



Scotland's Digital Technologies: Summary Report



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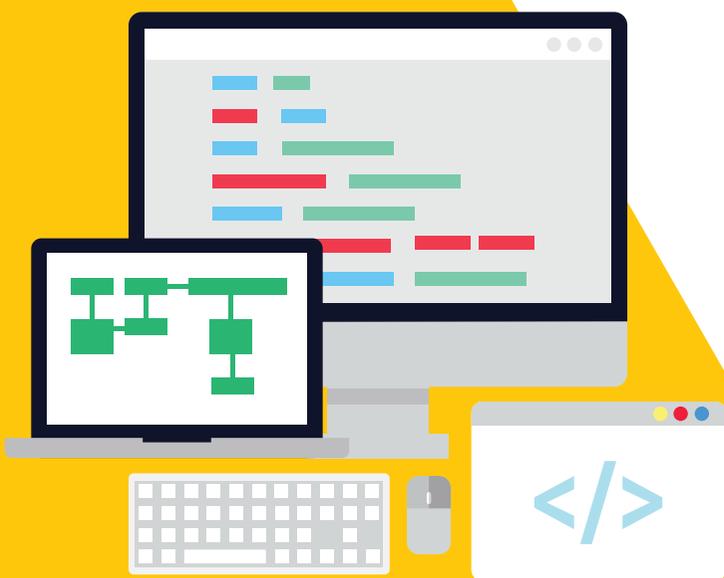
Introduction



It is a critical time for the digital economy as technology transforms the way in which we live, and is having an increasingly disruptive effect on business.

The impact of this digital revolution is no longer consigned to technology companies, but across all sectors as increasing types of business are harnessing the benefits of technology to drive innovation and increase competitiveness. For Scotland this means that the digital technology (tech) sector is in growth, and is a key contributor to economic growth and global competitiveness across every sector in Scotland.

In 2015 the tech sector contributed £3.9bn to the Scottish economy and over 90,000 people were employed as tech professionals across all sectors. Tech in Scotland is not only forecast to continue to grow, but is also identified as the fastest growing sector in Scotland. As this digital revolution continues to pick up pace it is creating an unprecedented demand for skills with employers across all sectors.





1 Digital Technologies in Scotland

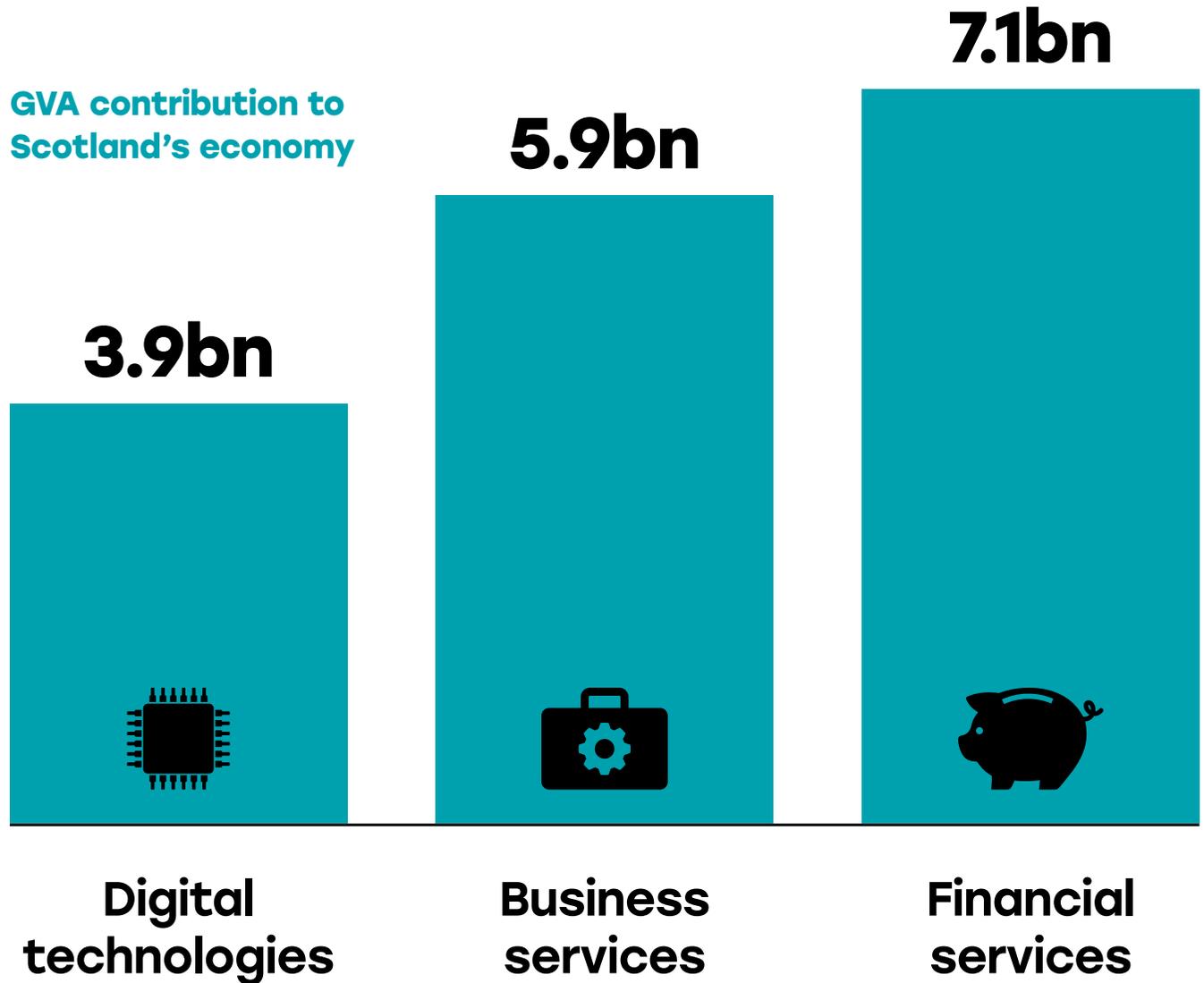


Economic Importance

The tech sector contributed £3.9bn Gross Value Added (GVA) to Scotland's economy in 2015, accounting for 3% of total GVA. GVA per head for the tech sector is 60% higher than for the economy as a whole, making it a considerable contributor to Scotland's economy.

The contribution made by the tech sector to GVA is fast approaching that of long established key sectors including Business services (£5.9bn GVA) and Financial services (£7.1bn GVA).

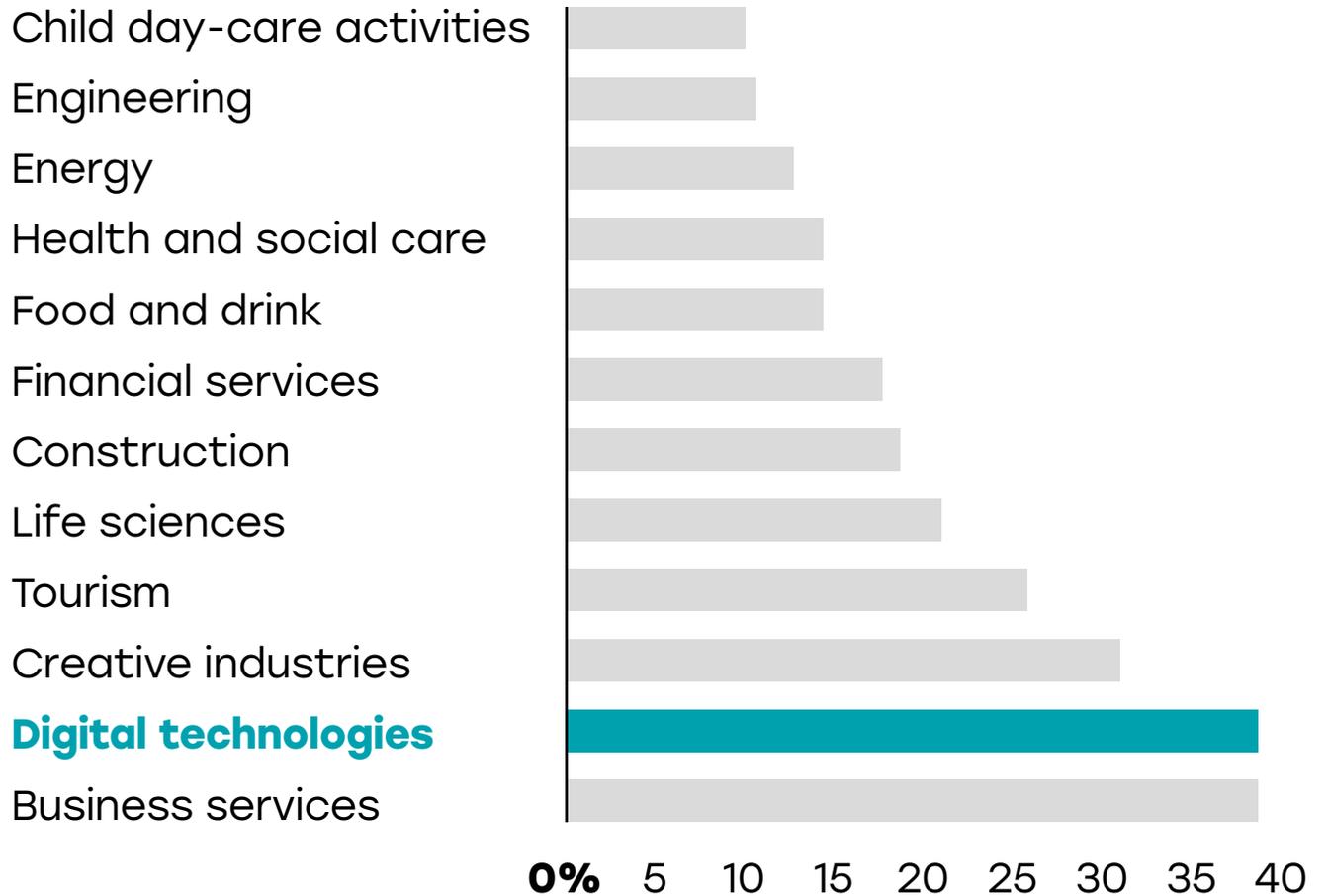
GVA contribution to Scotland's economy





The tech sector is forecast to be the **fastest growing sector** in Scotland to 2024, in terms of GVA (38%) – growing more than twice as fast as the economy overall (17.5%).

Forecast percentage GVA growth 2014-2024



1 Digital Technologies in Scotland

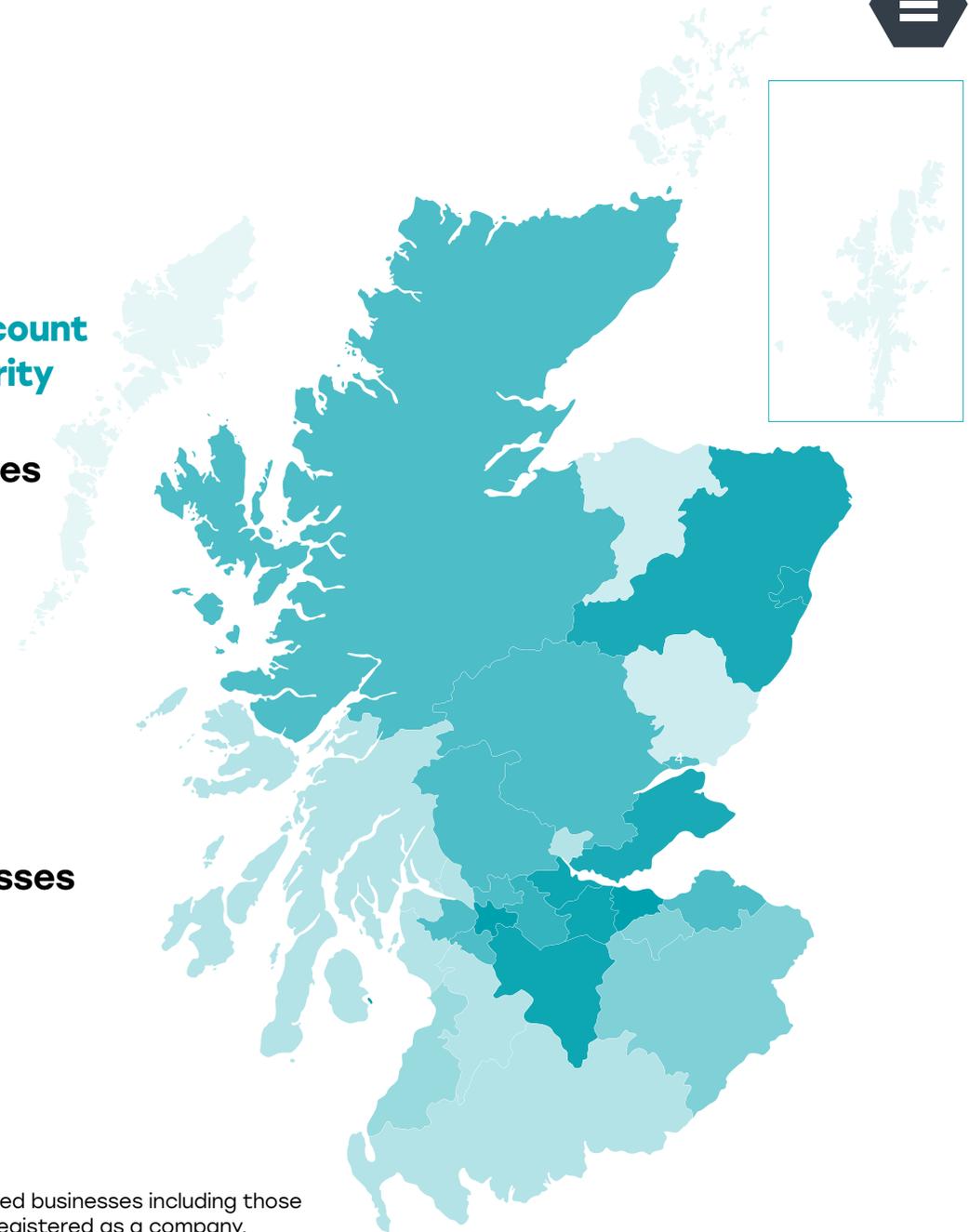
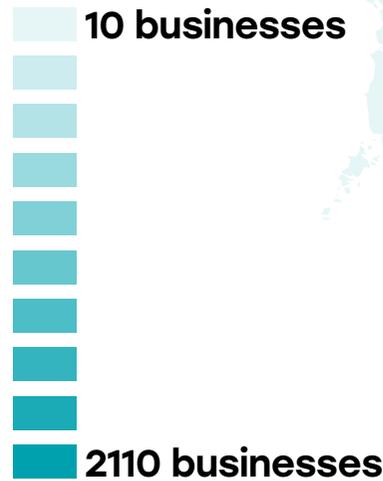


Tech Business Base

There were around 8,800 tech businesses¹ registered in Scotland in 2015, which is 5% of Scotland's total business base. These businesses are located across Scotland with concentrations in Edinburgh (25%), Glasgow (13%) and Fife (6%).

95% of the sector is made up of micro businesses (1-10 employees) compared to 88% in the economy as a whole. Tech businesses have an average of 7 employees per business, compared to 15 for the rest of the economy, reflecting the importance of the start-up community.

Tech business count by Local Authority

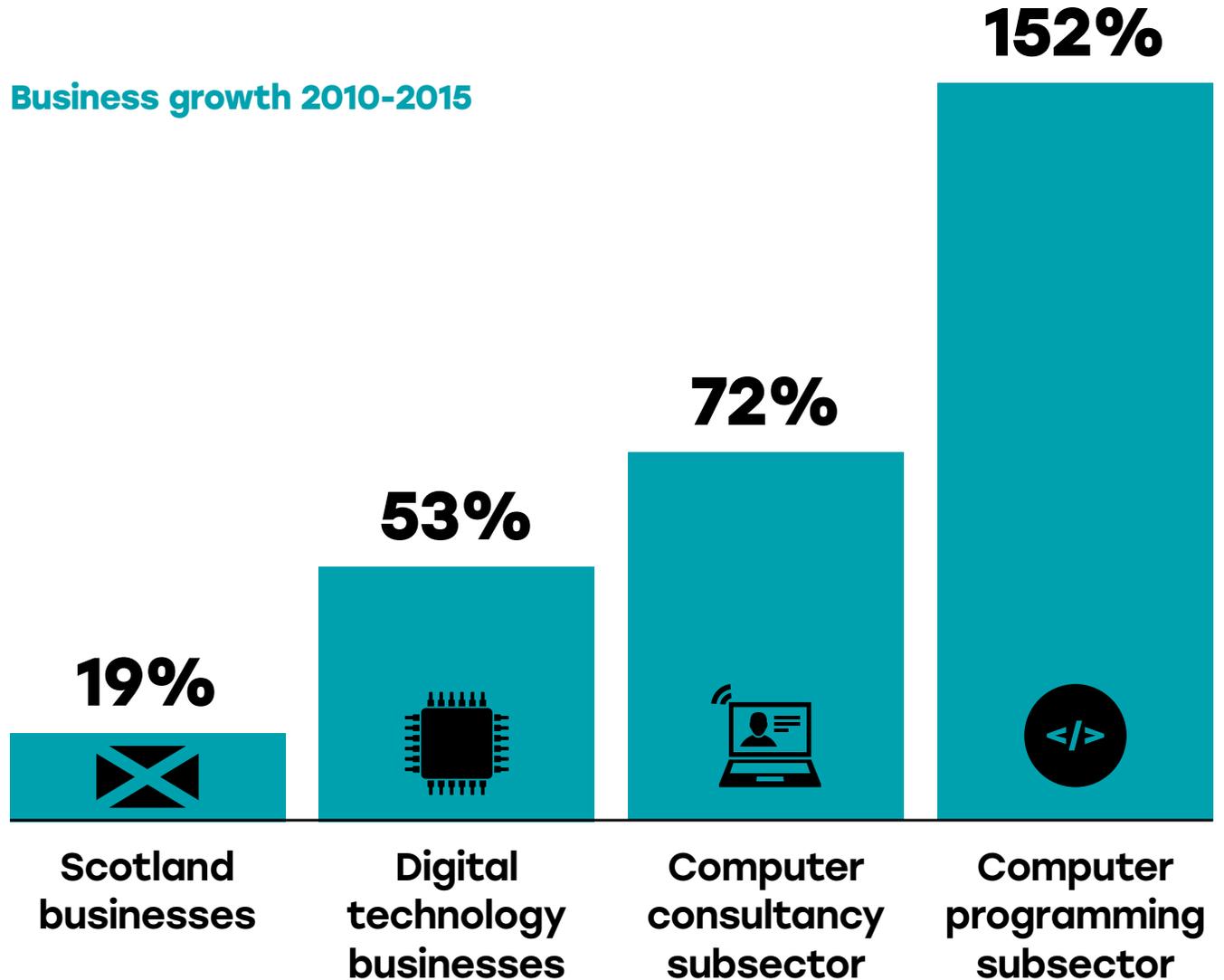


¹ Based on all VAT registered businesses including those who may be individuals registered as a company.



The number of tech businesses has grown by 53% since 2010 – almost 3 times as fast as businesses across Scotland (19%). Subsectors such as Computer consultancy (72%) and Computer programming (152%) have grown exponentially, illustrating the demand for these activities.

Business growth 2010-2015





Employment in Technology Businesses

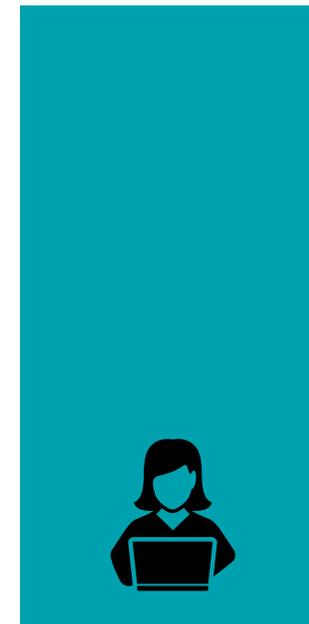
Over **60,000** people (in all job roles) are employed in tech businesses across Scotland; 2% of the national workforce. 60% of these people are in tech roles with 40% working in other types of jobs. This illustrates the wide range of job opportunities available in tech businesses.

The number of people working in tech businesses has been relatively stable since 2009 but there has been strong growth in Glasgow (36%) and Edinburgh (19%).

The Central Belt accounts for a high proportion of the workforce and the top three employment areas are Glasgow City (29%), City of Edinburgh (23%) and West Lothian (9%).

People employed in technology businesses

60%



**Digital
technology
roles**

40%



**Non-
technology
roles**



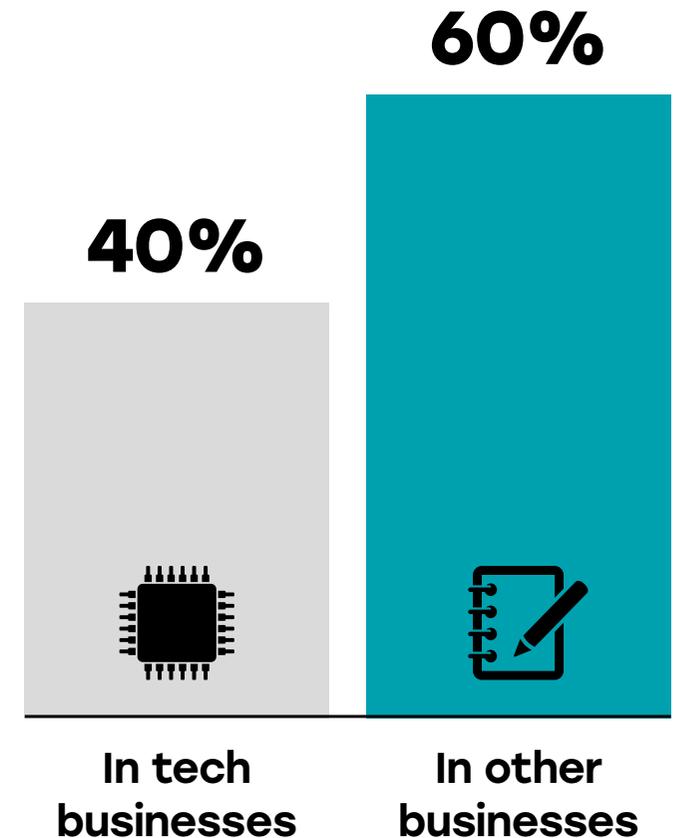
Employment in Technology Roles

Over **90,000** people are employed in tech roles across all sectors in Scotland. This represents 4% of the national workforce and a 10% increase in employment from 2015-2016.

40% of these people are employed in tech businesses with the remaining 60% employed in other sectors such as Finance, Creative industries, Energy, Engineering and Healthcare. This illustrates the importance of tech professionals across Scotland's whole economy.

The number of tech professionals employed in other sectors is growing faster than for tech businesses, further illustrating the demand for tech skills across all Scotland's industries.

People employed in technology roles



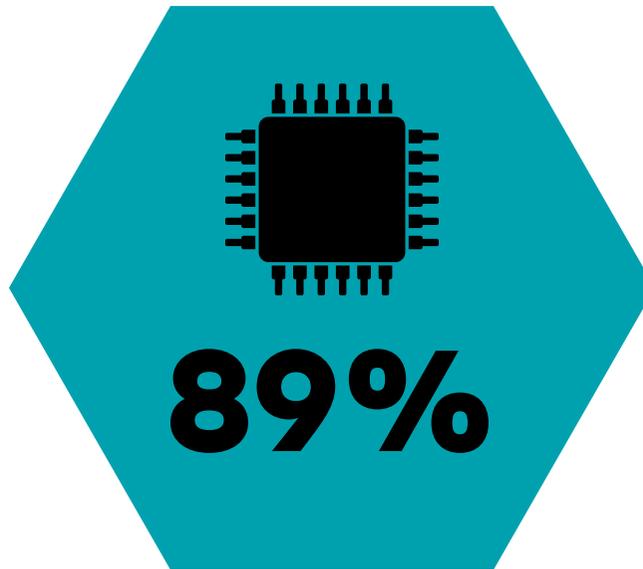


Workforce Demographics

People who work in tech businesses are more likely to be employed on a full-time basis (89%) than those in Scotland's workforce overall (67%).

Like many sectors, tech has an ageing workforce profile. The proportion of younger workers in tech roles is increasing, particularly those aged 16 to 24, but a large proportion are still aged 45 and above.

Full-time workers



In tech businesses

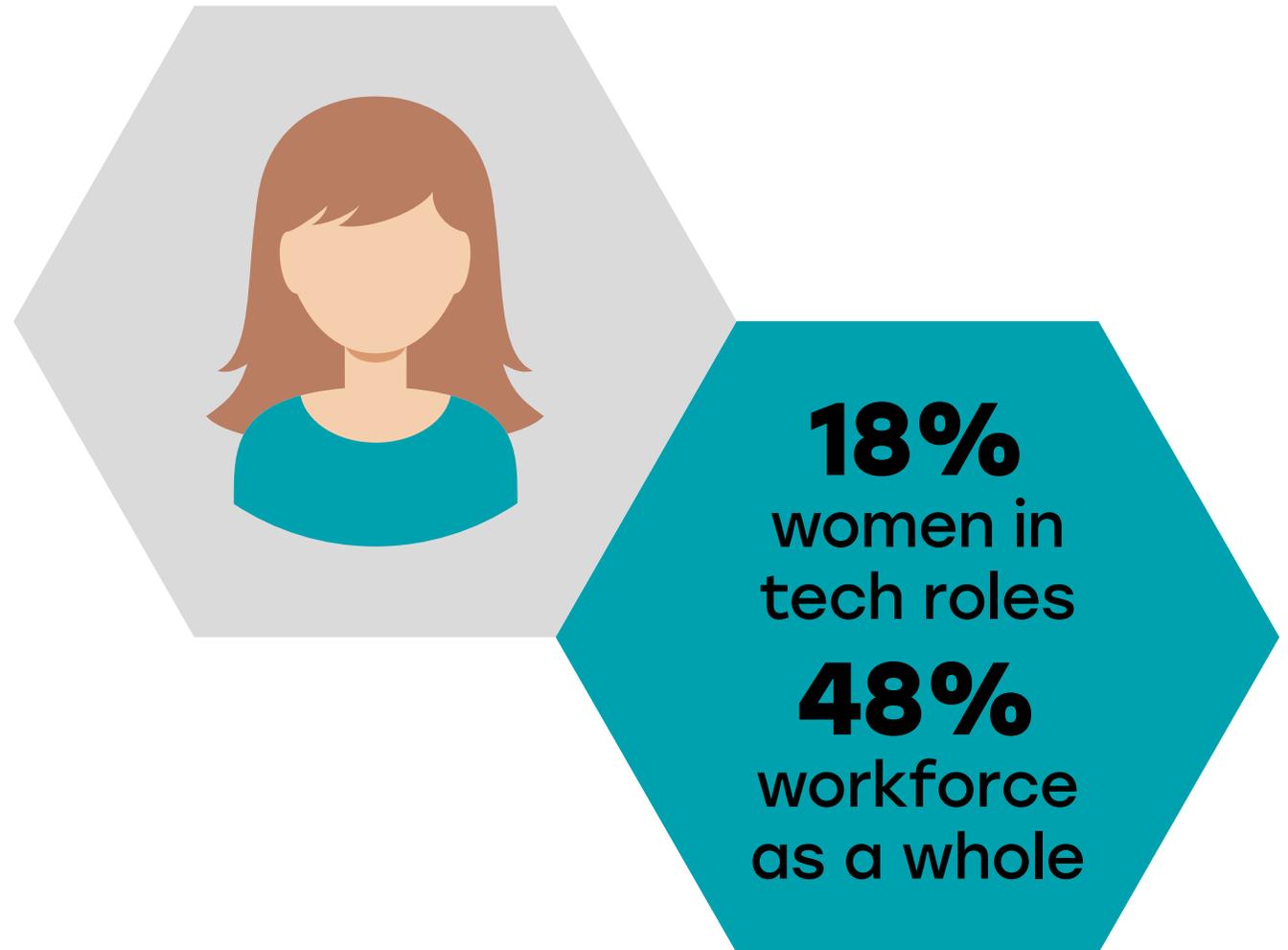


In Scotland



Women are under-represented in tech sector (19%) and in tech roles (18%), which is considerably lower than in other skilled roles (39%), and the workforce as a whole (48%).

Women in tech roles are also less likely to work part-time (16%) than those in other skilled roles (33%). There are a number of factors contributing to the gender imbalance which are summarised in [“Tackling the Technology Gender Gap Together”](#).





Salaries for Technology Jobs

The average salary for tech jobs is around £37,500, over 30% higher than the Scottish average of £28,000.

Tech salaries are also growing at a faster rate (15 - 20%), than overall salaries across Scotland (11%) (2010-2016).





Forecast Growth in Employment

It is estimated that Scotland has up to **12,800** tech job opportunities annually. A significant proportion of these jobs will be due to replacement demand.

This is a 16% increase on the previous demand forecasts of 11,000 annual job opportunities, and represents a significant opportunity for both young people and other new entrants across a wide range of job roles.





2 Digital Technologies Education Pipeline



Computing Science at School

The number of young people studying and passing computing science at school increased from 2014-2016 with an 8% overall increase in passes across all levels.

Level	Passes in 2016	Increase from 2014-16
SCQF 3-5 (National)	10,133	10%
SCQF 6 (Higher)	3,679	3%
SCQF 7 (Advanced Higher)	400	2%
Total	14,212	8%

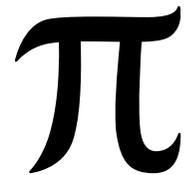
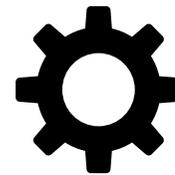
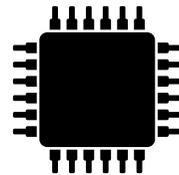


Computing science is just one of the learning pathways into tech courses and careers as all STEM disciplines develop transferable skills and knowledge.

In particular maths is a pathway into further computing science study; in 2016 there were almost 80,000 maths passes.

Some tech courses and careers also place emphasis on arts subjects as an entry route, so the potential talent pool is much wider than just those studying computing science.

STEAM subjects can lead into tech courses and careers



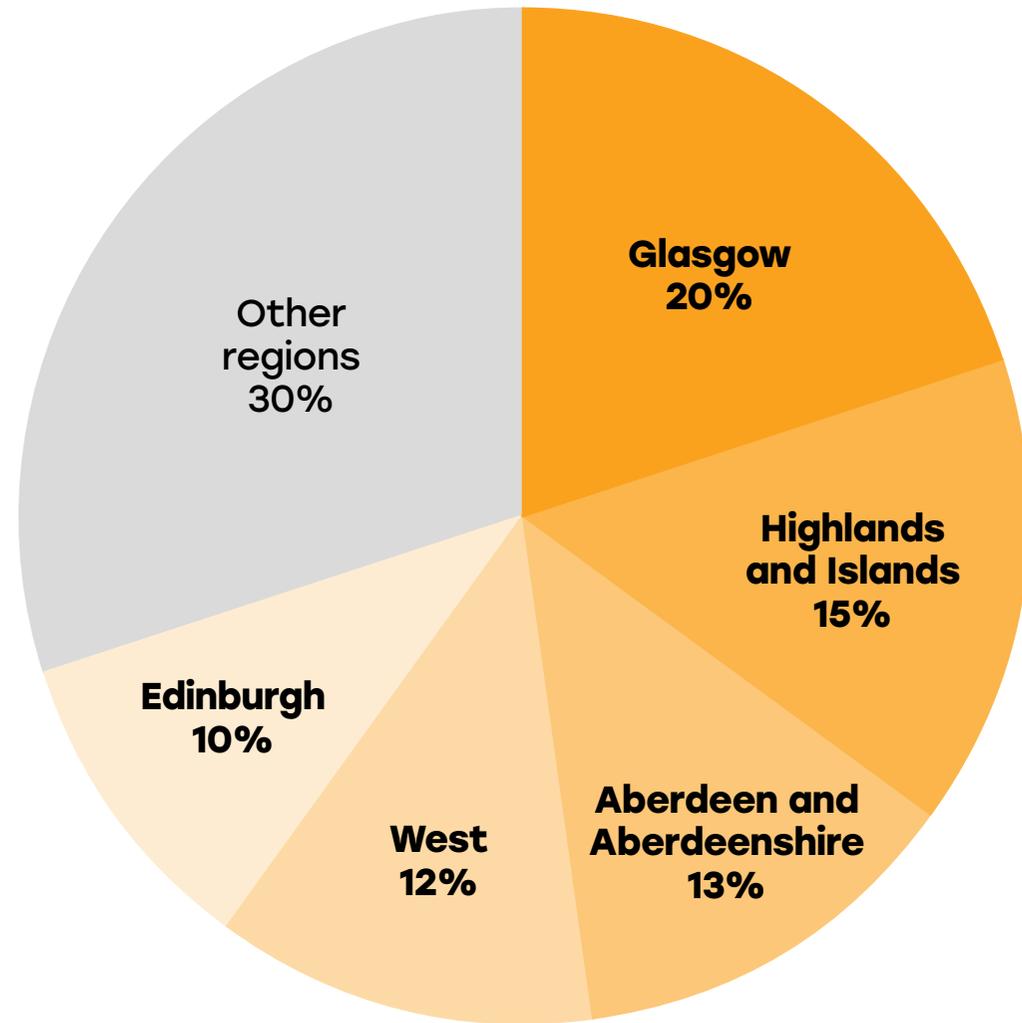
STEAM



Computing Science Provision at College

Computing science related courses are delivered by 23 colleges in Scotland across all 13 college regions.

There are clear concentrations in some areas with the highest proportion of enrolments in Glasgow 20%, Highlands and Islands 15%, Aberdeen and Aberdeenshire 13%, West 12% and Edinburgh 10%.



Computing science enrolments by college region



Total computing science related enrolments at college has decreased by 11% since 2012/13, but this reduction was mainly at SCQF level 5 and below and in non-certified courses.

The number of people studying computing science in college at further and higher education levels (SCQF 6-12) has remained broadly stable representing a continued focus on study at the higher levels which employers are looking for.

Framework Level²	Enrolments 2014/15³	Change 2012/13 – 2014/15
No/other Qualifications	3,389	-12%
SCQF 1-5	1,692	-25%
SCQF 6	533	4.5%
SCQF 7-12	3,708	-1.5%
Total	9,322	-11%

² <http://www.scqf.org.uk/framework-diagram/Framework.htm>

³ Enrolments: Registrations on courses across all year groups



Computing Science College Student Demographics

The computing science cohort at college is becoming younger. The number of enrolments aged 24 and under has increased with young people now representing 62% of enrolments, whilst the number of enrolments aged 25 and over has decreased.

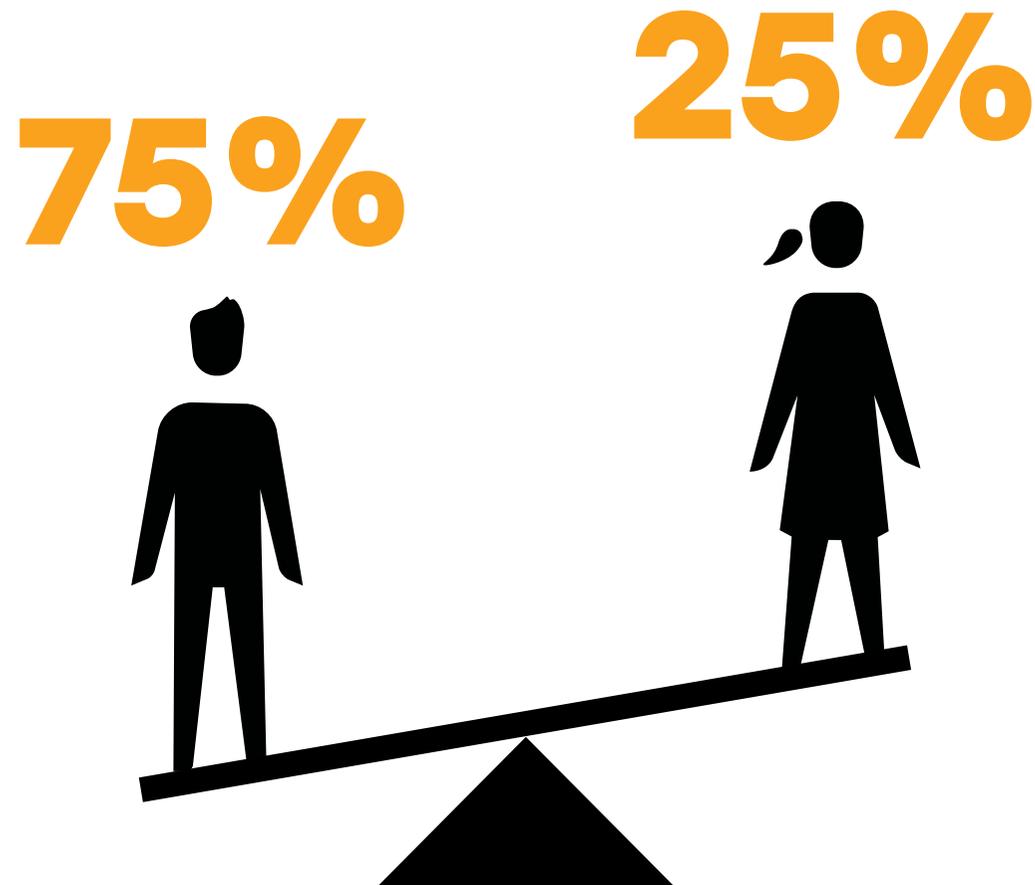
62%



24 years and under



The proportion of males studying computing science courses has increased to 75%. Males also account for a higher proportion of computing science credits (85%) suggesting they are more likely to opt for more intensive computing science focused courses.



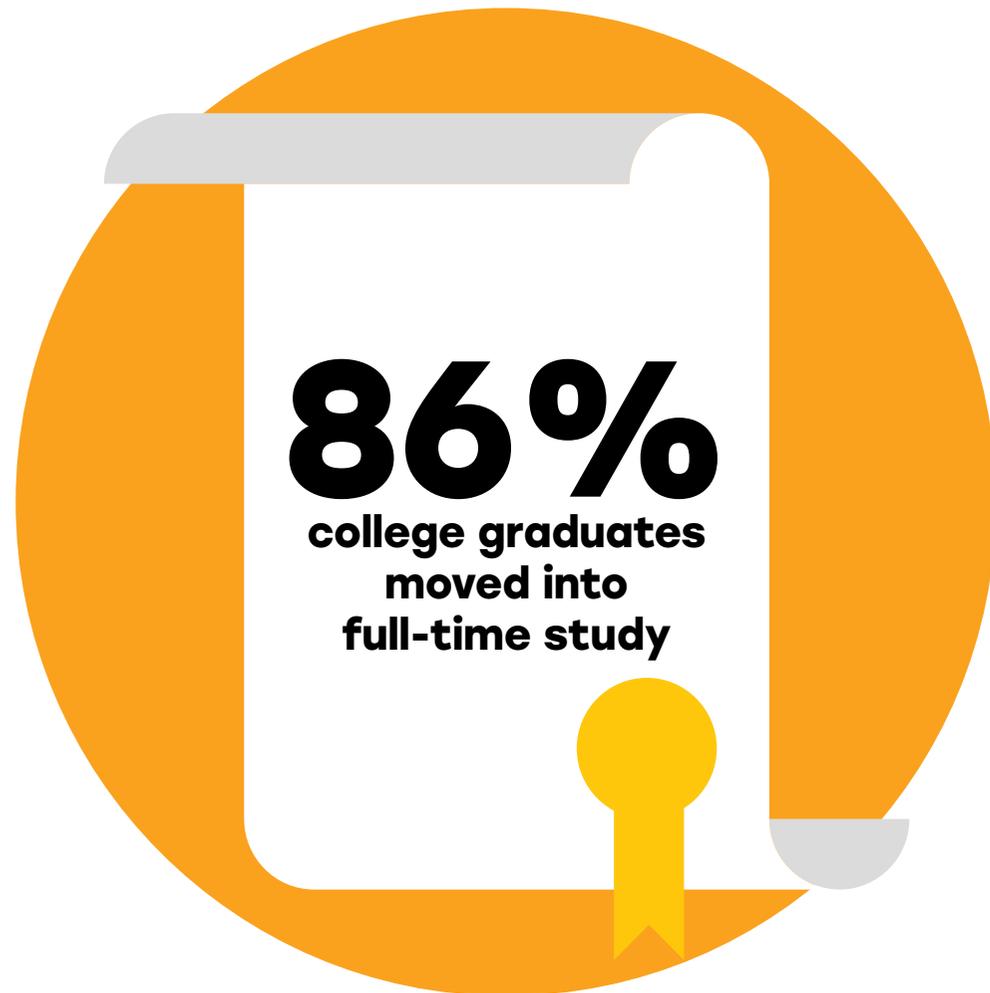
The computing science cohort at college is predominantly male



Computing Science College Leaver Destinations

In 2014/15, 86% of computing science college leavers entered further full-time study, compared with 69% across all college disciplines.

9% of computing science leavers directly entered employment, compared with an average of 14% across college disciplines. This supports the view that employers are looking for people with higher level qualifications.



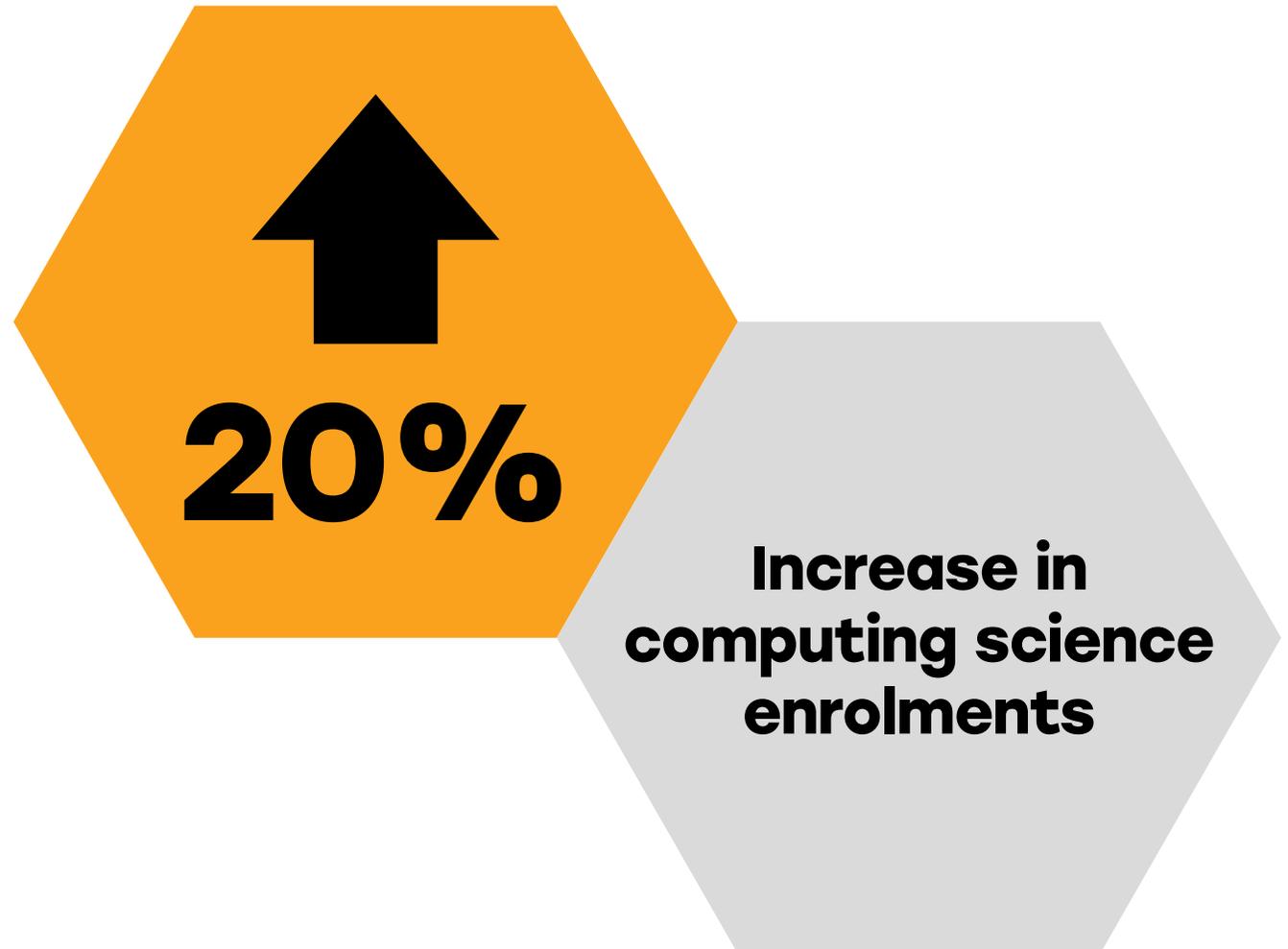


Computing Science Provision at University

15 Scottish Universities deliver undergraduate computing science degrees, and 14 deliver postgraduate qualifications.

The total number of computing science enrolments⁴ has increased 20% since 2012/13 to 15,111.

Computing science provision accounted for approx 6% of all university provision in 2014/15, with the majority of provision (81% of enrolments) at undergraduate degree level.



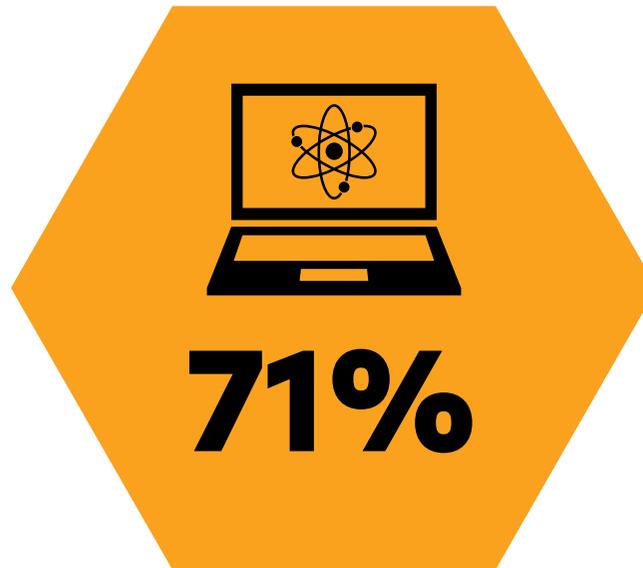
⁴ Enrolments: Registrations on courses across all year groups



University Student Demographics

The computing science cohort at university is younger than the overall student profile; 71% were 24 years and under compared to 64% for all university enrolments.

The number of 16 to 19 year-old computing science students is increasing faster than the other age groups.



**Computing science
students 24 years
and under**

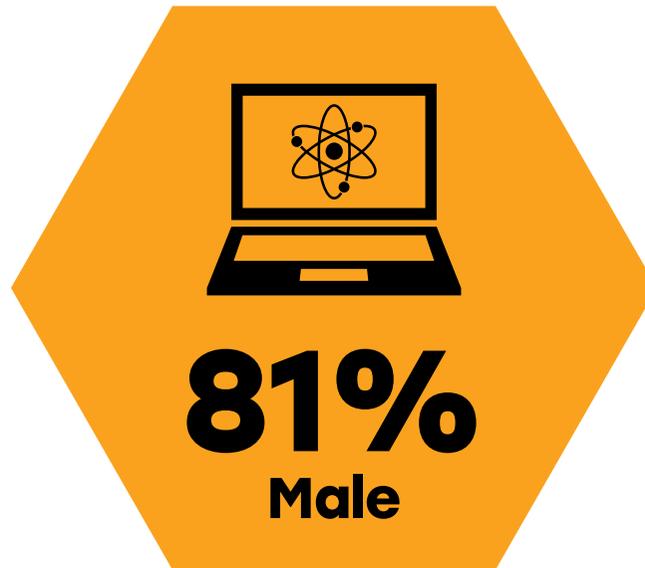


**All university
enrolments 24 years
and under**

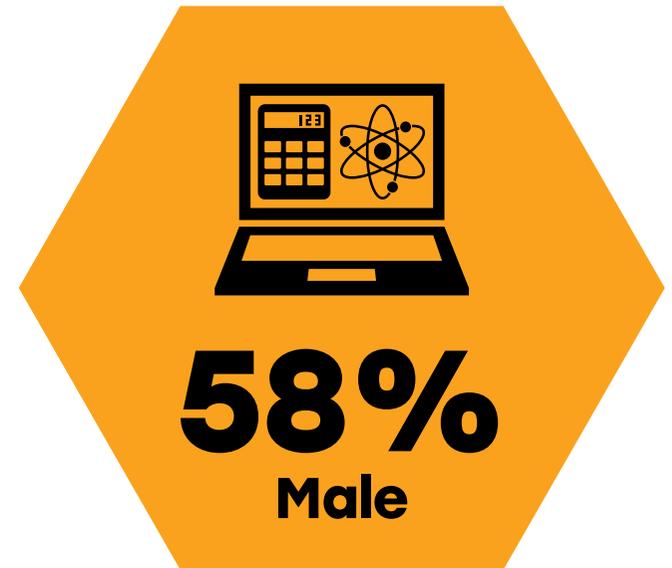


Computing science courses at university are male dominated (81%), while there is a more equal gender split on “mathematical and computing science” courses (58% male).

This suggests that males tend to opt for pure computer science degrees.



Computing science



**Mathematical and
computing science**



Computing Science Graduates

There were 4,381 computing science graduates in 2014/15. This is a 5% increase over 2 years since 2012/2013.

Over two-thirds of these graduates moved into employment after graduation (71%) with 16% going onto full-time study. 7% of graduates were unemployed 6 months after graduation compared with only 5% of all university graduates.

Those who enter full-time employment move into a variety of sectors, the most common ones being Information and Communication (35%), Financial and Insurance (16%) and Manufacturing (10%). This indicates the wide spread demand for computing science graduates across sectors.

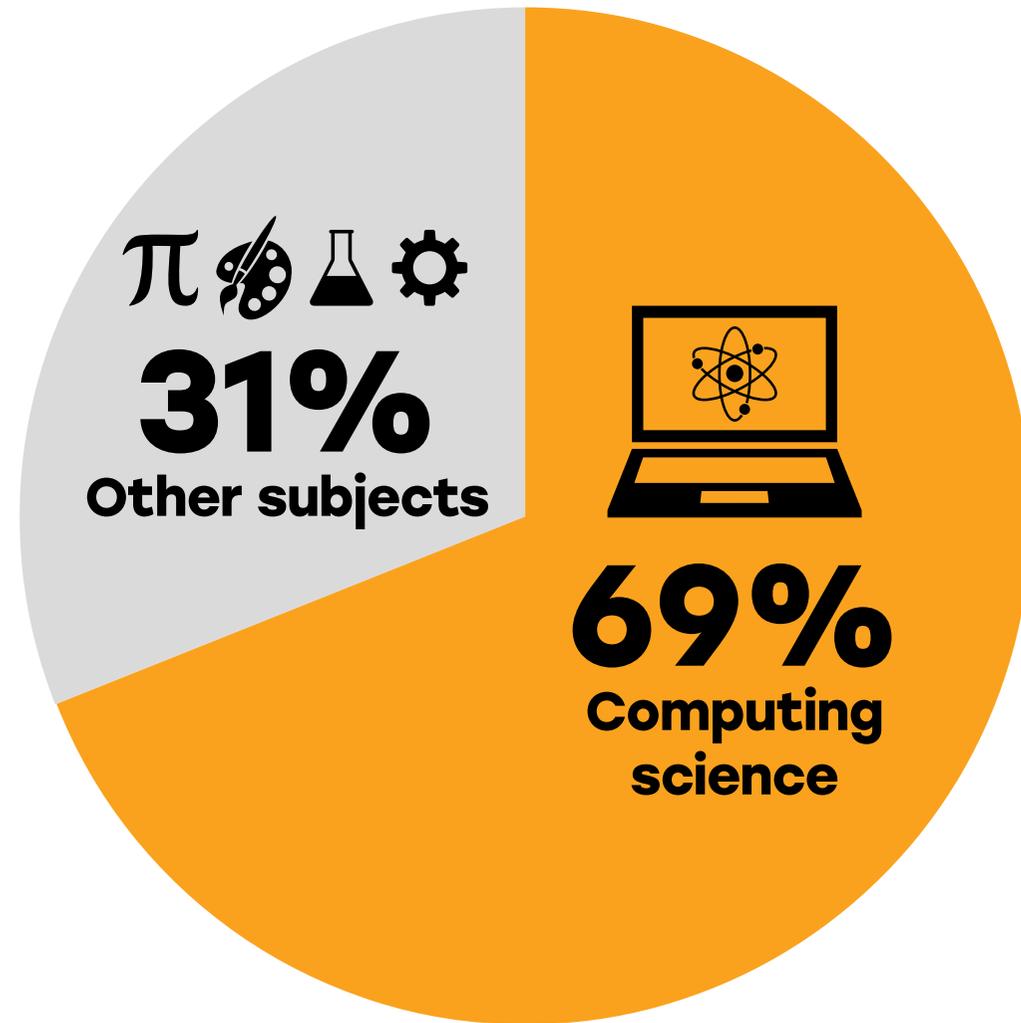


**University graduates
moved into employment**



Demand for Graduates

Graduates are most in demand and used by technology employers, and those with computing science, technology and mathematics degrees are most sought after. However 31% of graduates in technology jobs do not have a computer science degree and enter the sector from varied disciplines such as creative arts and design, business and administration, physical sciences, maths, engineering, biological sciences and social sciences. This illustrates the importance of transferable skills and a willingness of employers to recruit from wider backgrounds and disciplines.



Graduates move into tech roles from a variety of disciplines



Digital Technology Apprenticeships

Modern Apprenticeships (MAs) help employers to develop their workforce by training new staff and up-skilling existing employees. Digital Technology MAs are currently offered in five frameworks, covering a variety of disciplines and jobs roles related to hardware and networking, software development, cyber security, applications and data analytics.

The number of Digital technology MA starts has increased in the last 2 years (by 46%) to almost 950 starts in 2015/16, with a 73% achievement rate across frameworks.

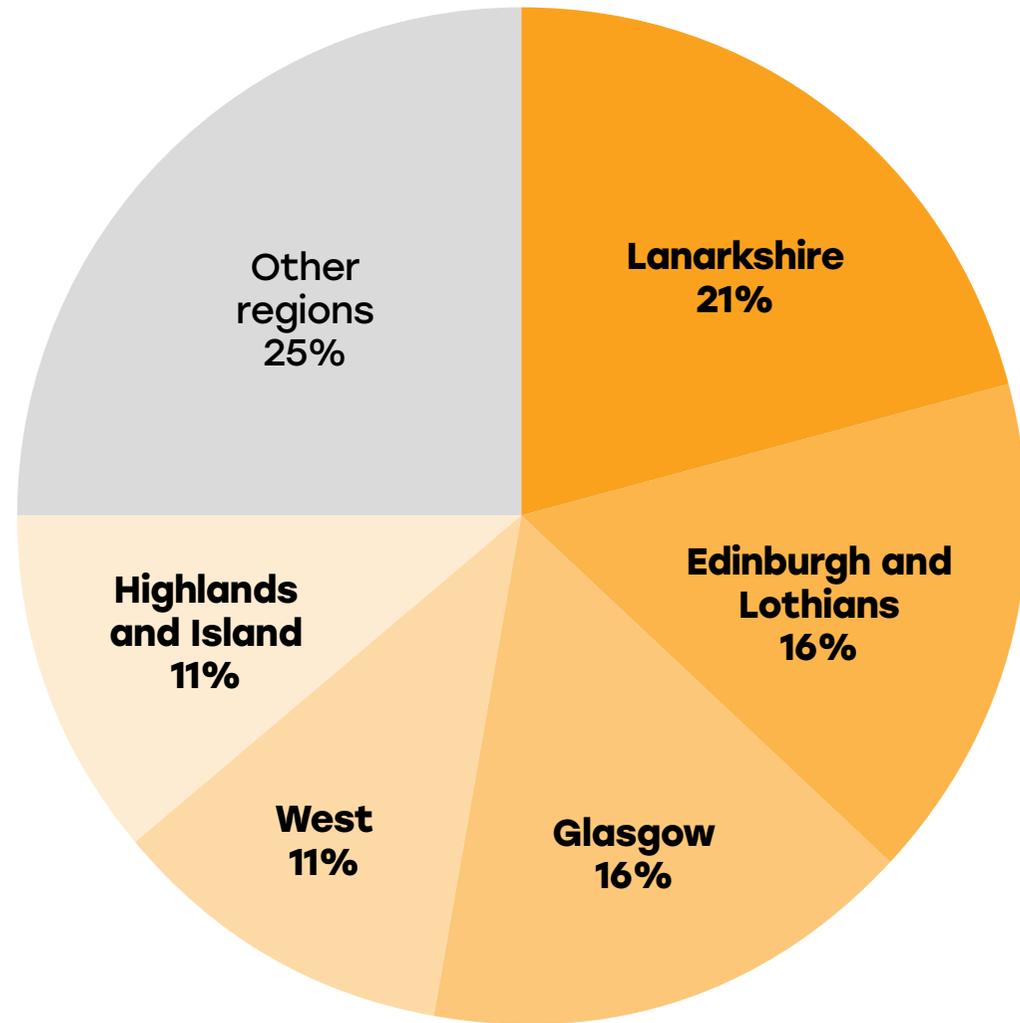


**Increase in tech
MA starts**

2 Digital Technologies Education Pipeline



Digital technology apprenticeships are offered across Scotland with a high proportion of MAs in Lanarkshire (21%), Edinburgh and Lothians (16%), Glasgow (16%), West (11%) and Highlands & Islands (11%).



**Digital technology
MA starts by region**



Digital technology apprenticeships are expanding and the apprenticeship family now also includes:

- Foundation Apprenticeships (FA) are offered as a subject choice in some schools. Launched in 2016/17 in Software development and Hardware & systems support.
- Graduate Level Apprenticeships (GLA) offered in the workplace. Piloted in 2017/18 in Software development and IT management for business.

Tech apprenticeships are viewed positively by employers and there is an increasing appetite for tech apprentices across sectors including Digital technology, Financial services, Creative industries and the public sector.





3 Employer Demand for Digital Technology Skills⁵

⁵ Ekosgen employer skills survey conducted with 378 employers in November 2016.

3 Employer Demand for Digital Technology Skills



Current Demand for Skills

Over half of employers (51%) recruited tech skills in the last 12 months; with high levels of tech skills recruited by financial services sector and tech sector employers when compared to other sectors.

Of those who had recently recruited tech skills, software development & implementation and client interface, sales & marketing skills were the two most common categories.

Of those who had recruited software skills the highest demand had been for experienced and technical level roles and most commonly for software development.

Skills recruited 2015/2016

Software/solution development and implementation

Client interface, sales and marketing

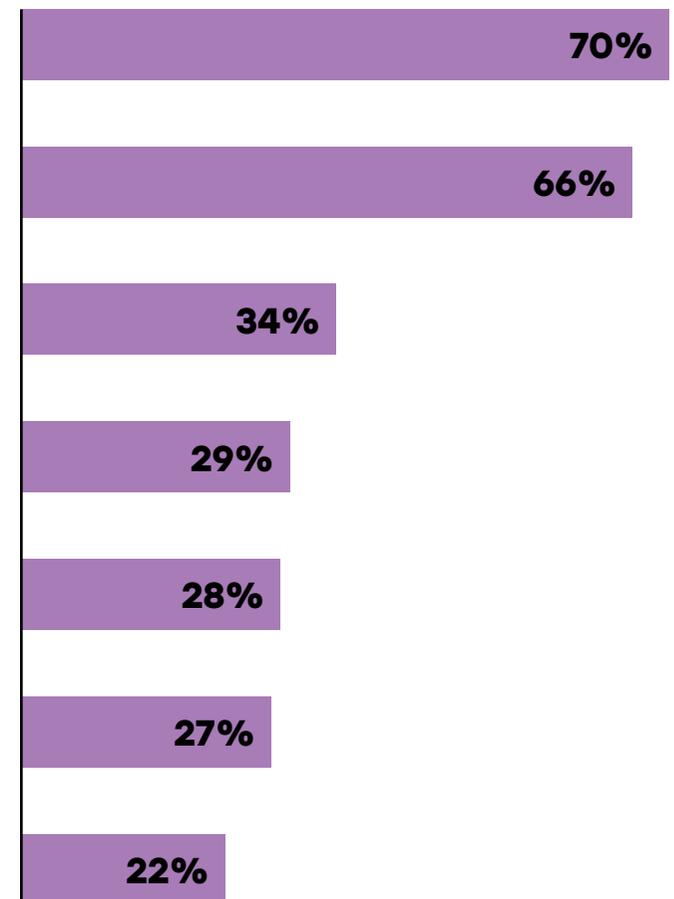
Strategy and architecture

Business change

Service management

Data skills

Procurement and management



3 Employer Demand for Digital Technology Skills



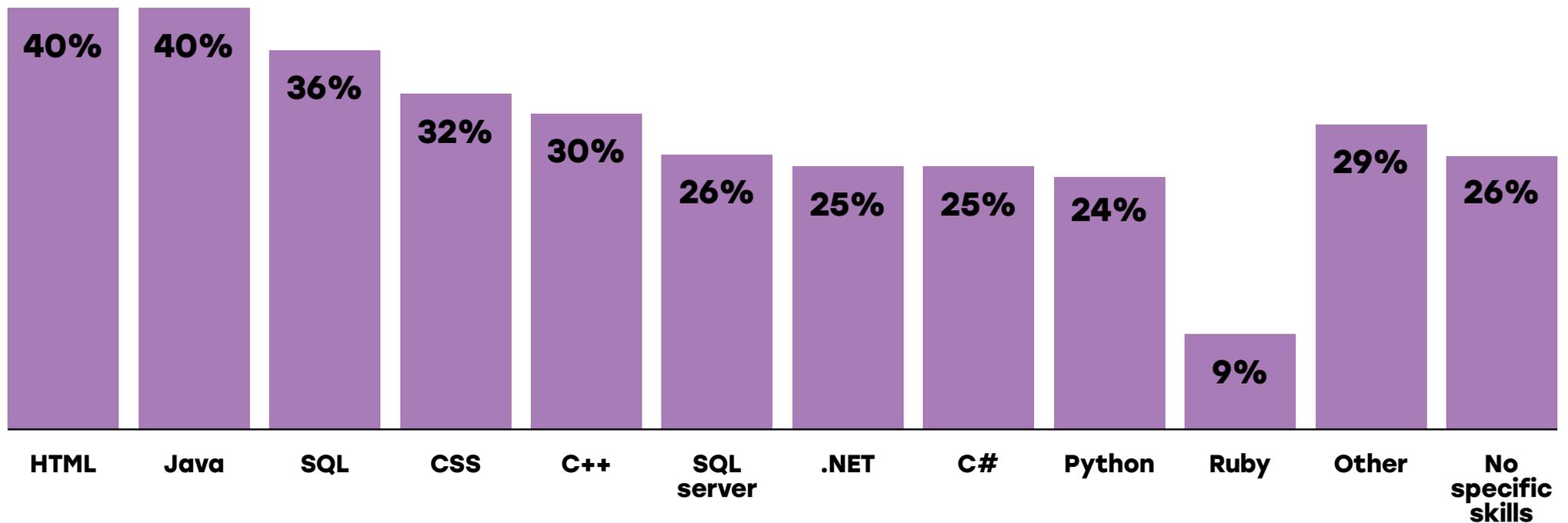
Language Skills Required

Employers require a range of language skills with HTML and

Java still highest in demand. A quarter of employers say they do not require individuals with

specific language skills, but instead the ability to learn different languages is important.

Language skills required by employers



3 Employer Demand for Digital Technology Skills



Future Demand for Skills

Employers expect little change in the skills they need. The skills which are important now will

continue to remain important and not as few employers expect any digital skills to become less important over the next year.

Software skills are growing in importance as are client interface, sales and marketing, and data skills.

Anticipated importance of skills in the future: 2017/2018

■ More important ■ No change ■ Less important

Software/solution development and implementation

Client interface, sales and marketing

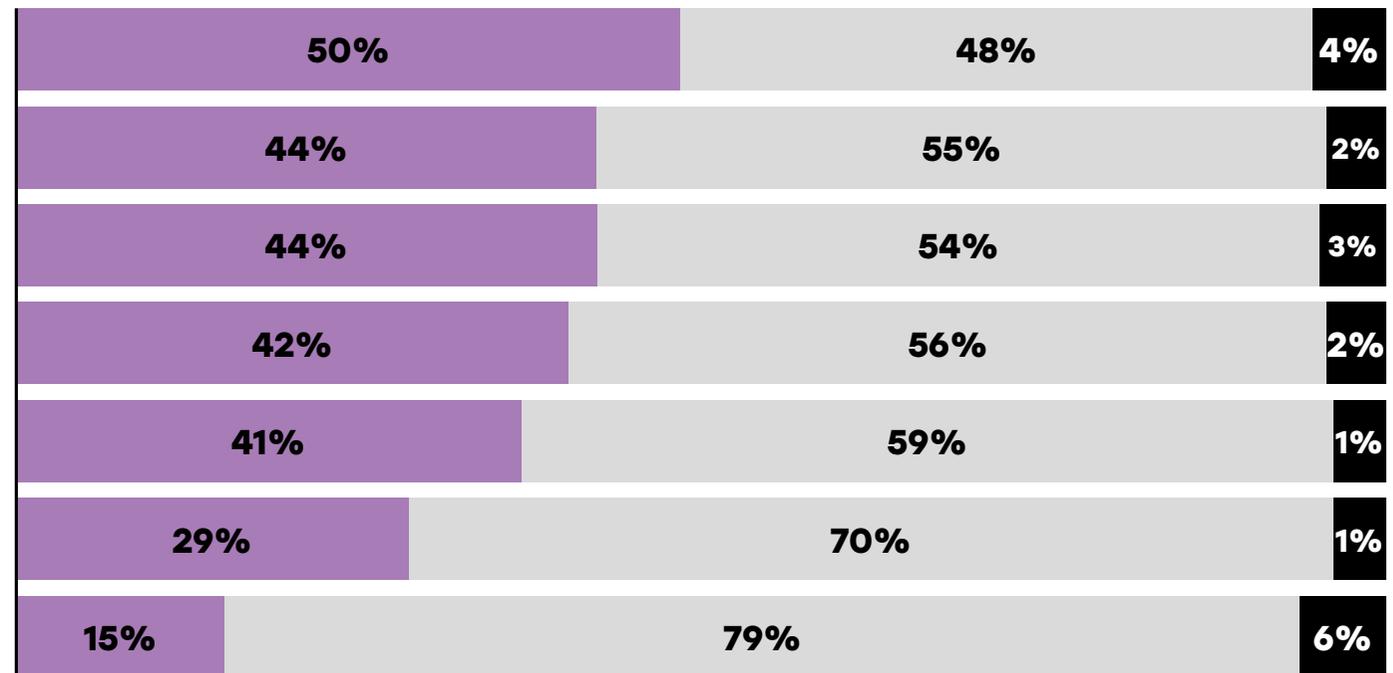
Data skills

Business change

Strategy and architecture

Service management

Procurement and management support



3 Employer Demand for Digital Technology Skills



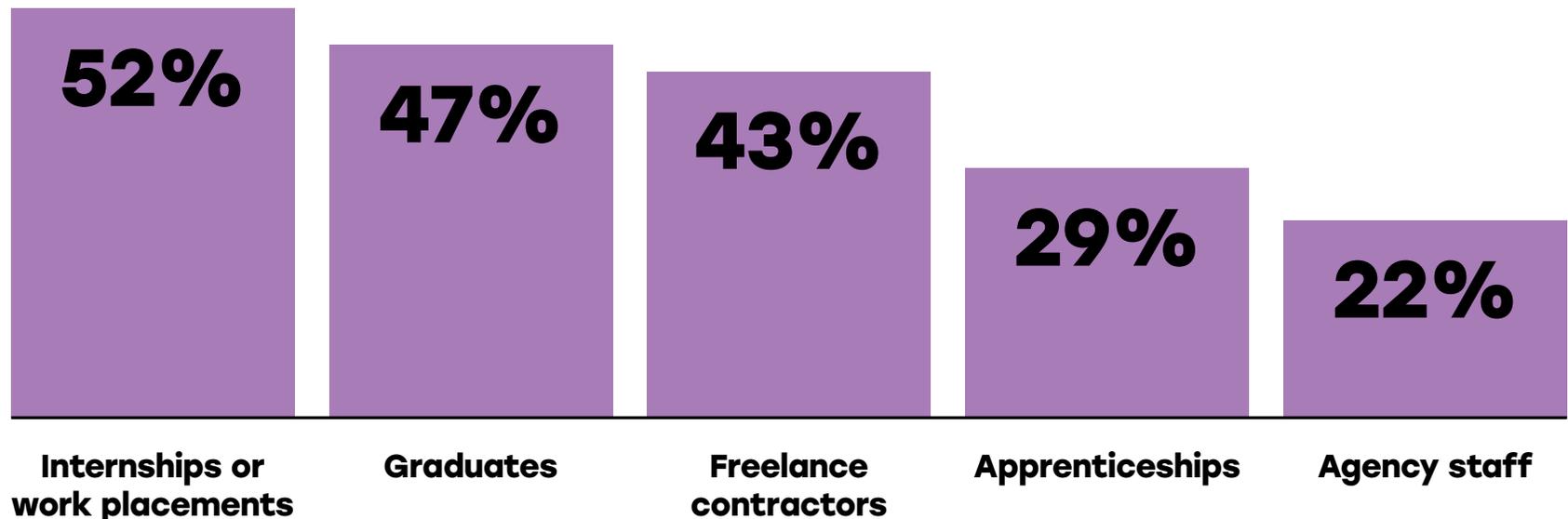
Recruitment Gaps

38% of employers currently have vacancies in tech roles. On average there are between 1 and 5 vacancies per employer.

Employers use a variety of solutions to meet their recruitment needs and challenges with high focus on interns and graduates in particular. This illustrates employers' appetite to invest in younger and less experienced talent.

International recruitment is also being used to help fill gaps. 37% of employers have recruited tech skills internationally. The main drivers for this are the requirement for specialist skills and experience and a lack of UK applicants.

Recruitment approaches to meet gaps





Current Workforce Skills Issues

Having a workforce with the right technical skills or experience is the biggest challenge for employers currently. 82% reported this as being an issue with 32% stating it as a significant one.

Current skills issues predominantly exist in experienced, technical and operational roles, and to an extent in managerial and director roles. Few employers experience skills issues in recruiting for entry level roles.





Future Skills Issues

Employers also anticipate the most significant issue in the future to be their ability to recruit people with the right technical skills or experience – 79% expect this to be an issue for them with 25% anticipating it as a significant issue.

In addition, over 60% of employers feel that keeping pace with the growth of the business and not having the correct technical skills within the organisation will be issues over the next 12 months. And over half of employers want to provide more tech skills training to their staff.

Employer future skills issues:

- **Difficulty recruiting right technical skills or experience 79%**
- **Difficulty keeping pace with the growth of the business 67%**
- **Not having the correct technical skills within the organisation 62%**

Acknowledgments



This summary report is based on “Scotland’s Digital Technologies Sector Analysis” – a research study undertaken by Ekosgen on behalf of the Digital Technologies Skills Group and their partners. This study was undertaken throughout 2016 and primarily involved a comprehensive desk-based analysis of the Scottish technology sector. This covered employment and enterprise data from a variety of statistical and employer sources to provide detail on the size and scale of the sector.

It also utilised occupation and industry data to build a picture of the cross-sector composition of the Scottish digital economy. In addition an in-depth review of education and training provision and qualifications was undertaken for subjects related to digital technologies jobs. This secondary research was complemented by an online survey and consultation programme with digital technologies employers.

Further information on this research and methodology can be provided by contacting **ketty.lawrence@sds.co.uk**

As lead partner for the Digital Technologies Skills Investment Plan, Skills Development Scotland would like to thank Ekosgen for undertaking the research and all individuals, businesses and partner organisations who took the time to support the development of this project by taking part in research, focus groups, consultations and workshops.