



No Longer Optional: Employer Demand for Digital Skills

ILO: Big Data for Skill Anticipation and Matching

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Building a Detailed Understanding of Labour Market Mismatch

Online vacancy data provides a key window into critical questions related to skill gaps.

- **How can we understand skill gaps at detailed and actionable level?** In order to determine effective policy interventions, we must be able to measure which specific jobs and skills face shortages.
- **What are the underlying dynamics and causes behind the gaps?** There set of systemic changes occurring in the job market disrupting past patterns of credentials and other signaling mechanisms: hybridization, upcredentialing, automation, etc.
- **What are the future trends in the job market?** We can project future skill demand to prepare tomorrow's workers, today.

IMPACT OF REAL-TIME JOBS DATA

POWERFUL RESULTS ACROSS COMMUNITIES



RESKILLING

Thousands of at-risk retail workers are reskilling for adjacent careers in retail banking and IT support.



ECONOMIC DEVELOPMENT

Cities like Pittsburgh and Birmingham have been using our data to shape coordination across education, industry, and government to build their skill base.



REEMPLOYMENT

1 million unemployed are served by agencies using our data. On average, they return to work a week faster than others.



EDUCATIONAL PERSISTENCE

90% of high dropout risk students at a national university are persisting in their studies.



JOB STABILITY

A global technology leader has been able to avoid thousands of layoffs by upskilling rather than replacing workers.



CAREER GUIDANCE

A training provider has experienced 60% increases in enrollments to high impact vocational courses by better articulating their career value.

Digitalization and Skill Policy

Research Questions to Address:

- What is the level of digitalisation occurring in the economy?
- What digital skills matter in the market and for whom?
- What are the wage premia associated with developing digital skills?
- What are the role of digital skills in helping workers decrease automation risk?

Translating Research into Action

- What are the implications of the findings above on setting skills policy?



Department for
Digital, Culture,
Media & Sport

Methodology

- [No Longer Optional](#), UK analysis based on 9.4M unique postings from Apr 2017 – Mar 2018. Sponsored by UK Department of Media, Culture and Sport.
- Occupations coded into UK SOC and skills according to Burning Glass's proprietary skills taxonomy. Digital skills are grouped in thematic clusters.
- Occupations are tagged as “digital” or “non-digital” based on digital skill requirements of the role.
- Germany analysis of occupational digital intensity based on based on Muro, Liu, Whiton, and Kulkarni (2017)

Digital Skill Requirements are Nearly Universal

- Even among low-skill jobs (RQF Level 1,2) 77% of job adverts are in occupations calling for digital skills
- Middle-skill jobs (RQF Levels 3-5) are more likely to call for digital skills than high skill jobs.

Demand by Skill Level

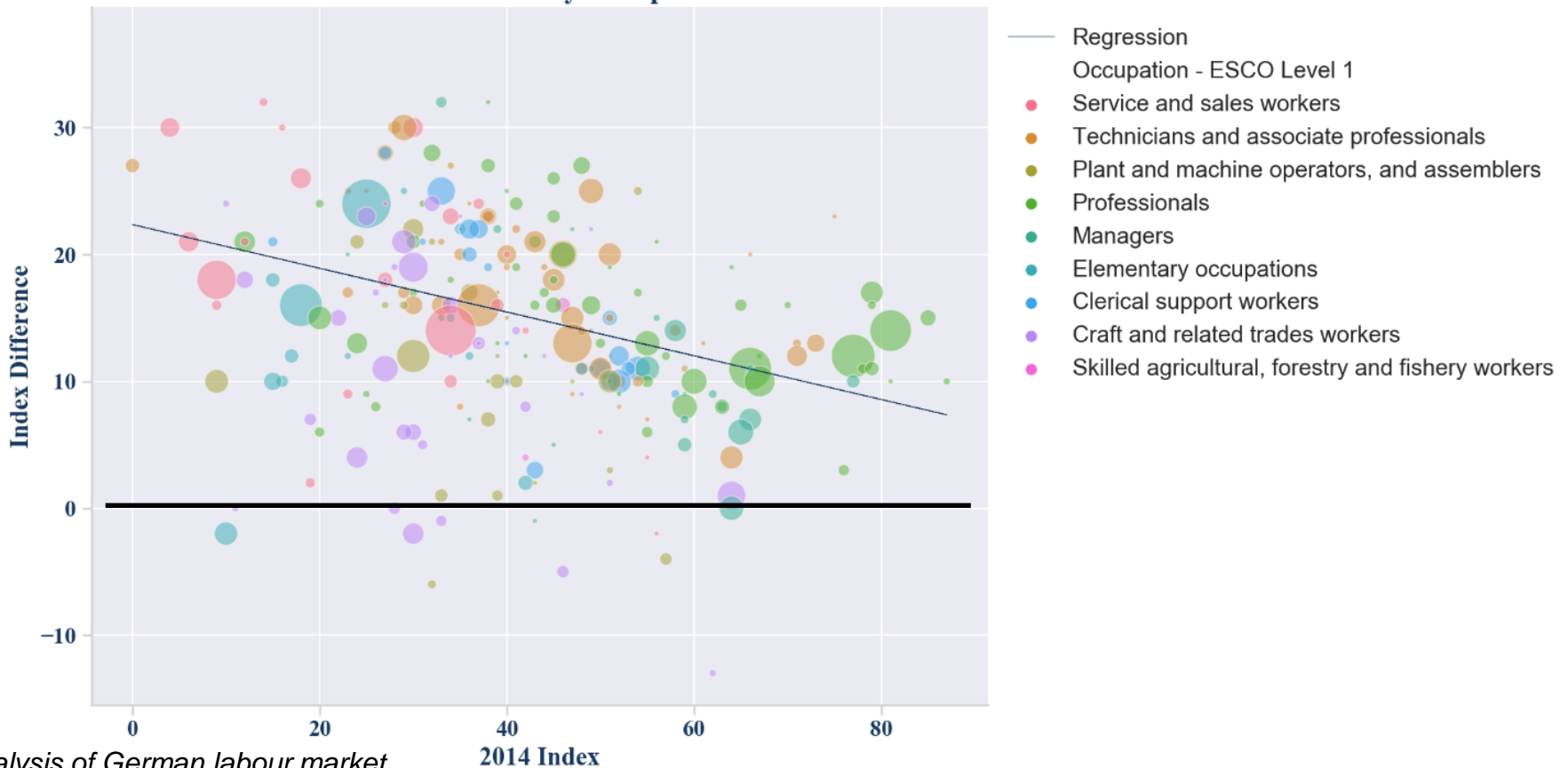
| Skill Level | Total Number of Job Adverts | Job Adverts in Occupations Requiring Digital Skills | % of Job Adverts in Occupations Requiring Digital Skills |
|--------------|-----------------------------|---|--|
| Low-Skill | 2,111,889 | 1,629,017 | 77% |
| Middle-Skill | 2,602,348 | 2,214,109 | 85% |
| High-Skill | 4,685,953 | 3,873,377 | 83% |
| All Jobs | 9,400,191 | 7,716,503 | 82% |

Digital Skill Intensity is Increasing

Our Germany study calculates “digital intensity” for each occupation.

- Nearly all jobs are increasing in their level of digital skill intensity.
- Digital intensity is increasing faster for less digital jobs than more digital ones.

Difference Based on 2014 Index by Occupation - ESCO Level 1



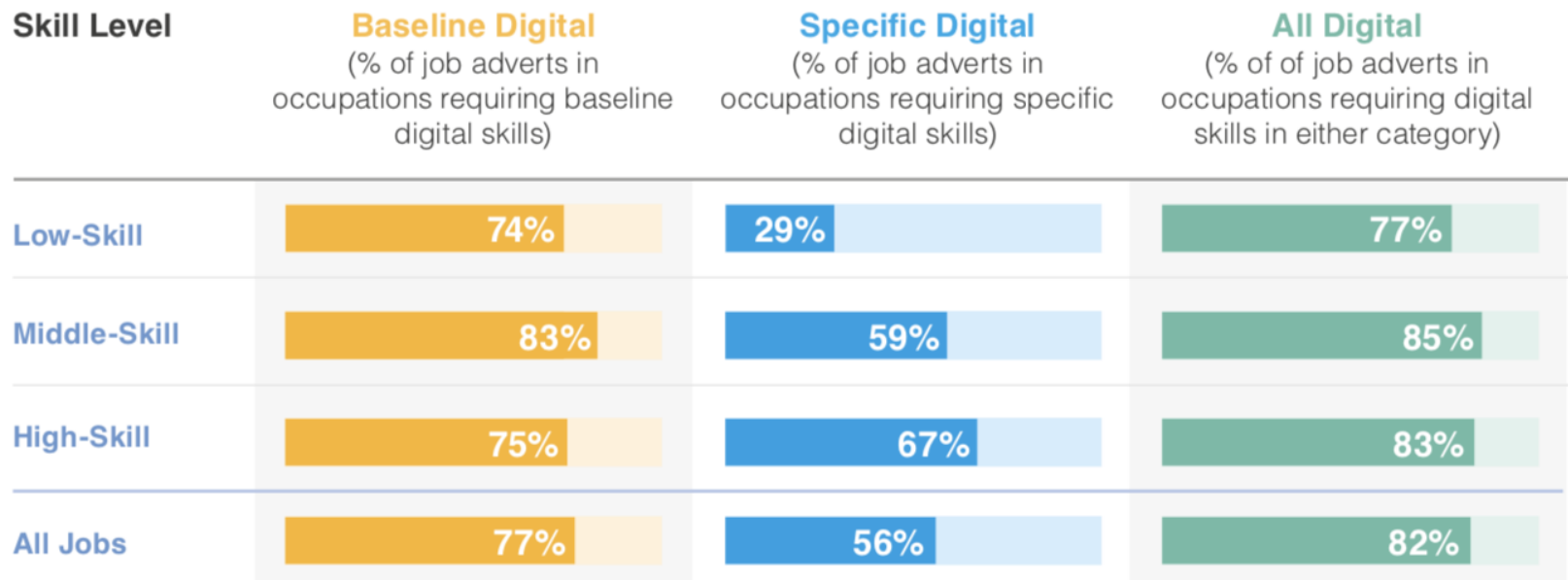
Digital Skill Typology

| Digital Skill Type | Digital Skill Cluster | Description | Common Occupations |
|--------------------|--------------------------------------|---|---|
| Baseline | Productivity Software | Productivity software skills such as Word and Excel, Enterprise Resource Planning (ERP), Project Management Software, SAP | <ul style="list-style-type: none"> • Administrative Occupations • Customer Service |
| Specific | Software & Programming | Programming languages such as Java, SQL, and Python | <ul style="list-style-type: none"> • Programmers • Software Developers • Database Administrators |
| | Computer & Networking Support | Set up, support and manage computer systems and networks | <ul style="list-style-type: none"> • Network Administrators • Software Developers • IT User Support Technicians |
| | Data Analysis | Data analysis tools like R or Stata, Big Data, Data Science | <ul style="list-style-type: none"> • Management Consultants • Economists • Statisticians • Business Analysts |
| | Digital Design | Digital production, graphic design, online advertising skills | <ul style="list-style-type: none"> • Marketing Associate Professionals • Graphic Designers |
| | CRM | CRM software, such as Salesforce or Microsoft Dynamics | <ul style="list-style-type: none"> • Sales Professionals • Marketing Associate Professionals • Customer Services Managers |
| | Digital Marketing | Digital marketing technologies, such as social media platforms and analytics tools, such as Google Analytics | <ul style="list-style-type: none"> • Sales & Marketing Professionals • Marketing Associate Professionals • HR Officers |
| | Machining & Manufacturing Technology | Machining and engineering software and tools such as CNC machining and computer-aided design | <ul style="list-style-type: none"> • Machine Operators • Civil Engineers • Quality Control and Planning Engineers |

Digital Skill Requirements are Nearly Universal

- Even among low-skill jobs (RQF Level 1,2) 77% of job adverts are in occupations calling for digital skills
- Middle-skill jobs (RQF Levels 3-5) are more likely to call for digital skills than high skill jobs. (83% vs 75%)

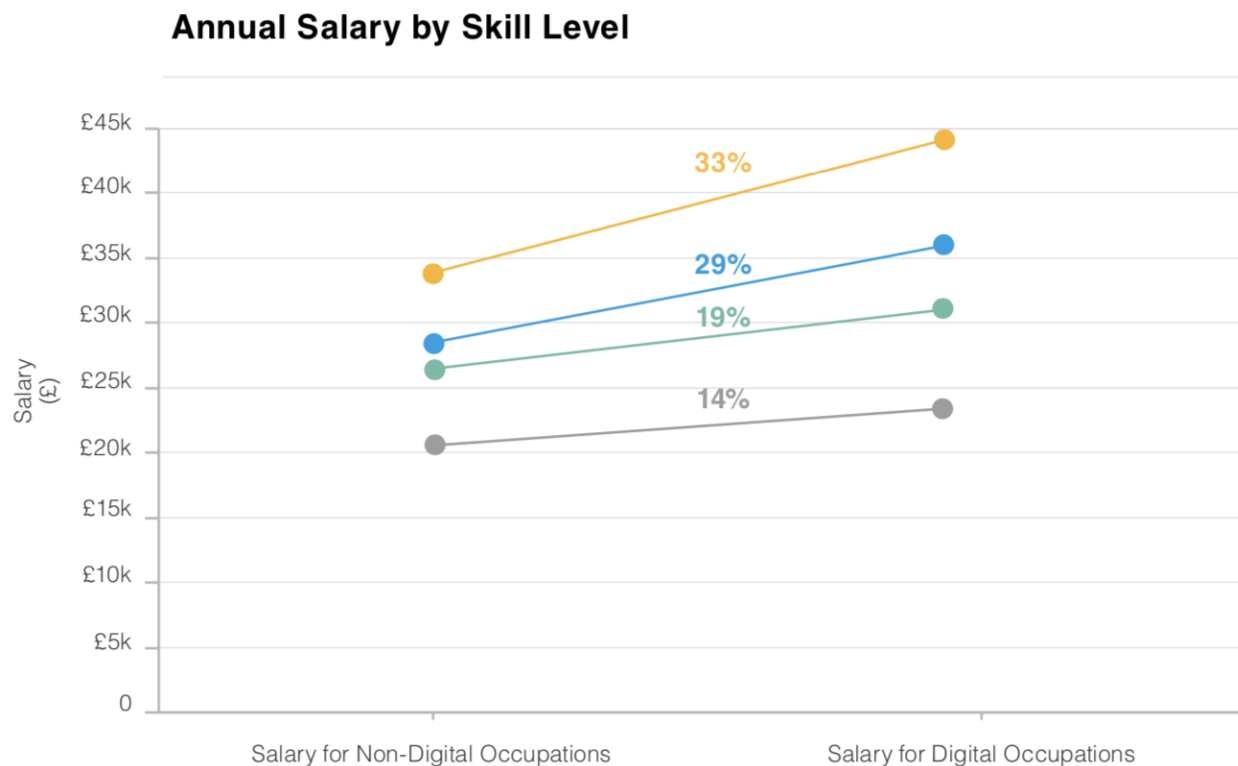
Annual Digital Demand by Skill Level



Note: The two categories 'baseline digital' and 'specific digital' are not mutually exclusive. An occupation can require both baseline and specific digital skills.

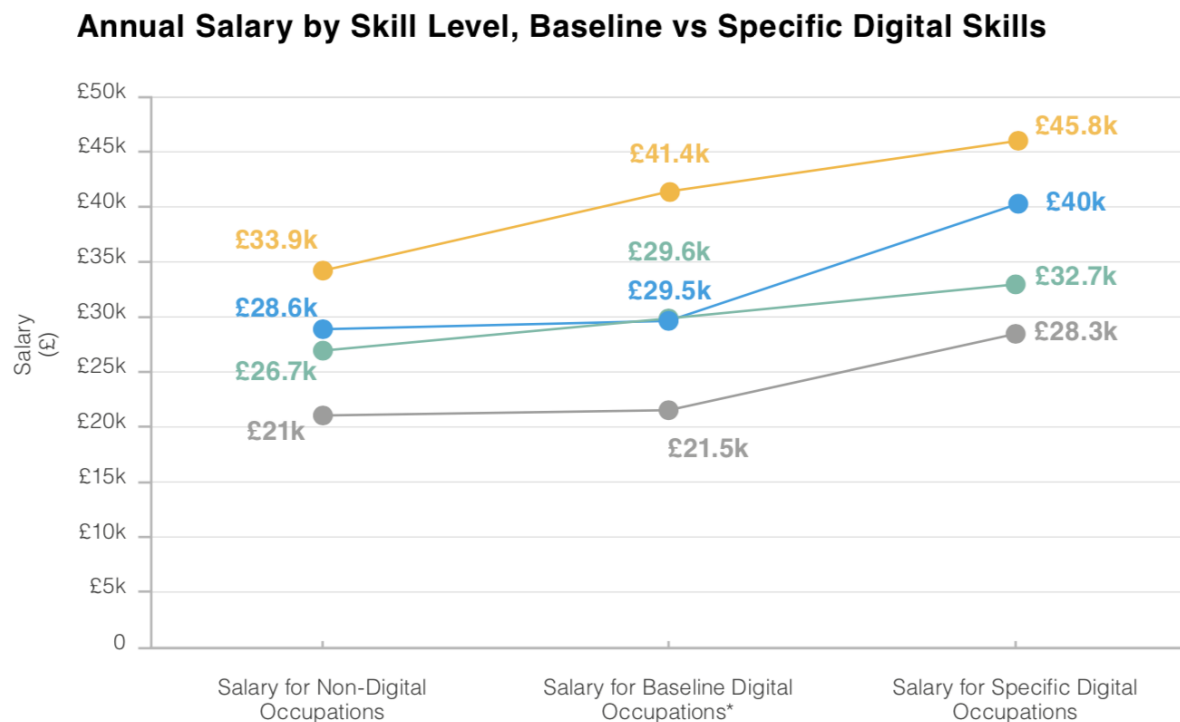
Digital Skills Offer Wage Premia

- Overall, roles requiring digital skills pay 29% (£8,300 per annum) over those roles that do not (£37,000 p.a. vs £28,700 p.a.).
- Higher skill roles have a greater return to digital skills.



Salary Increases Are Driven by Specialized Skills

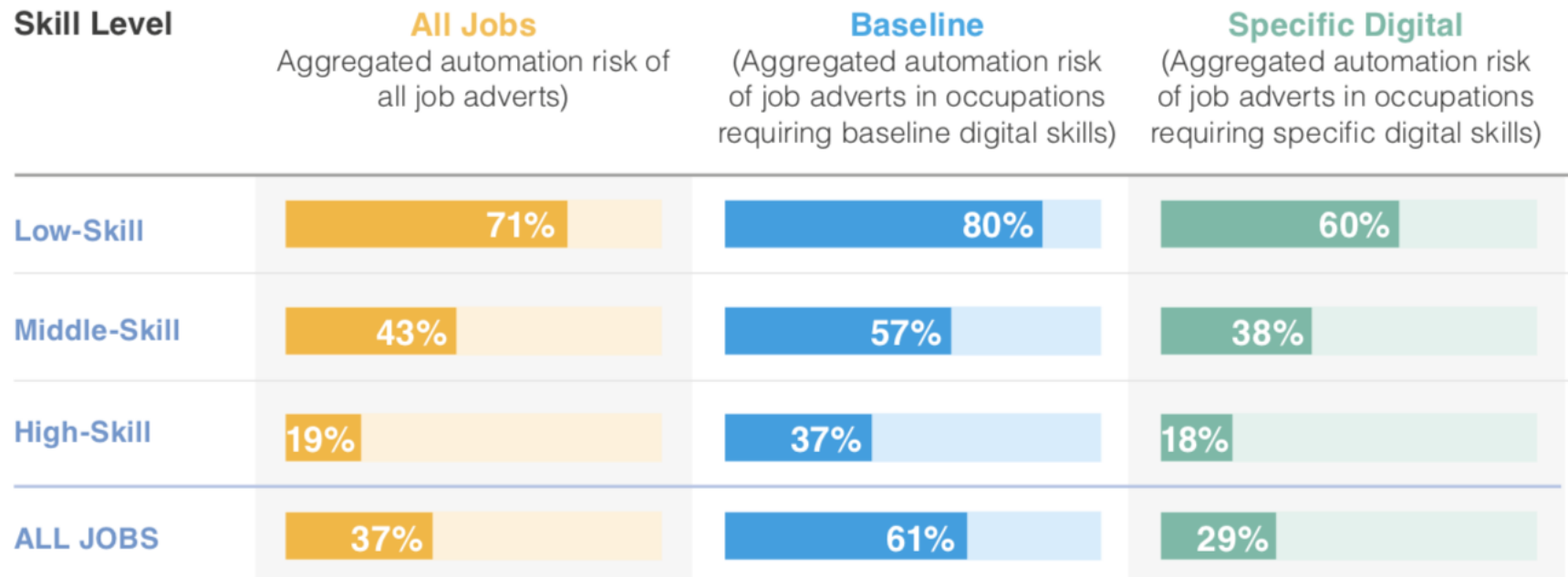
- Job seekers need to develop specialized digital skills to maximize economic returns.
- Baseline digital skills are considered assumptive and offer only modest salary benefits to low and middle skill job seekers.
- Jobs requiring specific digital skills offer salaries 40% higher over non-digital jobs (£40,000 vs £28,600).



Digital Skills Provide Insurance Against Automation

- Automation risk is influenced by two factors – skill level and digital skill category.
- Jobs requiring only baseline digital skills have the greatest automation risk.
- Roles that require specific digital skills reduce risk of automation by 59%.

Risk of Automation across Skill Levels



Note: Risk of automation score has been weighted by the size of demand for the respective group. Frey and Osborne (2013) found an overall automation risk of 47% of in their paper. The analysis of this paper is based on job openings and therefore represents the job market from the forward-looking employers' point of view. The overall automation risk is therefore lower.

Implications for Setting Skills Policy

Eight in ten online advertised job openings in the UK are for occupations that demand digital skills - clear and convincing evidence of how digital skills are not merely important, but central to the labour market.

- Focus on the Skill the Matter – Today and in the Future
- Skills Policy Should be Set Locally
- Identifying workers for retraining



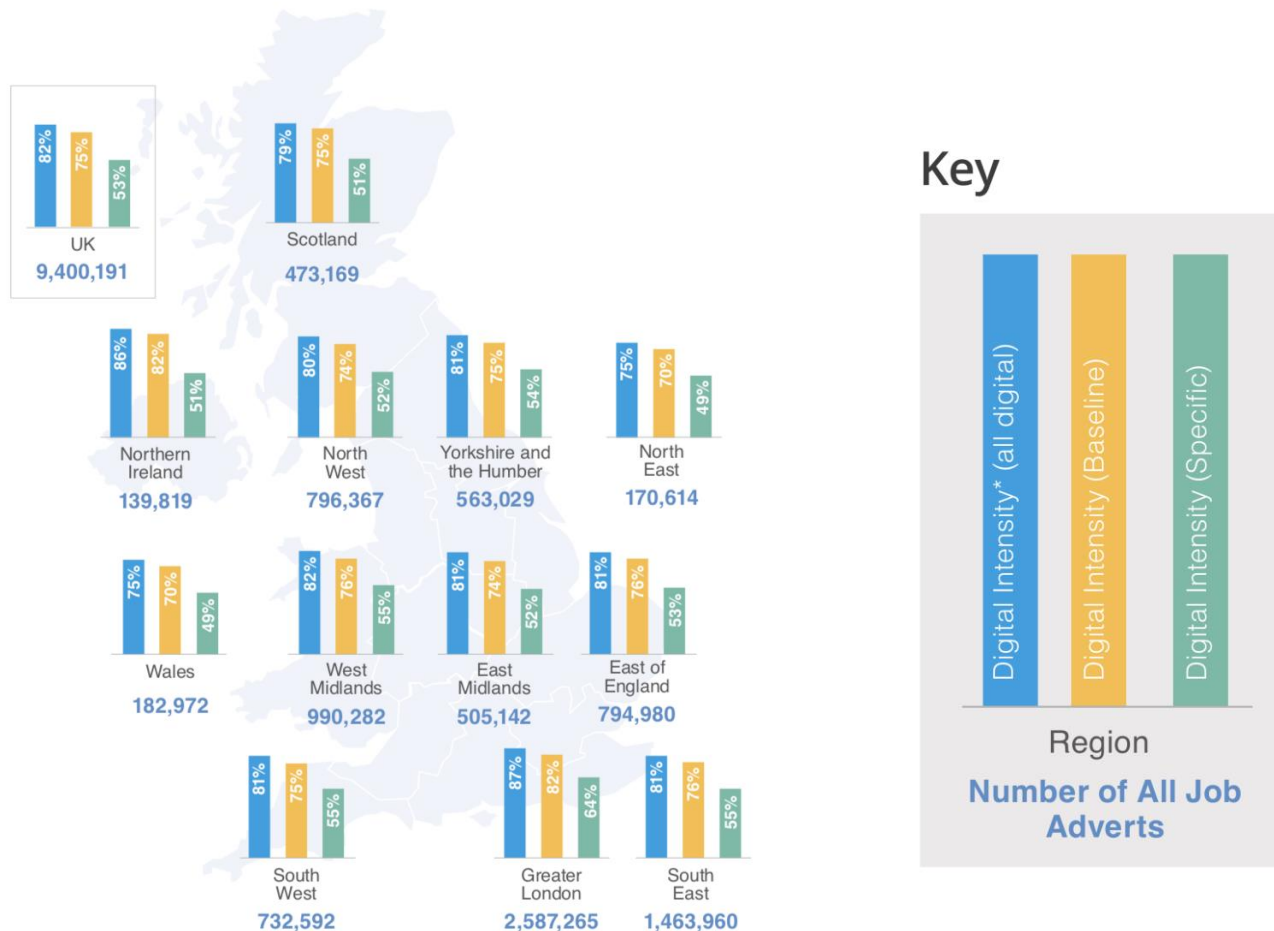
Digital Skills are “Not One Size Fits All”

- Productivity skills are more versatile and in greatest demand, but have lower salaries and growth.
- Data Analysts and Digital Marketing are more niche, but growing faster and pay more.

| Skill Cluster | Total Number of Job Adverts | Percentage Share of Digital Demand | Versatility | Average Salary p.a. | Projected Growth (5 years) |
|--|-----------------------------|------------------------------------|------------------|---------------------|----------------------------|
| Productivity Software | 5,616,911 | 80% | Very high (0.92) | £34,700 | Stable (+7%) |
| Programming | 4,109,656 | 58% | Low (0.29) | £54,900 | Stable (+4%) |
| Computer and Networking Support | 2,261,307 | 32% | Average (0.43) | £47,600 | Declining (-13%) |
| Data Analysis | 1,786,948 | 25% | High (0.64) | £52,300 | Fast (+33%) |
| Digital Marketing | 1,380,020 | 20% | Average (0.51) | £34,100 | Fast (+26%) |
| CRM | 1,204,558 | 17% | Very high (0.84) | £37,600 | Fast (+15%) |
| Manufacturing and Machining Technology | 762,376 | 11% | Average (0.35) | £38,600 | Stable (-8%) |
| Digital Design | 663,045 | 9% | Average (0.56) | £37,400 | Stable (-9%) |

Digital Skills Matter Everywhere

- In each region, 75%-87% of postings are for digital occupations



*Digital Intensity indicates the percentage share of job adverts in digital occupations within the total number of job adverts for a region / nation.

But, the Profile of Skill Differs Greatly

- In Greater London, the regional skills profile emphasizes data analysis
- In the West Midlands, advanced manufacturing skills are most critical
- In Northern Ireland, the skills profile is driven by baseline skills in administrative roles.

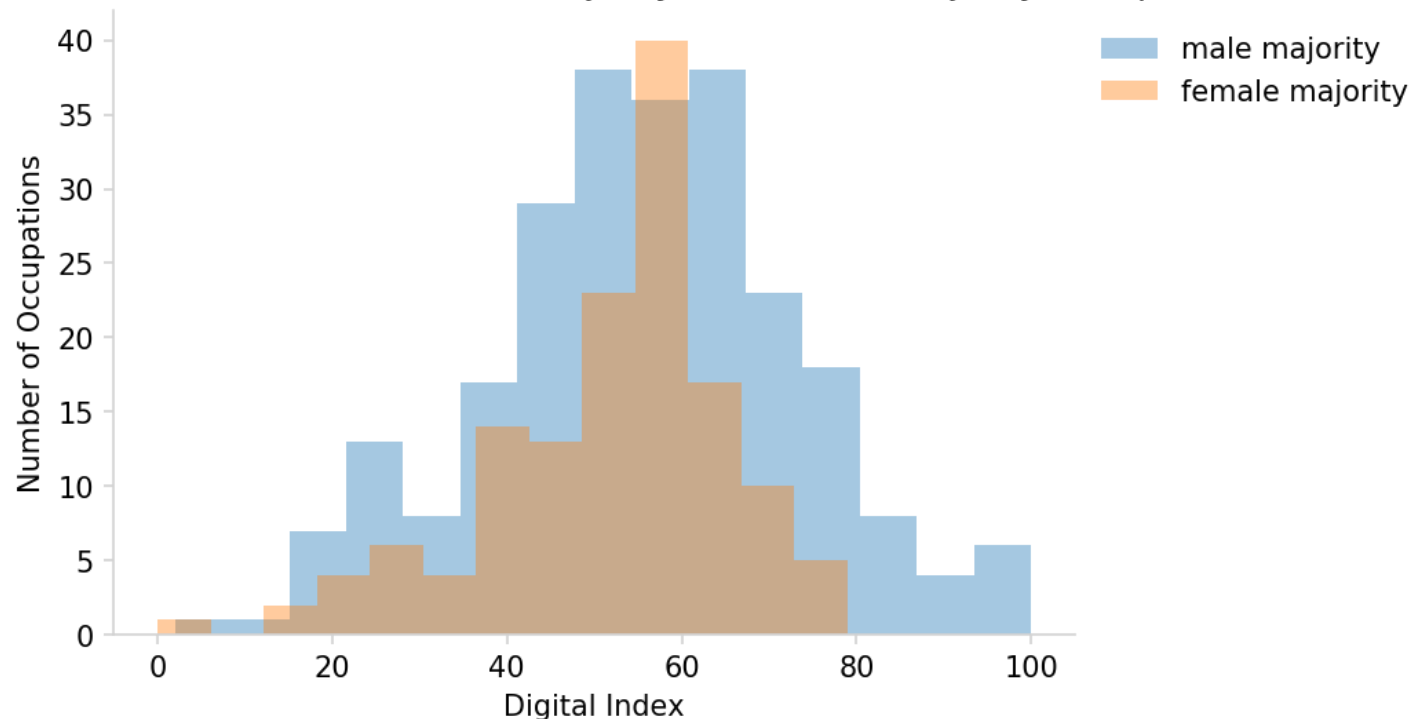
Figure 4: Digital Demand Concentration by Digital Skill Cluster and Region/ Nation*



Gender Profile of Digitization

- The most digitally intensive occupations (e.g. IT) and least digitally intensive (e.g. construction) tend to be majority male.
- Female majority occupations (e.g. secretarial) cluster at the center of the digital intensity distribution.

Digital Index Distributions for Male Majority and Female Majority Occupations



Tools and Information for Decision Making

Eight in ten online advertised job openings in the UK are for occupations that demand digital skills - clear and convincing evidence of how digital skills are not merely important, but central to the labour market.

- Detailed skill information for program planning
- Career ladders to show opportunities for progression
- Student and job seeker information (e.g. infographics)



Use Skill Information to Design Digital Curriculum

Key variables include level of demand, salary, versatility, projected growth.

Productivity Cluster Table 1: What are the most important skills in this cluster?

| Skill | Number of Job Adverts | Percentage Share within Cluster | Percentage Share of Digital Demand | Advertised Salary | Versatility | Projected Growth (5 years) |
|------------------------------------|-----------------------|---------------------------------|------------------------------------|-------------------|-------------------|----------------------------|
| Microsoft Excel | 810,239 | 14.4% | 11.5% | £31,300 | Very High 0.98 | Fast +23% |
| Microsoft Office | 463,117 | 8.2% | 6.6% | £29,800 | Very High 0.99 | Stable +3% |
| Microsoft PowerPoint | 185,619 | 3.3% | 2.6% | £34,300 | Very High 0.98 | Stable -5% |
| Microsoft Word | 175,513 | 3.1% | 2.5% | £27,900 | Very High 0.99 | Stable +2% |
| SAP | 164,034 | 2.9% | 2.3% | £39,200 | Very High 0.93 | Fast +24% |
| Oracle | 127,817 | 2.3% | 1.8% | £44,200 | High 0.71 | Declining -32% |
| Enterprise Resource Planning (ERP) | 101,257 | 1.8% | 1.4% | £47,600 | Very High 0.90 | Fast +25% |
| Spreadsheets | 100,349 | 1.8% | 1.4% | £28,400 | Very High 0.97 | Fast +47% |
| Microsoft Outlook | 54,712 | 1.0% | 0.8% | £27,100 | Very High 0.98 | Fast +12% |
| Microsoft SharePoint | 54,375 | 1.0% | 0.8% | £40,900 | High 0.78 | Declining -69% |

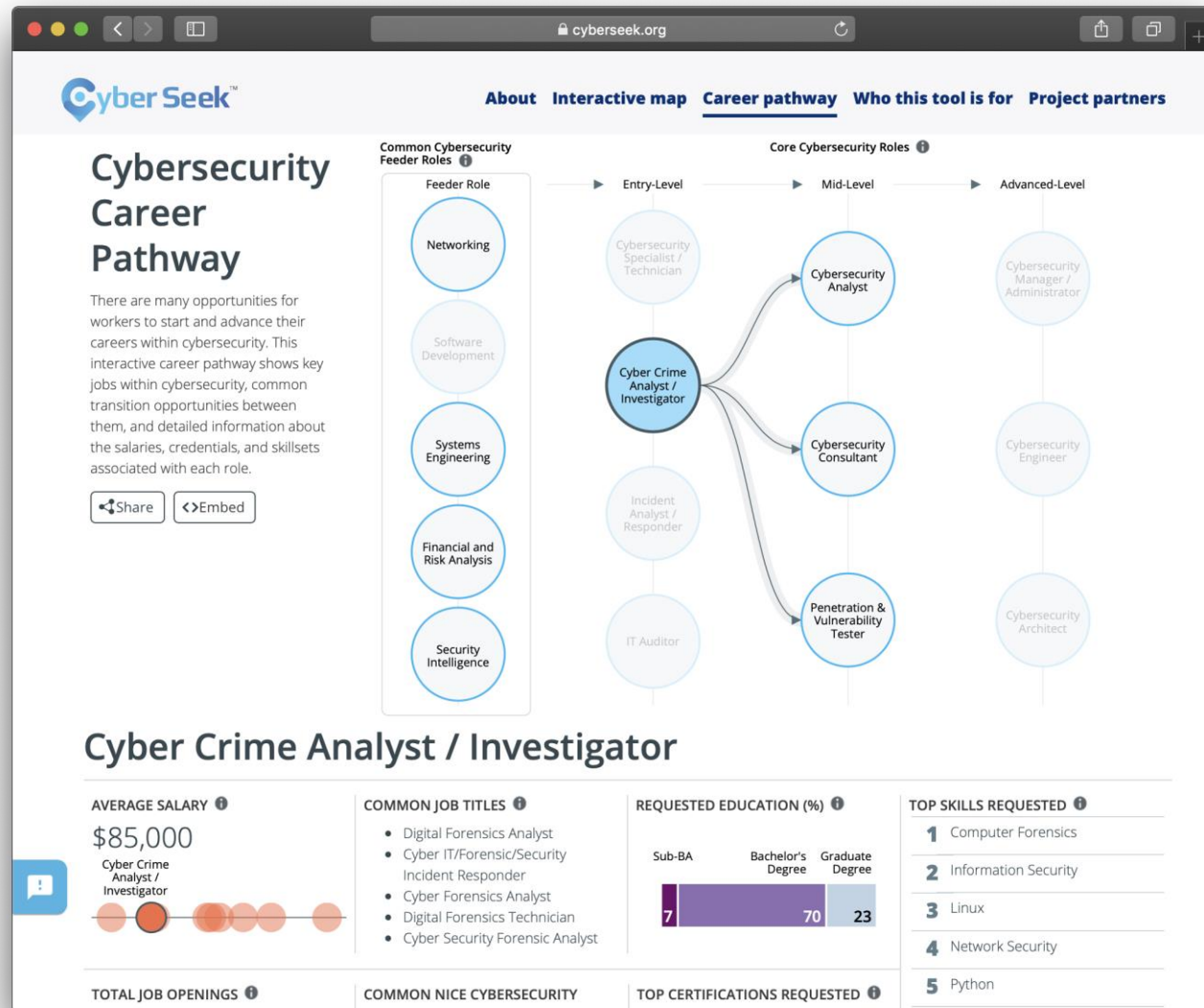
Use Skill Information to Design Digital Curriculum

Key variables include level of demand, salary, versatility, projected growth.

CRM Cluster Table 1: What are the most important skills in this cluster?

| Skill | Number of Job Adverts | Percentage Share within Cluster | Percentage Share of Digital Demand | Advertised Salary | Versatility | Projected Growth (5 years) |
|--|-----------------------|---------------------------------|------------------------------------|-------------------|-------------------|----------------------------|
| Customer Retention | 77,242 | 6.4% | 1.1% | £37,400 | Very High 0.98 | Stable +1% |
| Customer Relationship Management (CRM) | 51,143 | 4.2% | 0.7% | £31,800 | High 0.81 | Fast +31% |
| Salesforce | 27,235 | 2.3% | 0.4% | £41,900 | High 0.79 | Fast +37% |
| Customer Acquisition | 12,227 | 1.0% | 0.2% | £46,700 | Average 0.72 | Fast +26% |
| Account Development | 11,576 | 1.0% | 0.2% | £39,500 | Average 0.60 | Stable +9% |
| Consumer Behaviour | 3,775 | 0.3% | 0.1% | £47,400 | High 0.76 | Stable +1% |
| CRM Software | 2,688 | 0.2% | 0.04% | £36,900 | Average 0.67 | Fast +21% |
| Sales Database | 1,487 | 0.1% | 0.02% | £30,400 | Average 0.42 | Declining -16% |
| Account Consultations | 1,418 | 0.1% | 0.02% | £45,700 | Average 0.64 | - |
| Microsoft CRM | 1,224 | 0.1% | 0.02% | £43,000 | Average 0.49 | Declining -16% |

Highlight Progressions & Skill Gaps for Job Seekers



For young students: Highlight future opportunities

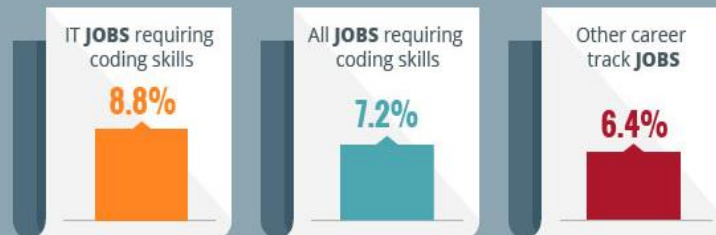
There were **6.8 million job openings** for roles requiring coding skills in the U.S. in 2015.

**CODING JOBS
ARE GROWING
FASTER**



Coding jobs are projected to grow faster than other jobs over the next 10 years.

PROJECTED 10-YEAR GROWTH



**CODING JOBS
PAY MORE**

Jobs requiring coding skills pay **\$22,000** more per year than other career track jobs.*

AVERAGE SALARY PER YEAR



Questions?

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