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**The
Guardian**

New faces of tech



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Introduction
Coco Khan



Want a futureproof career? It's time to get your tech on

Britain's tech sector is booming. Currently contributing £97bn to the UK GDP, and securing more investment than any other European country, Britain's digital economy is growing at twice the speed of the wider economy. Yet despite being a highly funded, growing sector there is a problem: a shortage of workers. Part of the problem is a widely held misconception that to work in the digital economy you must have a techy education and that the jobs available are the preserve of young men - usually wearing trainers, sporting beards and speaking in jargon.

But the growth of the sector has in turn created a growth in the types of jobs available. In this supplement, we'll be exploring the growth of the industry, the avenues available to people interested in joining the tech world, and meeting some of the diverse people behind the scenes. No matter where you are in your working life, there may be a job for you in the booming tech sector. And there's never been a better time to join.

'No matter where you are in your working life, there may be a job for you in the tech sector - there's never been a better time to join'

Boot camp
Could you become a coder in nine weeks?

Tech boot camps promise to take you from rookie to pro in just nine weeks, but do they deliver?

Zofia Niemtus

When you're changing career, it makes sense to look for an industry that's growing - which right now makes learning to code an obvious choice. Programming is no longer the preserve of lifelong technophiles; coding "boot camps" are popping up across the globe, promising to take beginners to employability in a few months. They are intense and immersive, typically lasting between six and 16 weeks. The cost varies enormously, from nothing to somewhere in the region of £16,000. But do they work? Clarissa Boys, founder of web



◀ Coding bootcamps typically last between six and 16 weeks
PHOTOGRAPH: GETTY IMAGES

design company Mouse Code, came to coding from public relations. Her love of computing was kindled when she was put in charge of managing her company's website rebrand,

and she found herself hounding the developer with questions. She decided to take a web design course, and carried on studying with "addictive" free online tutorials in the evenings. After two years, she quit her job and applied for Le Wagon's nine-week coding bootcamp in London.

"It was the toughest but the most rewarding challenge I've undertaken," she says. "You can't lose concentration for a moment because there is a new topic every day. Long, long hours are the norm as it's important to thoroughly review the day's work each evening." The course combines teaching

with project work, where teams build their own apps to present at graduation. The ups and downs were huge, says Boys, but the social element kept her going.

"Everyone was friendly and willing to help, it was a real community," she says. "And that has been invaluable since leaving as well. A few of my early clients came through this network, which was fantastic when I was first starting out alone."

"This time two years ago I was finishing the course and about to start my first project and I have been busy designing and developing for my clients ever since."

Adiba Maduegbuna took a more traditional route to her tech role; she is an android engineer at ASOS and a mentor at Witty Careers, a project to get more BAME women into tech careers. She focused on Stem subjects at A-level, she explains, before graduating from UCL in 2013 with a degree in computer science. Even so, she explains, she had blind spots when it came to coding.

"I still had to find my own path to being an app developer," she says. "On my degree we did do a bit of coding, but that doesn't prepare you for a career as a coder. So there is a gap between when you graduate and you're looking for a job."

She decided to take an internship during the summer of her second year, which enabled her to get up to speed with professional-level coding. She built an app for her dissertation, and then entered

'Coding bootcamp was the toughest but the most rewarding challenge I've undertaken'

Clarissa Boys
Founder, Mouse Code

a graduate program on mobile development. So how does she feel her experience compares to the bootcamp fast track?

"People are really intrigued by these different bootcamps," she says. "But a bootcamp is not a degree. Even though you get taught all sorts of things in those weeks, you can't really compare it to someone who has experience at university and some side projects."

Ultimately, she says, however you learn to code, it's wise to find an area that you're interested in and "build some sort of software solution around that."

"Come up with a prototype, so that passion is reflected," she says. Chris Meah also came from a traditional tech background; he finished his PhD in computing last year and decided to set up his own bootcamp, School of Code. But he's adamant about moving away from the usual model.

"There are a couple of problems that I have with them," he says. "One is that it's a lot of money. You're paying upfront and not earning for four months. If you can afford that, you're doing well, and you probably don't need much help."

"The second part is the prerequisites. It's harder to get into some bootcamps than to Harvard. You do a lot of online courses in advance, at home, on your own. You've already proven that you're motivated, so these bootcamps are really just finishing schools."

Instead, School of Code takes people with no previous tech experience, and aims to get them tech jobs after 16 weeks. The first cohort of 19 students graduated earlier this year, coming from "a massive array of backgrounds". The group included a baker, a warehouse worker, a returning-to-work mother, a refugee, a musician and a personal trainer; about three-quarters of them had never seen a line of code before, and all found it a "really hard slog". But they all completed the course and 95% of them are now in tech jobs. Meah is proud to be bringing different voices to the tech industry and emphasises the rewards of group diversity.

"It is a really intense process, but when you're with people who aren't like you, you learn soft skills like teamwork and communication and you can drop into any team," he says. "If you've just been through university with people who think and act like you and are your age, you can really only work with people like you. The diversity of the course prepares them really well."

With many future jobs expected to rely on coding skills, it is little surprise to see that education ministries across the world are beginning to push school to start teaching children how to code from a young age.

Within the EU, the UK stands out as one of the 15 countries that has embedded coding in secondary schools. The researchers tracking the curriculum rollout identify two simple statistics as prompting the move. Not only do 90% of jobs require IT skills today, by 2020 there will be a predicted skills shortfall representing 800,000 skilled IT jobs across the EU.

There are many organisations trying to bring this message home to girls at school. According to the latest UK government figures, just 17% of tech employees are female. The Women In IT group believes much of this is due to stereotyping that can make the coding and computer programming industry appear to be the preserve of boys. But if the message that coding is for everyone, not just for boys, can be conveyed successfully, today's children will be better placed to prosper in the AI-equipped world of the future.



skilled programmers that they have launched their own Institute of Coding.

Its message is that everyday people can learn to programme computers and smart devices. This is not a job for "IT geeks" and it does not lead to endless shifts typing odd-looking numbers and letters and brackets into a keyboard.

Instead the career is promoted as being more about critical thinking

and solving problems, which are skills that can open up a multitude of career paths to helping self-driving cars revolutionise global transportation.

The work can be rewarding but so can the pay. Programmers earn an average of £52,500 across the UK and more typically an average of £72,500 in London. Contractors, who work without the security of a full-time job, can expect around £93,000.

PHOTOGRAPH: GETTY IMAGES

Rise of the machines:
why coding is the skill you have to learn

With job losses to AI in the coming decades predicted in the millions, coding is one skill that looks futureproof

Sean Hargrave

Code is the language of the modern world. Whether it's the app that brings emails to a mobile or the car that knows how many miles to go until refuelling. Any smart device needs code instructions to tell it how to operate and communicate with the outside world.

This modern language is so central to business life that the common mantra around technology experts is that today's children will need to learn to code "or get coded". It is not just hyperbole. AI-powered robots and programs are on course to be so sophisticated that as many as 400m to 800m jobs are predicted to be lost to the technology by 2030.

With such a dire warning over future job prospects, it is not a great surprise to hear that more workers are deciding to do the coding, rather than get coded. Today, there are 23 million coders in the world and that number will reach almost 28 million within five years time.

Even so, one in two UK-based digital businesses have been so frustrated by the struggle to recruit

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So long, London

Why it's all starting up outside the capital

Across the UK, startups are thriving in major hubs outside of the M25

David Hillier

The UK's tech startup culture is thriving. According to analysis by the accounting and audit firm RSM, the UK saw a record 10,016 startups launching in 2017. This equals a 59% increase in new companies that specialise in programming or software development. But one of the survey's most revealing aspects was about the geographical spread of these new businesses. London, where Shoreditch's Silicon Roundabout has long been considered UK tech's spiritual centre, saw a 76% increase. But there's been a surge all over the country: 78% in the North East (to 173); 77% in Scotland (490); 40% (503) in the South West.

Put simply, a "startup" is any company that is just starting. Generally, it's attributed to tech companies no more than five years old, with a purpose that's not set in stone. People also talk about startups in terms of workplace culture, often conceived as a haven for bearded urbanite software developers in their 20s. But these stereotypes - while certainly not without precedent - do the tech startup culture a disservice. According to the UK-wide tech programme and initiative Tech Nation, the UK's digital tech sector is worth nearly £184bn, and startups provide a vital pipeline for this.

The traditional home for UK startups has been the capital. London gathered momentum as a tech hub in 2010 when, in the build-up to the London Olympics, then-prime minister David Cameron announced that the coalition government wanted to join Stratford's Olympic Park with Shoreditch to recreate a less sun-blessed version of California's Silicon Valley. Silicon Roundabout was born. Since then, the costs of running a business in London have only increased, and this trend shows no

sign of slowing - office rental costs are set to rise by 11.4% over the next three years - so tech startups are increasingly looking for a base outside of London. They are being aided by the establishment of business communities and co-workspaces across the country, where a "collaboration not competition" ethos has flourished. With city universities providing a steady stream of new talent, and many skilled workers realising that London is as much a drain on the brain as the wallet, the regional tech scene is thriving.

Gapsquare, Bristol

In 2012, George Osborne launched the Enterprise Zone in Bristol. Its raison d'être was to provide a hub for the digital, tech, and creative sectors, and stimulate growth in the region. Gapsquare is housed in Engine Shed, a tech incubator, and has signed 150 companies to its cloud-based program, which helps clients close their gender pay gap.

While CEO and co-founder Zara Nanu admits there is a kudos for investors being based in London, she sees Bristol as "small yet big".

"I think it's easier to find talent, it's easier to find each other and it's more collaborative. As a female running a socially minded company, the reason we've been able to achieve as much is because we're in Bristol."

Okra Technologies, Cambridge

Cambridge has a long and illustrious history with science and tech: from legendary alumni, including Charles Darwin and Alan Turing, to the Cambridge Science Park, the city's reputation in the sector has seen giants such as Apple, Microsoft and Amazon encouraged to move to the so-called Silicon Fen.

For Loubna Bouarfa, CEO of healthcare tech startup Okra Technologies, it's an inspiring place to work: "It has the student communities and a strong investor network - almost every VC has a representative here in Cambridge. It's a city where you can make your dreams a reality." Add in a short 45-minute commute from King's Cross, and it's the perfect city for the tech startup with lofty aspirations.

Mercato, Manchester

Sean Brown's life as a CEO began in London as the founder of Hatch. His new e-store platform, Mercato, started in 2017 and is based in UKFast's Fast Forward incubator. He cites a major difference between the two cities' working cultures: "In London, the cost of living is so expensive that people have to expend their time and focus on a day job to pay the bills. In Manchester their focus is on the business."

He acknowledges that they can't compete with London wages, but credits this with forcing them to



I think the reason we've been able to achieve as much is because we're in Bristol'

Zara Nanu
CEO, Gapsquare

▲ The Engine Shed has become a central hub for Bristol's thriving tech startup scene

develop a progressive company culture. "You have to find other ways of making yourself attractive," says Brown. "We're a better company because of it."

Employ, Birmingham

Based in Innovation Birmingham, a campus for the digital and tech communities, Employ is an e-learning platform that helps young people develop entrepreneurial skills. Employ operations director Sallie Adams says a major milestone was moving their development closer to home: "We were originally working with a team in India, then we started accessing the Birmingham tech industry. Having access to affordable software development, while having face-to-face interaction, made a real difference." Birmingham's status as the original 5G testbed also gives the city serious tech gravitas.

Float, Edinburgh

"The weather does put a lot of people off Edinburgh. But when the sun comes out there's no better place in the world," says Colin Hewitt of Float, which designs cashflow forecasting software and was recently named one of the 20 fintech ones to watch by the government-backed Tech Nation.

Hewitt says that being able to get his team in the same space around a whiteboard has been absolutely crucial to their development, and that London office rates alone would more than likely have forced them to work remotely.

According to Hewitt, the pipelines to the city's famous university are also key to developing the business and transforming Edinburgh's into a 21st-century tech hub: "We need new software developers here and the university brings quality people to the city."

Experience

'It's a caring environment': how codebar is building a diverse tech community

Non-profits are changing the sector with a new approach to teaching code

David Hillier

A da Lovelace is widely regarded as the "original" computer programmer. Nearly a century before Konrad Zuse built the world's first programmable machine in his parent's living room in 1938, Lovelace wrote the program for a computer called the Analytical Engine. The estranged daughter of poet Lord Byron, Lovelace referred to her work as "poetical science"; the fusing of logic and creativity.

More than 160 years after her death, keen coders huddle around the sofas and breakout areas of Brighton workspace PLATF9RM. They are here for codebar: a non-profit organisation that runs free programming workshops for underrepresented groups in tech. They're attempting to diversify a sector that, according to last year's Diversity Report, hires just 17% women and 17% BAME employees in the UK.

Inside, there's a gentle purr of activity as the group of 12 mostly female students in their early-to-late 20s are aided by the 12 coaches who have come along on a balmy August evening. It's a low turnout, according to organiser Cassie Evans, and they normally aim for two coders per coach. Those in attendance attack the free Pizza Express provided with quiet gusto, before settling in for an evening in front of their screens.

"I used to go to tech events and

guys would hit on you. You'd be like: 'Really?' But also think it was just standard," she says. "But there was also the feeling that - as a woman - people perceived you as a designer rather than a developer."

Her feelings bear out, with an estimated 11% of the developer workforce being female. Like Lovelace many years before, most of codebar's attendees have dual logical and creative minds: Evans used to be a photographer but was drawn to coding because "you just keep learning"; Freya Nash and Mariam Saeedi, both 25, come from psychology backgrounds but love the apparently infinite creative potential of code; Lydia Wosniak, 22, is an architecture graduate who's moving to London to start a developmental role with the BBC.

All are now employed in development roles and praise codebar's crucial role in this, with the focus repeatedly coming back to community. "It's not competitive here," says Saeedi. "It's very chill. You're able to experiment and make new friends."

"I think the diversity makes it much less intimidating," says Alice Boyd-Leslie, 27. "Everyone gets really excited when a regular gets a job. It's a comfortable, caring environment."

Founded in London in 2013, codebar now has groups all over the world, including Accra, Sydney and Helsinki. The Brighton chapter was the second, and has taught more than 800 students (many of whom go on to become coaches).

Its popularity in Brighton is perhaps unsurprising: the Green-voting city is famous for its liberal attitude and embrace of diversity. It also has a thriving tech and digital scene - with a 2017 turnover of £574m, according to Tech Nation -



▲ Architecture graduate Lydia Wosniak switched to coding and is now a developer at the BBC
PHOTOGRAPH: CHARLIE FORGHAM-BAILEY

◀ Alice Boyd Leslie: 'Diversity makes it much less intimidating'
PHOTOGRAPH: CHARLIE FORGHAM-BAILEY

and is part of the so-called Silicon Beach stretch of southern coastal cities that are utilising huge student populations (Brighton, for instance, is home to approximately 21,000 alone) and lower commercial rates to be a valid alternative to London for tech companies.

Central to this are support organisations such as Wired Sussex, Brighton Digital Catapult and Brighton Digital Festival, the latter of which celebrates the city's digital and startup culture and welcomed an audience of more than 60,000 in 2016 across its month-long programme of events.

They're all helping to nurture a local tech ecosystem that is very much looking to challenge the "white guy" hegemony of developers and founders - and for some, codebar can be a vital access point into the wider industry.

"We're like a happy little cult," says Evans with a smile, as she heads back to her computer. The flame of Lady Lovelace still burns bright.

Fintech: are you ready to get on board for the boom?

The UK's financial tech sector is about to break through in a big way - meaning it's the perfect time to find a role

Heidi Scrimgeour

Everyone's talking about the UK's fintech sector. A portmanteau of financial technology, fintech can be found everywhere - from your banking app to internet payment and credit scoring systems.

But fintech is more than just the convergence of the technology and finance sectors. It also refers to the ways technology is impacting the services and infrastructure that define the financial sector.

Fintech is attracting attention because of the significant sums being invested in the sector. During the first half of this year, global fintech investment reached a record high of \$57bn, and the UK attracted more of that investment (\$16bn) than the US or the rest of Europe combined. How such investment translates to actual returns is unknown, but the big money is betting on the success of fintech globally.

"Fintech is at the very start of an amazing 20-year cycle," says Nick Cowan, CEO of the Gibraltar Blockchain Exchange, who likens its significance to the impact of the advent of the internet in the 1990s.

Yet many students considering their career options rule out the financial technology sector, according to Daniel Kiernan, careers consultant for the International Capital Market Association Centre at Henley Business School.

"Three common assumptions students make about careers in fintech are that it's only open to students with qualifications in tech or finance; that working for a fintech means joining a startup; and, that fintech is a sector in its own right," he says.

In fact, there are many different career paths open to those interested in working in fintech without a background in finance or technology, and many sub-sectors to work in, from insurance and



▲ Innovations such as mobile payments have recently emerged from the fintech sector
PHOTOGRAPH: GETTY IMAGES

investment to wealth management and regulation.

"Fintechs are businesses like any other, so they need everyone from operations managers and customer service teams to salespeople and marketers," he says.

To those put off fintech by the thought of starting their career in a high-risk startup, Kiernan points out that many fintech businesses have already progressed to become small and medium-sized enterprises. "The big financial services incumbents all have departments looking at fintech concepts or working with fintechs, so startups certainly aren't the only route to a career in fintech."

Cowan says that he believes the fintech sector to be "incredibly vibrant" and on course to become even more so. "It's an incredibly exciting opportunity, especially for anyone interested in change and inclusion," he says. "This is the perfect time to get involved."

10,016

Number of startups launched in the UK in 2017

SOURCE: RSM

£184bn

Total value of the UK's tech sector in 2017

SOURCE: TECH NATION

'We want to give a career in tech an image overhaul'

Holly Rostill, senior associate in cybersecurity at PwC, is enthusiastic about its ambition to get more women to take on jobs like hers



It's a tough time for businesses. According to a survey by PwC, 69% of UK CEOs believe emerging technologies will disrupt their businesses in the next five years. But it's not all doom and gloom - Holly Rostill, senior associate in cybersecurity at PwC, believes the situation can be seen as an opportunity: "The world is changing. Technology is such a massive disruptor that making it our main offering would be a huge success for us."

Rostill says PwC has traditionally been seen as a tax and audit firm, but points out that now "every single thing that we do, be it a cybersecurity review, consulting on sustainability or auditing, is integrated with technology."

"For me, it's about how we solve important problems and help society. It's about using our position and influence to make things better."

Rostill is also actively involved in encouraging more women to consider a career in tech. While 38% of UK CEOs - according to the same survey - find it difficult to attract the right kind of digital talent, initiatives such as the Tech She Can Charter aim to improve the gender balance in technology roles by taking coordinated action to improve the pipeline of females looking to pursue a career in technology.

One of the aims of the charter is to share best practice in attracting more women to the tech industry through work experience. Sarah Martin, a Spanish and business student, says she hadn't considered a career in tech until she spoke to a recruiter. "She said that if I wasn't sure what I wanted to do I should try tech, because knowing another language can help with learning coding languages. She suggested that I do some research to see if I liked it."

Having completed PwC's Tech Academy earlier this year, Martin is now planning to apply for jobs in cybersecurity and computer forensics. But Rostill points to PwC's Women in Tech: time to close the gender gap survey - in which just 27% of female students responded that they would consider a career in technology (compared with 61% of males) - as proof that more still needs to be done to make the industry attractive for women.

However, she is positive about the changes that are happening. "It's a great time to be a woman in tech, because women are really supporting each other. When we started, there were just a few of us working out how to get more women into tech. Initially, 18 companies signed up [to the Tech She Can Charter] but now we're

'I've met so many female role models during my career'



up to 76. I've met so many role models thanks to the charter."

While the charter addresses the need to attract more women into tech careers, businesses are looking at the changes they can make to retain and promote talent from within. Rostill mentions PwC's flexible working and "dress for your day" policies, both of which are in place to help staff make the most of their work-life balance.

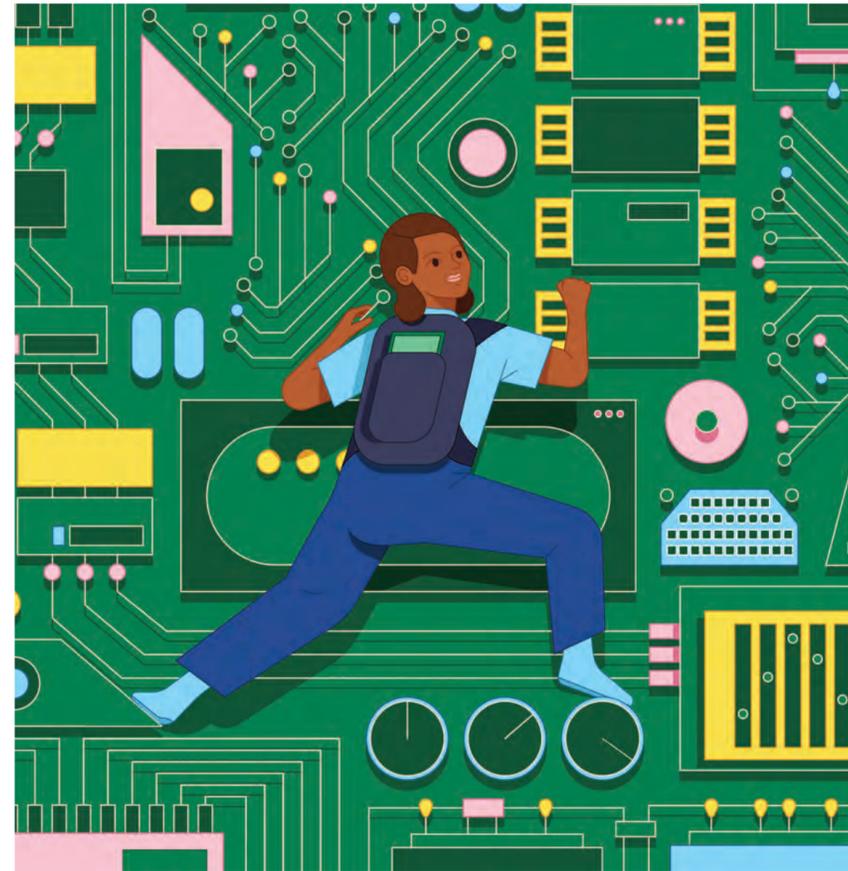
But lifestyle is not the only draw. "For me, it's about innovation," she says. "I'm doing research at the moment that's not directly making revenue, but the fact that we are supporting innovation for our people, I think, is so attractive."

This is the spirit of PwC's "Frontier". A space that Rostill describes as the opposite of what you'd expect a tech space to be, Frontier's aim is to create a physical environment that promotes collaboration and innovation. PwC's experience centre is based there, along with the teams who work on technologies such as blockchain, artificial intelligence, virtual reality and drones, which PwC is already moving out of the lab and into real-life scenarios with its clients.

"We want to give a career in tech an image overhaul," says Rostill. "I want people like me to think: 'I could do this.'"

To find out more about careers at PwC, visit pwc.co.uk/careers

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◀ Tech degree apprenticeships offer a degree while earning and building valuable experience in the workplace

ILLUSTRATION: KIKI LJUNG / FOLIO ART

Bridging the gender divide

The industry needs more women in technical roles - and degree apprenticeships may be the answer

Sean Hargrave

It is not surprising schoolgirls may not always see tech as a viable career path. Recent research by the British Computer Society and the Tech Talent Charter found that just 17% of tech jobs are held by women.

With a shortage of female role models in tech, apprenticeship schemes are having to work hard to show that tech is not an all-boys club, and that university is not the only way in.

Ellie Ulrich, apprenticeship manager at Cisco, reveals the company has managed to achieve an equal gender balance in its degree apprenticeship scheme through working with schoolchildren before they decide on further education or their future career path.

"You have to reach out and put the work in to encourage interest so you get a pipeline of talent coming through," she says. "It's also crucial you don't just look at people with tech qualifications. We look for enthusiasm, commitment and potential; we can train the technical skills."

Reaching out through events and social media certainly attracted Yasmine Rasselkaf to enter the profession. She is two thirds of the way through a three-year degree Cisco apprenticeship scheme and reveals gaining a degree without amassing student debt was a deciding factor.

"I was interested in tech and so found out about the scheme I'm on through a careers event, which I discovered through Googling and using social media," she says.

"One of the best aspects for me has been that you study part time, alongside your job, for three years and you get a degree. Unlike someone leaving university at the same age, though, you've got three years of work experience behind you."

I would definitely say girls shouldn't listen to anyone who says tech is not a career for them'

Kirstie Wilkins
Degree apprentice

Kirstie Wilkins was similarly attracted to gaining a degree while earning and training. "I would definitely say schoolgirls shouldn't listen to anyone who says it's not a career for girls," she insists.

"The first day I started there were three of us on the scheme - all young women. You've just got to be determined and go for it. I've only had a positive experience. Everyone has been so supportive."

To take the first steps into tech, many young women will find they face the catch-22 common to those hoping to enter the workforce in a wide variety of sectors - and it is the same one Shajida Akthar encountered three years ago. Employers are looking for people with experience, but such experience can only be acquired on the job - so how does one get the job in the first instance?

She got her break through the government's Movement to Work programme, which is supported by many technology companies offering work experience in order for pupils to get taste of a career in tech and improve their CVs. For Shajida getting a foot in the door was crucial to earning her apprenticeship degree at Accenture, but so too would have been hearing more from women role models in tech.

"I didn't have any role models when I was at school, so I now help out as an ambassador talking to schoolchildren about technology," she says. "It's so important, particularly for girls, to hear from women who are enjoying successful careers in technology."

Comment
Nuala Murphy



'The secret to tech success as a woman: you've got to lean in'

I've always loved technology, and that only grew when I transitioned into the health sector and saw the impact it can have on improving care. My own personal journey in life is very closely connected to the development of Moment Health. It feels like a natural convergence of my experience in building communities and responding to challenges, and my love of technology.

I was very lucky - I had excellent healthcare support during my pregnancies. But I realised, after spending many nights online while feeding my baby at 3am, that there was nowhere for people to talk openly about the challenges of parenting without fear of judgement from virtual strangers.

I set about trying to bridge that gap, and Moment Health emerged. It's a free app - developed with the help of clinicians and medical professionals - that uses evidence-based screening tools to support maternal mental health. The app includes a survey to detect signs and symptoms of depression and anxiety, and a locator tool for accessing relevant maternal mental health resources and services. This enables early detection and treatment, which has been shown to prevent the onset of mental illness.

It's a huge challenge leading a company in new territory, tackling issues that people don't talk about. Finance is a big issue - why did I think I'd be part of the 2% of female-led startups that successfully raise finance?

I get frustrated explaining that we're trying to support women facing mental health problems during and after pregnancy. But I'm determined to keep focusing on the people we're helping and the problems our technology is solving. I'm looking for supportive investment partners, particularly around the launch of our workplace offering.

I'm passionate about tech as a space for women because it's such an enabler. The world's crying out for more diverse teams to build better solutions to the problems we

all face. Female consumers are responsible for 80% of spend, so we need more women building the products women want.

One of the biggest challenges facing women in tech is access to networks and mentorships, which is why I started Lean In Belfast. It was all about timing. When I was pregnant with my first child, I remember feeling ashamed and wondering what was wrong with me because I wanted to keep working. Then I started reading Sheryl Sandberg's book, *Lean In: Women, Work and the Will to Lead*, and I had this lightbulb moment - what I was feeling was a global issue.

I reached out to other women so we could support each other to achieve our goals. We were in stealth mode for the first year but had almost 800 members in our second year, then one of the largest employers in Northern Ireland came on board.

Now we have over 1,500 members, but I'd love to help support women across the whole of the UK and Ireland.

Why should you consider a career in tech? Because it offers more opportunities to work in a valuable or meaningful capacity than many other sectors. Don't be daunted by other people's achievements. The so-called overnight successes we read about take, on average, five years to achieve. To succeed in a career in tech, be bold and reach out to the people you admire. They'll welcome it. Create your own definition of what career success looks like. And above all, lean in.

Nuala Murphy is the founder and CEO of Moment Health. As told to Heidi Scrimgeour

Never too late

Life skills and experience why the tech industry needs mature workers

For workers over 50, the sector is not just a viable option, but a place where their skills will be in demand

Sean Hargrave

Government figures predict that by 2020 nearly one in three, or 30%, of workers will be aged 50 or over. This means retraining is almost certainly going to be required, if skills acquired decades ago are going to be refreshed so people have the chance to change direction and have a second or third career.

Rather than see this as an obstacle, Debbie Forster believes that, along with attracting a more gender-balanced intake of school and university leavers, the tech industry will find retraining people midway through their careers can fill the current skills gap. Forster is CEO of the Tech Talent Charter, a not-for-profit organisation that encourages tech companies to share best practice on achieving a gender and age-balanced approach to recruitment.

“Employers need to be open to hiring both women and men who

are returning to work after career breaks, as well as existing workers of any age who want a second or even a third career,” she says.

Forster makes the point that gender and age diversity in a tech team makes economic sense. According to Harvard Business Review, companies with a diverse workforce are 45% as likely to improve market share and 70% more likely to be successful in capturing new markets.

“If you can help ‘tech up’ these people, you won’t just have people with great tech skills, you’ll have people with wider work and life experience that they can put to work for your company.”

Jenny Pattinson is a case in point. When she was advising FTSE 100 clients on tax issues and contracts as a high-flyer in the city, she never dreamed of a career in tech. That was until her husband became ill and later went blind. The long hours

“There are so many women with so much to offer, but have put their careers on hold to raise families”

Jenny Pattinson
Centrica

▼ Mature workers bring wider life experience to the workplace
PHOTOGRAPH: STOCKSY UNITED

of such a senior role were only going to get more demanding, so she decided to change career.

Due to her husband having served in the Royal Navy she qualified for the Amazon Web Services ReStart scheme. It offers former services personnel - and their partners - training in tech and help finding a job.

Pattinson completed the four-week course, which led to a trainee role working in development operations for Centrica’s Hive remote central heating system. She has now risen to security risk and governance manager.

“I loved computers as a child, but did humanities subjects at school and university, so I think I’m proof you can retrain and learn new skills,” she says.

“There are so many women who have so much to offer, but have put their careers on hold to raise families or support spouses.”

Many women seeking a new direction to their career after maternity leave will empathise with Barbara Clarkson. Her South African qualifications were not valid in the UK and so she worked at charities while raising a young family. Online research led her to the Supermums programme, run by software company Salesforce, in partnership with Economic Change - an organisation devoted to helping charities get more out of tech.

“I was at home, bored on maternity leave and just knew I could do more in my career, so training up for a role in IT was really appealing,” she says.

“It took six months of part-time study, but I ended up actually getting a job at Economic Change, the charity behind the scheme. I’m now advising charities across the country on how to set up and customise their customer relationship management software,” adds Clarkson. “It’s a totally new direction I wouldn’t have previously thought possible.”



Experience ‘The best programmers are all self-taught’

Leon Brown didn’t let dyslexia stop him from learning to code. Now, he is inspiring others with his experience

Interview by Mark Smith

My first coding breakthrough came as a result of a Christmas present in the 1990s - an Amstrad computer. Initially used for games, it was one of my parent’s friends who suggested the idea of making games instead of playing them. Intended to persuade me to learn something, this comment was the catalyst for my career.

With no budget to purchase books or equipment, it was through tutorials in Amstrad Action magazine and library books that

I developed an understanding of programming, which provided a natural route for me to learn maths. It was this breakthrough that elevated me from low achiever to average at school.

When I found a part-time job outside of school hours I was able to save for a computer upgrade that enabled easy internet access. The combination of accessing tutorials and speaking to knowledgeable people through online forums proved that the internet was the ultimate space for learning.

Without any help available from family, careers advice was limited to the grapevine. Despite what I was told, a degree was never a requirement for my ambitions - it turns out the best programmers are all self-taught!

Persuaded to choose the university route, I discovered that their approach to teaching software engineering was a distraction from the progress I was already making. Not least because the majority

“My poor experience at university inspired me to help other people facing similar challenges”

Leon Brown
Software developer

▲ Leon Brown is now a developer in demand
PHOTOGRAPH: SHAW AND SHAW

of lectures relied on explaining advanced concepts using jargon and maths, which made it more difficult to learn due to my dyslexia. Persevering, I graduated using all of the knowledge I had gained before and outside of university. It was this poor experience that inspired me to help other people facing similar challenges.

One of university’s few benefits was access to their work experience service. My persistence in contacting them almost every day for two weeks led to me being the replacement for a student who didn’t turn up for an IT project. This opportunity led to high praise from the firm and a career-long contact who provided extensive career advice. From technical skills and training delivery to understanding business, every job and freelance project I’ve worked on has offered opportunities to learn something new. This constant addition of skills has enabled me to become highly sought after by companies willing to pay a premium for my services.

Having found the learning approach that works best for me, I’ve been able to teach myself the skills that teachers and lecturers were unable to. With many people experiencing similar difficulties, I recognised this as an opportunity to create education content to teach people how to understand maths and computer science using actions and stories that helped me.

Why a great mentor can do wonders for your tech career

Entering a new profession can be daunting, so finding a tech mentor to offer guidance is invaluable

Abby Young-Powell

If you’re starting out in tech you’ll want a good mentor. The benefits are numerous; mentors can provide advice and support, boost your confidence, and work with you to set goals. Plus, if you’re a woman, are BAME, or live outside London, they can be particularly useful in an industry that is not always strong on diversity. “I have many mentors and I heavily rely on them,” says Laura Chung, board member at DevelopHer. “I call them my ‘league of legends.”

So how can you find a good mentoring “league” of your own? There are many structured programmes to match people with mentors in tech. Stemettes has recently set up a scheme for young women. Other programmes are run by Structur3dpeople, Girls in Tech and Freeformers. You can also find a mentor less formally, by asking peers or colleagues to recommend somebody, or approaching them directly on social media.

The first step, though, is to work out what you want help with in order to find the right person. “You need to understand what you want a mentor for,” says Chung. “Work out what your personal challenge is and then you will have a clearer idea of what you are looking for.”

Once you’ve done that, you’ll need to go away and do your homework, says Rav Bumbra, director of Structur3dpeople. “Look at people’s credentials,” she says. “Have they mentored before? What do they do in the industry? How active are they in this space?”

A common mistake is to go for the

most senior person in a company, Chung says, when someone less senior may have more time and be a better fit. Another is to look for someone just like you, says Yasmin Iohdi, programme manager at Stemettes. You want someone different who can challenge you, she says, you’re not looking to become their “mini me”.

So what makes a good mentor? There’s no magical formula - it’s about finding someone who is a good fit with you and provides the kind of support you’re after. “There’s got to be some form of chemistry,” says Cathy White, founder of CEW Communications. “You need to be able to talk openly with that person: it’s a bit like dating.”

Bumbra says it’s important to find someone positive, who is a good communicator and listener, while Chung says transparency and empathy are the most important characteristics for her. It’s also a good idea to look for someone who’s well networked, says Anne-Marie Imafidon, chief executive of Stemettes. “Someone who looks like they know people,” she says.

When you’ve done your research and know who you want, contact

“It’s important to find someone positive - we could all do with someone to be there and show us the way”

Rav Bumbra
Structur3dpeople

them. “But don’t just come straight out and say: ‘Will you be my mentor?’” says Bumbra. Instead, ask for a coffee, or a chat over the phone.

It’s worth the extra effort to find a good mentor, says Chloe Mackie, from Geek Girls. Mackie, from France, initially struggled to find her way in London’s tech world. A mentor can help you get started, she says. “I use the analogy of an explorer in a jungle. It’s difficult to decipher the way in the beginning, but a good mentor can help find it.”

Every mentorship dynamic is unique, and you might prefer to set out a structured programme, with set goals for you to complete. Or perhaps you’d rather meet less regularly and simply talk things through. Either way, it’s a good idea to have more than one mentor, to provide different perspectives.

Whatever your goals, a mentor can be invaluable in your career. “We could all do with someone to be there and show us the way,” says Bumbra.

▼ Finding the right mentor will depend on the type of support you need
PHOTOGRAPH: GETTY IMAGES



New faces of tech

All-ages show From apps to startup culture - young and mature tech workers share their views

A diverse group reflect on the challenges they face in the tech sector, and what they love about it

Abby Young-Powell

Take a minute to think of a typical tech employee. Perhaps a young, male computer geek comes to mind. Which makes sense; the average age of Facebook employees last year was just 28, while at Google it was 30. But a growing chorus of voices is demanding change and greater age diversity. Here's what they had to say.

Lydia Hallie, 20, self-employed Javascript developer
I wasn't interested in tech when I was younger because I thought it wasn't for me - I thought you had to be super good at maths and know loads about computers, but that's not the case. One of my relatives is a web developer and I saw just how amazing it is to create stuff yourself and how many jobs there are, so I went to a bootcamp. I was the youngest and almost the only girl there, but there was no reason for it to be like that.

Young people have a different attitude - we don't like hierarchy, for example - and we can inspire kids to start coding. I don't think tech is just for the young, though. I've seen many older people make a career switch and become successful.

Arnav Sharma, 11, is at school but has created two apps: VivifyMe and AsthmaPi. He won Tech4Good's people award in 2016
I created VivifyMe to help people with dementia, because my grandfather and great grandmother had it. And I created the AsthmaPi kit when I was nine, after one of my friends had an asthma attack on a school trip. First I started to play

'I think anyone of any age can get into tech, because the skills are becoming more accessible'

Arnav Sharma
App developer, 11



What I love about working in tech is that it's a level playing field - it doesn't matter if you're young or old, male or female, black or white; you can really thrive in this industry. You can do so many incredible things, like connect the world. That idea of reaching out and reaching the whole planet is quite extraordinary.

Older people bring in common sense, along with all the experience and mistakes and failures they've had. It's also powerful to have young brains. I've recently been working with the girl guides and they are all so smart, they just think in such diverse and disruptive ways.

'It doesn't matter if you're young or old, male or female, black or white; you can thrive in tech'

Jaqueline de Rojas
TechUK, 55



around with basic electronic things, like simple circuits. Then my dad bought me a Raspberry Pi, which is like a small computer. I taught myself coding and started using it to develop products to help people. It's fun, and the positive feedback I've had has been nice, but I've found it difficult to get the funding I need to take it to the next step because I'm young. My age appears to be holding me back a bit. I still think anyone of any age can get into tech though, because technology skills are becoming more accessible, so it's easier for young kids to learn.

Jaqueline de Rojas, 55, president of trade association techUK
I've been working in the tech industry for 31 years. I even remember when mobile phones were invented, and we were carrying them around like house bricks, which is bizarre.



'An older person brings experience, contacts and an understanding of how the world works'

Chip Conley
Airbnb, 57



Chip Conley, 57, ran a hotel company before joining Airbnb
I joined Airbnb when I was 52; twice the age of the average employee. I had zero tech knowledge and at first I felt awkward because they were talking a language I didn't understand. But what I was really valuable for was my wisdom - my leadership skills and the contacts I have. There needs to be a conversation about age diversity in tech and not purely because it's the right thing to do, but because it's the smart thing to do. An older person brings experience, contacts and, most importantly, an understanding of how the world works.

Funmilayo Adewodu, 22, works at Starling Bank, improving its app
I've always been interested in tech, then one day after I graduated I discovered coding online. Right away I knew it was something I wanted to learn. I started teaching

'Meeting people is one of the best parts of the tech scene. The industry is now more diverse'

Funmilayo Adewodu
Developer, 22

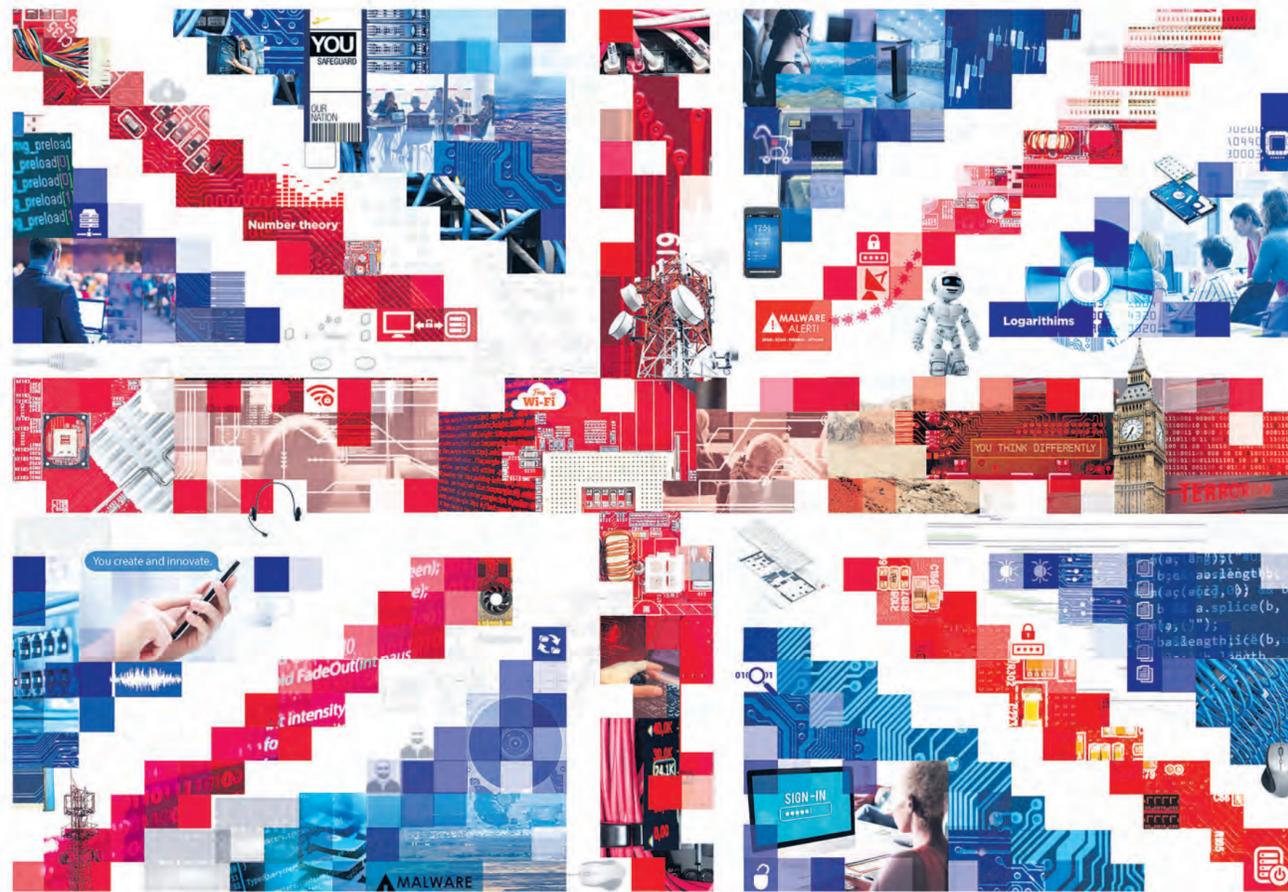


myself and it was fun and involved logic. It opened up a world of different possibilities. The tech community is great. Meeting people is one of the best parts of the tech scene. I think the industry is now more diverse and this definitely helps. It's also open, in that you can start at any age.

Elsbeth Briscoe, 45, founder of Learning With Experts
I was five months pregnant when I first raised funding for Learning with Experts. Before I set up my own company, I had been working as a landscape designer. Tech has been seen as a young person's game, but that's changing - certainly in sectors such as education, where wisdom is really respected. A lot needs to change still, but there's enormous power coming through with female and older founders. What I love about working in tech is that you are able to change the way things are done - it's the magic of problem solving. I also think technology is a creative industry and you can tear up the rulebook. My advice for people starting out is to just do it. Age is irrelevant.

'A lot still needs to change, but there's power coming through with female and older founders'

Elsbeth Briscoe
Startup founder, 45



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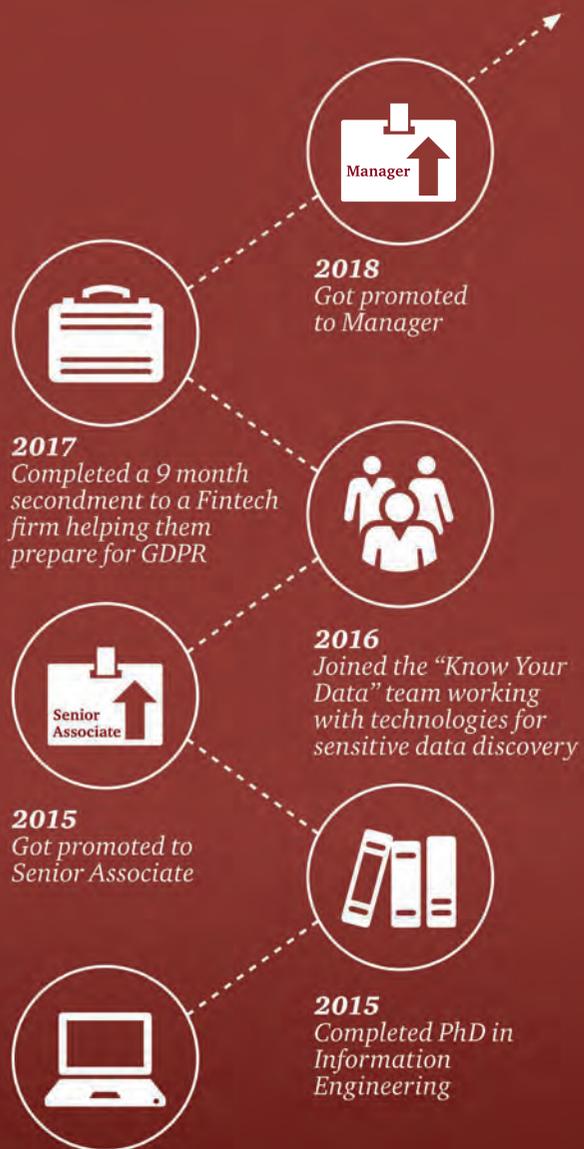
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