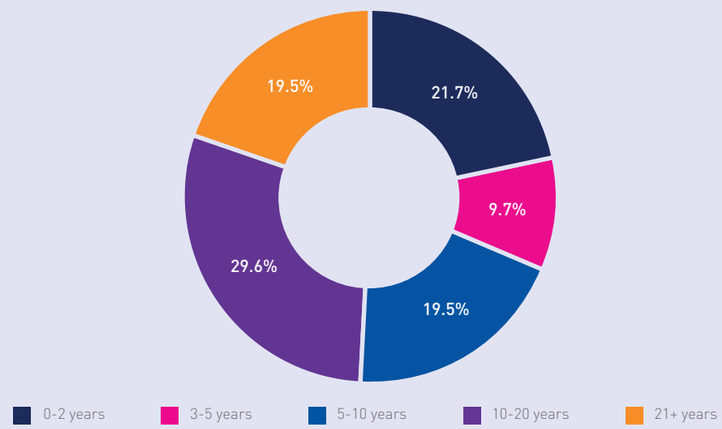


Figure 16: *ACS Tech & Digital Skills Survey 2020* - Duration of Tech and Digital careers

AGE RANGE OF SURVEY RESPONDENTS

Two age ranges that reported to ACS' T&D Survey 2020 - mid-career tech and digital professionals – 25 to 34 years of age (41%) and 35 to 44 years (28%) make up a significant majority (69%) of respondents. This data is consistent with discussion, on the previous page, on these mid-career group/s.

NUMBER OF YEARS IN TECH & DIGITAL ROLES

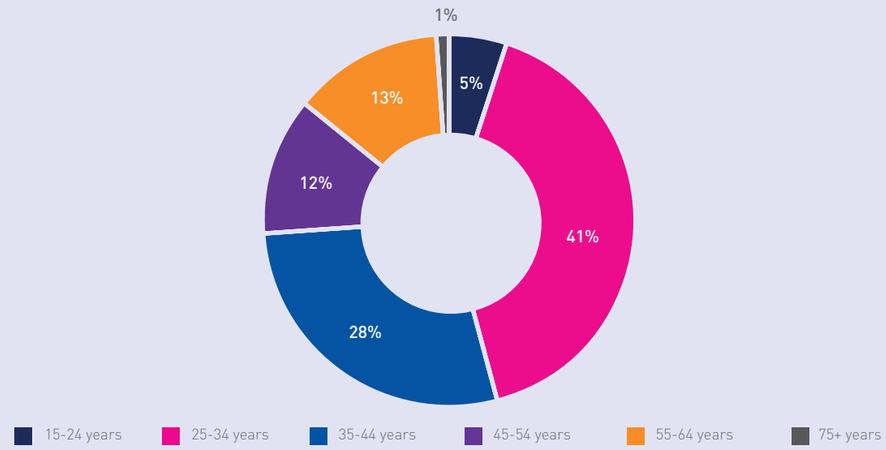


Figure 17: *ACS Tech & Digital Skills Survey 2020* - Distribution of respondents across six Age Range Categories

MAIN ADDRESS NOT AUSTRALIA

The countries that were provided as main contacts for respondents to *ACS Tech & Digital Skills Survey 2020* are indicative of the wide-ranging cultural diversity of survey participants – the largest numbers to the smallest, other than the majority that did not provide contacts, are:

- Australia
- India
- Singapore
- Philippines
- Malaysia, UAE & Pakistan
- Ghana, Russia
- Bangladesh, Brazil, China, Spain, Hong Kong, Indonesia, Iran, Ireland, Nigeria, Oman, Qatar, Sri Lanka, Zimbabwe

APPENDIX 1

90 Tech & Digital Roles

This appendix provides the following information on the top 90 tech and digital roles that were reported in *ACS Tech & Digital Skills Survey 2020*:

- the **role** (from most to least reported) and its **SFIA level** of responsibility
- the pathway, **stream** or domain in which the role is working or operating
- the **top five skills** related to the role and the **SFIA category** in which each skill sits
- the **percentage of responses** for each top skill.

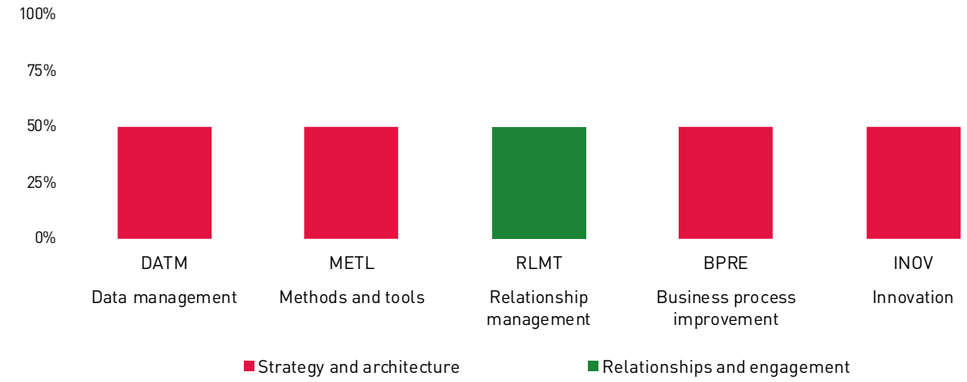
Earlier commentary in this report identified that tech and digital professionals are increasingly taking a pathway approach to setting up their digital and tech careers. Noting the stream or pathway within which the role is operating allows both individual professionals and businesses to:

- look strategically at current roles
- upskill to future capabilities in a targeted fashion
- look at skills and role mobility within a logical stream or domain of work

AI, MACHINE LEARNING, ROBOTICS STREAM

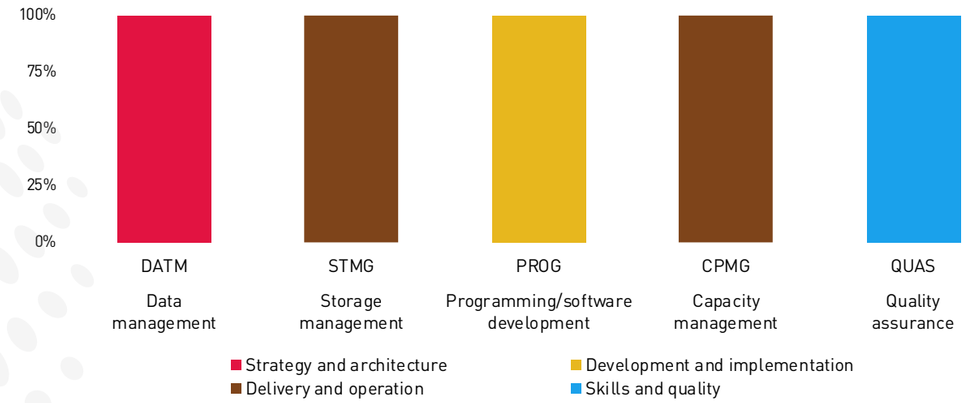
AI Decision-Maker

SFIA Level 5



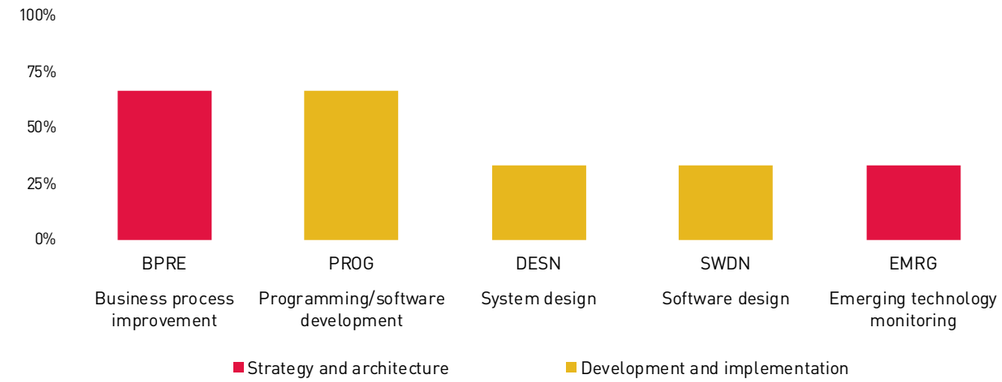
Deep Learning Engineer

SFIA Level 5



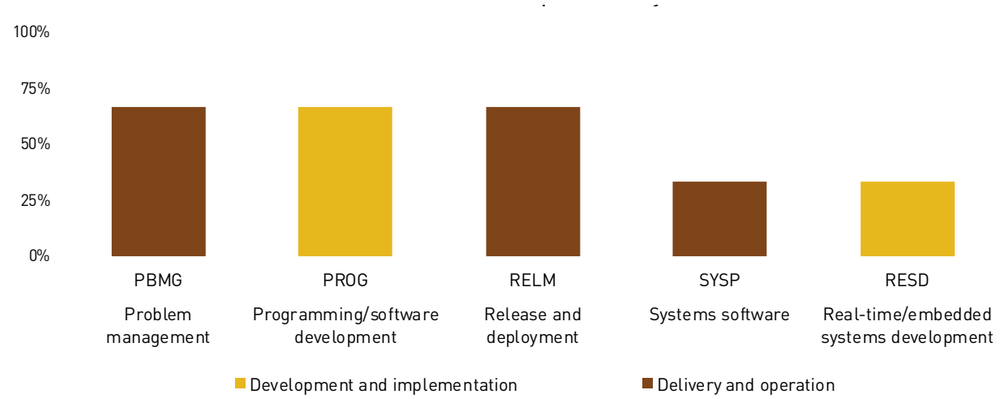
Machine Learning Engineer

SFIA Level 5



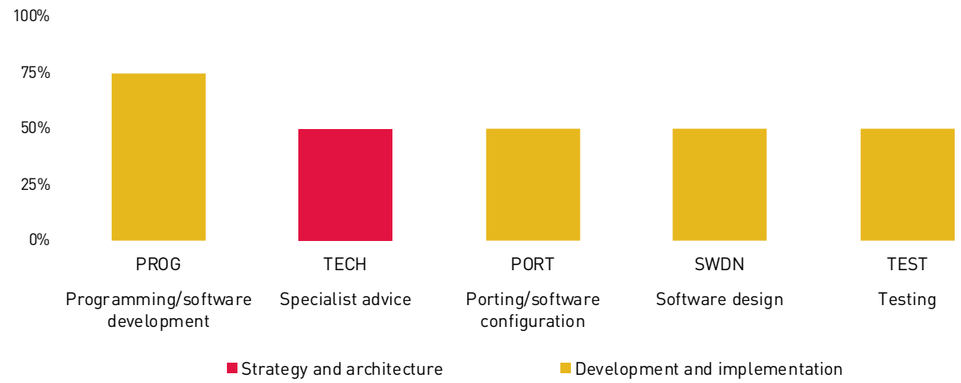
Robotics Technician

SFIA Level 4



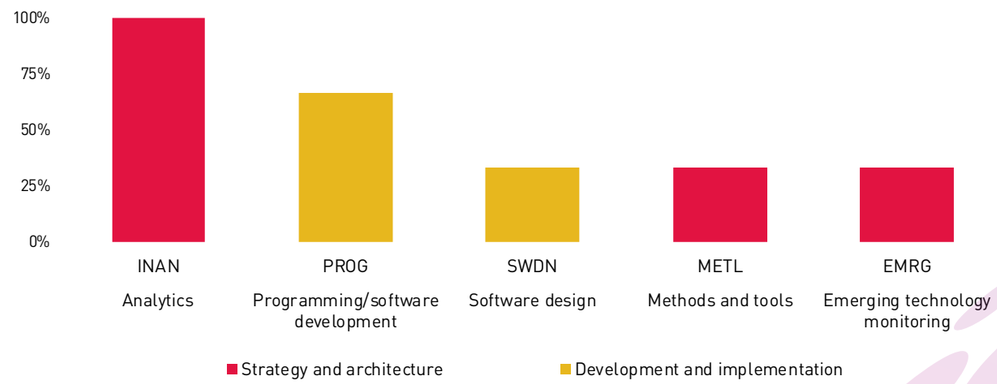
Robotics Automation/Developer

SFIA Level 4



Algorithm Developer

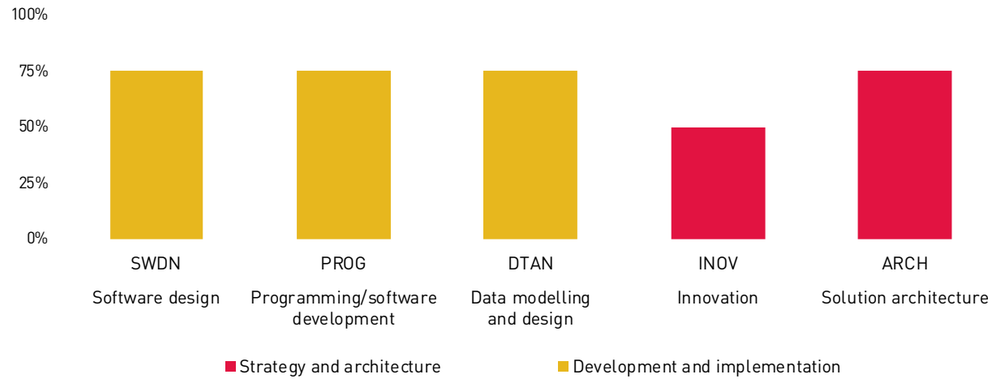
SFIA Level 4



BLOCKCHAIN STREAM

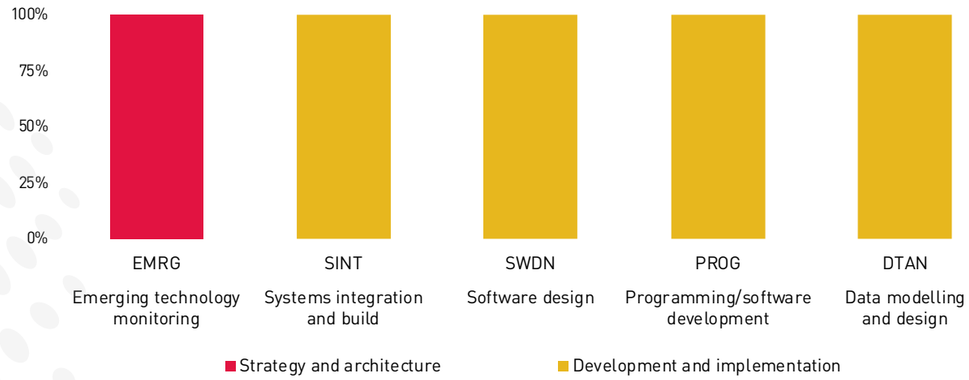
Technical Architect

SFIA Level 5



Blockchain Engineer

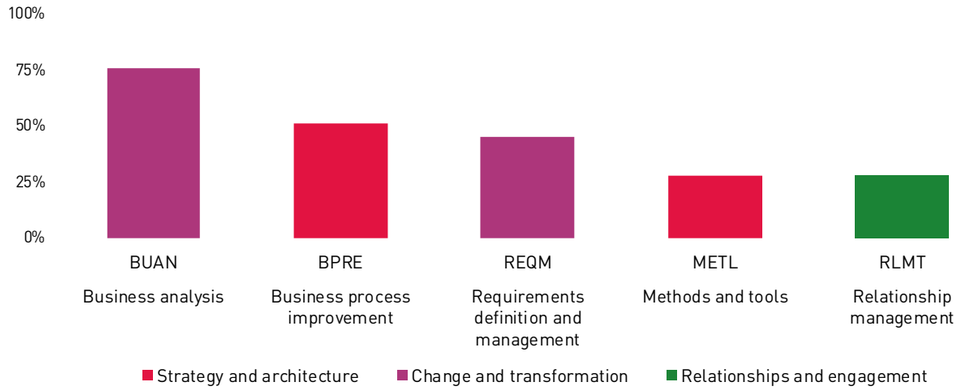
SFIA Level 5



BUSINESS ANALYSIS STREAM

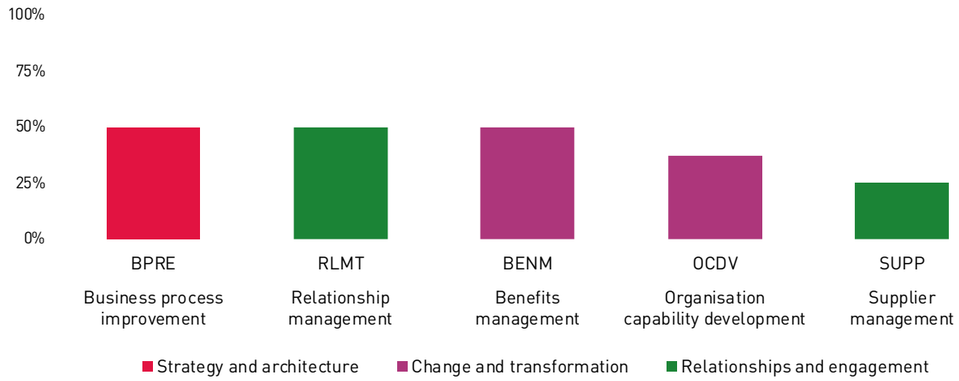
Business Analyst

SFIA Level 5



Relationship Manager

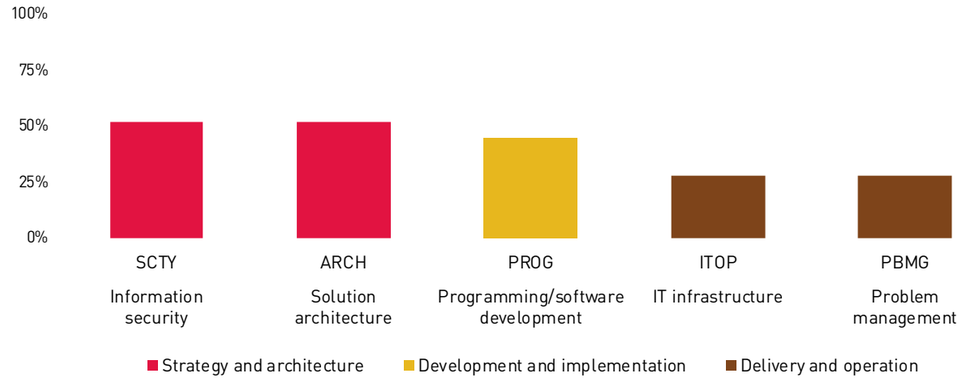
SFIA Level 5



CLOUD SERVICES STREAM

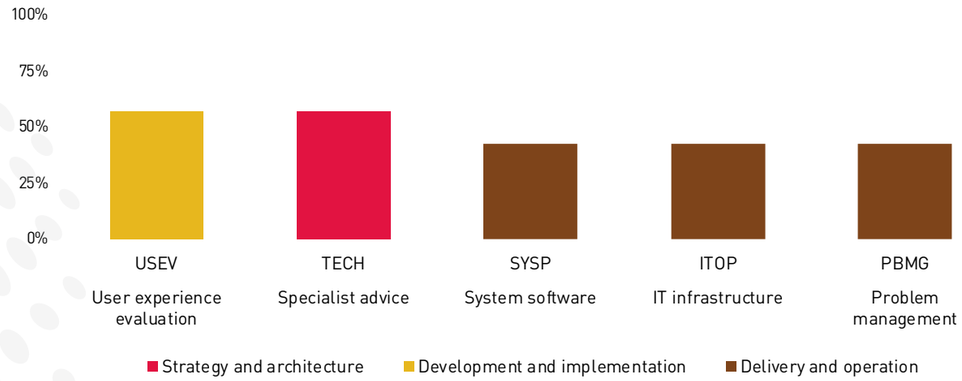
Cloud Engineer

SFIA Level 4



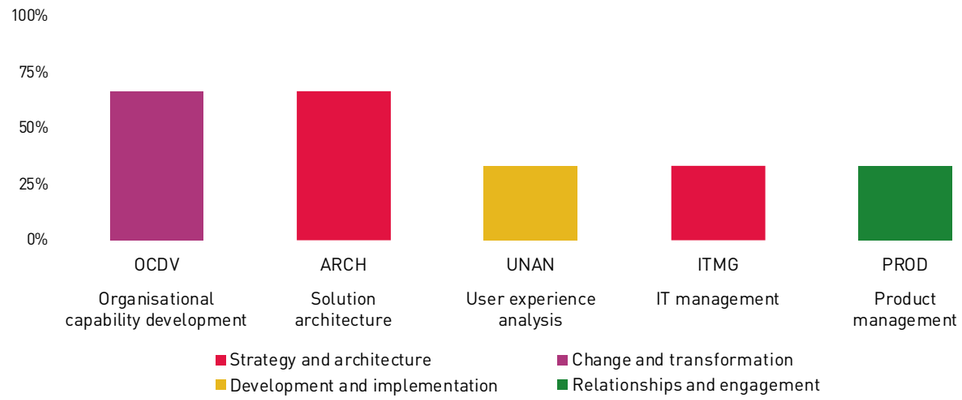
Cloud Analyst

SFIA Level 4



Cloud Evangelist

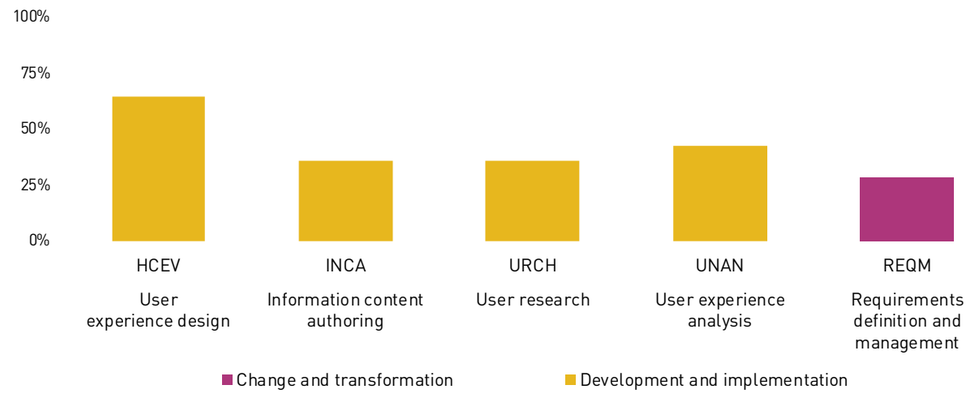
SFIA Level 5



CX/UX STREAM

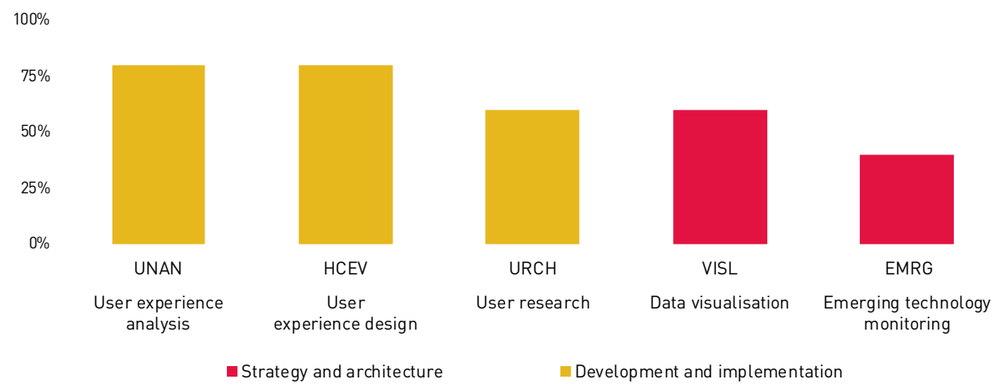
UX Developer/Designer

SFIA Level 4



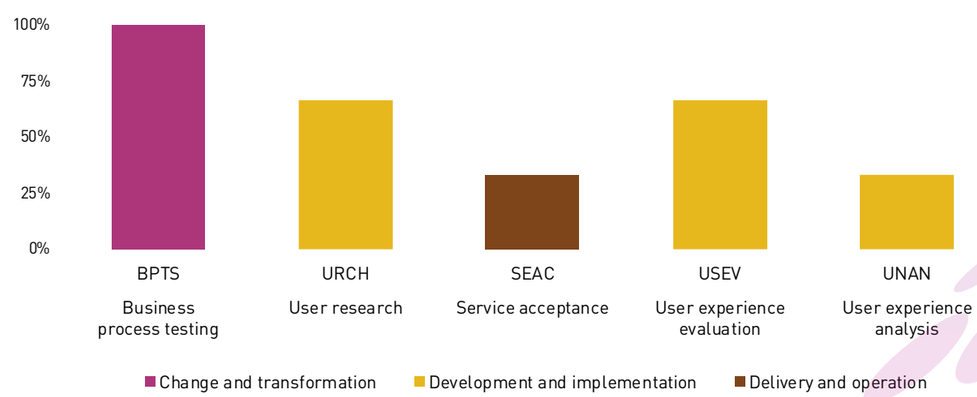
UX Researcher

SFIA Level 5



CX Specialist

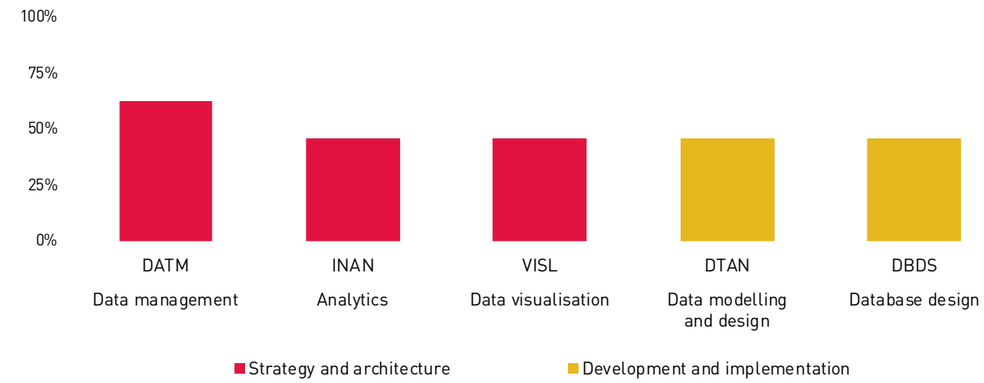
SFIA Level 5



DATA, BIG DATA & DATA SCIENCE STREAM

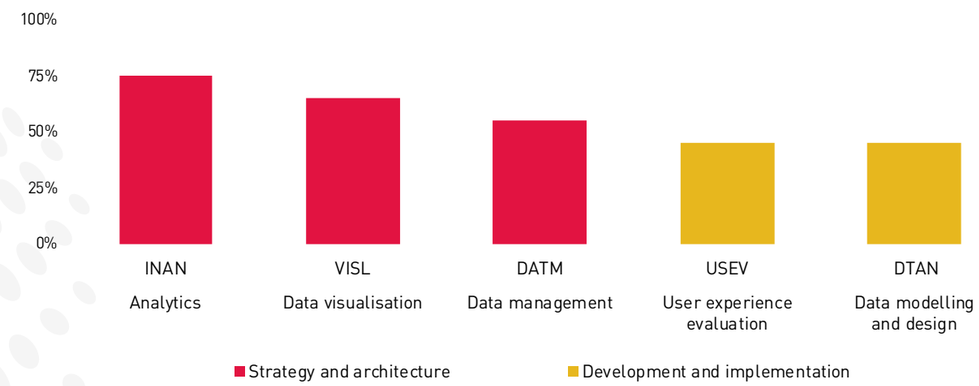
Data Engineer

SFIA Level 6



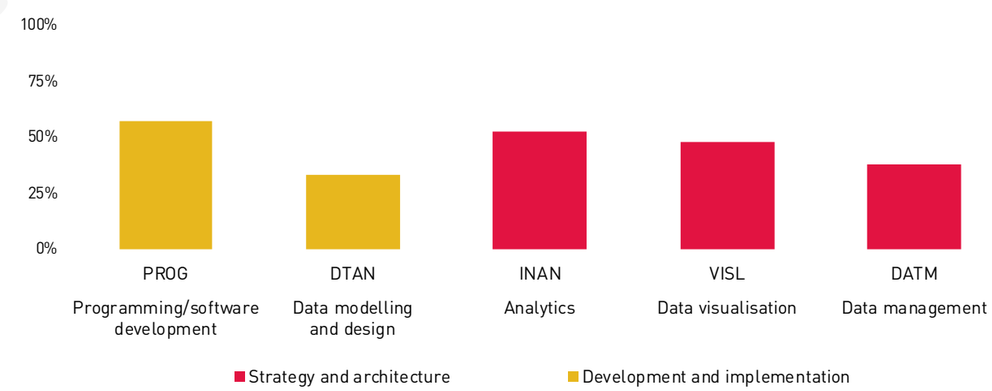
Data Analyst

SFIA Level 4



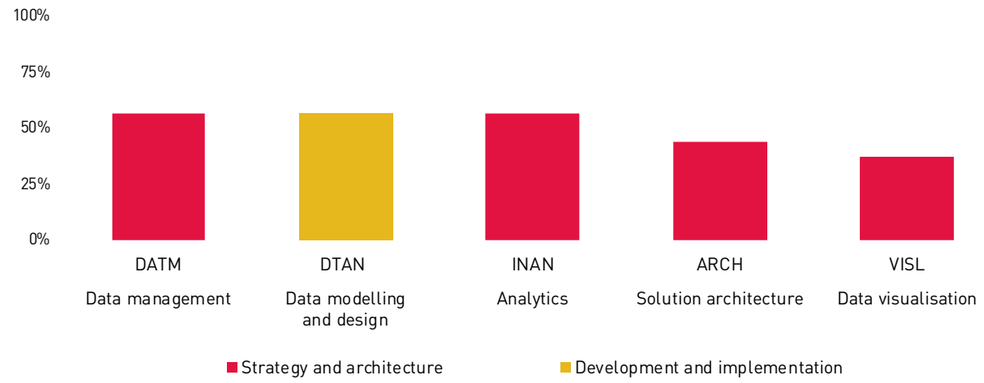
Data Scientist

SFIA Level 6



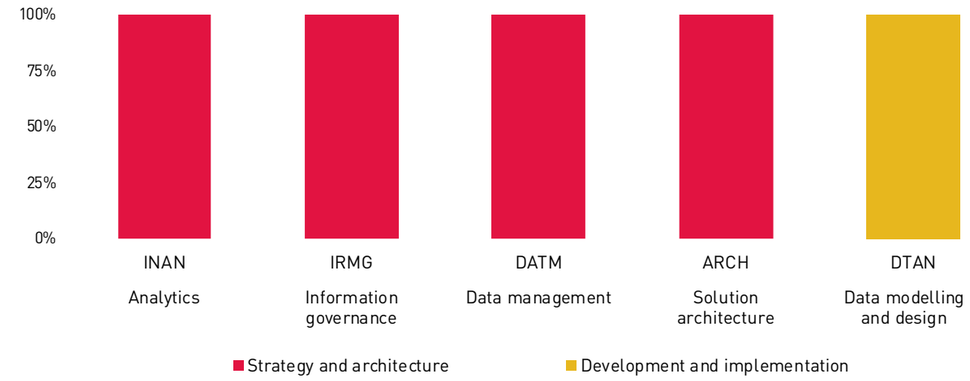
Data Architect

SFIA Level 5



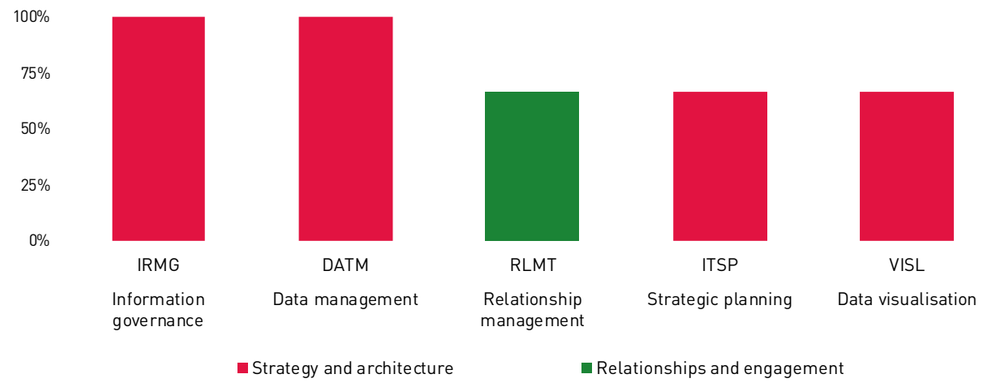
Data Wrangler

SFIA Level 5



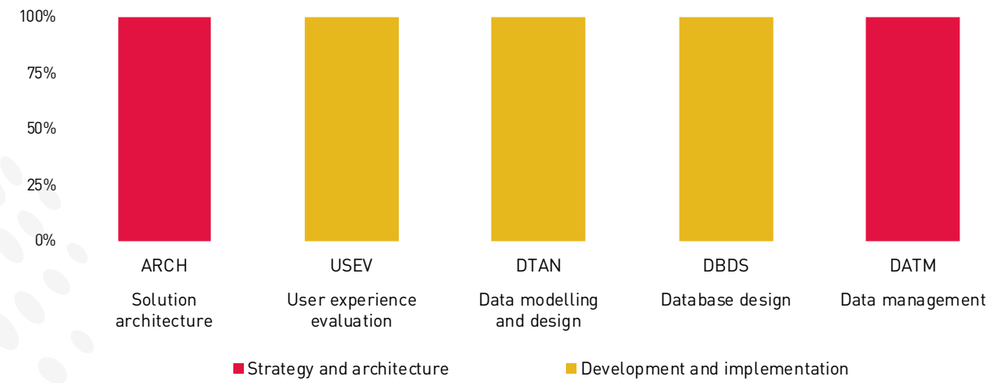
Data Manager

SFIA Level 5



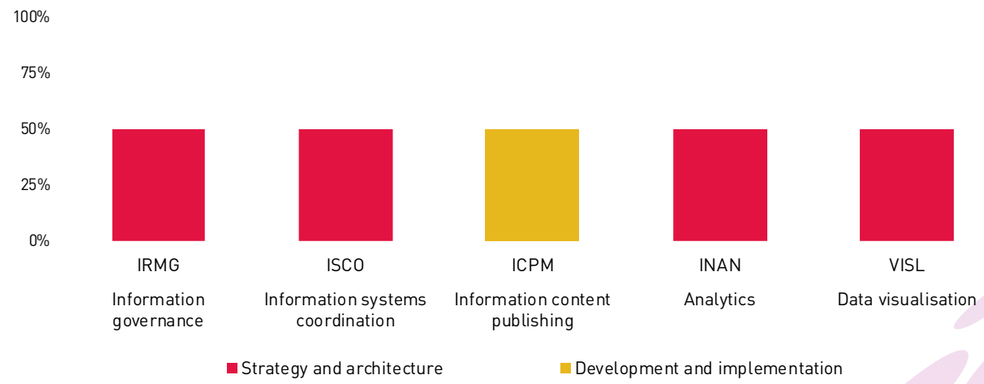
Data Modeller

SFIA Level 4



Data Visualiser

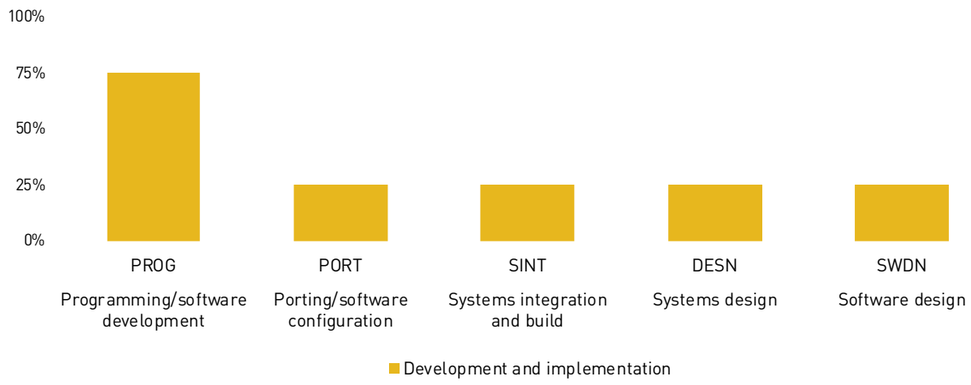
SFIA Level 5



DESIGN AND DEVELOPMENT STREAM

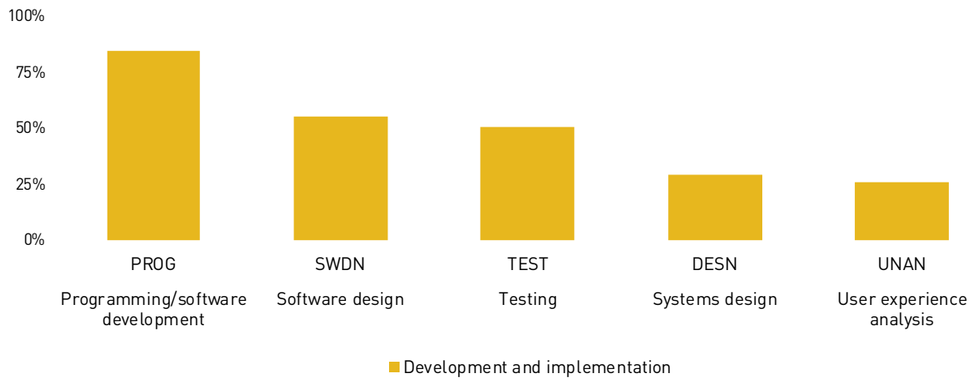
Back End Engineer

SFIA Level 4



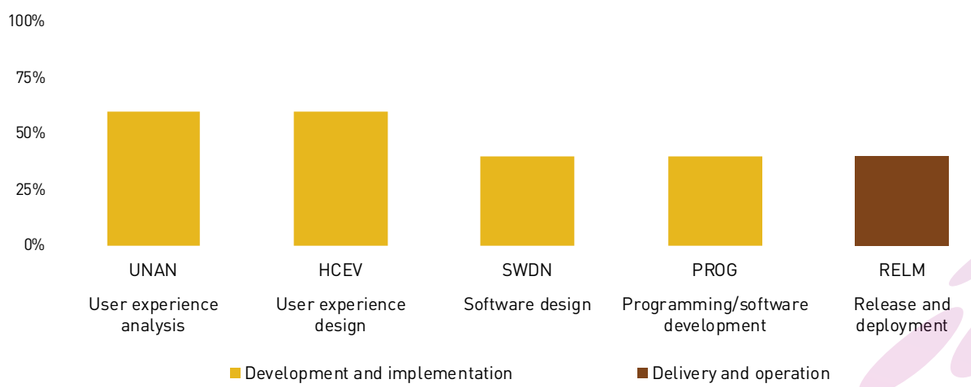
Developer/Programmer

SFIA Level 4



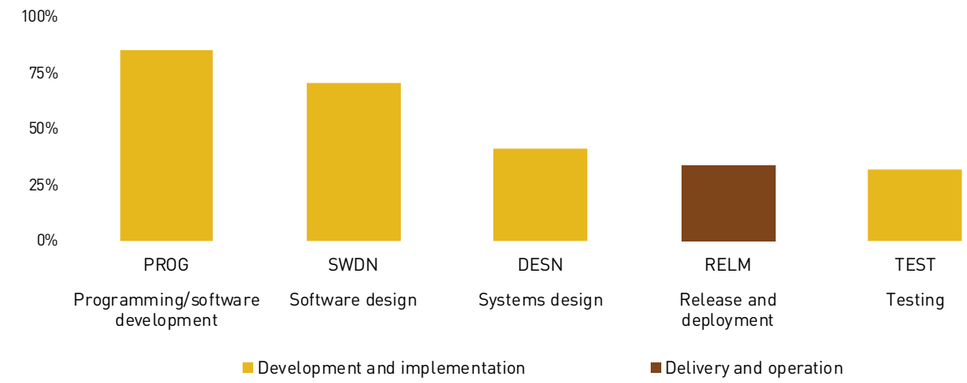
Front End Engineer

SFIA Level 4



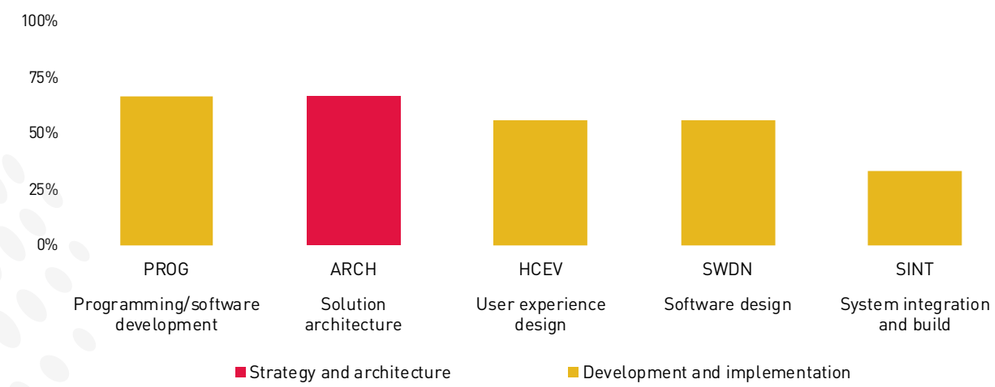
Full Stack Developer

SFIA Level 4



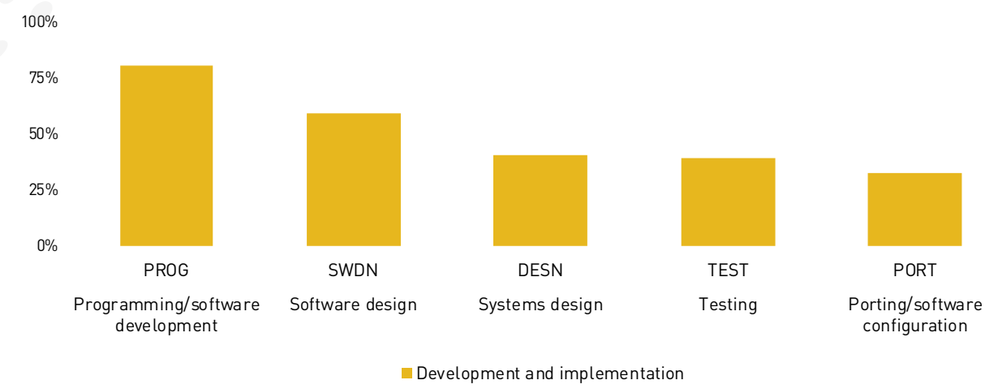
Software Architect

SFIA Level 5



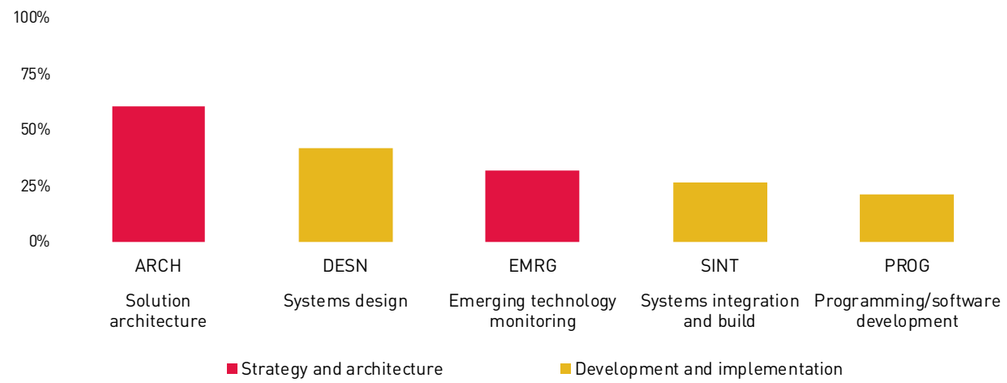
Software Engineer

SFIA Level 5



Solution Architect

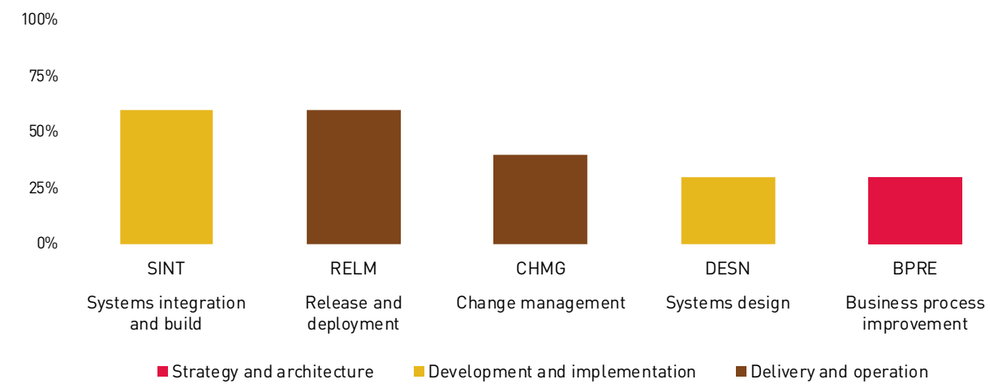
SFIA Level 5



DEVOPS STREAM

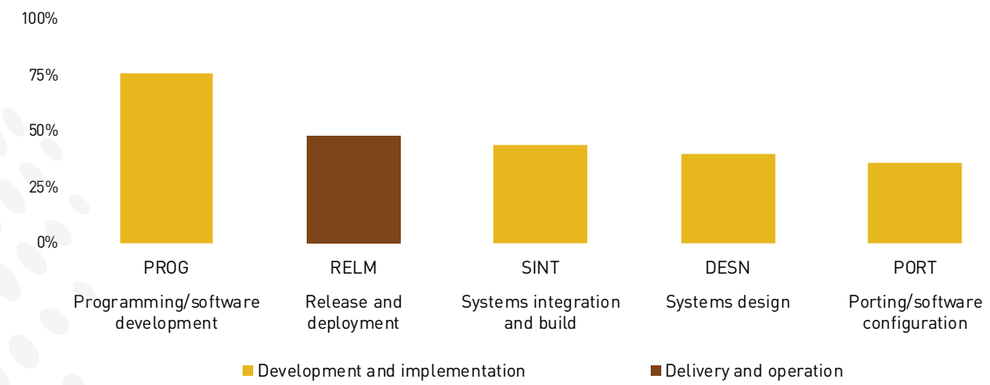
Automation Expert

SFIA Level 5



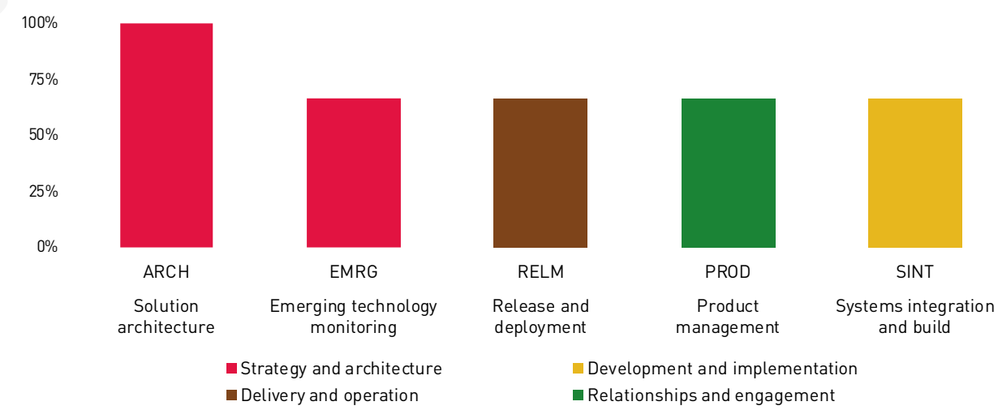
DevOps Engineer

SFIA Level 4



DevOps Evangelist

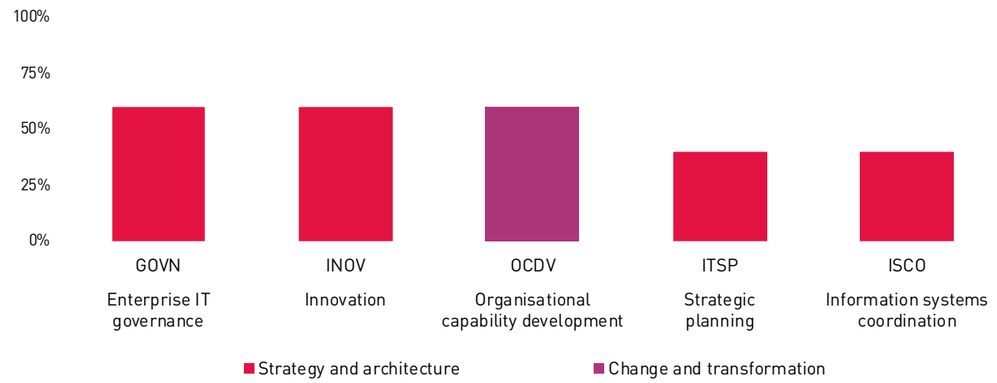
SFIA Level 5



DIGITAL TRANSFORMATION STREAM

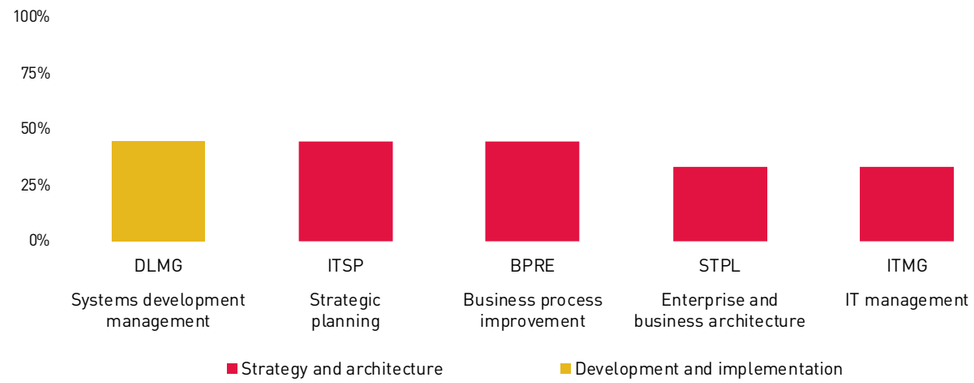
Chief Digital Officer

SFIA Level 7



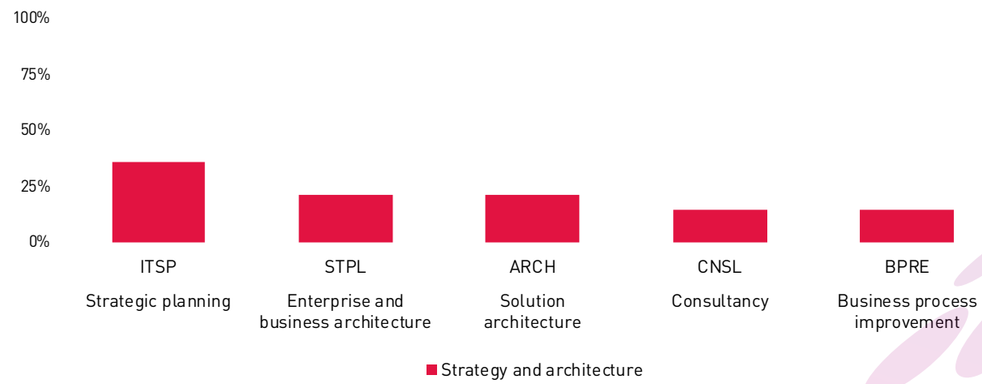
Chief Technology Officer

SFIA Level 7



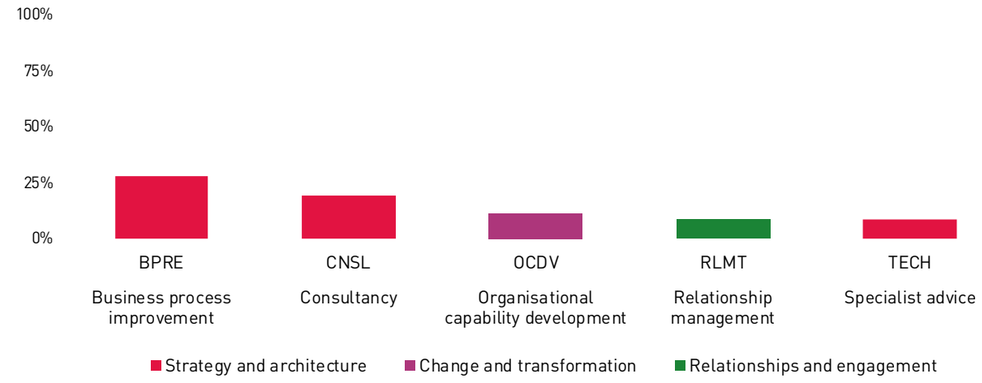
Enterprise Architect

SFIA Level 6



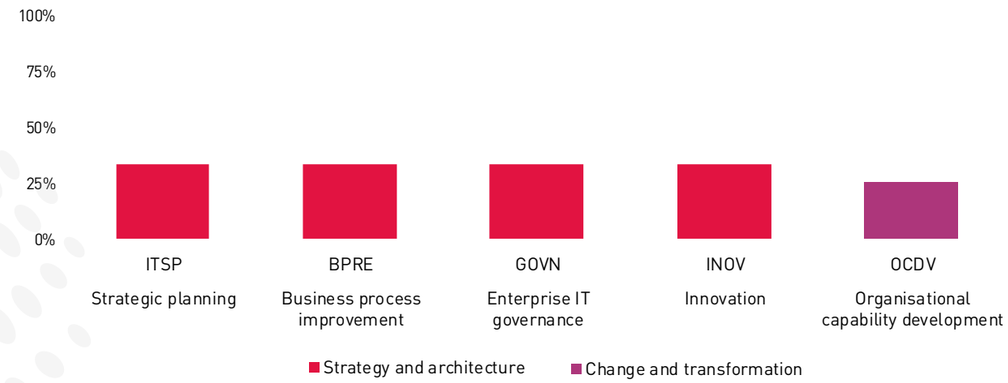
ICT/IT Consultant

SFIA Level 5



IT Director/Partner

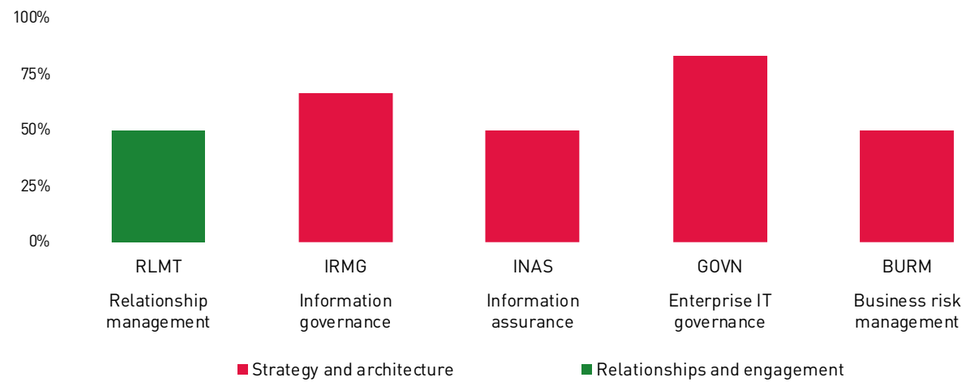
SFIA Level 6



GOVERNANCE & QUALITY MANAGEMENT STREAM

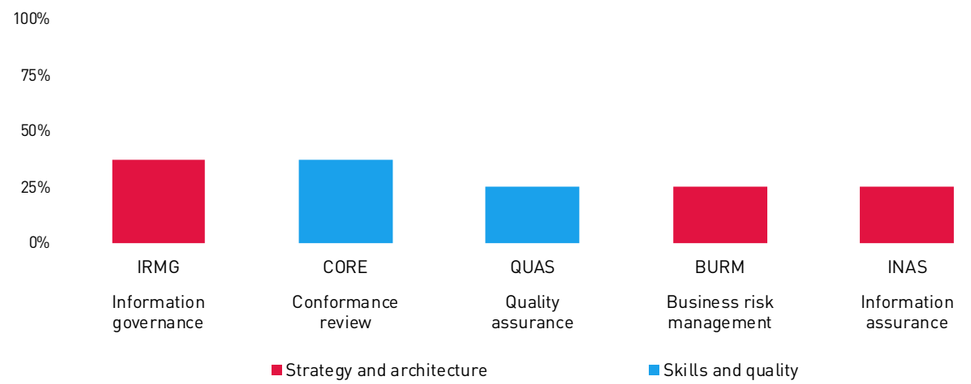
Governance Manager

SFIA Level 5



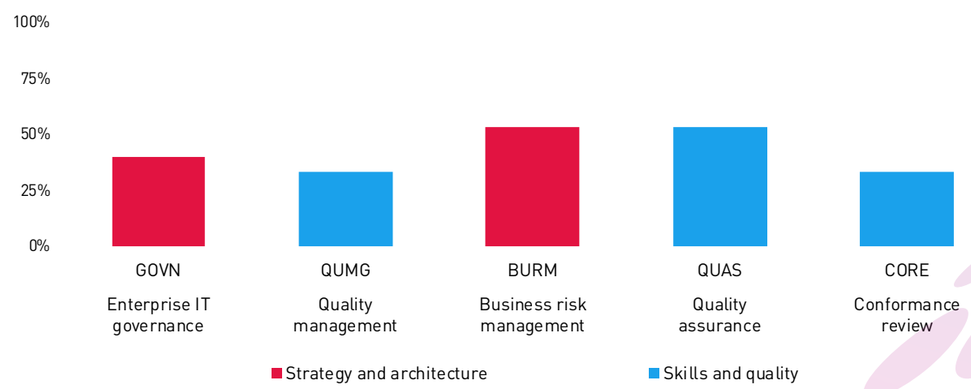
Risk & Compliance Manager

SFIA Level 5



Quality Assurance Manager

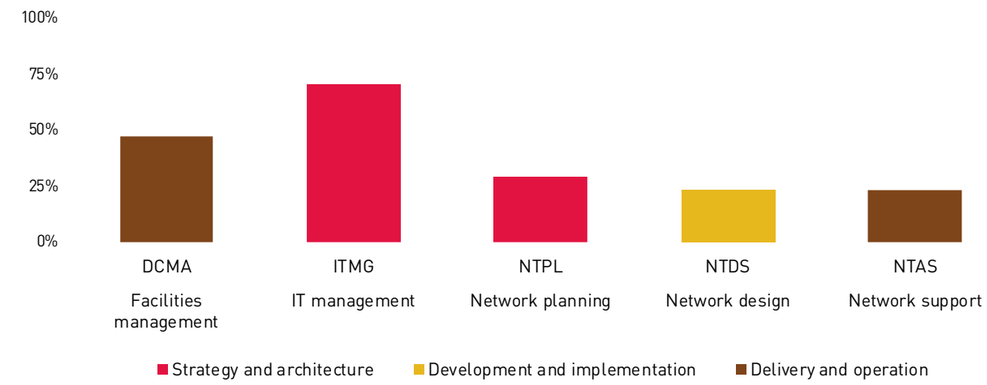
SFIA Level 5



INFRASTRUCTURE & FACILITIES STREAM

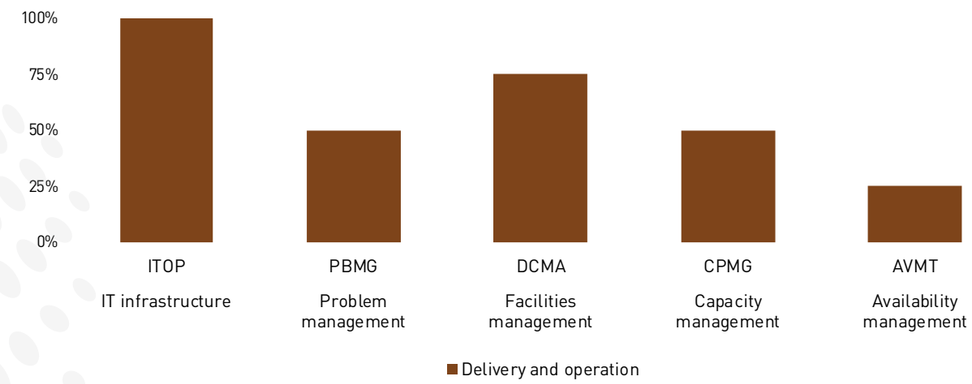
Infrastructure Engineer

SFIA Level 5



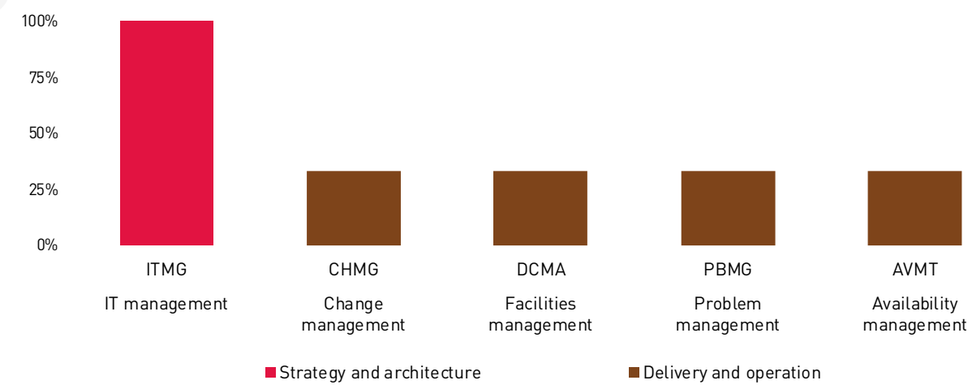
Facilities Manager

SFIA Level 5



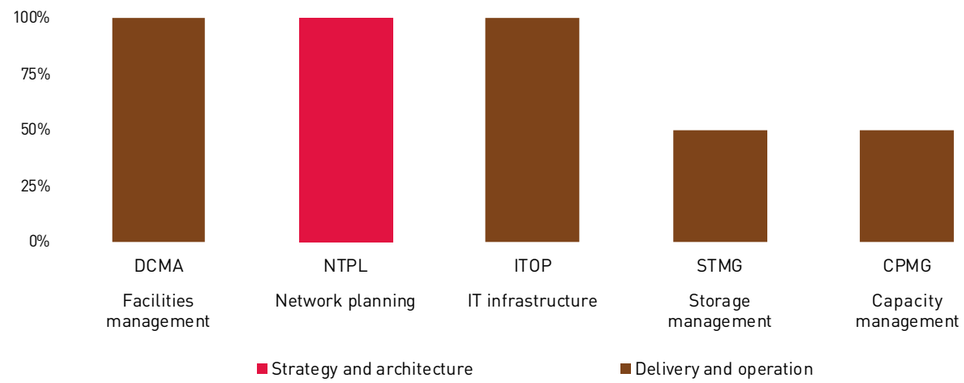
Data Centre Operations Manager

SFIA Level 5



Data Centre Engineer

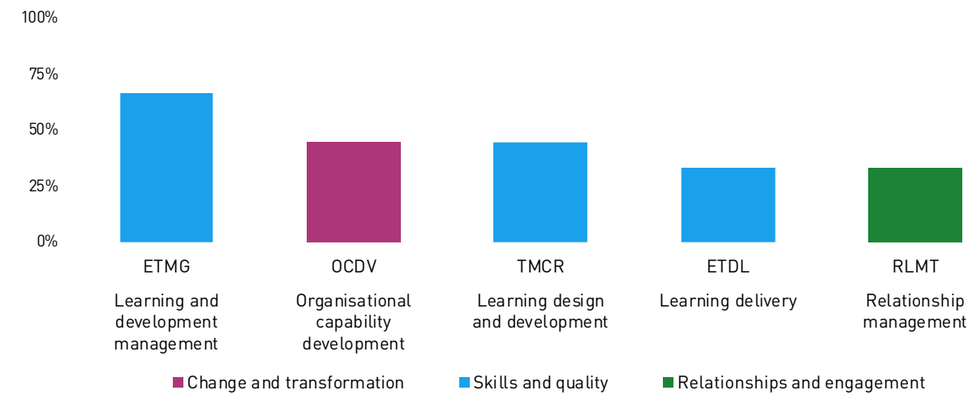
SFIA Level 5



ORGANISATION CAPABILITY STREAM

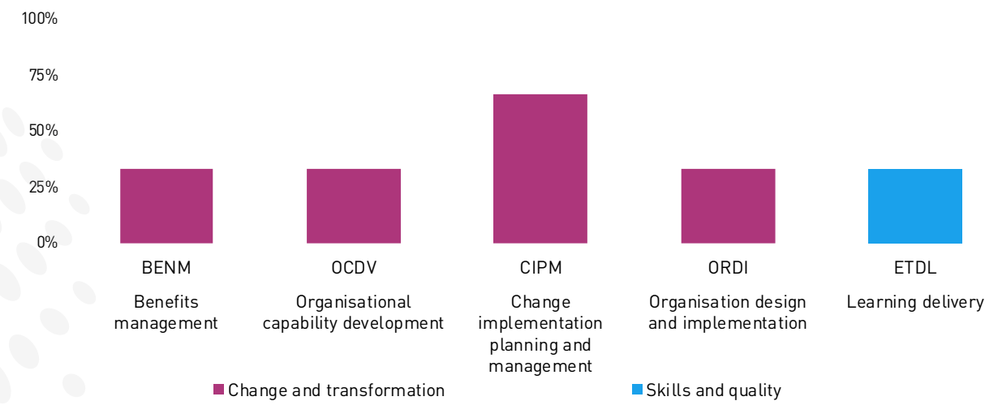
Learning & Development Consultant

SFIA Level 5



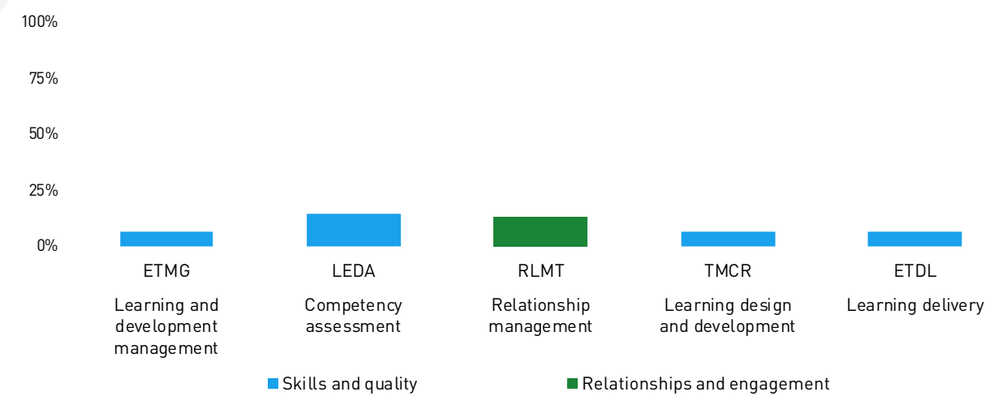
Organisation Change Manager

SFIA Level 6



Teacher, Trainer, Assessor, Tutor

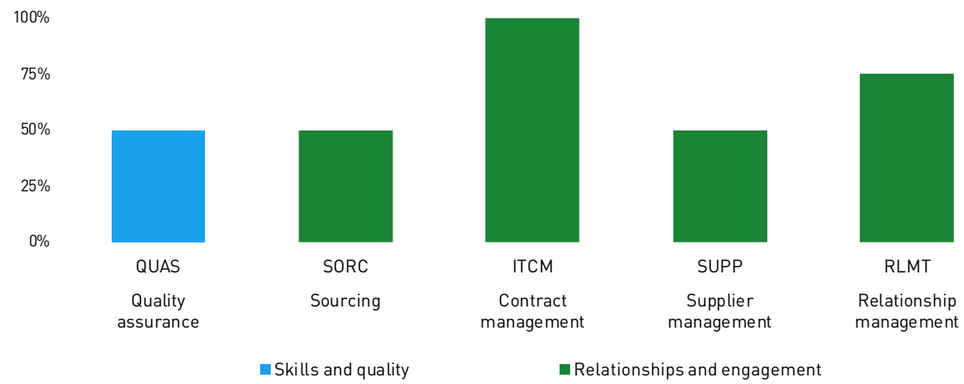
SFIA Level 4



PROCUREMENT & VENDOR STREAM

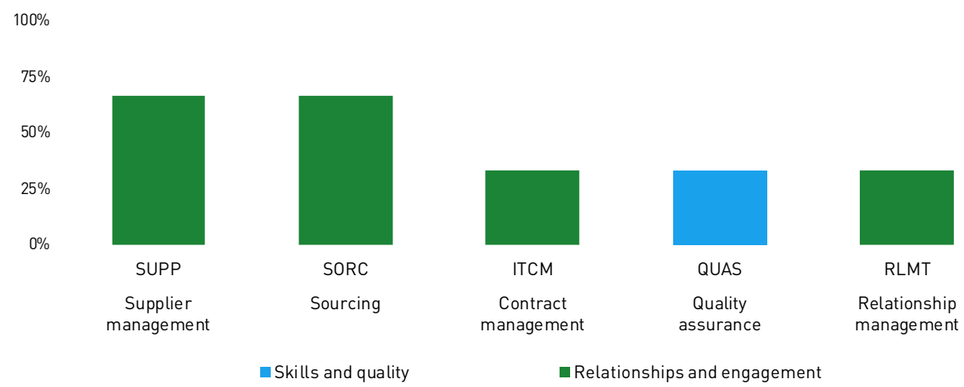
Contract Manager

SFIA Level 4



Procurement Officer

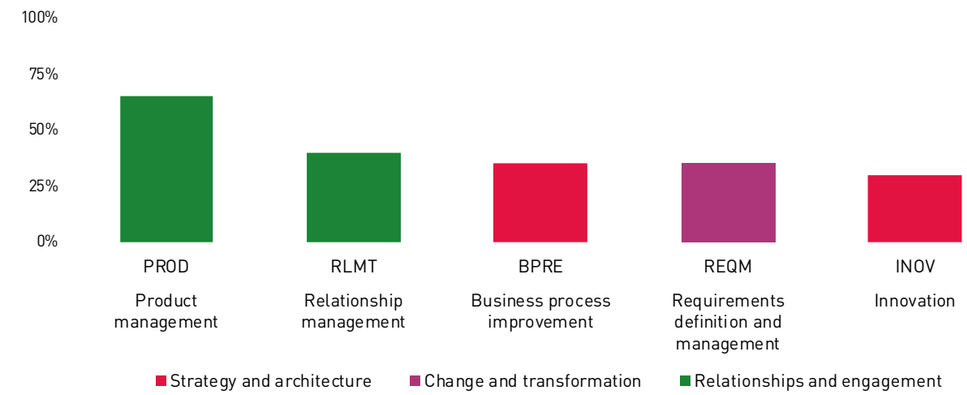
SFIA Level 3



PRODUCT MANAGEMENT, STARTUPS, INNOVATION STREAM

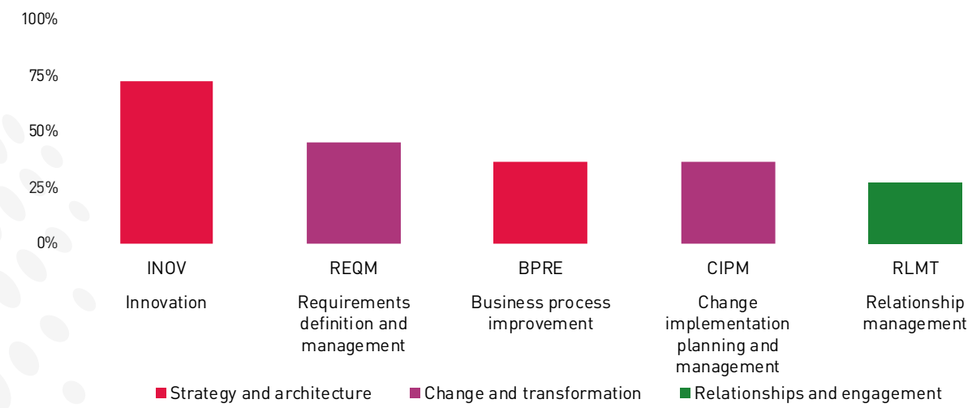
Product Manager

SFIA Level 5



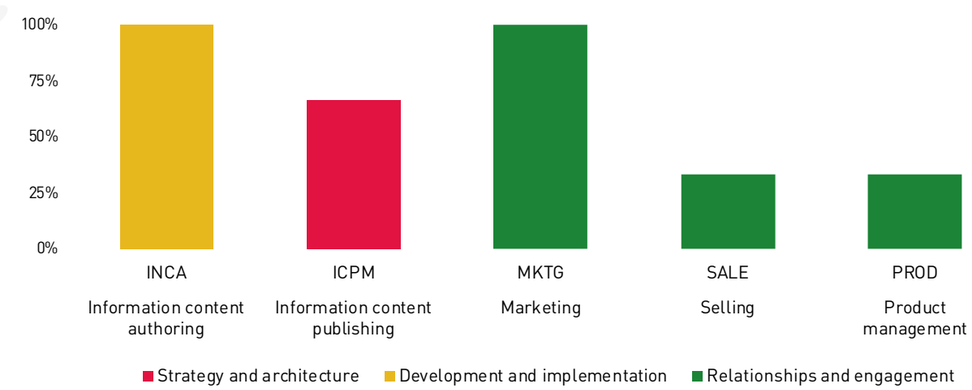
Innovation Manager

SFIA Level 5



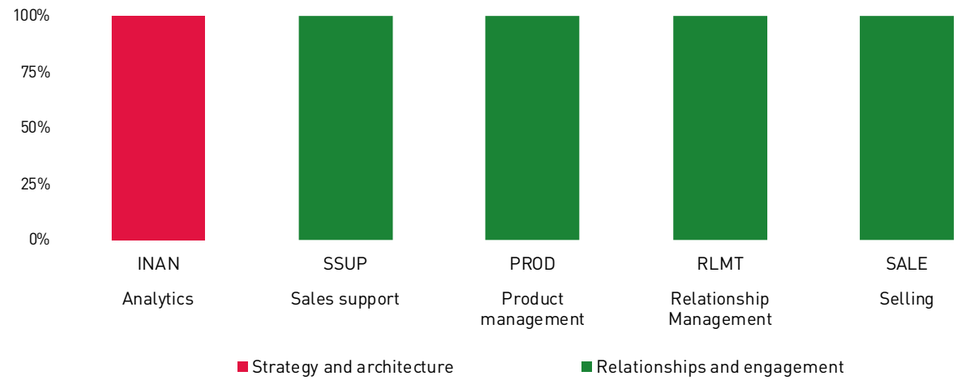
Digital Marketer

SFIA Level 5



Sales Engineer

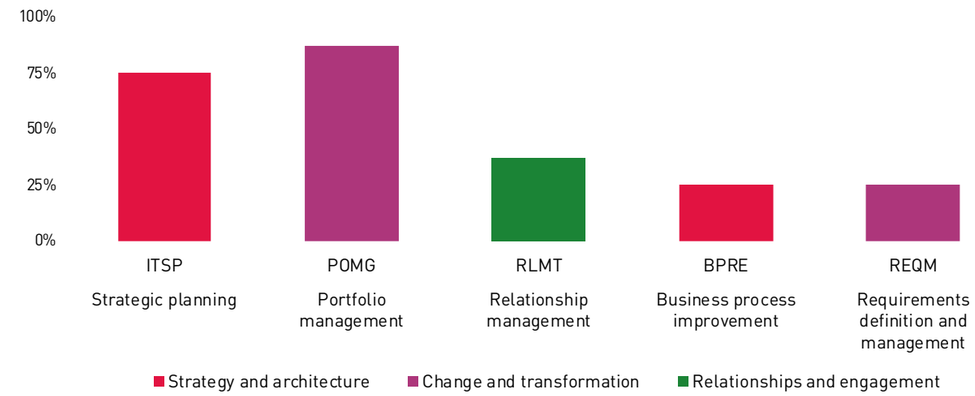
SFIA Level 5



PROJECT, PROGRAM, PORTFOLIO MANAGEMENT STREAM

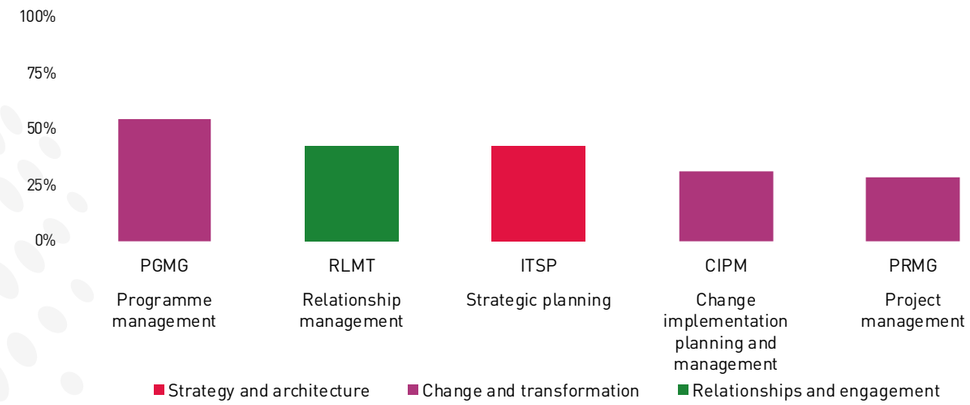
Portfolio Manager

SFIA Level 6



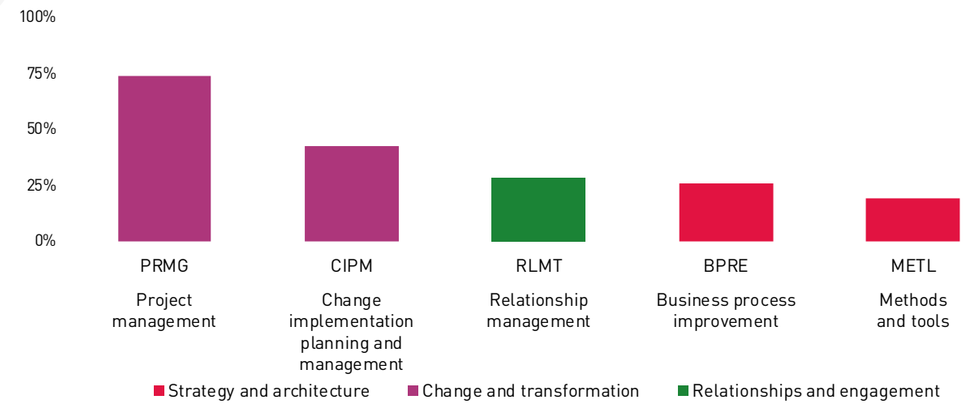
Program Manager

SFIA Level 6



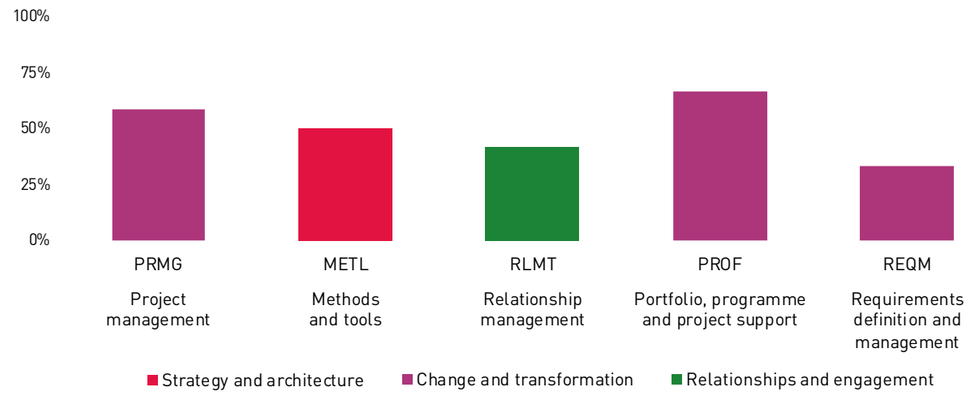
Project Manager

SFIA Level 5



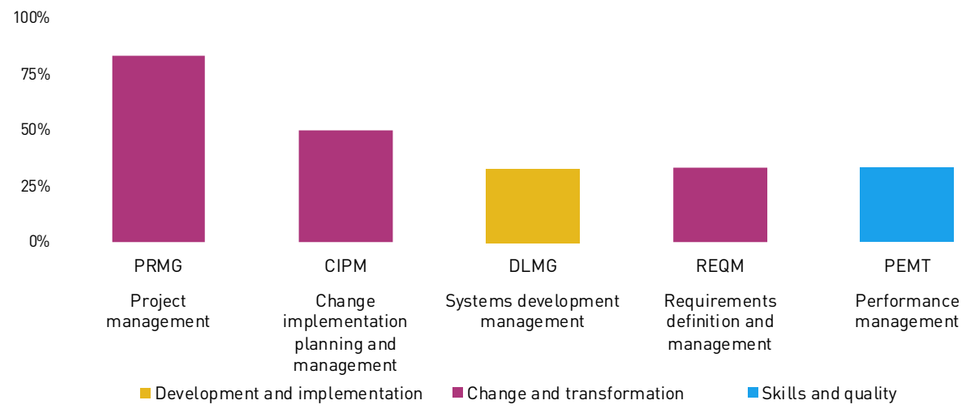
Project Support Officer

SFIA Level 4



Scrum Master

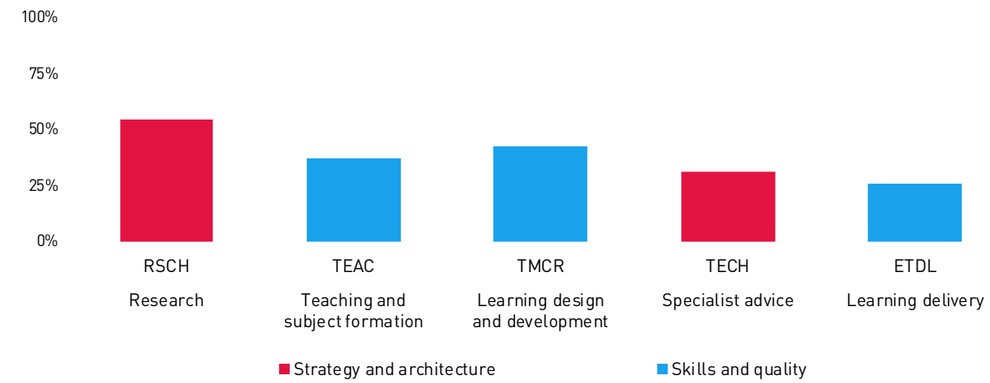
SFIA Level 6



RESEARCH & DEVELOPMENT STREAM

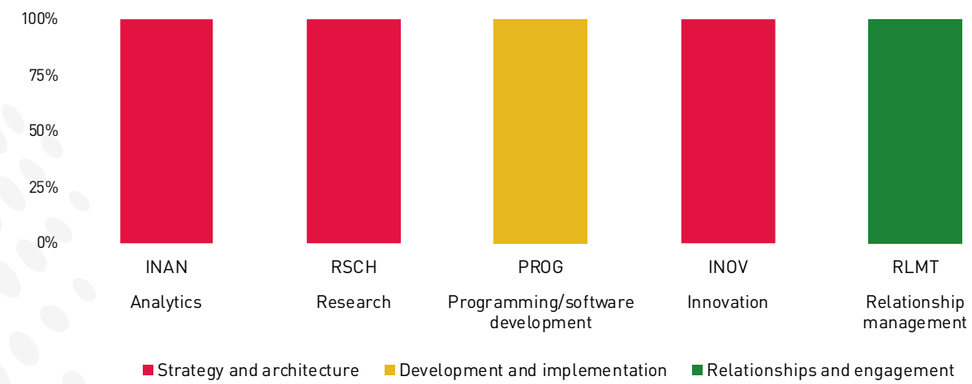
Academic

SFIA Level 5



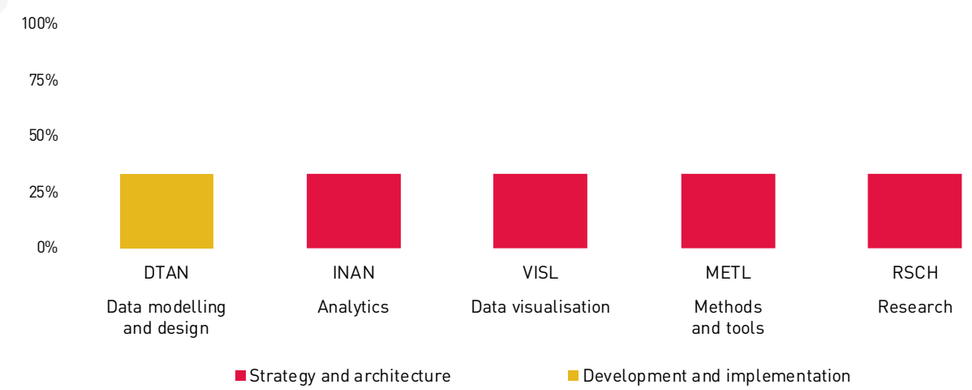
Computational Scientist

SFIA Level 5



eResearch Specialist

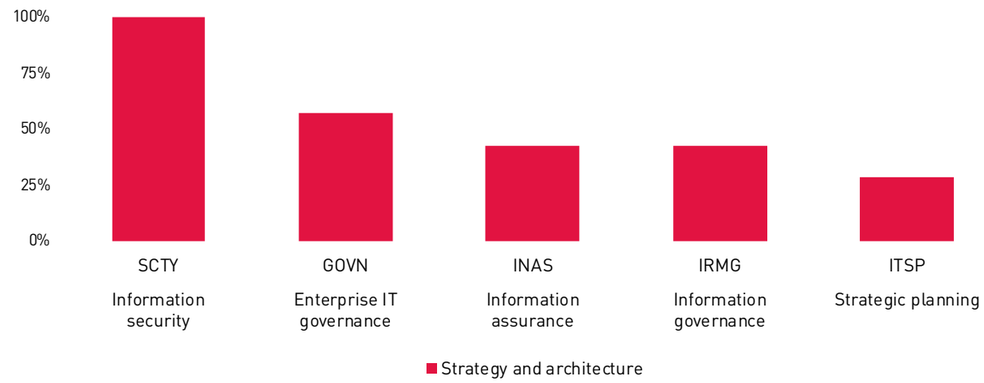
SFIA Level 4



SECURITY – CYBER, SYSTEMS, INFORMATION STREAM

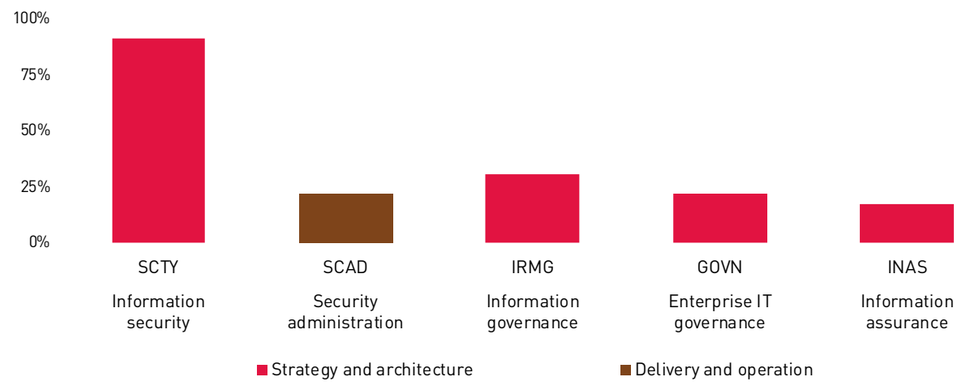
Chief Information Security Officer

SFIA Level 7



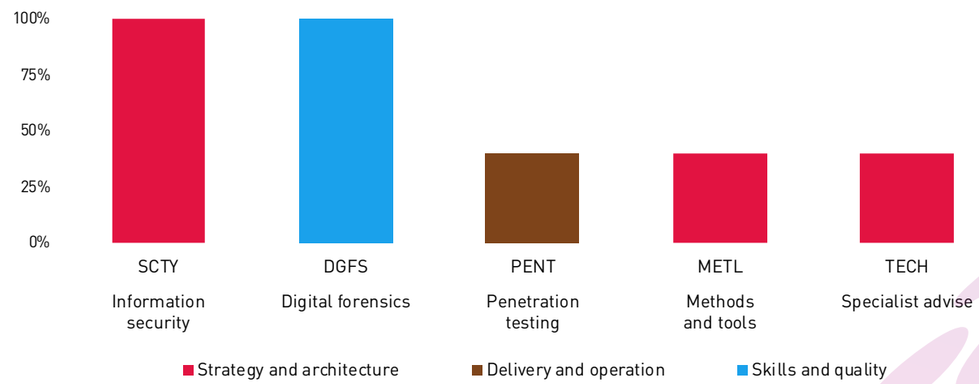
Cyber Security Officer

SFIA Level 5



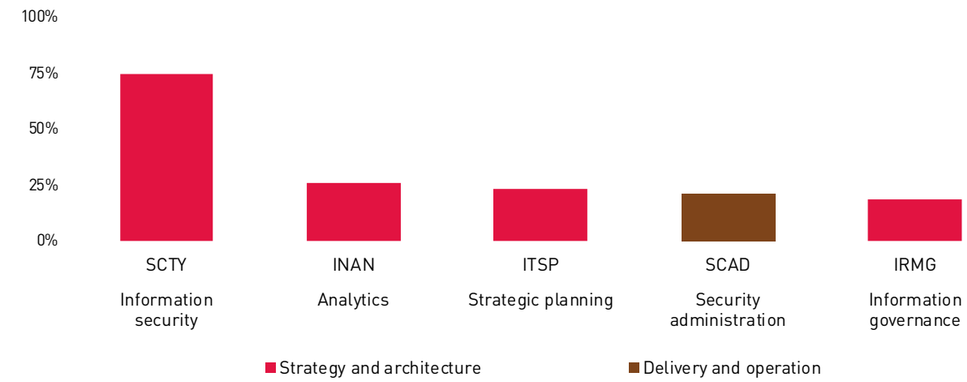
Digital Forensic Specialist

SFIA Level 4



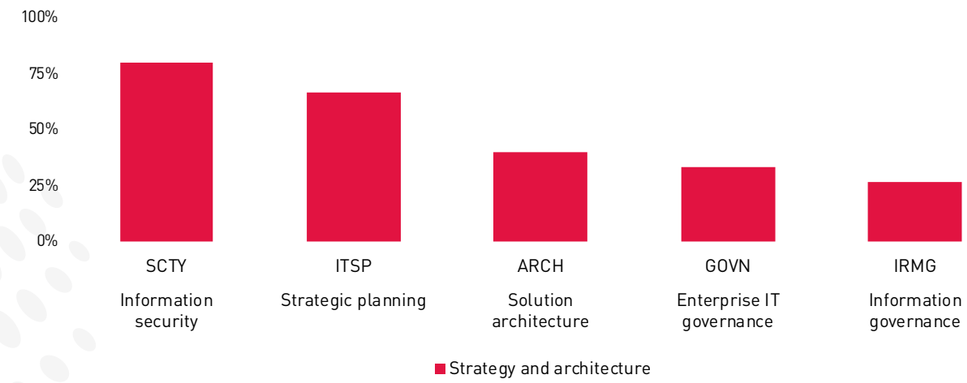
Security Analyst

SFIA Level 4



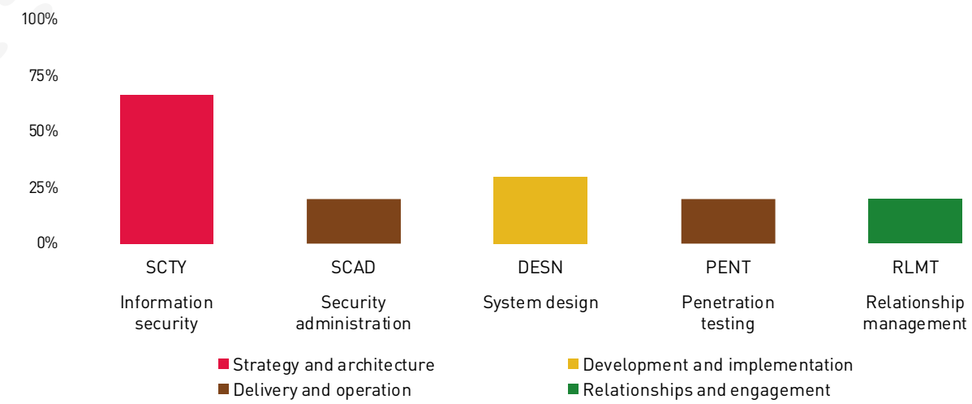
Security Architect

SFIA Level 5



Security Engineer

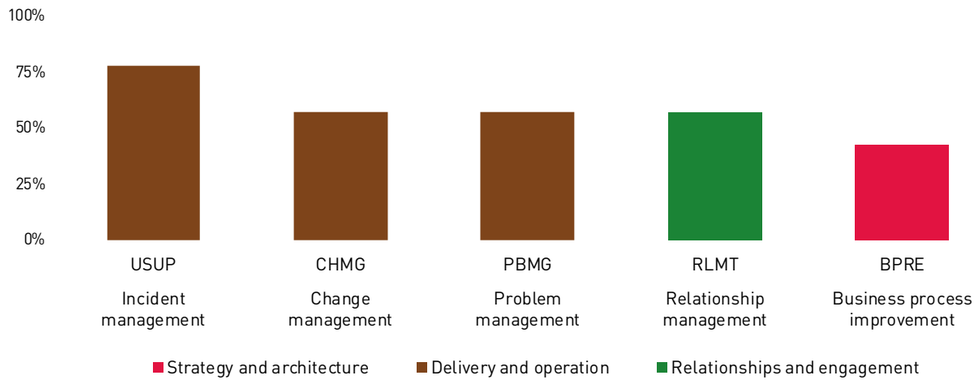
SFIA Level 4



SERVICE DELIVERY & MANAGEMENT STREAM

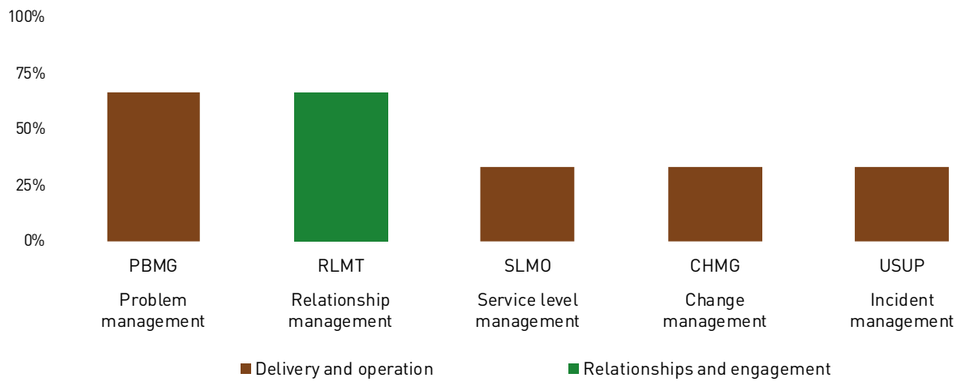
Incident Manager

SFIA Level 5



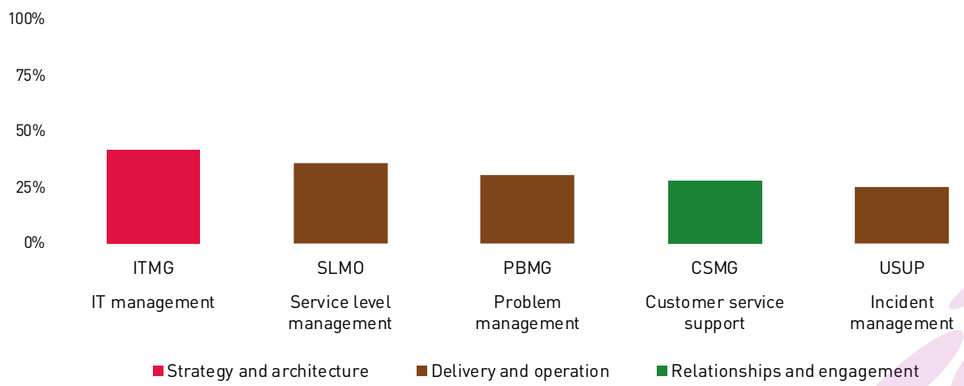
Problem Manager

SFIA Level 5



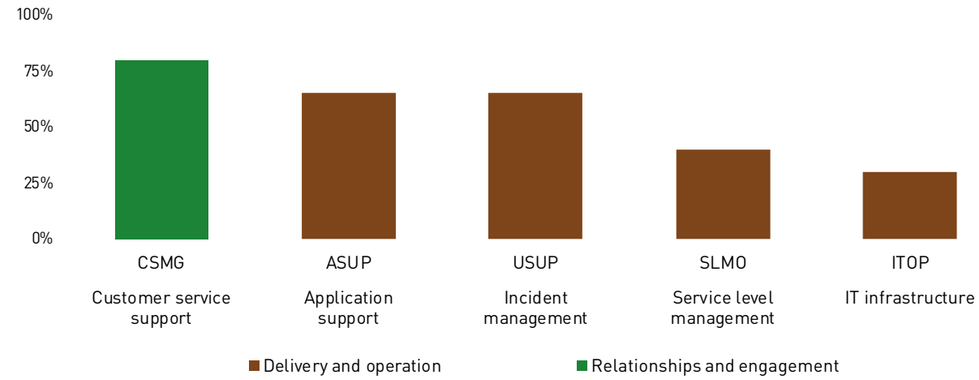
Service Delivery/Operations Manager

SFIA Level 5



Service Desk Operator

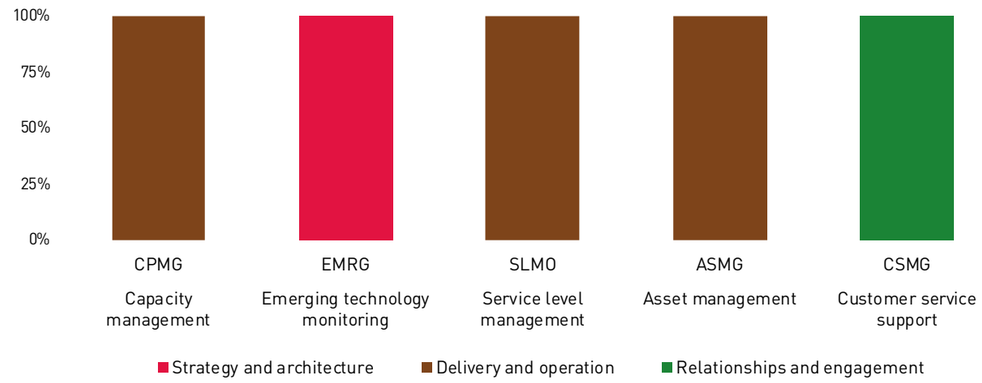
SFIA Level 3



SERVICE TRANSITION & INTEGRATION STREAM

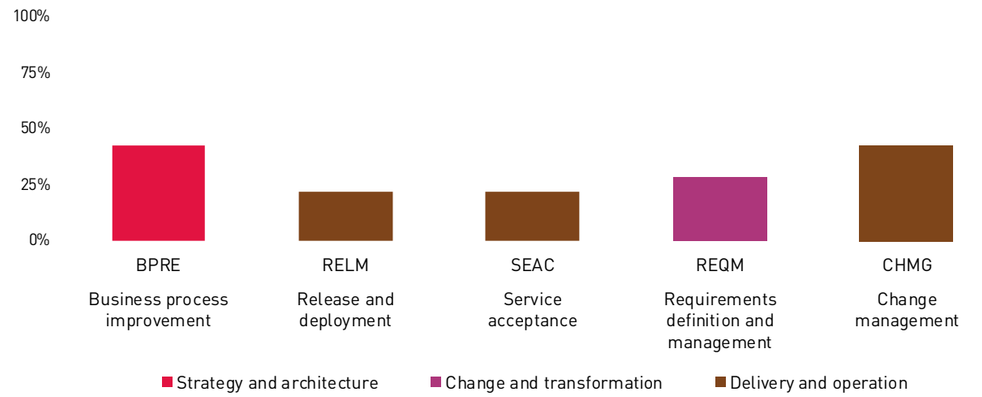
Asset Manager

SFIA Level 5



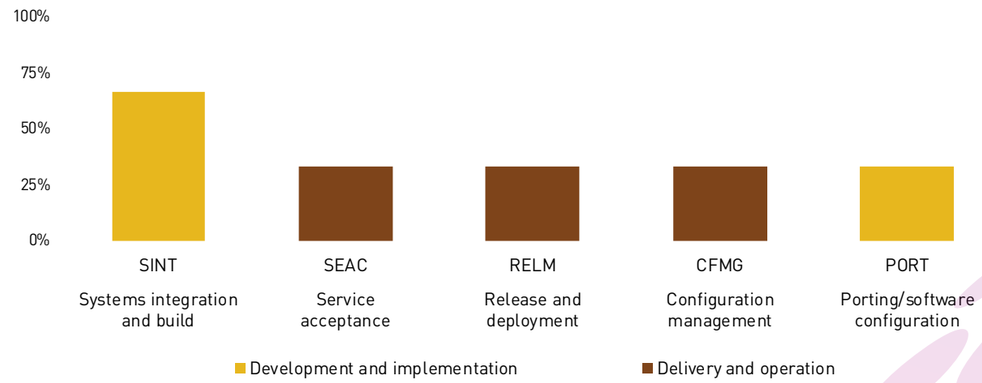
Change Manager

SFIA Level 4



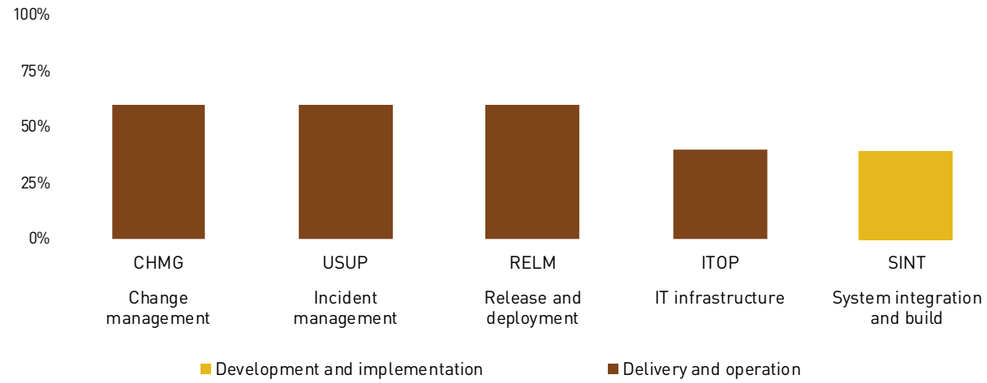
Configuration Manager

SFIA Level 5



Integration Specialist

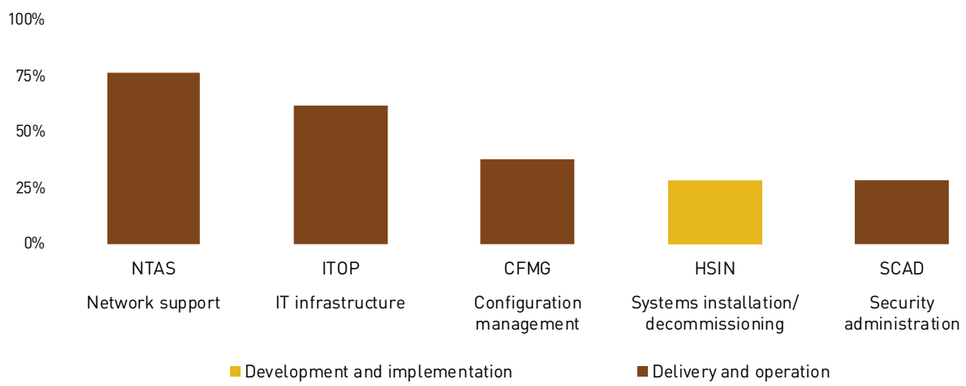
SFIA Level 5



SYSTEM ADMINISTRATION STREAM

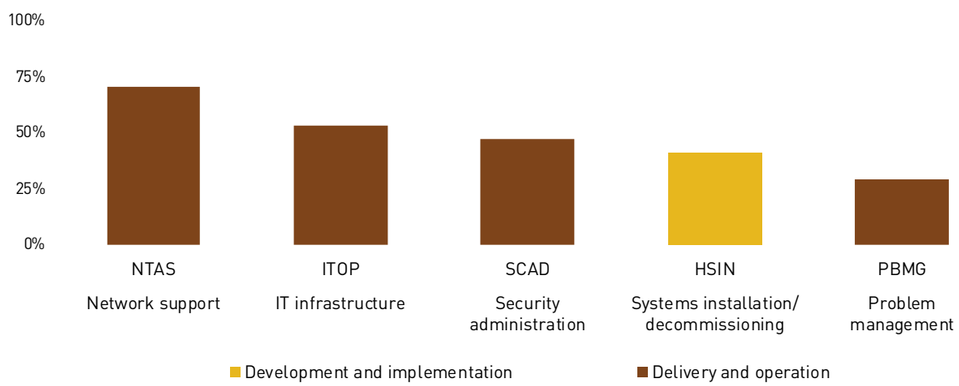
Network Administrator

SFIA Level 4



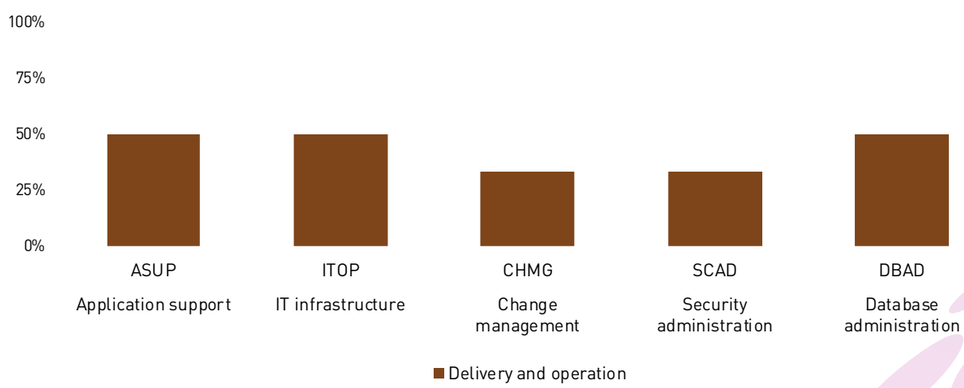
Network Operating Systems Administrator

SFIA Level 4



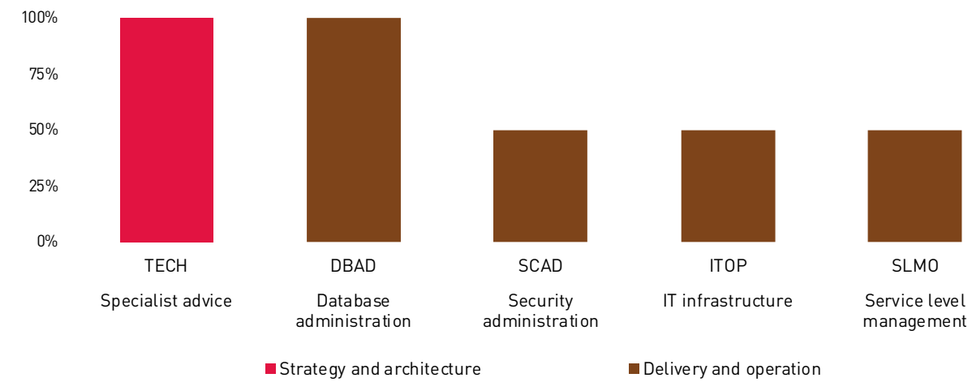
Database Administrator

SFIA Level 4



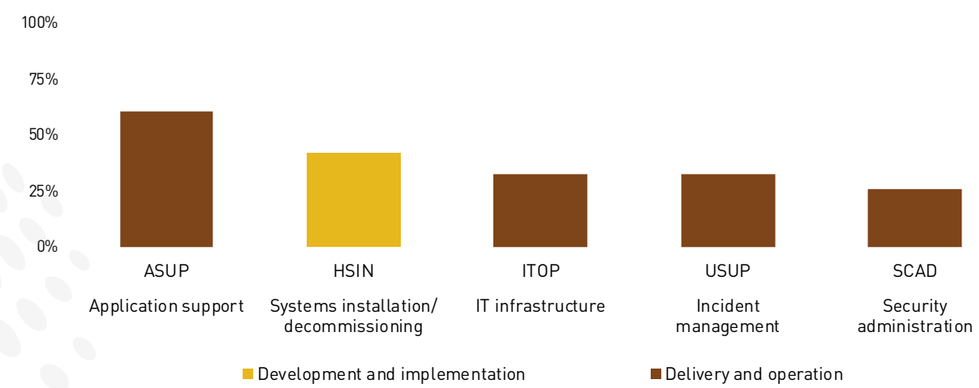
Technical Analyst

SFIA Level 3



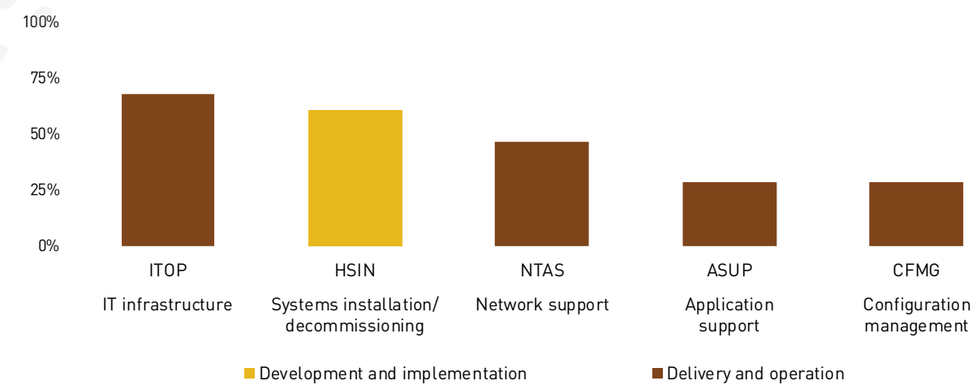
Systems Administrator

SFIA Level 4



Systems Engineer

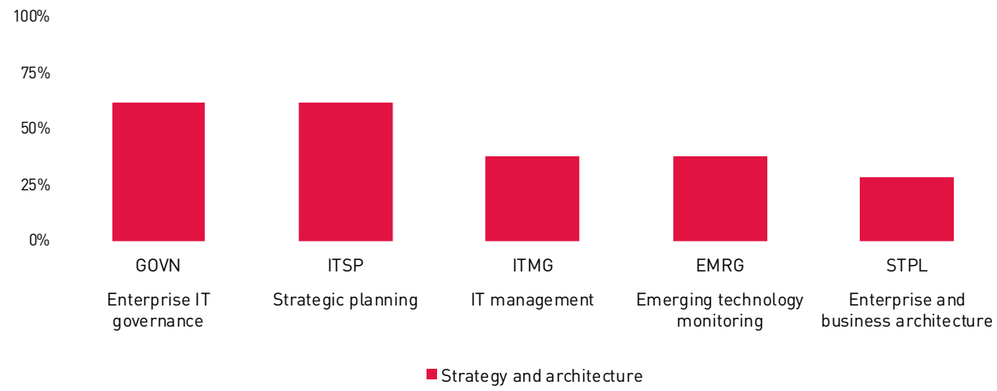
SFIA Level 5



TECHNOLOGY LEADERSHIP STREAM

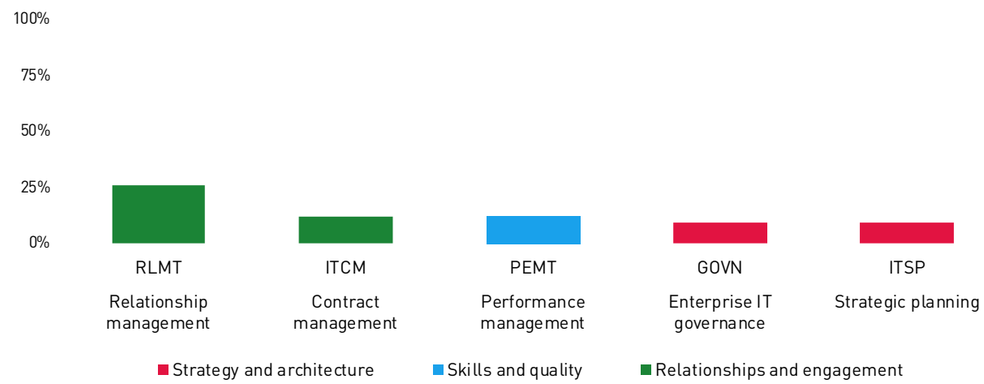
Chief Information Officer

SFIA Level 7



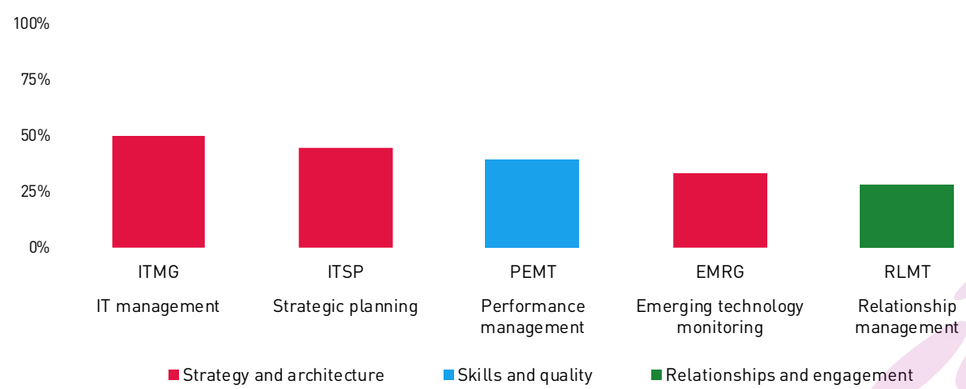
General Manager

SFIA Level 6



IT Operations/Technology Manager

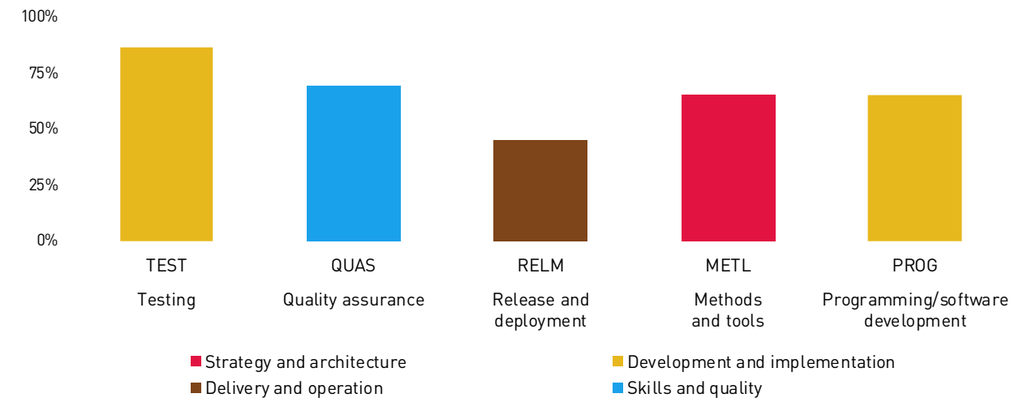
SFIA Level 5



TESTING STREAM

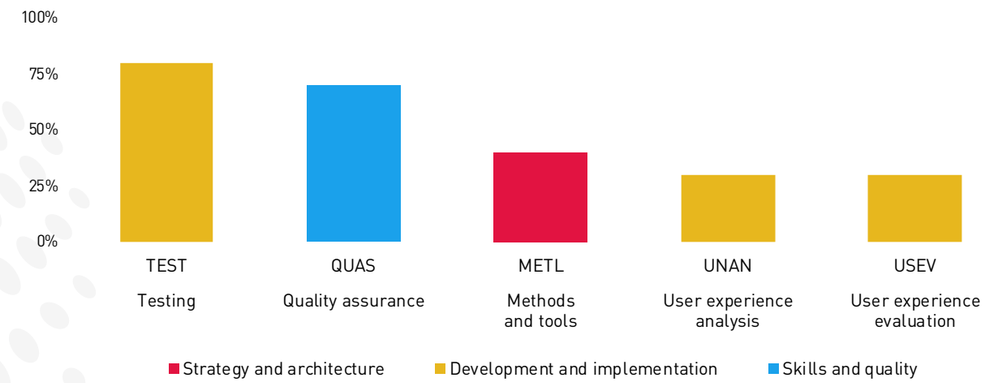
Automation Tester

SFIA Level 4



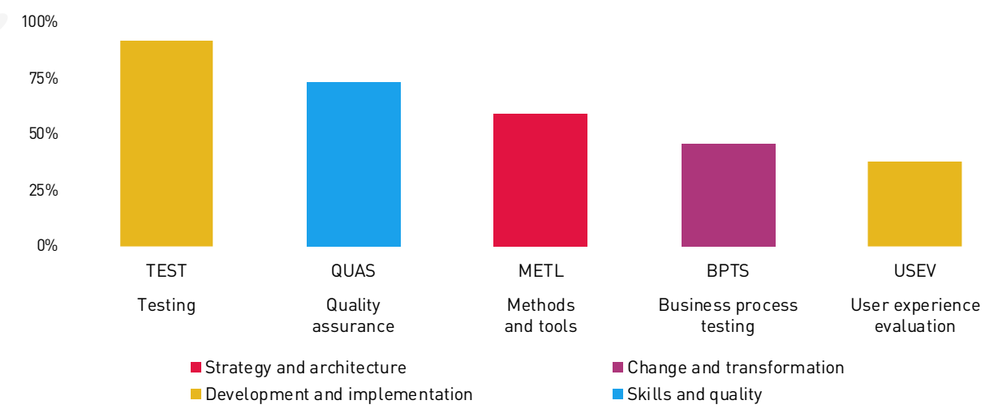
Testing Engineer

SFIA Level 5



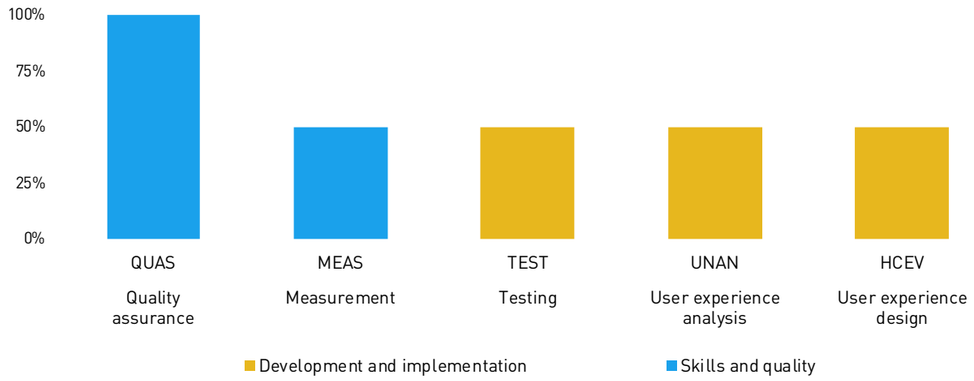
Test Analyst

SFIA Level 4



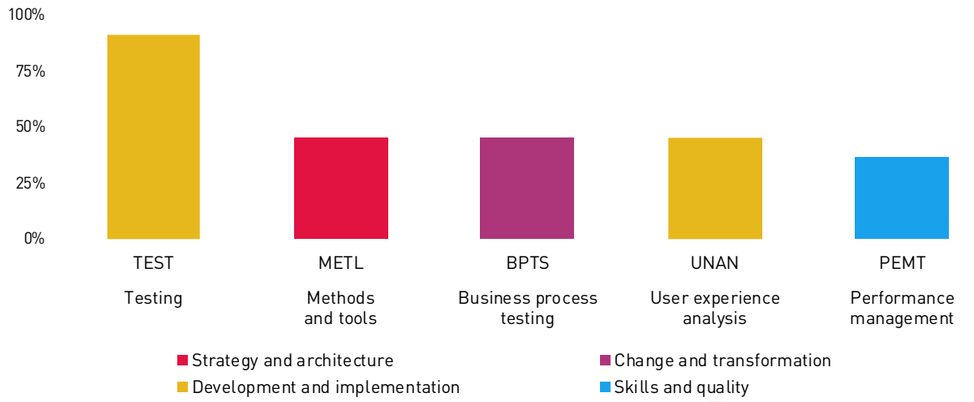
Test Assurance Officer

SFIA Level 4



Test Manager

SFIA Level 5



APPENDIX 2

Most reported SFIA Skills & Operating Levels / SFIA Levels of Responsibility

The commentary provided earlier in this report - Operating Levels & SFIA Responsibility Level Mapping - refers to the following eight figures

TECHNICAL - SPECIALIST (SME) & SFIA L5

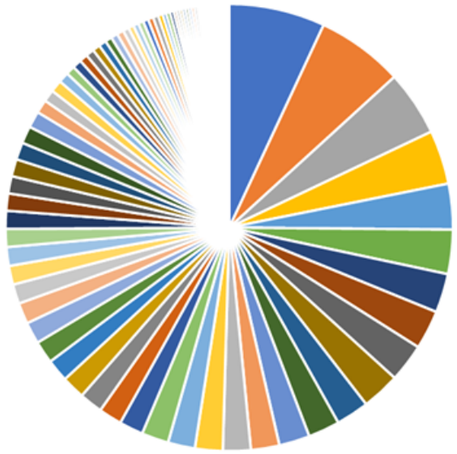


Figure App 2.1 Technical - Specialist (SME) & SFIA L5

LEADERSHIP - TECHNICAL & SFIA L5

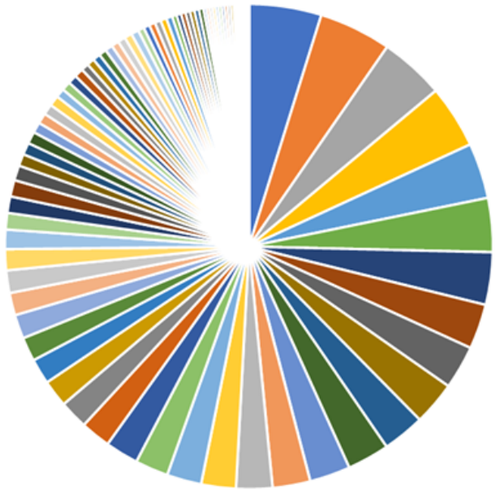
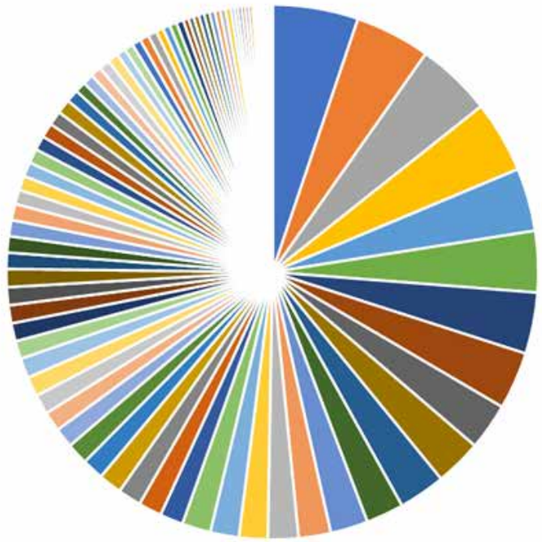


Figure App 2.2 Leadership - Technical & SFIA L5

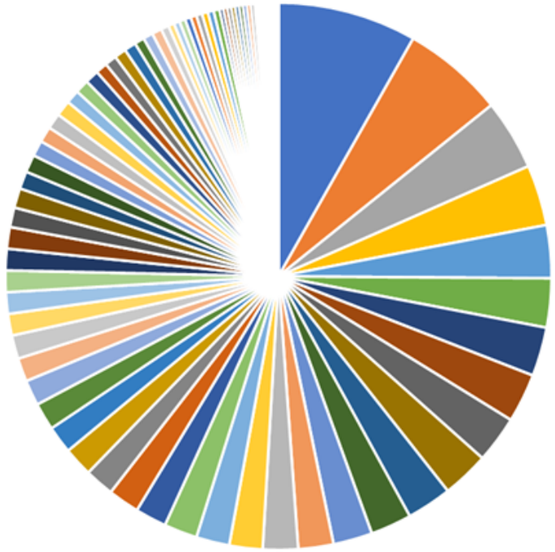
LEADERSHIP - TEAM & SFIA L5|6



- Relationship management
- Project management
- Performance management
- Methods and tools
- Quality assurance
- Analytics
- Solution architecture
- Business risk management
- Data modelling and design
- Data management
- Systems integration and build
- Financial management
- Learning delivery
- Problem management
- Business modelling
- Learning and development management
- Innovation
- Teaching and subject formation
- Strategic planning
- Business process improvement
- Requirements definition and management
- Change implementation planning and management
- Service level management
- Consultancy
- IT management
- Business process testing
- Information security
- Change management
- Information governance
- Systems design
- Supplier management
- Enterprise and business architecture
- Portfolio, programme and project support
- Research
- Information assurance
- Software design
- Business analysis
- Specialist advice
- Programming/software development
- Testing
- Enterprise IT governance
- User experience analysis
- Emerging technology management
- Programme management
- Incident management
- Systems development management
- Product management
- User experience design
- Data visualisation
- Configuration management
- Learning design and development
- IT infrastructure
- User experience research
- Network support

Figure App 2.3 Leadership - Team & SFIA L5|6

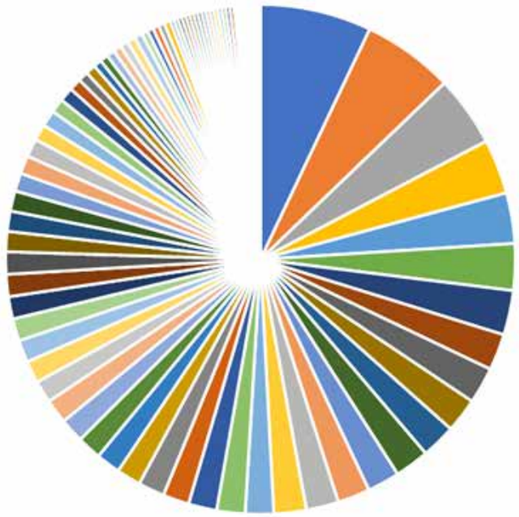
TECHNICAL - APPLIED & SFIA L4



- Programming/software development
- Methods and tools
- Application support
- Systems integration and build
- Relationship management
- Performance management
- Business process improvement
- User experience design
- Systems development management
- Project management
- Business process testing
- Data management
- Change management
- Database administration
- User experience research
- Product management
- Customer service support
- Testing
- IT infrastructure
- Network support
- Systems design
- Business analysis
- Requirements definition and management
- Analytics
- IT management
- Quality assurance
- Problem management
- System software
- Consultancy
- Configuration management
- Business modelling
- Strategic planning
- Porting/software configuration
- Quality management
- Software design
- Data modelling and design
- Specialist advice
- Systems installation/decommissioning
- Incident management
- User experience analysis
- Solution architecture
- Data visualisation
- Security administration
- Service level management
- Information security
- Emerging technology management
- Innovation
- Database design
- Information governance
- Release and deployment
- Information systems coordination

Figure App 2.4 Technical - Applied & SFIA L4

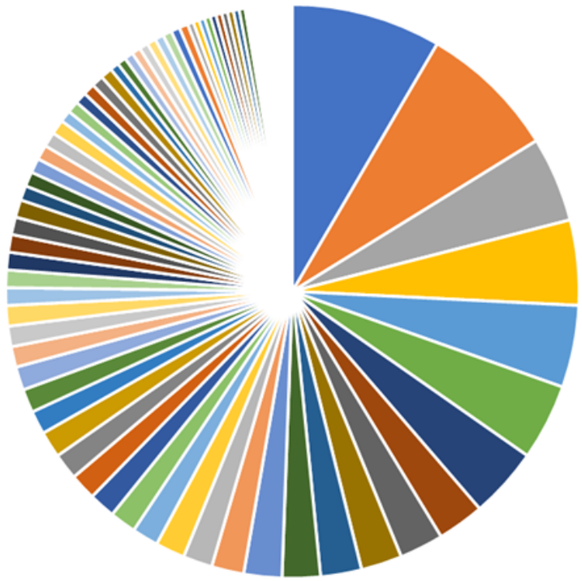
GRADUATE & SFIA L3



- Programming/software development
- Software design
- Systems design
- Business process improvement
- Performance management
- Problem management
- User experience analysis
- Consultancy
- Data visualisation
- Incident management
- Service level management
- Solution architecture
- Enterprise IT governance
- Systems installation/decommissioning
- User experience evaluation
- User experience research
- Release and deployment
- Knowledge management
- Portfolio, programme and project support
- Research
- Programme management
- Testing
- Business analysis
- Relationship management
- Systems development management
- Data modelling and design
- Specialist advice
- Security administration
- Requirements definition and management
- Network support
- Application support
- Business process testing
- IT infrastructure
- Database administration
- Information systems coordination
- Business risk management
- Information governance
- Business modelling
- Real-time/embedded systems development
- Organisation design and implementation
- Change implementation planning and management
- Database design
- Methods and tools
- Strategic planning
- Analytics
- Information security
- Project management
- Quality assurance
- Configuration management
- Data management
- Systems integration and build
- User experience design
- Customer service support
- Emerging technology management
- System software
- IT management
- Learning delivery
- Change management
- Continuity planning
- Innovation
- Penetration testing
- Product management
- Information assurance

Figure App 2.5 Graduate & SFIA L3

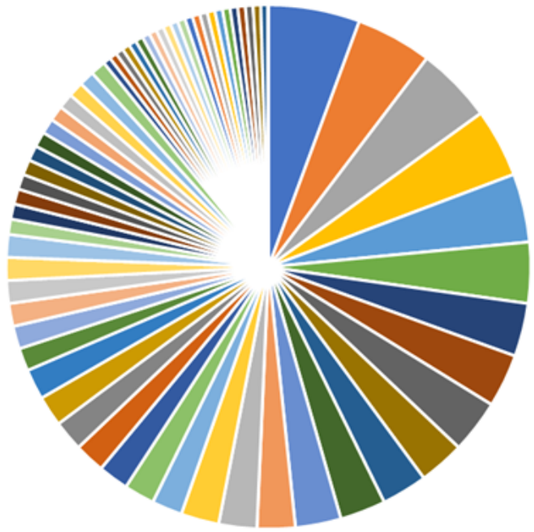
LEADERSHIP – ORGANISATION & SFIA L6|7



- Strategic planning
- IT management
- Consultancy
- Change implementation planning and management
- Contract management
- Information governance
- Information security
- Organisation capability development
- Programme management
- Security administration
- Data management
- Portfolio management
- Organisation design and implementation
- Information content authoring
- Product management
- Professional development
- Data modelling and design
- Network support
- Learning delivery
- User experience design
- Knowledge management
- Competency assessment
- Relationship management
- Performance management
- Business risk management
- Systems development management
- Service level management
- Systems design
- Programming/software development
- Methods and tools
- Innovation
- Problem management
- Learning design and development
- Change management
- Information assurance
- Testing
- Incident management
- Release and deployment
- Sourcing
- Penetration testing
- Demand management
- Marketing
- Specialist advice
- Business process improvement
- Emerging technology management
- Enterprise and business architecture
- Project management
- Requirements definition and management
- Financial management
- IT infrastructure
- Business analysis
- Systems integration and build
- Supplier management
- Business modelling
- Learning and development management
- Customer service support
- Portfolio, programme and project support
- Software design
- Data visualisation
- Information systems coordination
- Application support
- Research
- Network planning
- Selling
- Enterprise IT governance

Figure App 2.6 Leadership - Organisation & SFIA L6|7

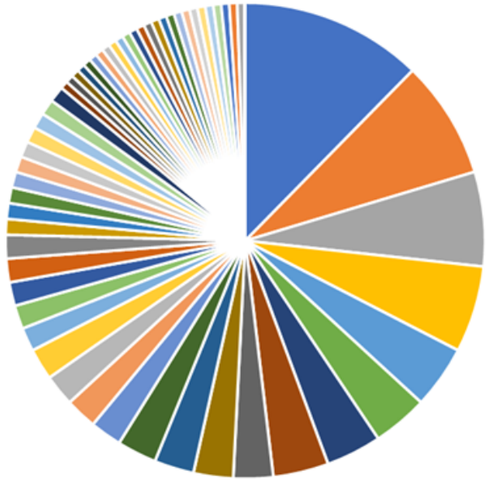
ENTRY (NON-GRADUATE) & SFIA L1/2



- Analytics
- Testing
- Information security
- Consultancy
- Problem management
- Software design
- Requirements definition and management
- Application support
- Performance management
- Database administration
- Enterprise IT governance
- Service level management
- System software
- Quality management
- Programming/software development
- Relationship management
- Data visualisation
- IT management
- Methods and tools
- Specialist advice
- Systems development management
- User experience design
- Systems integration and build
- Product management
- Emerging technology management
- Innovation
- Information systems coordination
- Digital forensics
- Data management
- Business analysis
- Customer service support
- Incident management
- Systems design
- Data modelling and design
- IT infrastructure
- Strategic planning
- Security administration
- Business process improvement
- Information governance
- Release and deployment
- Penetration testing
- Knowledge management

Figure App 2.7 Entry (non-graduate) & SFIA L1|2

LEADERSHIP – LARGE ORGANISATION/INDUSTRY & SFIA L7



- Strategic planning
- Relationship management
- Business analysis
- Analytics
- Performance management
- Organisation capability development
- Organisation design and implementation
- Systems design
- IT infrastructure
- User experience analysis
- Business risk management
- Software design
- Quality assurance
- Business process testing
- Configuration management
- Product management
- Enterprise IT governance
- Enterprise and business architecture
- IT management
- Systems development management
- Project management
- Testing
- Financial management
- Solution architecture
- Network support
- Programming/software development
- Requirements definition and management
- Problem management
- Systems installation/decommissioning
- Database administration
- Programme management
- Information security
- Consultancy
- Specialist advice
- Business process improvement
- Emerging technology management
- Innovation
- Information governance
- Quality management
- Data modelling and design
- Change implementation planning and management
- Methods and tools
- Incident management
- User experience design
- Change management
- Business modelling
- Information systems coordination
- Data visualisation

Figure App 2.8 Leadership - Large Organisation/Industry & SFIA L7

References

[i] ACS Australia's Digital Pulse 2021, p1

[ii] SFIA Foundation, Skills Framework for the Information Age (SFIA), https://sfia-online.org/en

[iii] ACS Australia's Digital Pulse 2021, p1

[iv] FÆTHM & ACS, Technology Impacts on the Australian Workforce, March 2020, p11

[v] Ibid, p11

[vi] ABS, Australian Industry, 29/05/2020 – IMT (Information Media and Telecommunications Services)

[vii] The Australian and New Zealand standard Classification of Occupations (ANZSCO)

[viii] FÆTHM & ACS, Technology Impacts on the Australian Workforce, March 2020, p11

[ix] FÆTHM & ACS, Technology Impacts on the Australian Workforce, March 2020, pp34-69

[x] FÆTHM & ACS, Technology Impacts on the Australian Workforce, March 2020, p91

[xi] McKinsey, Rewriting the rules: Digital and AI-powered underwriting in life insurance, 31/07/2020

[xii] ACS Australia's Digital Pulse 2021, p2

[xiii] Ibid, P26

ABOUT ACS

ACS is the professional association for Australia's Information and Communication Technology (ICT) sector. More than 40,000 ACS members work in business, education, government and the community.

ACS has a vision for Australia to be a world leader in technology talent, fostering innovation and creating new forms of value. We are firmly vested in the innovative creation and adoption of best of breed technology in Australia, and we strive to create the environment and provide the opportunities for members and partners to succeed.

ACS works to ensure ICT professionals are recognised as drivers of innovation in our society, relevant across all sectors, and to promote the formulation of effective policies on ICT and related matters.

Visit acs.org.au for more information.

ACS
International Tower One
Level 27
100 Barangaroo Ave
Sydney NSW 200

P: 02 9299 3666
F: 02 9299 3997
E: info@acs.org.au
W: acs.org.au