CHAPTER 11

STEM PATHWAYS: INFORMATION TECHNOLOGY

WHAT IS INFORMATION TECHNOLOGY?

The main purpose of studying and working in Information Technology (IT) is to understand and apply knowledge of information systems, programming languages, information management and artificial intelligence, and the ability to apply them to solve problems. IT is comprised of Computer Science, Information Systems, and Other Information Technology. (ABS, 2001)

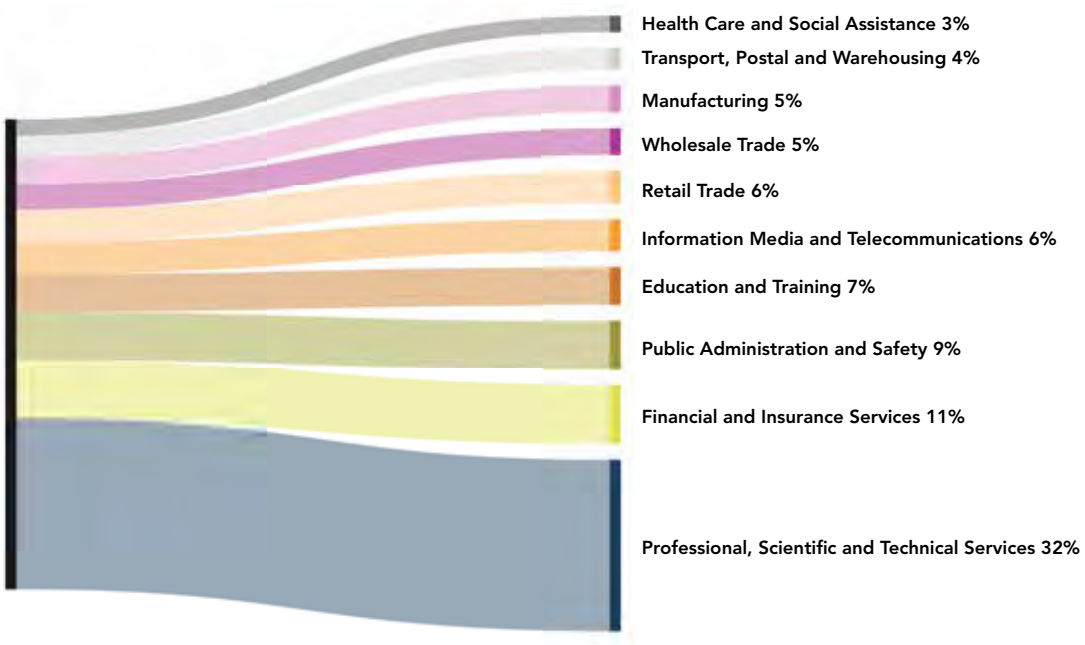
11

STEM PATHWAYS: INFORMATION TECHNOLOGY

KEY FACTS

1. In 2011, there were 160 919 Information Technology (IT) graduates, the majority of which were male (75 per cent).
2. Around one quarter of graduates held postgraduate qualifications: 24 per cent masters and 2 per cent doctorates.
3. The IT workforce was younger than the Non-STEM workforce, with one half under the age of 35 (50 and 37 per cent, respectively).
4. The private sector employed 82 per cent of all IT graduates—varying from 84 per cent of bachelors and masters to 44 per cent of doctorates.
5. One-third (32 per cent) of all IT graduates were employed in the Professional, Scientific and Technical Services industry.
6. The majority (58 per cent) of graduates were employed as Professionals, 21 per cent as Software and Applications Programmers.
7. A larger proportion of IT graduates had a personal income in the highest bracket (more than $104 000) than Non-STEM graduates (24 and 15 per cent, respectively), and this difference was particularly pronounced in the younger age groups.

Top ten industry sectors of employment for Information Technology graduates



HOW MANY INFORMATION TECHNOLOGY GRADUATES ARE THERE IN AUSTRALIA?

In 2011, there were 160 919 Information Technology (IT) in Australia. Three quarters of graduates were male. Around one quarter of IT graduates had postgraduate qualifications (41 579), with 24 per cent holding masters degrees and two per cent doctorates. The majority of graduates with postgraduate qualifications were male (75 per cent). Fourteen per cent of graduates (22 321) were either not in the labour force or were unemployed (10 and 4 per cent, respectively).

The field of IT has four sub fields: Information Technology, n.f.d. (not further defined), Computer Science, Information Systems, and Other Information Technology. Just under two thirds (65 per cent) of IT graduates recorded their field of study as Information Technology, n.f.d. This chapter reports on the workforce characteristics of all the sub-fields together.

HOW OLD IS THE INFORMATION TECHNOLOGY GRADUATE WORKFORCE?

The IT workforce was substantially younger than the Non-STEM workforce, with almost one half under the age of 35 (Figure 11.1). 47 per cent of females and 50 per cent of males were 35 years old or under, compared to 33 per cent of females and 39 per cent of males in the Non-STEM workforce.

Similar percentages of the workforce were aged between 35 and 54 for both IT and Non-STEM, while in the over 55 age brackets, there are far fewer IT graduates in the workforce.

WHERE DO INFORMATION TECHNOLOGY GRADUATES WORK?

The private sector employed 82 per cent of all IT graduates. The proportion employed in the private sector varies with qualification as follows:

- Bachelor level: 84 per cent
- Postgraduate level: 81 per cent
  - Masters: 84 per cent
  - Doctorate: 44 per cent

INDUSTRY SECTORS OF EMPLOYMENT

Industries are classified in four levels (ABS, 2006a):

- Divisions (the broadest level)
- Subdivisions
- Groups
- Classes (the finest level)

See Appendix B for a detailed list.

Figure 11.1: Age distribution of employed Information Technology graduates at bachelor level and above, by field and gender

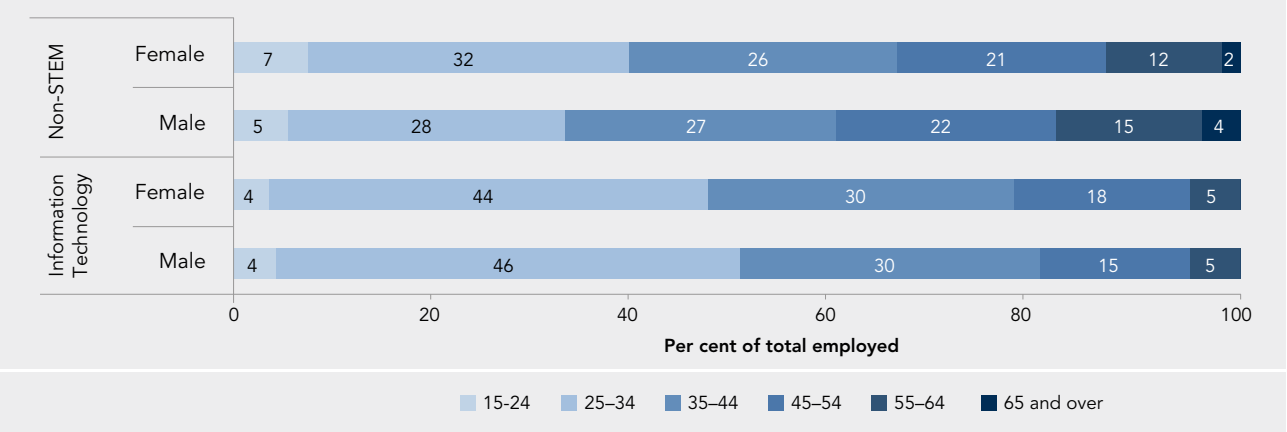


Figure 11.2: Top ten industry divisions of employment for Information Technology graduates with qualifications at bachelor level and above, by gender

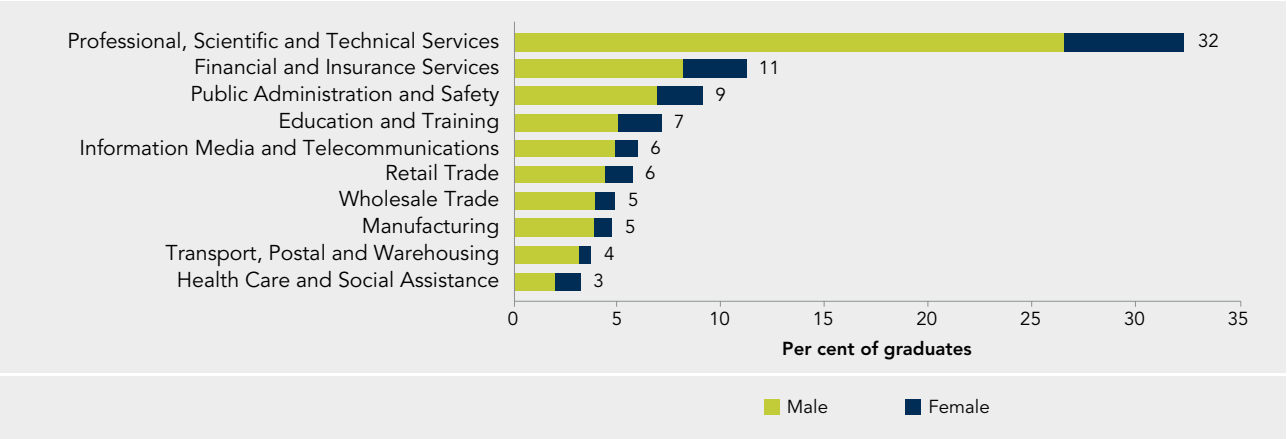
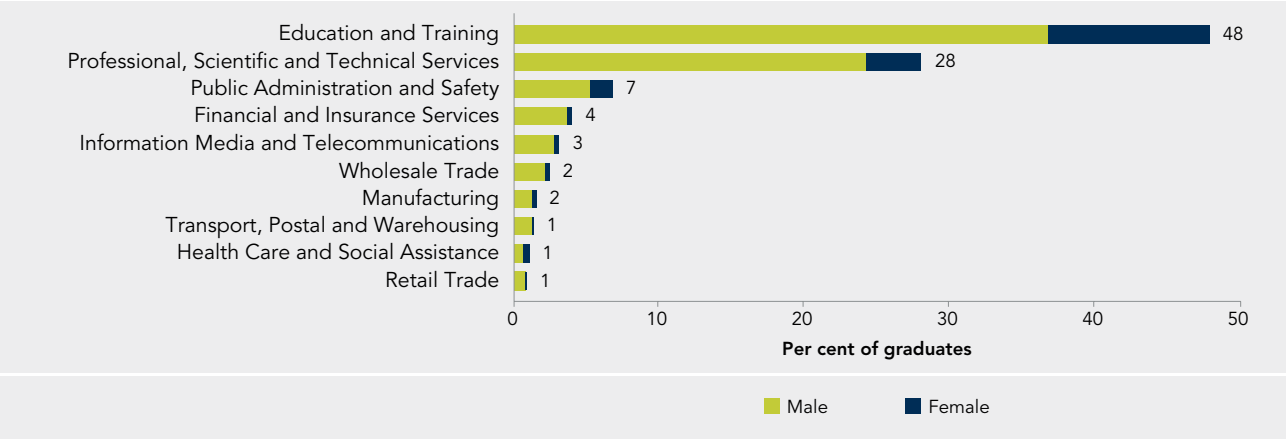


Figure 11.3: Top ten industry divisions of employment for Information Technology doctoral graduates, by gender



Before reporting on the industry sectors of employment for IT graduates, it is important to first note that only 85 per cent of respondents (136 066 out of 160 919) provided adequate information in this section of the Census.

Almost one third of IT graduates worked in the Professional, Scientific and Technical Services industry (32 per cent) (Figure 11.2). This was the top destination of employment for both males and females, employing 34 per cent of male graduates and 26 per cent of female graduates. The next most common industries were Financial and Insurance Services, and by Public Administration and Safety (11 and 9 per cent, respectively).

At the doctoral level of qualification, almost one half worked in the Education and Training industry (48 per cent)(Figure 11.3). In contrast, just 7 per cent of the total cohort of IT graduates at the bachelor level and above worked in the Education and Training industry. Professional, Scientific and Technical Services (28 per cent) and Public Administration and Safety (7 per cent) were the next most common industries of employment for IT doctoral graduates. The top three industries of employment were the same for both male and female doctoral graduates.

The industry of employment can be broken down to the class level to show more detail of the destinations of graduates, as shown in Figure 11.4 and Figure 11.5. These were broadly the same for male and female graduates. The most common industry class of employment for IT graduates was in Computer System Design and Related Services, which employed just over one quarter of all graduates (26 per cent). The second most popular industry

Figure 11.4: Top ten industry classes of employment for Information Technology graduates with qualifications at bachelor level and above, by gender

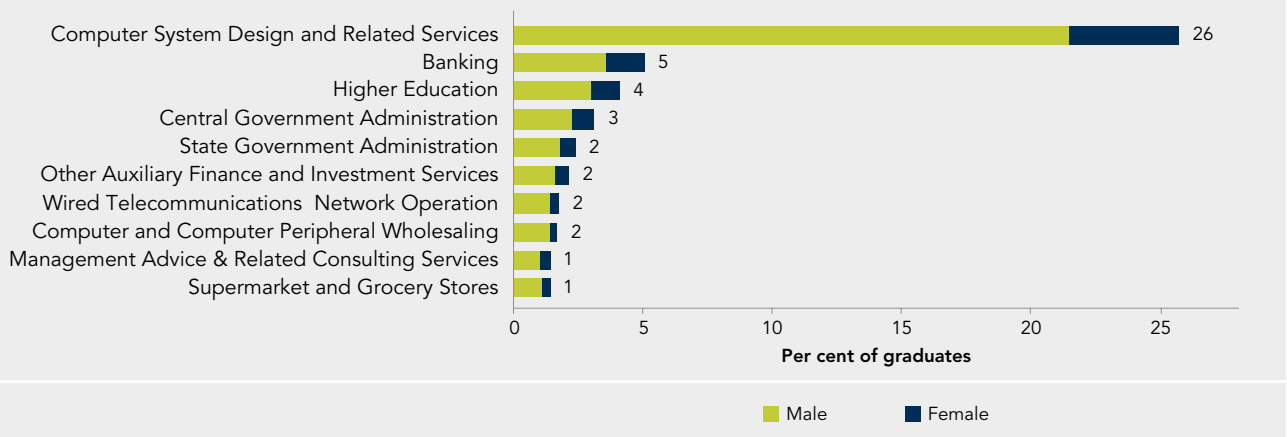
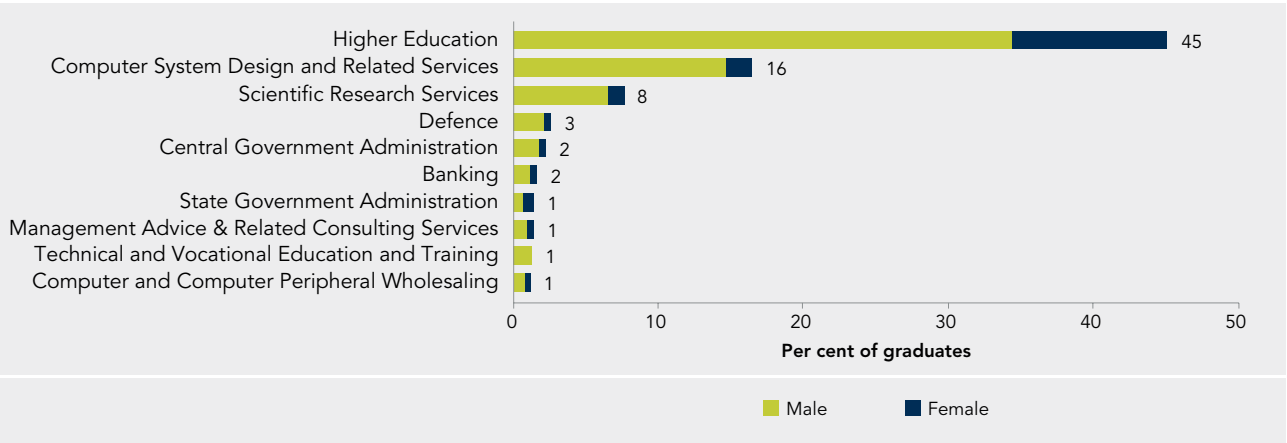


Figure 11.5: Top ten industry classes of employment for Information Technology doctoral graduates, by gender



class was Banking, which employed 5 per cent of all graduates. The rest of the top ten industry classes were then dispersed across a range of industries, including Public Administration and Telecommunications.

At the doctoral level, graduates were more concentrated in fewer industry classes, with 45 per cent employed in Higher Education, and 16 per cent in Computer System Design and Related Services. The third highest industry class was Scientific Research Services (8 per cent of doctoral graduates), which does not appear in the top ten industry classes for the whole cohort of IT graduates.

Figure 11.6: Top ten sub-major group occupations of Information Technology graduates at bachelor level and above, by gender

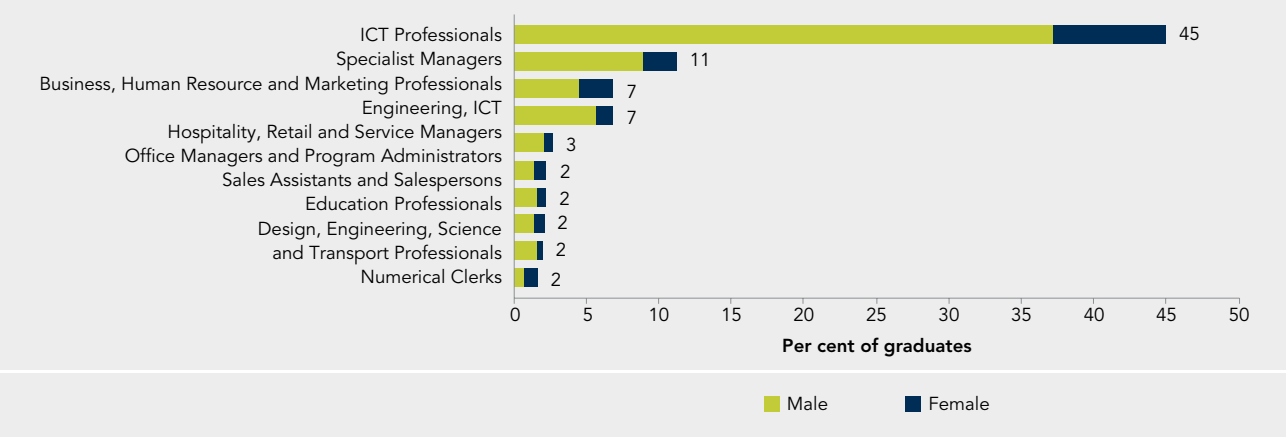
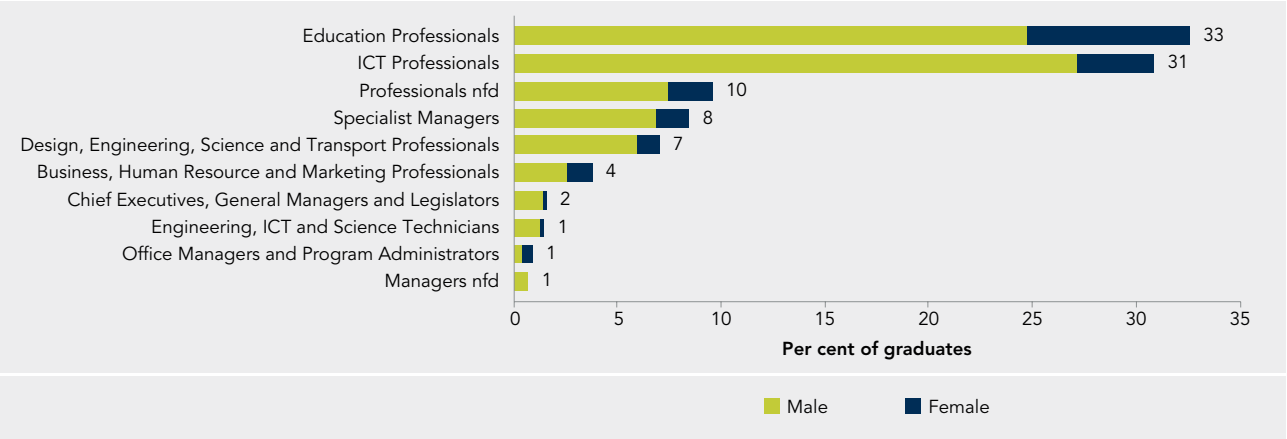


Figure 11.7: Top ten sub-major group occupations of Information Technology doctorate graduates, by gender



Managers, and Business, Human Resources and Marketing Professionals (11 and 7 per cent, respectively).

Occupations are classified in five levels (ABS, 2013):

- Major group (broadest level)
- Sub-major group
- Minor group
- Unit group
- Occupation (most detailed level)

See Appendix C for a detailed list.

The most common occupation for IT graduates with doctorates was as Education Professionals, with one-third employed in this role (33 per cent), with a higher percentage of women (41 per cent) than men (31 per cent) (Figure 11.7).

The occupation groups can be broken down further to the unit group level to provide more detail on the destinations of graduates (Figure 11.8 and Figure 11.9). The top ten unit group occupations for IT graduates are all ICT professional, management and technician specialties. The top occupation was as Software and Applications Programmers, with just over one-fifth of graduates (21 per cent). The second most popular occupation employed 8 per cent of graduates and was ICT Managers.

The unit-group level occupations for IT graduates at the doctoral level were different to those of the whole graduate cohort (Figure 11.9). The most common occupation was as University Lecturers and Tutors, with almost 1 in 3

Figure 11.8: Top ten unit group level occupations of Information Technology graduates with qualifications at bachelor level and above, by gender

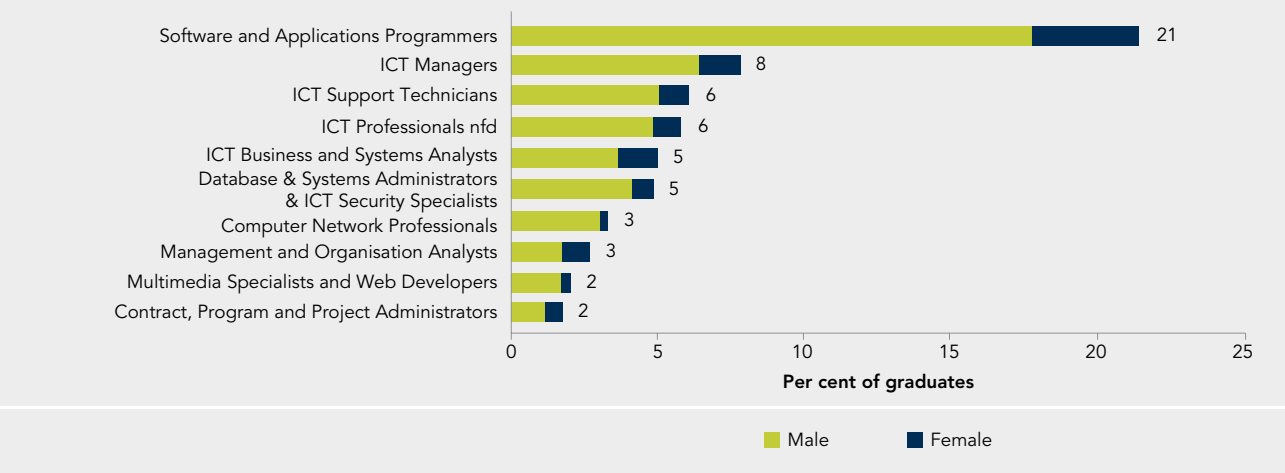
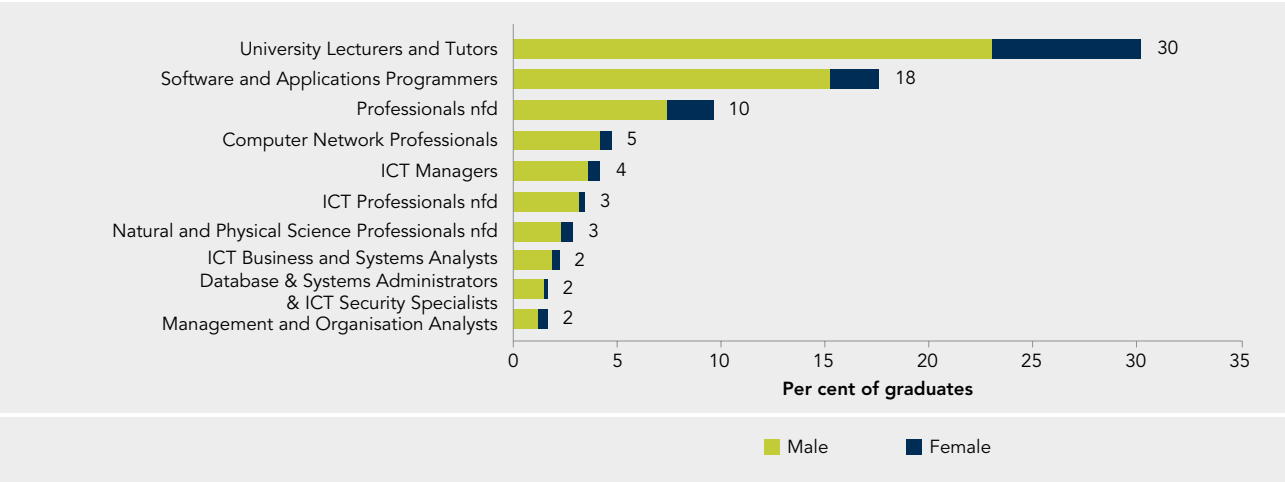


Figure 11.9: Top ten unit group level occupations of Information Technology doctorate graduates, by gender



(30 per cent) doctorates, in contrast to 1 per cent of the total IT graduate cohort.

ARE INFORMATION TECHNOLOGY GRADUATES HIGH EARNERS?

Around one quarter of graduates with a bachelor degree in IT had a personal income in the highest bracket (more than $104 000), which is comparable to the proportion of the STEM graduate cohort with bachelor degrees as a whole, and more than the Non-STEM cohort (26, 25 and 15 per cent, respectively) (Figure 11.10). Additionally, IT graduates were least likely to have a personal income in the lowest bracket compared to both STEM and Non-STEM bachelor graduates (20, 27 and 34 per cent, respectively).

Completing a doctorate in IT can be financially rewarding compared to having a bachelor degree, with the proportion of graduates earning in the highest income bracket growing from 26 per cent to 39 per cent with the higher qualification.

Graduate income levels were dependent on both gender and full-time or part-time employment. A lower percentage of females earned an income in the highest bracket for both bachelor and doctorate holders (Figure 11.11). At the bachelor level, around one-fifth of female graduates had a personal income in the highest bracket, compared to around one-third for male graduates (19 and 30 per cent, respectively). At the doctorate level of qualification 32 per cent of females and 44 per cent of males had an income in the top bracket.

Figure 11.10: Personal annual income of graduates, by field and level of qualification

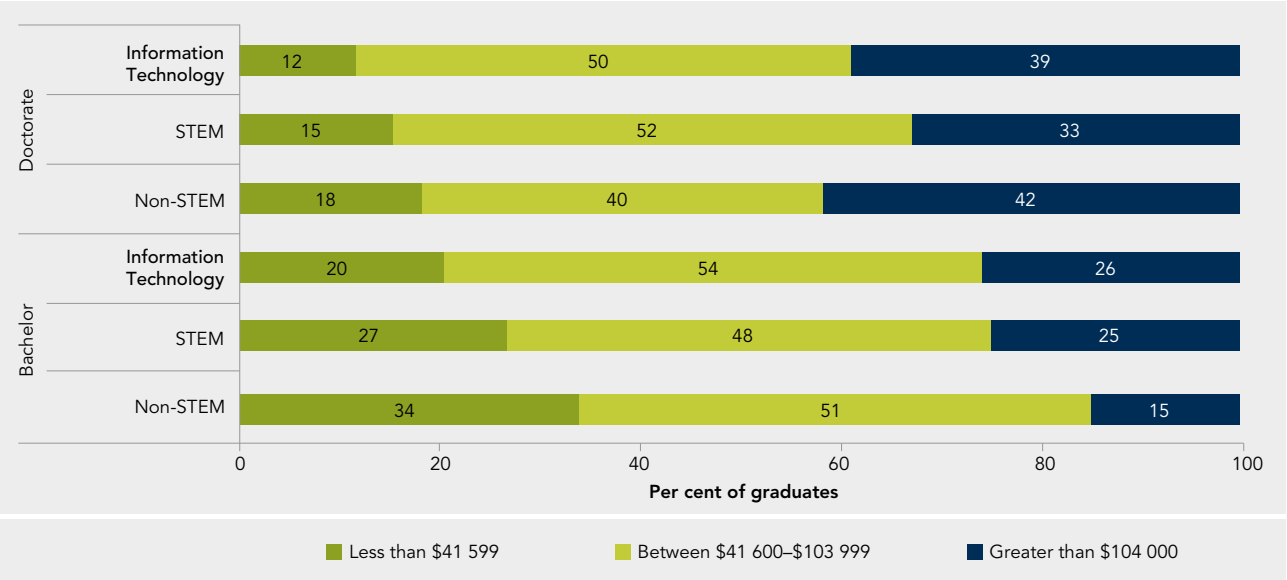
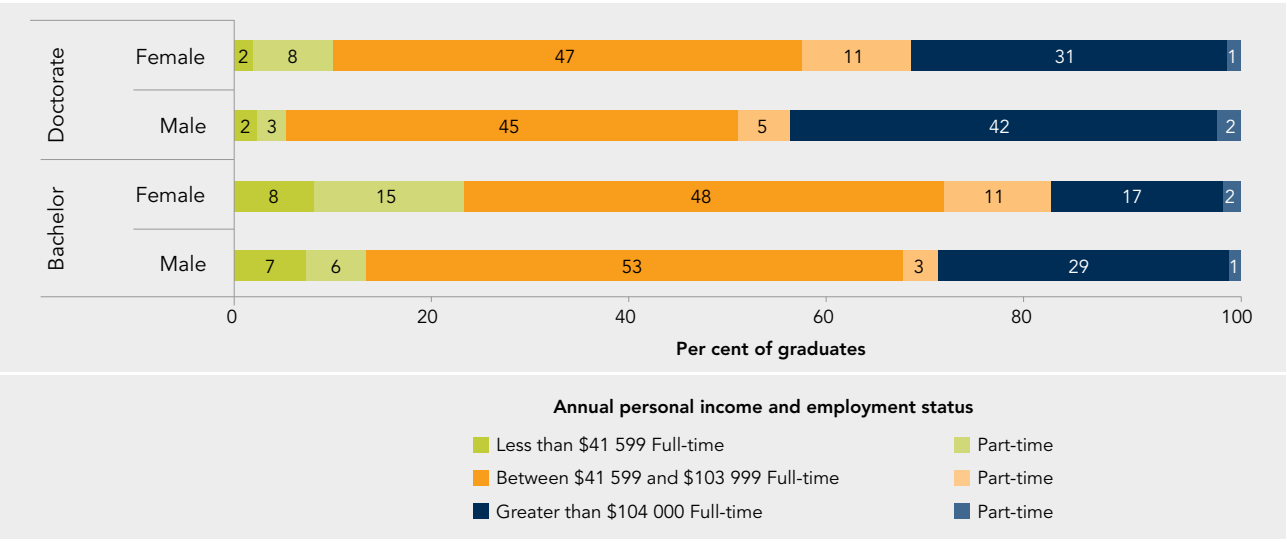


Figure 11.11: Personal annual income of Information Technology graduates working full-time and part-time, by gender and level of qualification



At the other end of the income scale, almost one quarter (23 per cent) of female bachelor graduates earned less than $41 599, 15 per cent of which worked part-time. This is substantially more than males, where 15 per cent had a personal income in the same bracket, and only 6 per cent worked part-time.

A higher proportion of women than men worked part-time across both qualification levels. At the bachelor level, 27 per cent of women and 10 per cent of men worked part-time, while at the doctorate level 20 per cent of women and 10 per cent of men worked part-time.

Compared to the STEM and Non-STEM cohorts, a higher percentage of male IT graduates reached the highest income bracket at both the bachelor and doctorate level, across most age groups (Figure 11.12 and Figure 11.13). The percentage of males in the highest bracket was at least 1.5 times that of females up to the age of 65 and above for bachelor graduates.

Figure 11.12: Percentage of bachelor level graduates earning greater than $104 000 annually, by gender, field and age group

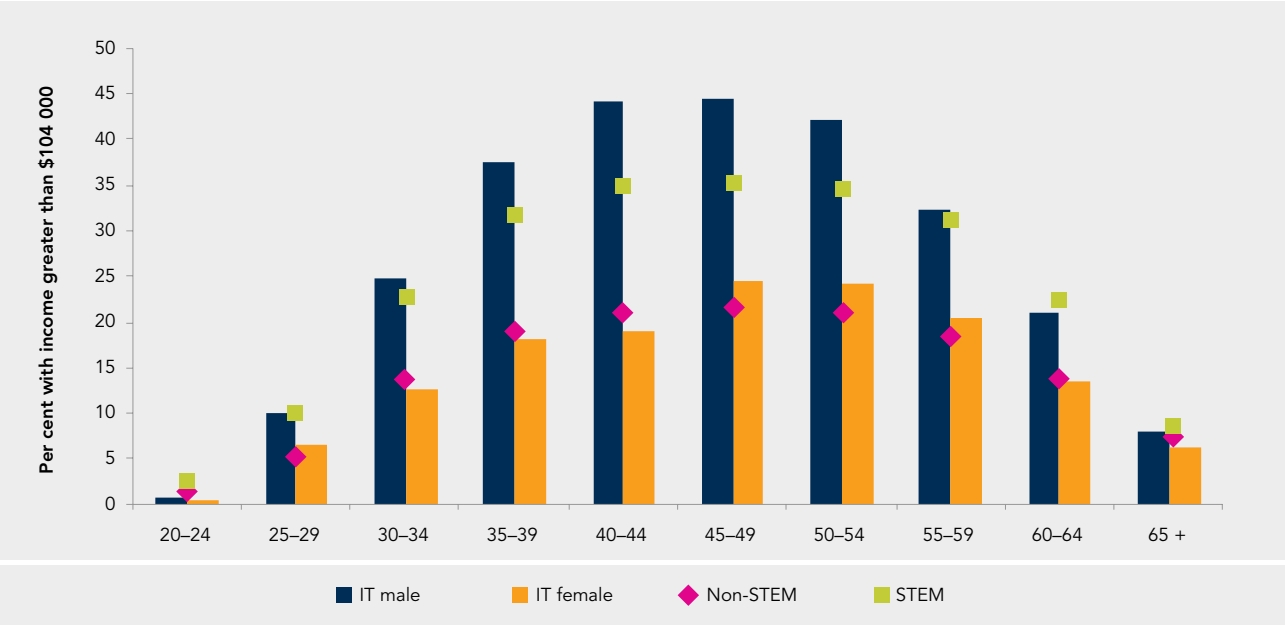
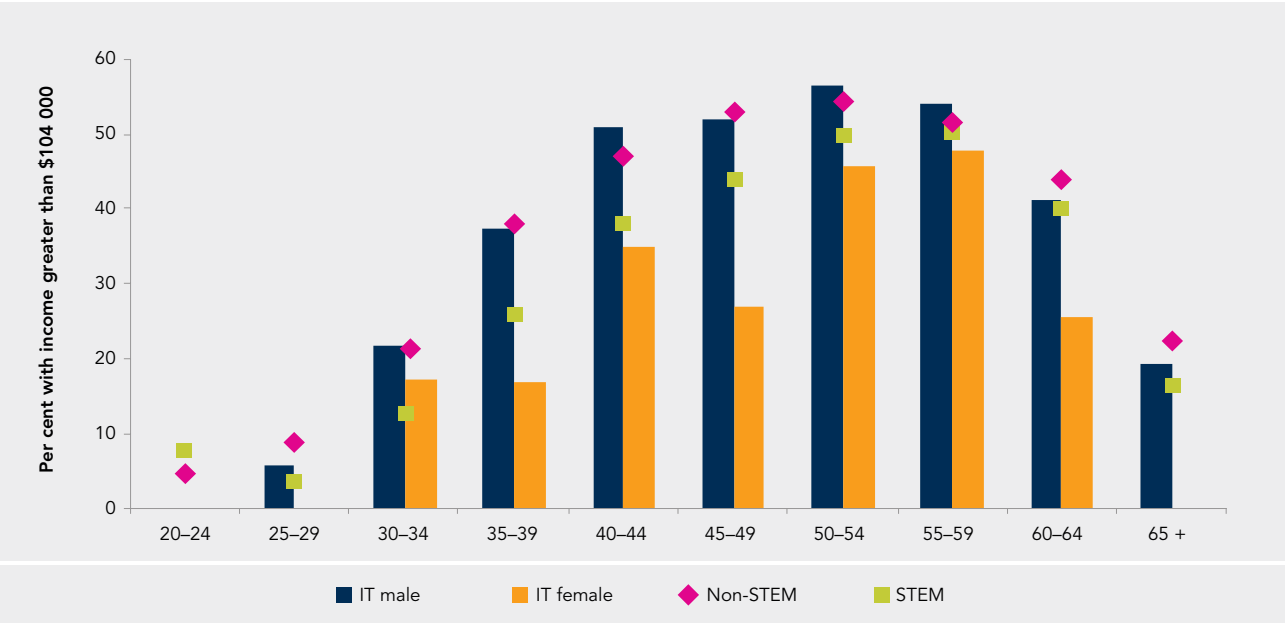


Figure 11.13: Percentage of doctoral level graduates earning greater than $104 000 annually, by gender, field and age group



The proportion of IT graduates with earnings more than $104 000 peaked at 44 per cent between the ages of 40 to 49 for males with bachelor qualifications, and at 25 per cent for females with bachelor qualifications. At the doctoral level, the proportion with highest earnings peaked at 57 per cent between the ages of 50 to 54 for males, and at 48 per cent between the ages of 55 to 59 for females.