# CBI NI DIGITAL SKILLS INITIATIVE
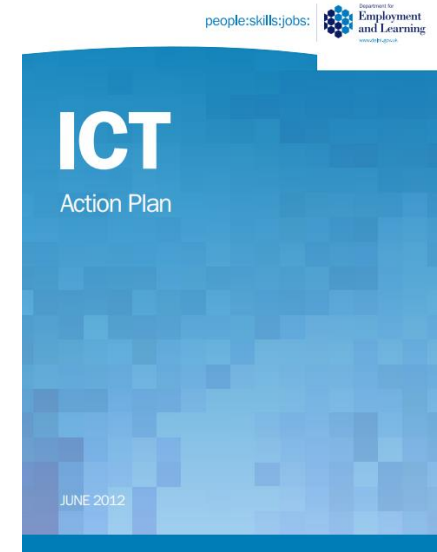
INVEST NORTHERN IRELAND
*25TH MARCH 2019*

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# OPPORTUNITY AT HAND

- There exists general concern that there is an lack of stability in the current labour market for digital skills.

- Requires alignment between industry, educational institutions and Government.

- CBI to provide analysis and potential actions that can be taken by Government.

- Initial review of the sentiment of industry.



ICT
Action Plan

people:skills:jobs:

Department for
Employment
and Learning

JUNE 2012

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# INDUSTRY SENTIMENT

To understand the overall concerns of business.

# THE NI ECONOMY IS COMING TO A TIPPING POINT ON DIGITAL SKILLS

## 76%
Businesses currently have digital skills shortages

## 95%
Businesses expect their need for digital skills to grow

## 60%
Businesses expect to feel their most acute digital skills needs over next 1-2 years

## 72%
Businesses expect to feel their most acute digital skills needs over next 3-5 years

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# DIGITAL SKILLS GAPS ARE ALREADY PRESENT IN SOFTWARE ENGINEERING AND DATA ANALYTICS

| Skill | % businesses struggling to hire for these skills |
|---|---|
| Software engineering | 43% |
| Data analytics | 37% |
| IT support and system maintenance | 3% |
| Digital marketing and sales | 19% |
| Cyber and IT security | 24% |
| Computer literacy | 0.4% |
| Understanding of how digital technologies work | 19% |
| Soft skills (problem-solving etc) | 9% |

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# THERE ARE A WIDE RANGE OF ACTORS THAT HAVE AN IMPORTANT ROLE

**61%**

Businesses **strongly agree** that it is important for government to take action to address UK digital skills gaps

**35%**

Businesses strongly agree that collaboration with partners, supply chains, charities, is important to address UK digital skills gaps
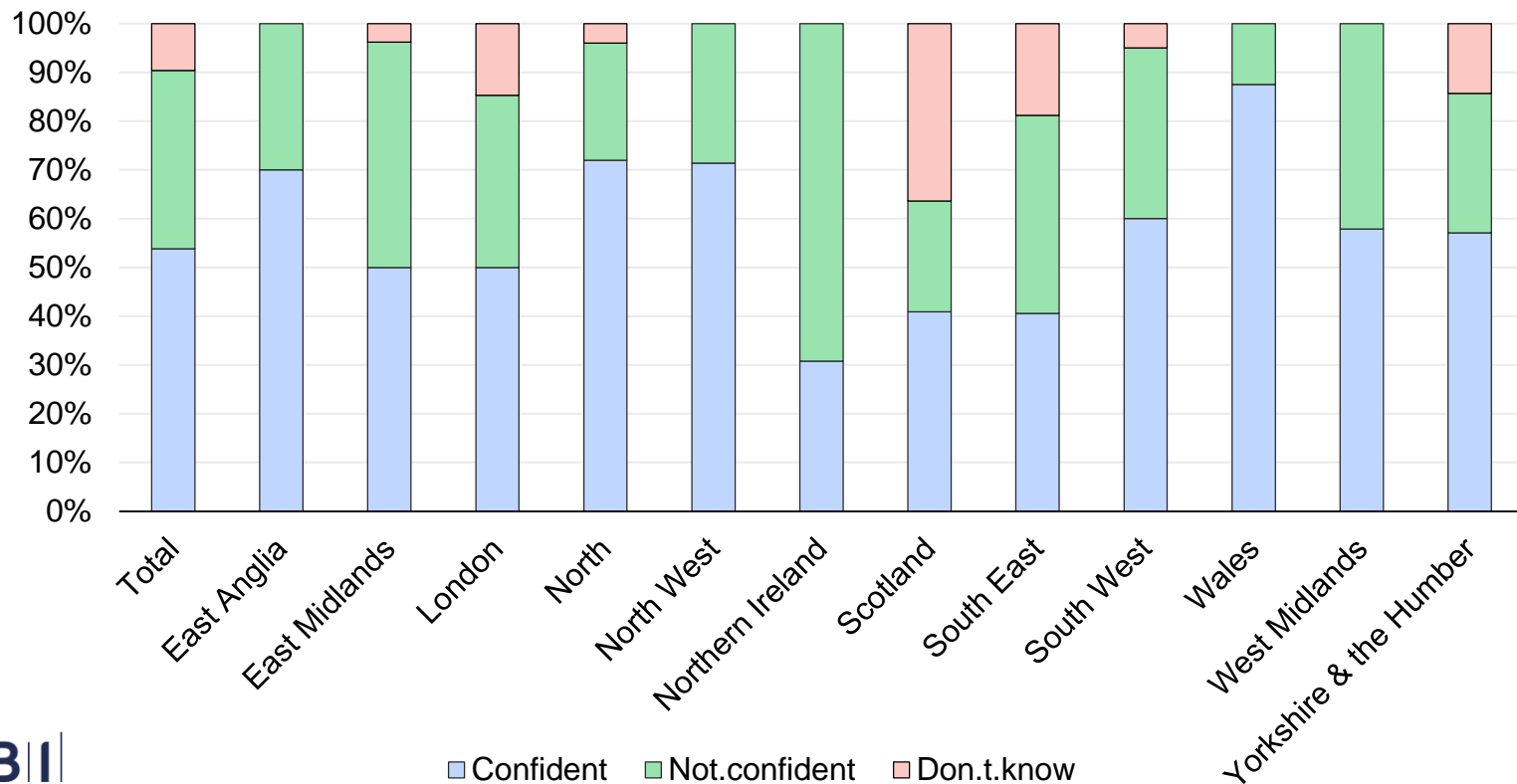
**41%**

Businesses **strongly agree** that the role of business is greater than the role of government in addressing UK digital skills gaps

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# CONFIDENCE OVER FUTURE NI LABOUR SUPPLY

*How confident are you that there will be sufficient people available in the future to meet your organisation's skills needs?*

# UK-WIDE CONFIDENCE



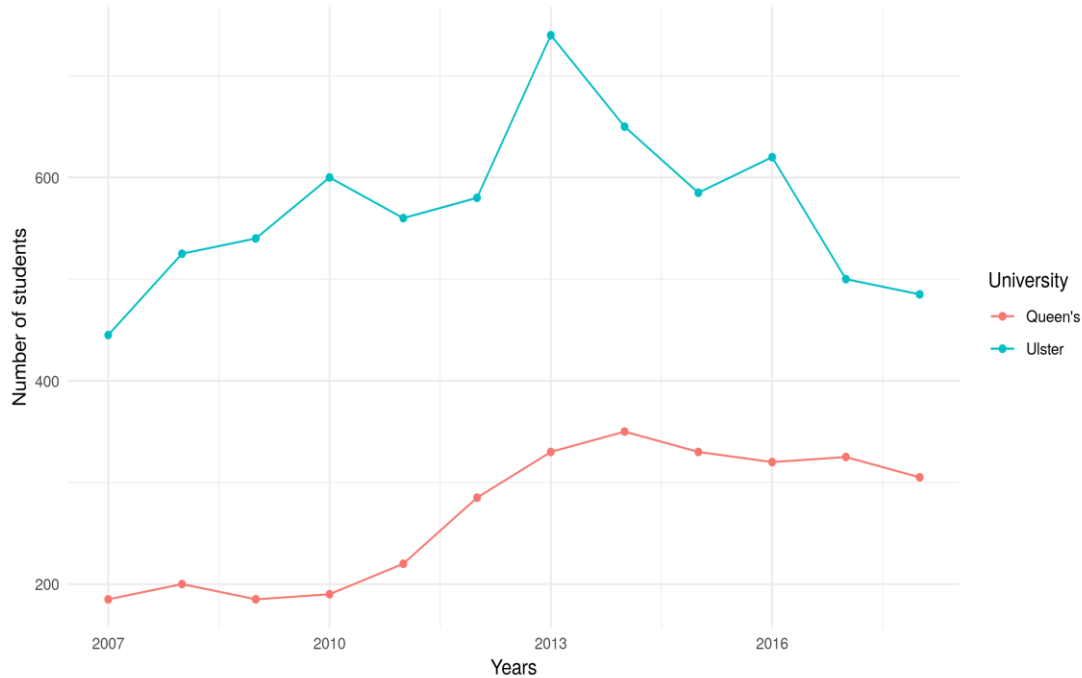Legend: ☐ Confident  ☐ Not.confident  ☐ Don.t.know
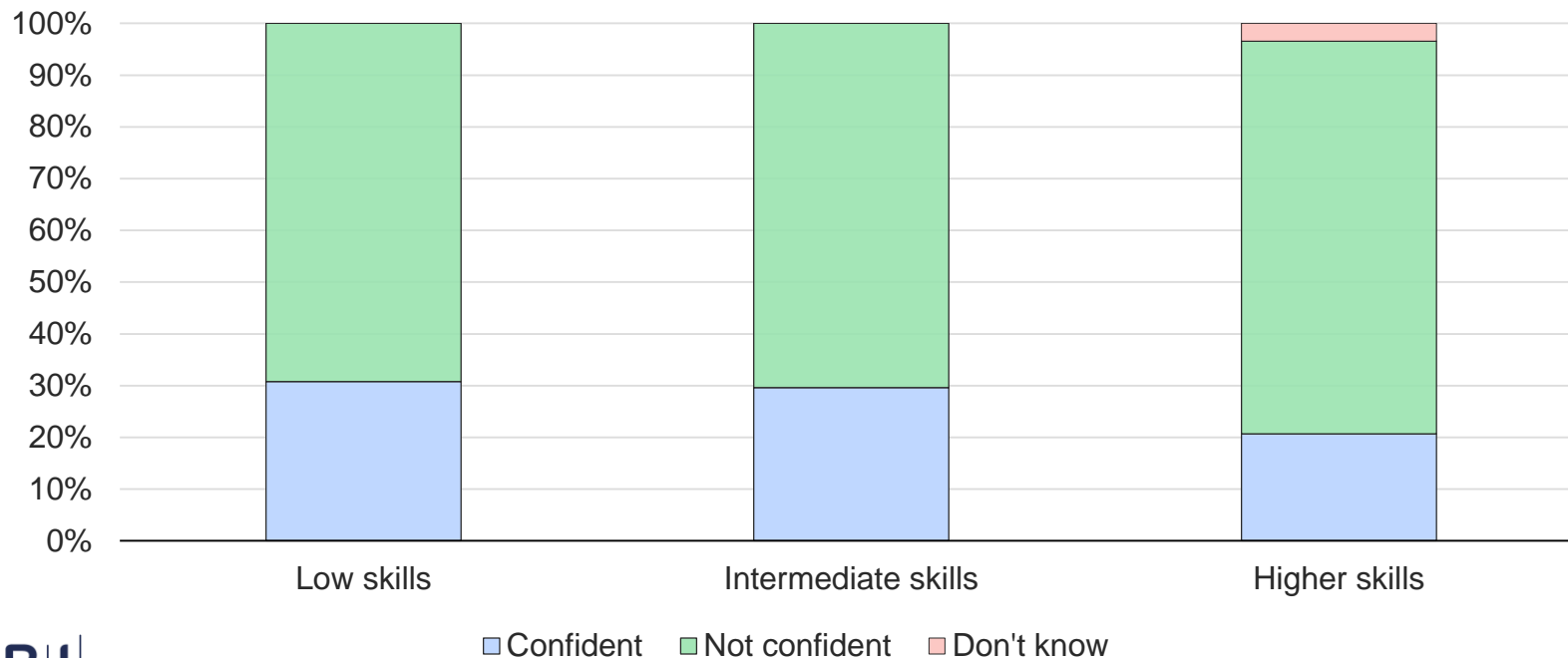
# SKILLS PROVISION

To review the demand, *enhance* the overall supply and *quality* of digital skills, and address known skills gaps in Northern Ireland.

# SUPPLY: UNIVERSITY STUDENTS (1)



Total number of UCAS acceptances for 'Computer Sciences' for NI Universities
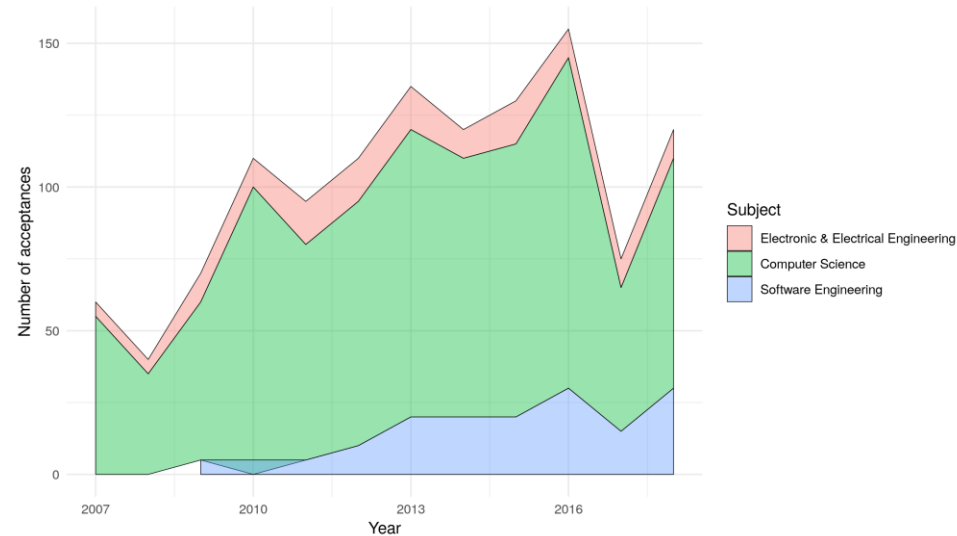
Source: UCAS

- Overall number of students enrolling in 'Computer Sciences' (broad category as defined by UCAS) in NI universities has fallen.

- Majority of this fall seems to have come from UU.

- Given dropouts, overall approximately 500 University graduates per year.

- 25% -- 30% female participation rate.

# SUPPLY: UNIVERSITY STUDENTS (2)



All NI University acceptances by all 'Firm choice' applicants (2007--2018)
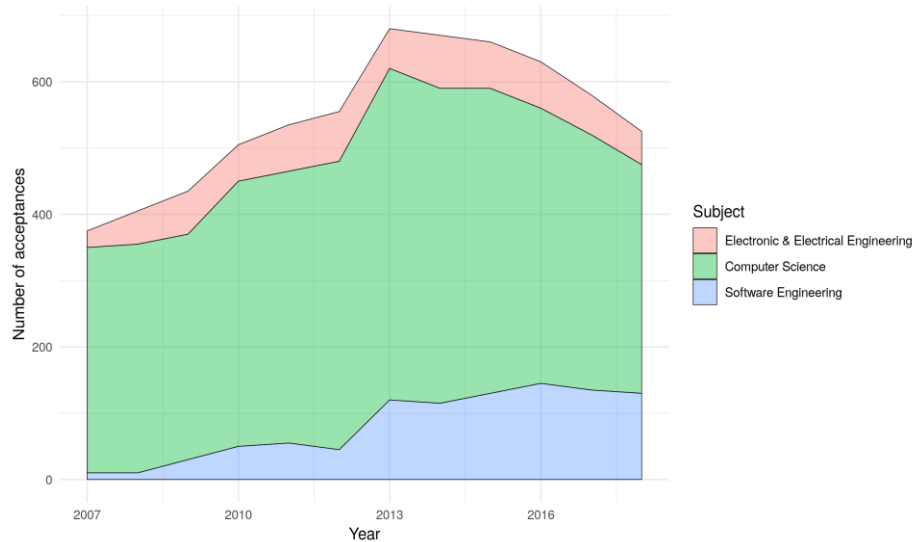


All NI University acceptances by all 'Insurance choice' applicants (2007--2018)

Source: UCAS

- Number of NI Universities selecting students in EEE/CS as their 'Firm Choice' has fallen over the past 5 years.

- NI students are increasingly choosing GB universities. Therefore, NI universities rely on students that are selecting local Universities as their 'Insurance Choice'.

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# SUPPLY: UNIVERSITY STUDENTS (3)

Difference between number of University applications and number of acceptances (2007--2018)
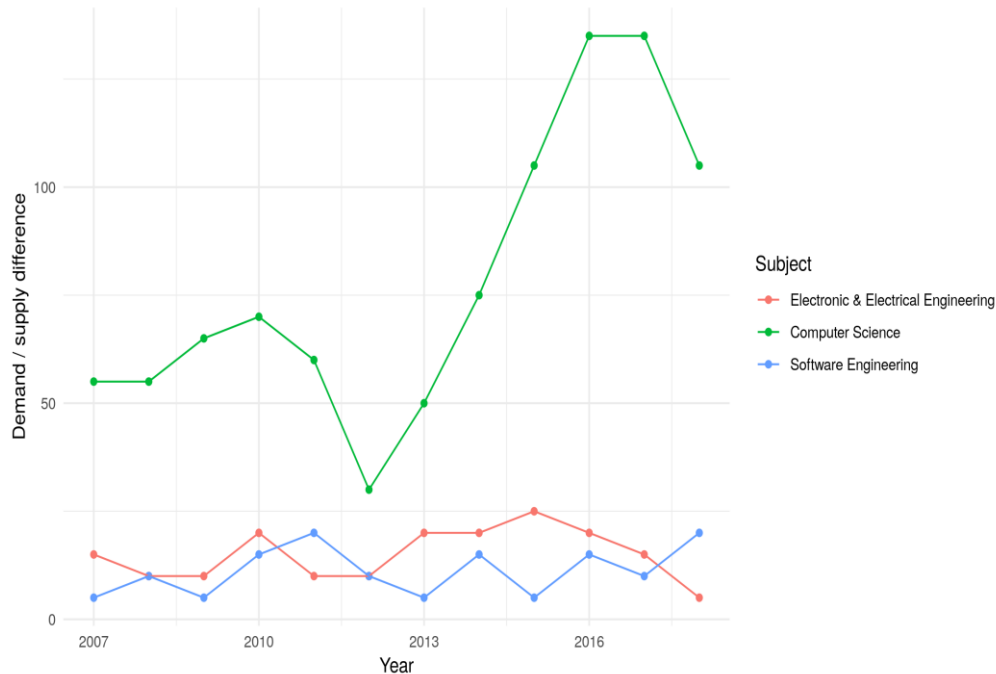


- Although Software Engineering has become more popular, the demand has largely been met by NI Universities.
- The surplus of demand has dramatically increased for CS, specifically over the last 5 years.

## Other issues

- Student to staff ratios in NI Universities are poor: 20.9 (QUB) and 24.1 (UU).
- Concern that the pipeline of PhDs and lecturers to teach CS and ICT-related fields at postgraduate & undergraduate levels in QUB and UU are falling.
- Doctorial training: 4000 places awarded in UK – only 25 awarded in Northern Ireland.

# SUPPLY: POSTGRADUATE STUDENTS



Number of students attending posgraduate courses in technical subjects in NI
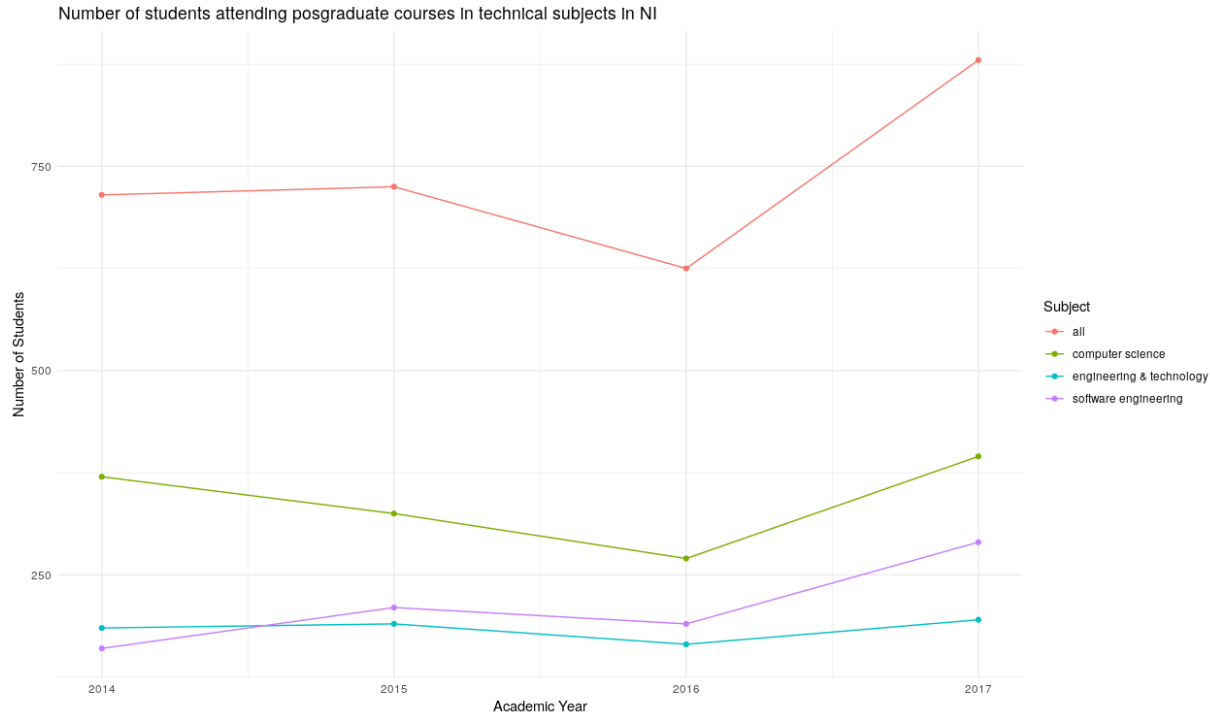
- Postgraduate education in technical subjects in Northern Ireland has grown in the last year.

- The biggest growth in % terms overall has been in software engineering, however growth in CS over the past year has been significant.

# SUPPLY: UNIVERSITY COURSES

## QUB

- Artificial Intelligence (Stage 3, *Optional*)
- Intelligent Information System (Stage 3, *Optional*)
- Information System Security (Stage 3, *Optional*)
- Advanced Intelligent Information Systems (Stage 4, *Optional*)

## UU

- Systems Security (Stage 2, *Compulsory*)
- Big Data and Distributed Computing (Stage 4, *Optional*)
- Artificial Intelligence (Stage 4, *Optional*)
- Data Analytics (Stage 4, *Optional*)

- One of the highest drop-out rates. Why?
- No alternative routes when students drop out.
- Requires discussion between Universities, schools and industry.

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# SUPPLY: STUDENTS LEAVING FOR UNIVERSITY

- NI students who apply for a course in Computer Science are above average more likely to leave to attend a University in GB or Rest of World.

- Overall this is equal to just over 250 EEECS students per year leave NI to study elsewhere.

- Approx. two-thirds of the 250 do not come back.

- No known initiatives are in place to attract back students that leave NI to study and work (perhaps too late!)
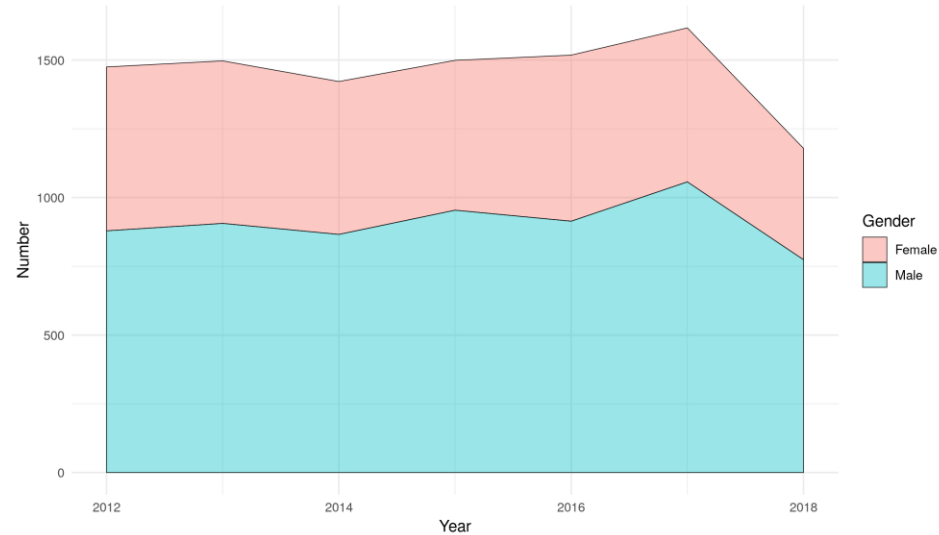


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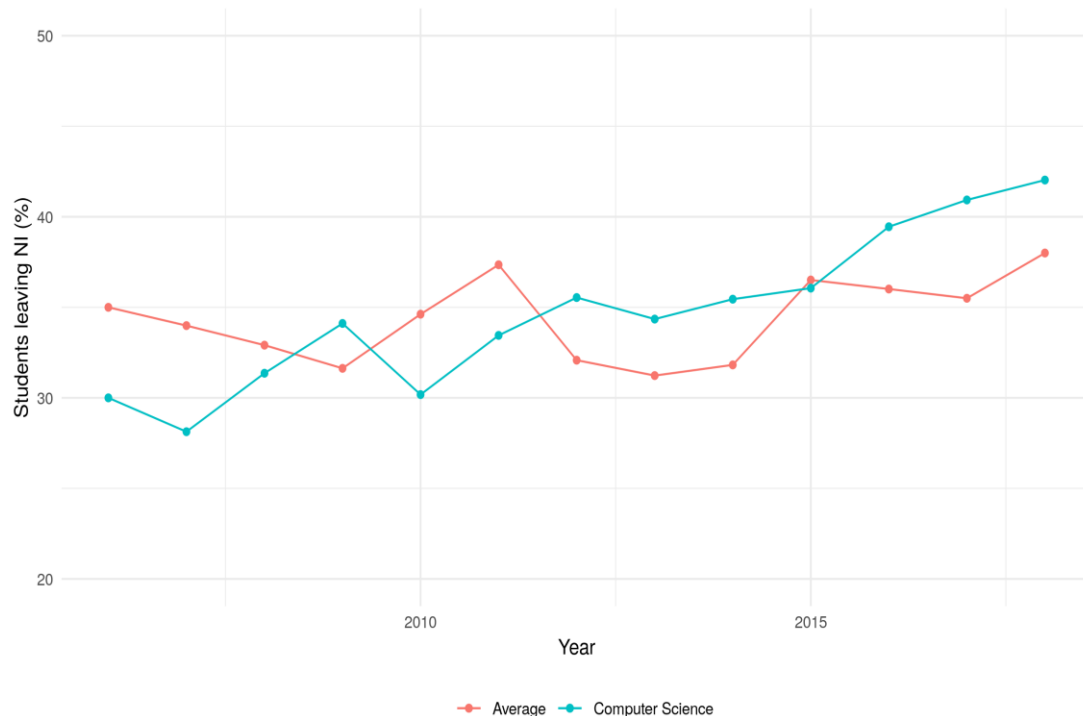
# SUPPLY: A LEVEL STUDENTS



Number of enrolled A Level students by subject (2012--2018)



Gender and number of enrolled A Level students (2012--2018)
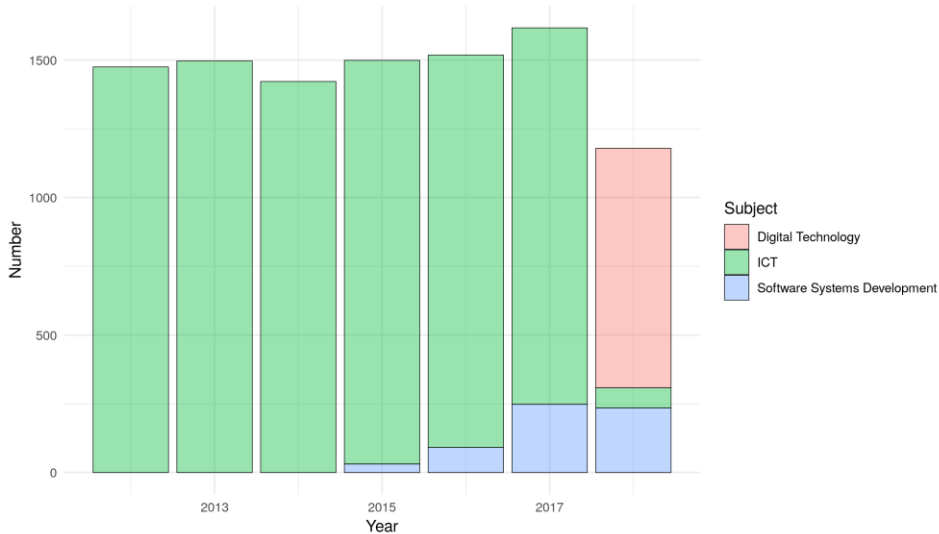
- Introduction of *Software Systems Development* A-level seems to have more split the pool of willing students as opposed to increasing it.

- Approx. 34% female to 66% male at this level.
- Females generally perform better than males.

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# SUPPLY: AS LEVEL STUDENTS



Number of enrolled AS Level students by subject (2012--2018)

Subject
- Digital Technology
- ICT
- Software Systems Development



Gender and number of enrolled AS Level students (2012--2018)
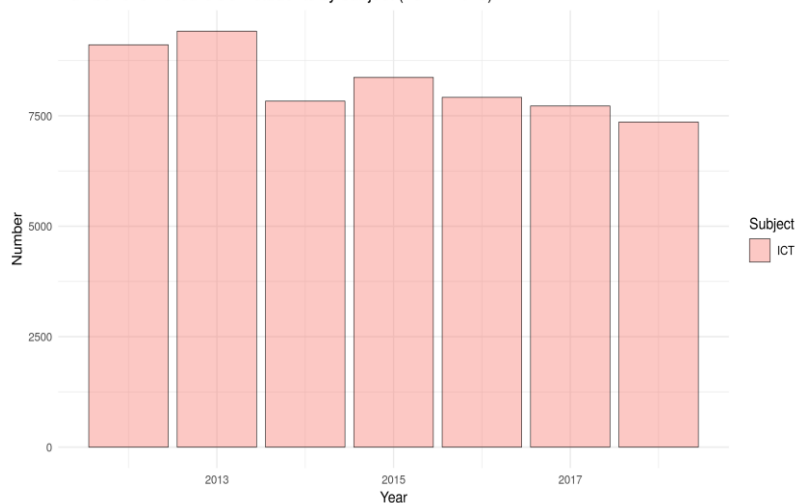
Gender
- Female
- Male
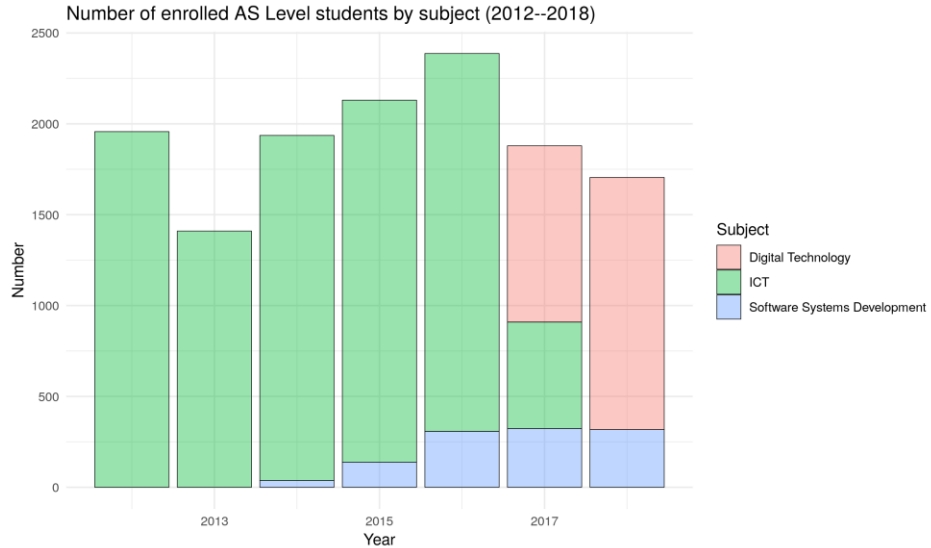
- 20% -- 25% are lost from AS Level.
- Looks like there is a continued downward trend.
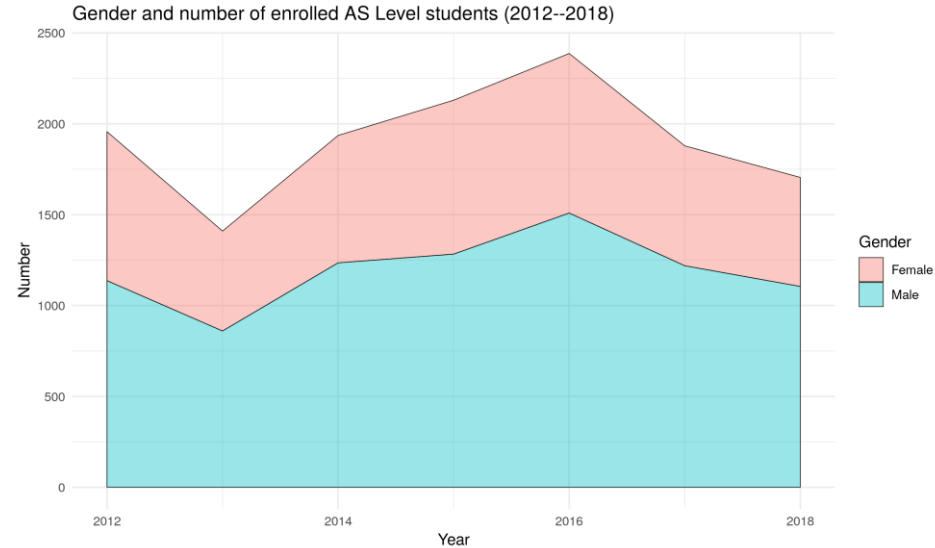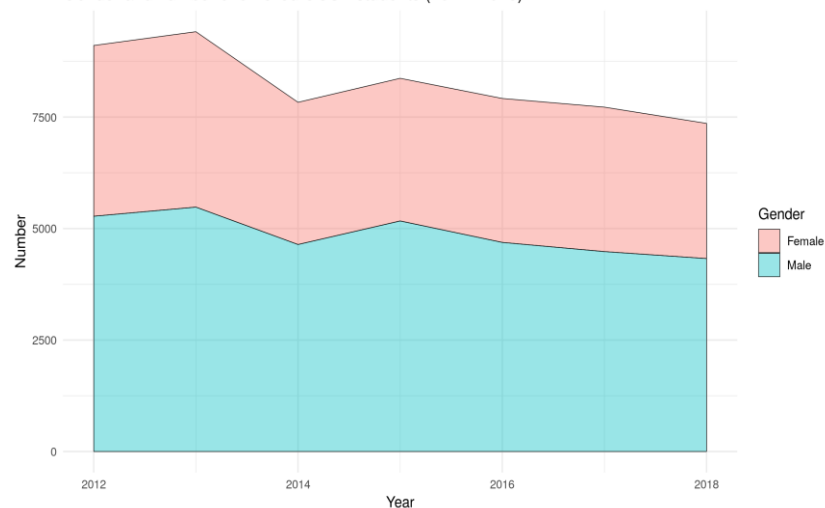
- Again, generally, females perform better.

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# SUPPLY: GCSE STUDENTS

Number of enrolled GCSE students by subject (2012--2018)

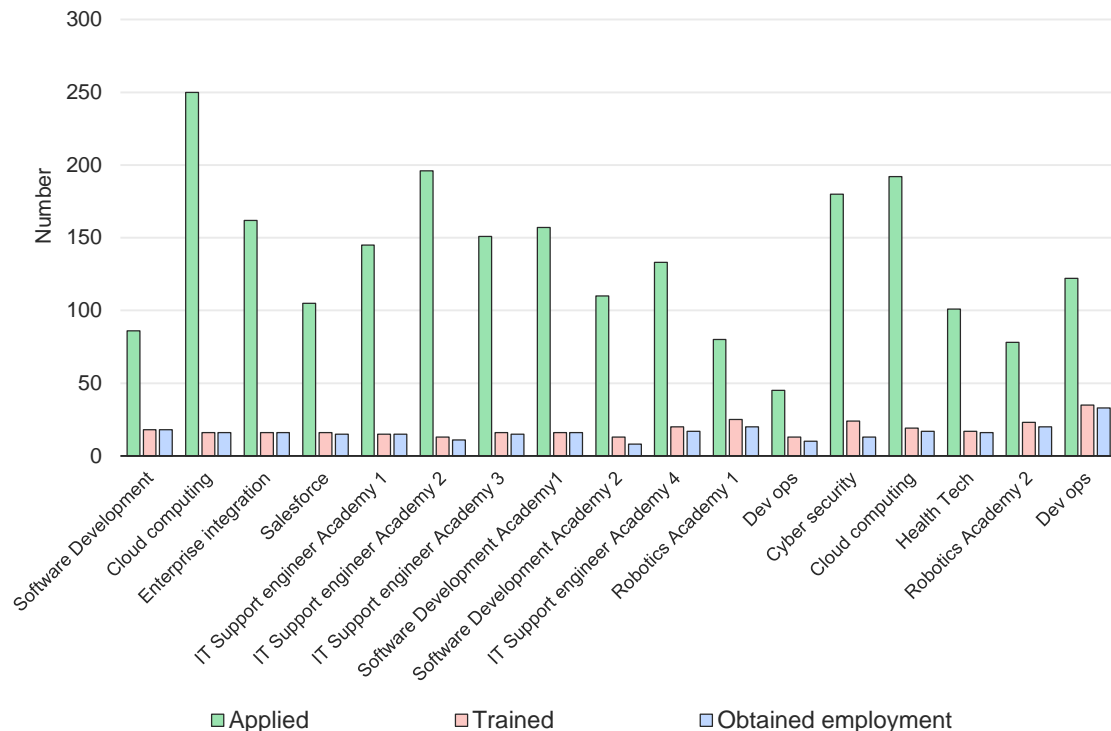

Gender and number of enrolled GCSE students (2012--2018)



- 82% leave from GCSE to AS level.
- Again, the overall supply seems to be diminishing at this level.

- 43% female to 57% male at this level.
- Yes… females continue to perform better!

# SUPPLY: ASSURED SKILLS ACADEMIES



**315** people trained

**276** found employment

**2,293** applications

- Serves **13.7%** of people interested in developing specific skills.

- Provides a short-term solution, but the marginal cost to train more people is minimal.

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# SUPPLY: RECOGNITION OF ALTERNATIVE ROUTES

- Incredible number of online resources (Udemy, YouTube, CodeTree, etc.).
- Individual skills developed can be used across a large number of other disciplines.
- Remote teamwork can be developed through the use of Git code repositories.
- Local teamwork can be developed through tech meet-ups.
- Employers look at portfolios and heatmaps and provide challenges that are posted on repos, Uni's should too!
- Gaining real-world experience is accessible at all ages.
- Teachers and parents need support for meetups and hackathons (more than 40 in Greater Belfast alone!).

# DEMAND: INFORMATION & COMMUNICATION COMPANIES

All NI technology firms registered with Companies House: 2018



Number of technology firms registered In Northern Ireland
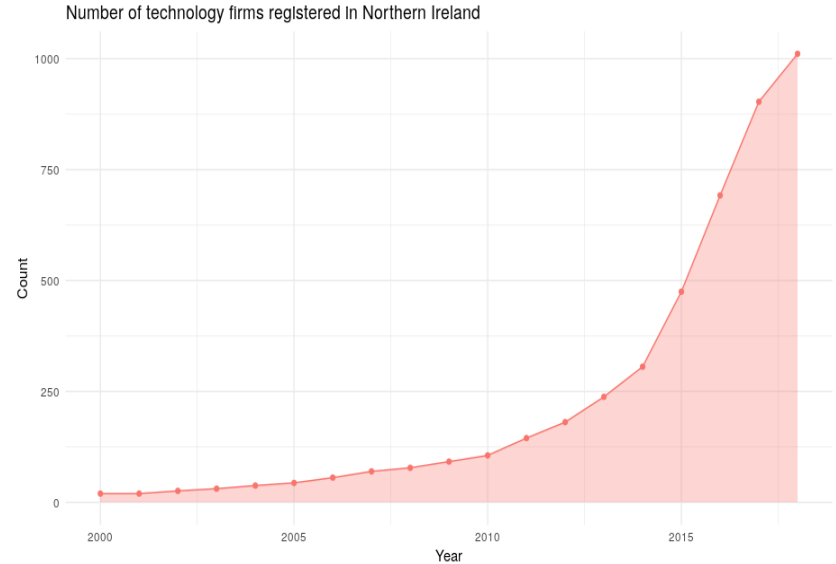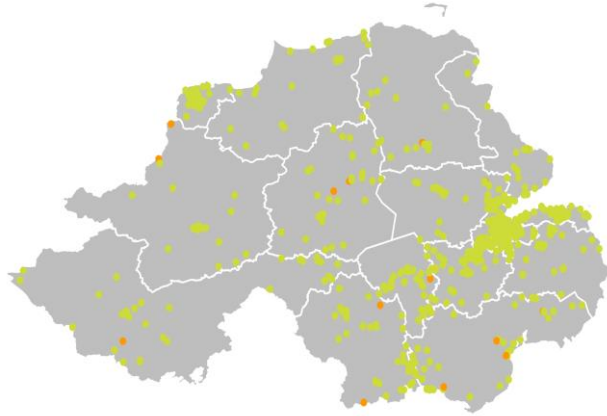


- The number of technology firms registered in Northern Ireland (Companies House data) has grown exponentially over the last two decades.
- This is in light of the declining supply of labour in ICT.

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# DEMAND: INFORMATION & COMMUNICATION COMPANIES

Employment change by full time/part time split, NI, 2012-2018
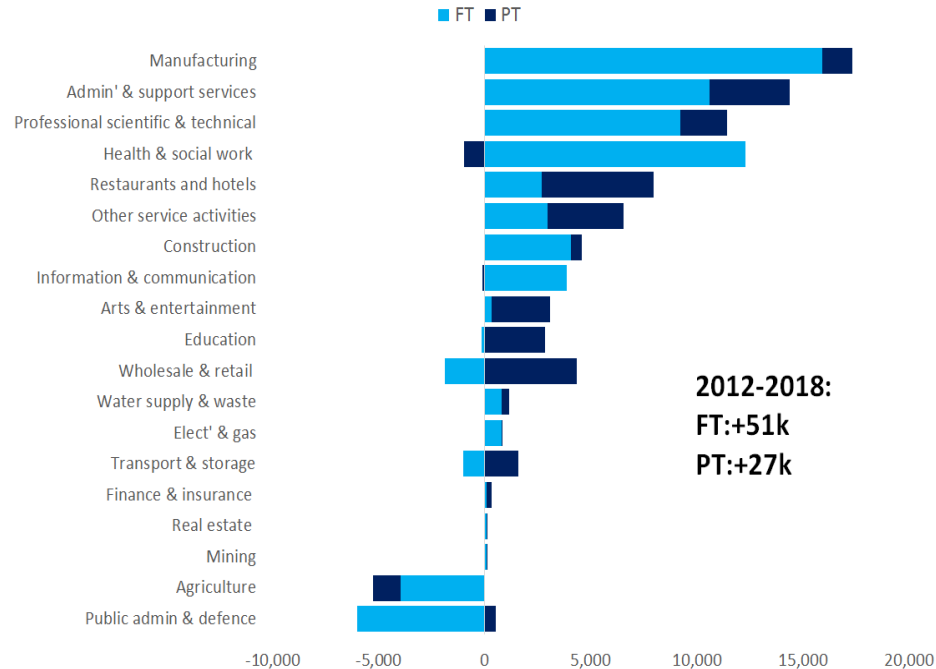


- Approx. 4,800 jobs in the information & communication sector and the 12,000 in professional scientific sector.

- Lower-skilled labour typically involved in the sectors with high employment growth, such as manufacturing, admin, restaurants & hotels.

# DEMAND: FDI PROJECTS

- Over 5 years, Invest NI supported 11,265 projects, assisting the generation of 31,317 jobs, with 5,335 in Information & Communication.

**Jobs created across all investment projects**
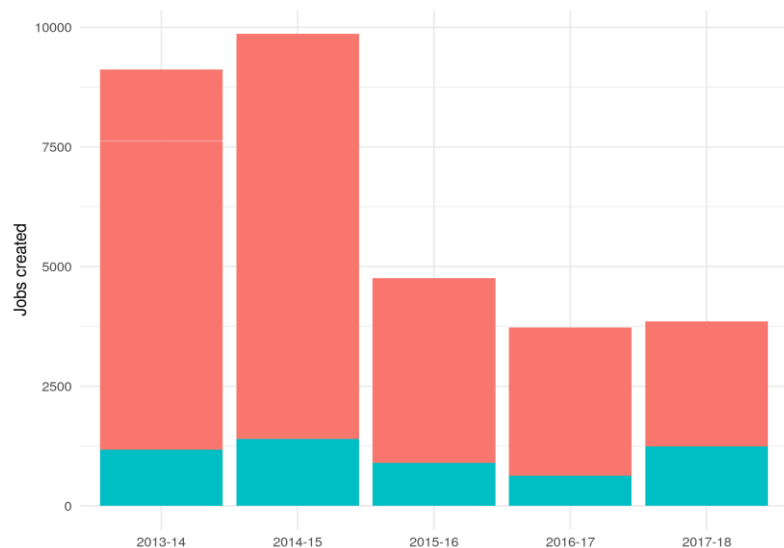


**Jobs created across ICT investment projects**
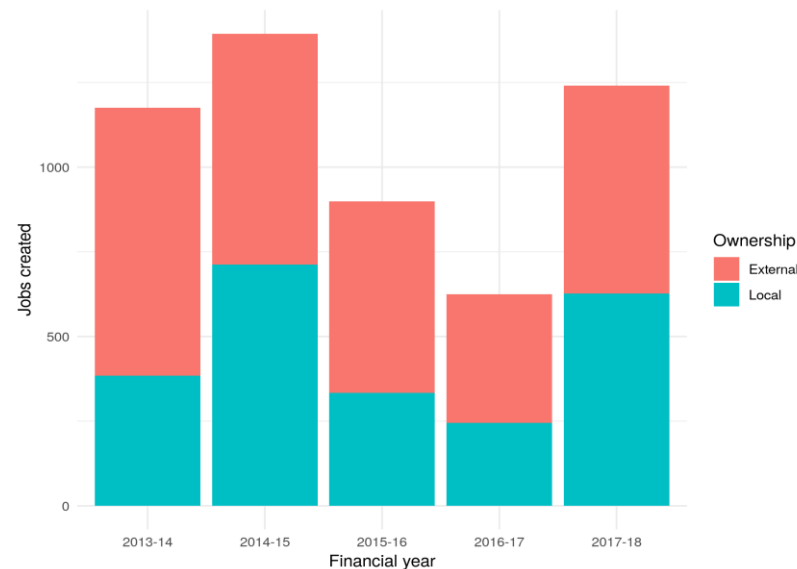
# DEMAND: PROPORTION OF JOBS AND INVESTMENT

**Proportion of projects invested in ICT**
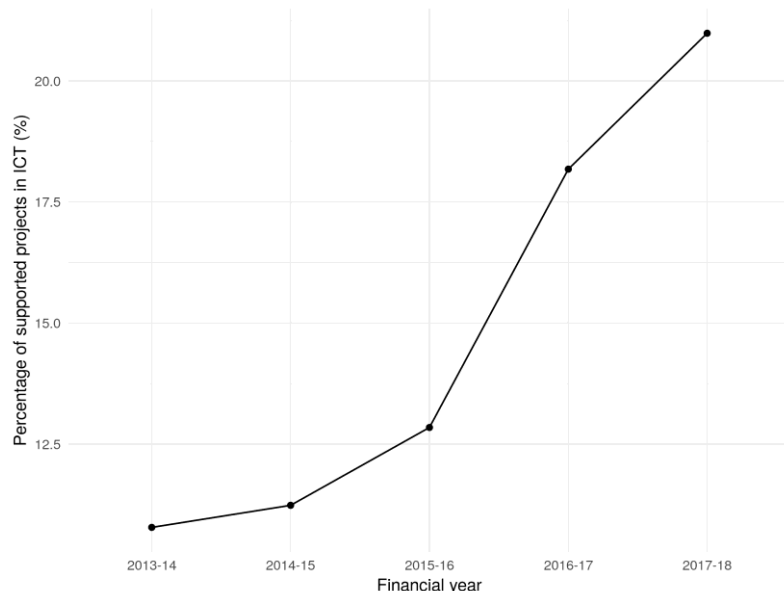
**Proportion of jobs created in ICT**
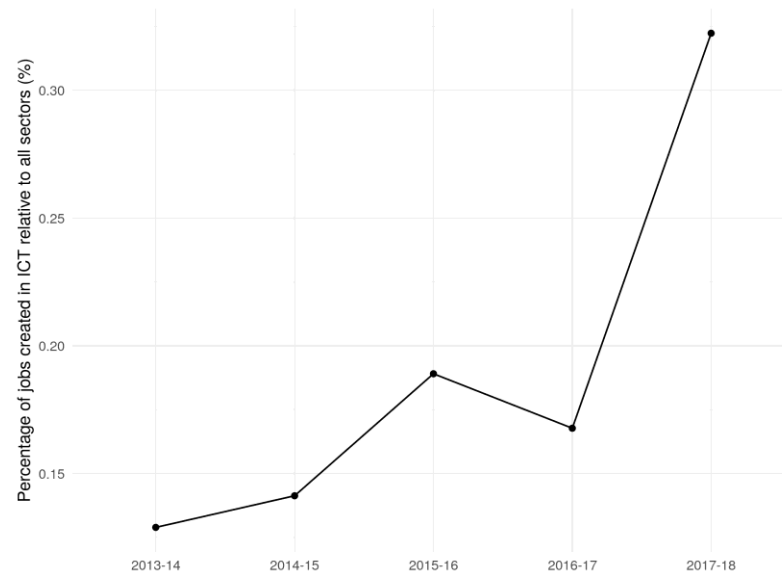


- Increased proportion of projects supported by Invest NI in the Information and Communication sector – along with it an increase in the proportion of jobs supported.

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# SKILLS: OVERALL DEMAND AND SUPPLY

## At max. 600

Individuals **supplied** to the labour market every year (may be even less given leakage)

## ~1,000

Jobs being **generated** per year (may be even more given the drive of private sector)

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# SKILLS: DEMAND ALREADY OUTSTRIPPING SUPPLY

| Rank | Subject area | Vacancies | Skills barometer |
|------|-------------|-----------|------------------|
| 1 | Computer science | 2895 | Under-supplied |
| 2 | Engineering | 1589 | Under-supplied |
| 3 | Mathematics | 1301 | Under-supplied |
| 4 | Computer software engineering | 640 | Under-supplied |
| 5 | Business administration | 545 | Over-supplied |
| 6 | Electrical engineering | 504 | Under-supplied |
| 7 | Statistics | 484 | Broadly in balance |
| 8 | Physics | 430 | Under-supplied |
| 9 | Computer engineering | 234 | Under-supplied |
| 10 | Economics | 154 | Over-supplied |

- Top 10 disciplines sought by technology / AI employers.
- Many are under-supplied.
- Supporting apprenticeships could be mechanism to resolve this issue, but Apprenticeship Levy in NI causes a problem.

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# SKILLS PROVISION: ACTIONS

## Short-term

- Review current and projected **demand** and **supply** for ICT professionals.
- Review and address known **critical skills shortages** for ICT professionals.
- Form **agreement** on sub-sectors and areas for growth and the supply of skills and FDI into those areas.
- Accommodate for more spaces in Academies that tend to be **over-subscribed**.
- Agreement within Industry for **HLA**'s.

## Medium-term

- Help primary and secondary teachers to equip themselves to teach **digital wraparound skills**.
- Include ICT in **Continuous Professional Development for teachers.**
- **Better business representation** in primary and secondary education.
- Encourage the **up-take of ICT-related studies at A-level**.
- Encourage the **take-up of ICT-related studies at college and university**.
- University **syllabus** to better reflect industry needs and policy / growth areas and clusters.
- **Ringfence PhD funding** for ICT and software engineering-related disciplines in universities… **More teaching fellows?**

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# SECTOR ATTRACTIVENESS

To increase student and graduate interest in working in the ICT sector in Northern Ireland.

# ATTRACTIVENESS: UNIVERSITY STUDENTS



Stay   Leave
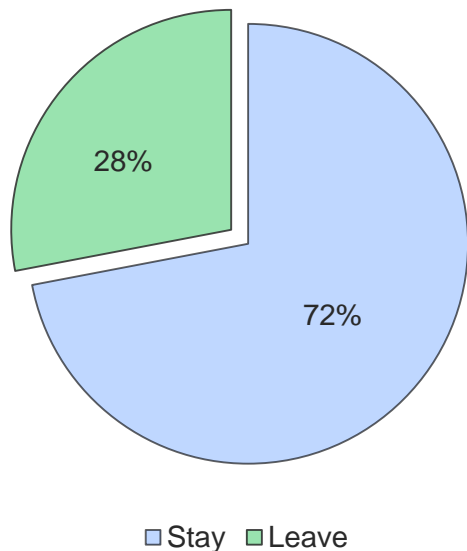
52% of NI computer science and software engineering graduates pursue a career in the ICT industry.

- 8% are ICT consultants
- 32% are web (application) developers
- 7% are data scientists / analysts
- 10% are network / system designers and engineers
- 43% are software designers and engineers

# GLOBAL SKILLS: MIGRATION

Change in employment by country of birth, Northern Ireland, 2008-2017
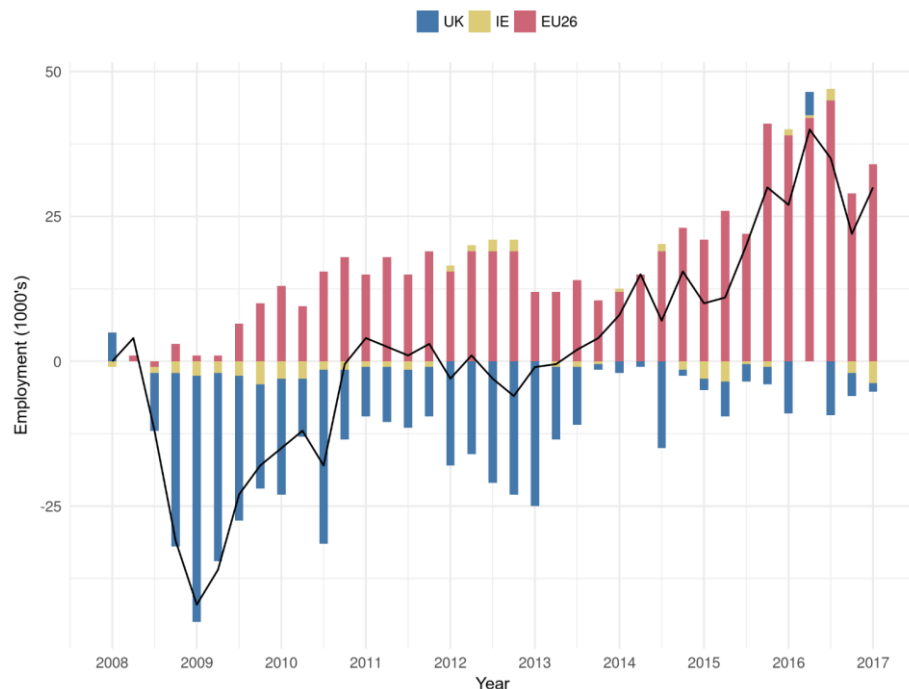


- We need more people!
- According to UUEPC, average salary of Knowledge Economy: £28,000.
- Below proposed salary threshold.
- Netherlands and Danish Government support and host business to provide **ambassador programmes** to attract global talent.
- 42% of Ireland's tech workforce are from foreign nations.
- Less than 10% for Northern Ireland.

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# SKILLS, AWARENESS & INITIATIVES

- Over 43 STEM / STEAM skills and awareness initiatives across the public and private sectors.

- Diluted activity with the Bring I.T. On programme: not as many ambassadors.

- Bring I.T. On seemed to work, but…

  - *Is Belfast Met the right home for the programme?*

  - *Should industry and Government focus on a broader programme, such as "I.T's Your Choice"?*



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# SECTOR ATTRACTIVENESS: ACTIONS

## Short-term

- Understand why people with relevant skills choose not to work in Northern Ireland.
- **Promote career opportunities** to primary and second level students.
- I teachers and
- Support initiatives that address the **gender imbalance**, particularly from A-levels.
- Review and encourage more engagement with the 'Bring IT On' programme.
- Agreement on **global ambassador programmes** to other nations.

## Medium-term

- Establish initiative to **help teachers in training** (at, say, University Colleges) to better understand the career opportunities for students.
- Government to develop programmes to **attract back** NI students that leave for University education.
- Government to assist in the development of **global ambassador programmes**.

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# COORDINATION & COMMUNICATION

To *reduce duplication of effort* and *remove silos* by increasing coordination, communication and agreement between industry, Government and educational stakeholders.

# SKILLS PROVISION: ACTIONS

**Continual**

- Consult industry regarding **FDI strategy** for ICT sector.

- Universities and colleges to work with industry when **updating syllabus**.

- Support and improve coordination **of skills initiatives**.

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