



SIP

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Science Industry Partnership

Building tomorrow's workforce

Insights into the adoption of apprenticeships
in the science sector

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Foreword

I'm pleased to welcome the latest results of the Science Industry Partnership's Apprenticeship Survey. Apprenticeships remain an important element in any organisation's talent strategy, enabling employers to future-proof their workforce while providing the learner with hands-on practical experience that supports professional development. For a dynamic and innovative science sector, the availability of high-quality skills is essential for growth and competitiveness on a global stage. It is, therefore, welcome news that approximately 2,500 people started an apprenticeship within the science sector in England in 2020/21, making a significant impact on productivity and supporting the development of our future skills base.

The SIP remains concerned, however, about the overall fall in apprenticeship starts at science companies (dropping by 51% between 2015/16 to 2020/21) and across the economy more generally (dropping by 33% during the same period). The analysis shows that the decline in apprenticeship starts is even more pronounced amongst the sector's SMEs (which have dropped by 72%), representing a potential skills risk to a part of our industry regarded as a highly innovative and agile breeding ground for talent.

Careful consideration needs to be given towards a new approach for engaging science sector SMEs with the apprenticeship system, and this report suggests a number of practical policy-led initiatives to reverse the trend, including enhanced incentives, reduced bureaucracy, and clearer and more accessible information.

The picture is more varied across the science subsectors, where the availability of degree-level apprenticeship standards, such as Clinical Trials Specialist and Bioinformatics Scientist, has helped boost the number of apprentices in the Pharmaceutical (increased by 4%) and Scientific R&D industries (increased by 42%). Degree apprenticeships deliver on the need for higher-level skills and have been widely welcomed and supported by the sector, with many companies investing in them more each year as part of their early talent plans, as well as using them to upskill existing staff.

It comes as little surprise, therefore, that two-thirds of employers surveyed expressed concern over the potential implications of the general trend to remove qualifications from apprenticeship standards. The SIP is keen to ensure that degree apprenticeships continue to offer the same breadth and depth of knowledge as equivalent options and that the changes don't negatively affect the overall standing and reputation of apprenticeships. Failure in this regard

would raise the risk of a two-tiered apprenticeship system developing, which could potentially undermine our globally recognised, accredited qualification system and harm the international transfer of talent, which is so important to the science sector.

While survey respondents paid in Apprenticeship Levy funds of £29.3m in the 12 months prior to the survey, just £11.8m had been recovered to spend on training, a recovery rate of approximately 40% (up from 28% in 2020 and 13% in 2018). A positive trend, however, it is more than five years since the introduction of the Levy system, and still, 60% of the funds raised within the sector are lost when they expire. To counter this, the report suggests increasing the flexibility of the Levy to fund a wider variety of training and Continuing Professional Development opportunities.

In terms of engagement with the apprenticeship system, I'm encouraged that employers remain largely positive, 63% of respondents felt empowered by the employer-led system, whilst 70% said they feel able to effectively communicate their organisation's position on elements such as the development of apprenticeship standards.

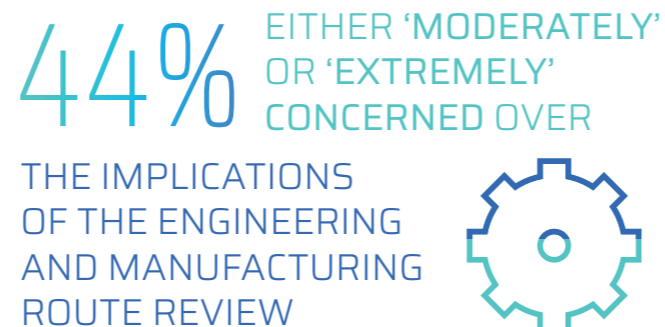
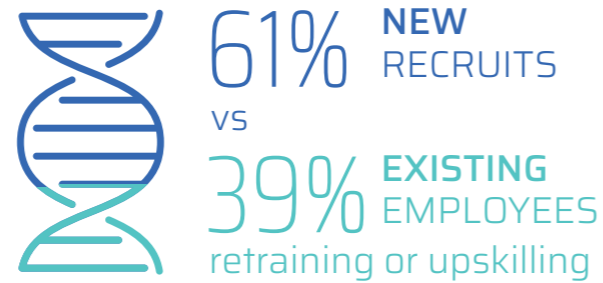
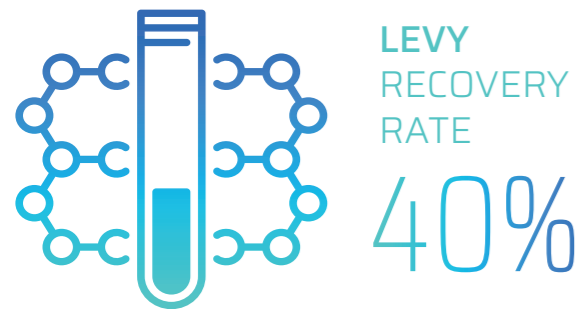
Finally, the release of this report represents another opportunity to re-enforce the need for stability in our skills system. For our sector to prosper, employers require confidence to invest in long-term workforce development, and there is a role for employers and policymakers alike to resist change for change's sake whilst we recognise and protect the aspects of our skills system that work.



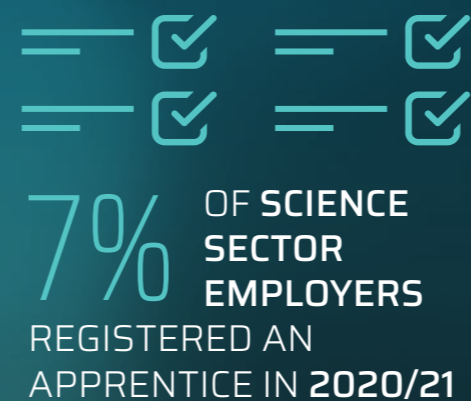
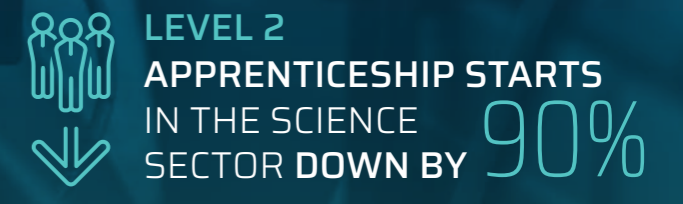
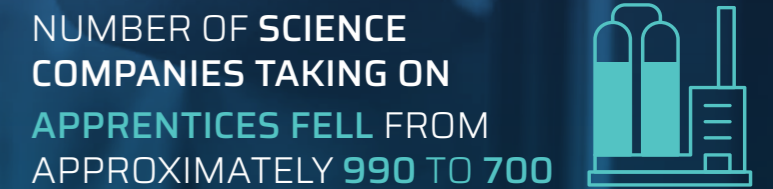
DR MALCOLM SKINGLE CBE,
CHAIR OF THE SCIENCE
INDUSTRY PARTNERSHIP

Director, Academic Liaison,
GlaxoSmithKline

Survey Responses

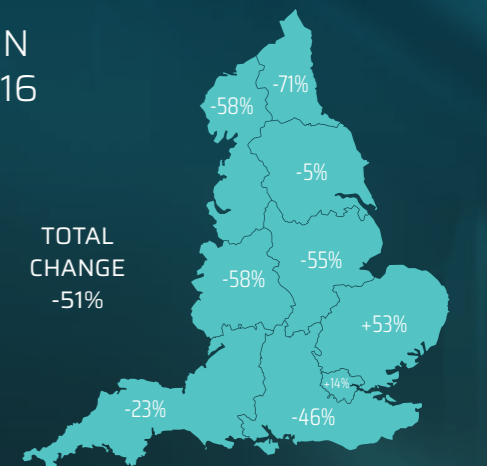


National Data



REGIONAL CHANGE IN STARTS SINCE 2015/16

- East Midlands -55%
- East of England +53%
- London +14%
- North East -71%
- North West -58%
- South East -46%
- South West -23%
- West Midlands -58%
- Yorkshire and Humberside -5%



National data analysis

Introduction

The apprenticeship system in England has undergone significant change in recent years, most prominently with the introduction of the Apprenticeship Levy. The Levy is paid by all employers with a pay bill of over £3 million each year. It is paid monthly and is set at 0.5% of the company's total annual pay bill. Approximately 2% of companies across the whole economy pay the Levy, but the money raised is used to support apprenticeship training for all employers.¹ It was introduced at the start of the new tax year on the 6th of April 2017; halfway through the 2016/17 academic year. The national data we reference therefore go back to the start of 2015/16 as that provides the best comparison of what activity was like before the Levy came into effect.

It is also important to note that the Levy is just one of a long list of policy changes made to the apprenticeship system over the past decade, which also includes:

- Minimum 12-month duration for all apprenticeships
- Minimum English and Maths qualifications requirement for apprentices
- Withdrawal of frameworks and introduction of new standards
- Minimum threshold of 20% off-the-job training
- Creation of the Institute for Apprenticeships (IfA)
- Introduction of end-point assessment (EPA)
- Expansion of IfA to become the Institute for Apprenticeships and Technical Education (IfATE)
- Transfer of external quality assurance for EPA's over to Ofqual

Beyond the above, there are also regular reviews by IfATE into apprenticeship design and funding policy, with new changes being introduced. Perhaps emblematic of this intense period

of change and uncertainty is that the UK has had ten different Secretaries of State for Education in the past 12 years.

The need for collaboration across the sector remains as important as ever to provide a strong and influential voice that can articulate industry's perspective and the consequences of reforms.

This report makes the case that seemingly constant change and uncertainty is damaging employer engagement with apprenticeships and limiting training and development opportunities for individuals. Employers need stability in the skills system to maximise its effectiveness and have the confidence to invest in long-term growth and development plans for their workforce. It is, therefore, important to recognise and protect the aspects of the system that are valued and work well. There is also an acute need to ensure that employers of all sizes have access to sufficient funding to incentivise activity and deliver workplace learning that works for them and their employees. SMEs in particular need additional support to navigate the evolving system and not get left behind.

Falling starts

The number of apprenticeship starts at science companies in England has dropped by 51%, from approximately 5,090 in 2015/16 to 2,482 in 2020/21. The science sector is not unique in this with apprenticeship starts across the whole economy falling by 33.5% during the same period. The data show a significant fall in the number of apprentices being trained at Chemicals companies (-48%), Downstream Petroleum companies (-52%), and in the Polymers industry (-70%). In comparison, there has been some modest growth in apprenticeship use in the Pharmaceuticals industry (+4%) and strong growth in Scientific R&D (+42%).

Industry	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21
Chemicals	1,048	1,023	650	838	813	550
Downstream Petroleum	111	55	43	86	96	53
Pharmaceuticals	357	275	336	322	417	370
Polymers	3,176	3,928	2,145	1,783	1,391	963
Scientific Research & Development	398	387	597	749	577	546
Total	5,090	5,668	3,771	3,778	3,294	2,482

Table 1: Breakdown of apprenticeship starts at science companies in England by industry

1. <https://www.gov.uk/Government/news/key-facts-you-should-know-about-the-apprenticeship-levy> Date accessed: 27/10/2022

This may be influenced by several factors, including the size and makeup of companies within the industry. The data show that apprenticeship starts at SMEs have dropped significantly compared to starts at large Levy payers. It is, therefore, unsurprising that industries with a high prevalence of large employers (e.g. Pharmaceuticals) have fared better than those where the majority of employees work for SMEs (e.g. Polymers).

Equally, the number of starts in an industry is influenced by the range and quality of apprenticeships on offer. Growth in the number of Pharmaceuticals starts is helped by the availability of an appropriate range of degree-level apprenticeship standards, such as L6 Clinical Trials Specialist and L7 Bioinformatics Scientist. If there is a lack of appropriate options available to serve a particular industry, the number of apprenticeship starts will likely fall. It remains critically important that employers continue to support the ongoing development of both new and existing apprenticeship standards to ensure they are up-to-date and fit for purpose.

Disproportionate impact

As previously stated, the number of apprenticeship starts across the whole economy has dropped by approximately 33.5%, from around 457,020 in 2015/16, to 303,730 in 2020/21. However, it is important to note that the

Enterprise size	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21
Small (0-49 employees)	173,200	166,170	107,430	100,080	81,450	91,230
Medium (50-249 employees)	73,630	74,800	43,470	41,120	34,250	32,550
Large (250+ employees)	210,190	208,850	195,760	224,970	185,620	179,880
Total	457,020	449,820	346,660	366,170	301,320	303,660

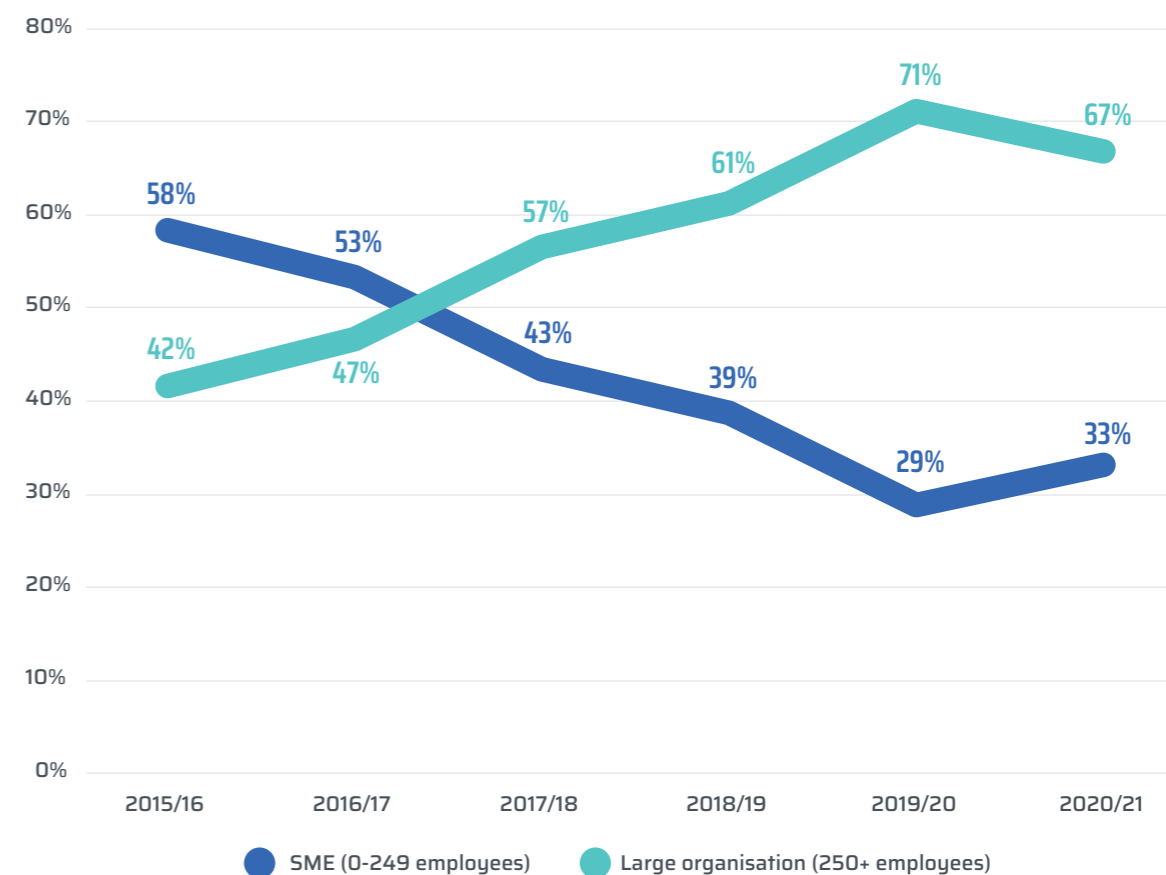
Table 2: Breakdown of apprenticeship starts in England by enterprise size

Please note: Recently released data up to the end of academic year 2021/22 show an 8.6% increase in all apprenticeship starts in England. Unfortunately, these data do not allow analysis of either employer or learner characteristics, so it is unclear at this point how much of this rebound has translated into the science sector.

Enterprise size	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21
Small (0-49 employees)	1,178	1,112	630	529	389	415
Medium (50-249 employees)	1,801	1,931	1,012	949	562	428
Large (250+ employees)	2,122	2,669	2,137	2,342	2,353	1,704
Total	5,101	5,712	3,779	3,820	3,304	2,547

Table 3: Breakdown of apprenticeship starts at science companies in England by enterprise size

Figure 1: Share of apprenticeship starts at science companies in England: SME vs large organisation



For context, SMEs are responsible for approximately 61% of total employment across all sectors in the UK economy and 52% of turnover. However, the proportion of workers employed by SMEs can vary substantially depending on the size and makeup of businesses within a given industry. For example, just 23.8% of Pharmaceuticals employees work for SMEs, compared to 57.2% in Chemicals and 70.1% in the Polymers industry.²

Overall, SMEs account for over 97% of companies within the UK science sector.³ They often bring innovative ideas to fruition and are a breeding ground for talent for larger organisations. A fall in the number of apprentices being trained at science sector SMEs harms the pipeline of talent for all companies by weakening an important entry point to a career in the sector. This results in fewer people with training and experience in the sector, while many companies continue to suffer from skills shortages.

Regional differences

As previously stated, the total number of apprenticeship starts in the science sector dropped by 51% between 2015/16 and 2020/21. However, Table 4 shows that the reforms have disproportionately impacted the different regions within England. The worst affected region has been Yorkshire & The Humber, losing 77% of its science sector apprentices, followed by North East (71%), West Midlands (58%), North West (58%), and East Midlands (55%). In contrast, the number of apprentices in London and the East of England increased by 14% and 53%, respectively, over the five-year period. Thus the five worst affected regions are the ones that should otherwise be targeted for action to support the levelling up agenda.

2. Department for Business, Energy & Industrial Strategy: Business Population Estimates for the UK and the Regions 2021

3. Department for Business, Energy & Industrial Strategy: Business Population Estimates for the UK and the Regions 2021

Region	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	% Change 2015/16: 2020/21
East Midlands	644	656	516	412	334	290	-55%
East of England	271	520	422	295	332	414	+53%
London	170	124	165	263	196	194	+14%
North East	467	470	290	266	254	135	-71%
North West	983	1,257	665	562	563	417	-58%
South East	537	534	476	507	571	289	-46%
South West	324	451	283	240	261	249	-23%
West Midlands	650	712	479	686	444	270	-58%
Yorkshire and The Humber	1,031	932	506	556	351	242	-77%
Total	5,077	5,656	3,802	3,787	3,306	2,500	-51%

Table 4: Breakdown of apprenticeship starts at science companies within the nine regions of England (based on learners' home address)

The explanation for this may lay with the types of businesses prevalent in the different regions, not just in terms of size but also by industry. There has been a substantial drop in the number of apprenticeships in both the Chemicals and Polymers industries. This has more of an impact in the regions where these industries have a significant footprint. In contrast, there has been growth in Pharmaceuticals and Scientific R&D

apprenticeship starts, so it makes sense that the regions with a high prevalence of Life Sciences companies have fared better.

To level up opportunity across the country, investment must be targeted to incentivise activity at precisely the types of businesses that have recently disengaged from the apprenticeship system.

	East Midlands	East of England	London	North East	North West	South East	South West	West Midlands	Yorkshire and The Humber	Total
Chemicals	-2	41	10	-91	-165	-113	8	-47	-127	-487
Downstream Petroleum	-1	11	0	-11	11	-1	-22	10	-45	-48
Pharmaceuticals	-23	74	106	-23	-13	-91	21	-11	-23	14
Polymers	-354	-94	-90	-215	-387	-126	-51	-320	-565	-2,202
Scientific R&D	28	112	-2	9	-11	83	-30	-11	-29	148
Total	-353	143	24	-331	-566	-248	-75	-380	-788	-2,574

Table 5: Change in apprenticeship starts at science companies in England between 2015/16 and 2020/21, breakdown of region and industry

Disengaging SMEs

Beyond the data for apprenticeship starts it is also useful to look at the number of individual companies that registered apprentices. Between academic years 2015/16 and 2020/21, the number of science companies taking on apprentices dropped by 29% from approximately 990 to 700. Considering the findings in the previous section, it is unsurprising that this decrease was entirely driven by the number of SMEs that were engaged, which fell by approximately 40% from 760 to 460. In contrast, there was a modest increase of 4.3% in the number of large organisations that took on apprentices, rising from 230 to 240.

This overall drop in engagement was also experienced more widely, with the number of companies taking on apprentices across all sectors in England falling by 35.9%, from 106,530 to 68,270 over the same period. Again, this was predominately driven by a significant drop in the number of SMEs engaged, which fell by 38.9%, while the number of large organisations fell by just 4.6%.

It is also important to consider whether there has been a change in the number of employers operating within the sector during this period. To do this, we have analysed data from the Department for Business, Energy & Industrial Strategy (BEIS) business population estimates series; the only official estimate of the total number of private sector businesses in the UK at the start of each year. This dataset uses the same two-digit Standard Industrial Classification (SIC) codes, so a direct comparison is possible.

The data in **Table 6** show that the number of companies within the science sector has grown by nearly 7% over the five year period. The fall in engagement on apprenticeships is, therefore, even more significant than it first appeared. In 2015/16 approximately 11% of science sector companies had registered apprentices. By 2020/21 it had dropped to around 7%. In this most recent year less than 5% of the sectors SMEs had registered apprentices, compared to 81% of large employers.

Enterprise size	2015/16			2020/21		
	All employers	With apprentices	% w/ apprentices	All employers	With apprentices	% w/ apprentices
Small (0-49 employees)	7,830	450	6%	8,375	250	3%
Medium (50-249 employees)	1,085	310	29%	1,140	210	18%
Large (250+ employees)	270	230	85%	295	240	81%
Total	9,185	990	11%	9,810	700	7%

Table 6: Breakdown showing the proportion of science sector companies with registered apprenticeship starts, comparison of 2015/16 and 2020/21

The 990 science companies with apprenticeship starts in 2015/16 registered approximately 5,101 starts between them. Meaning that, on average, these companies registered 5.2 apprenticeship starts each. In comparison, the 700 sector companies with starts in 2020/21 had registered approximately 2,547 apprenticeship starts between them. The average number of apprenticeship starts registered per company had therefore dropped to approximately 3.6. Consequently, not only has there been a fall in the number of companies engaging with the apprenticeship system, but even those that remain active are (on average) now taking on fewer apprentices.

It is now important to explore the reasons why apprenticeship starts at large organisations have fared better than those at SMEs.

Levy driven

The Apprenticeship Levy system is not perfect, and our survey results show strong support for several potential flexibilities to be introduced to enable employers to spend more of their Levy. However, companies that are required to pay the Levy (predominately larger organisations) have at least retained consistent access to funding. They access their funds directly through the Government's online apprenticeship service as they set up and manage their apprenticeships. They also have an incentive to actively train apprentices, otherwise they will lose access to the funds they have contributed to.

Table 7 shows that the number of apprentices directly funded via the Apprenticeship Levy had been rising each year until a fairly sizeable drop in 2020/21, which may be an impact of the coronavirus pandemic. This recent drop means that Levy-supported starts in the sector were instead 9% lower than in 2017/18 - the first full academic year after the Levy was introduced. The data therefore suggest that (until recently at least) the Apprenticeship Levy has been incentivising Levy payers to train an increasing number of apprentices.

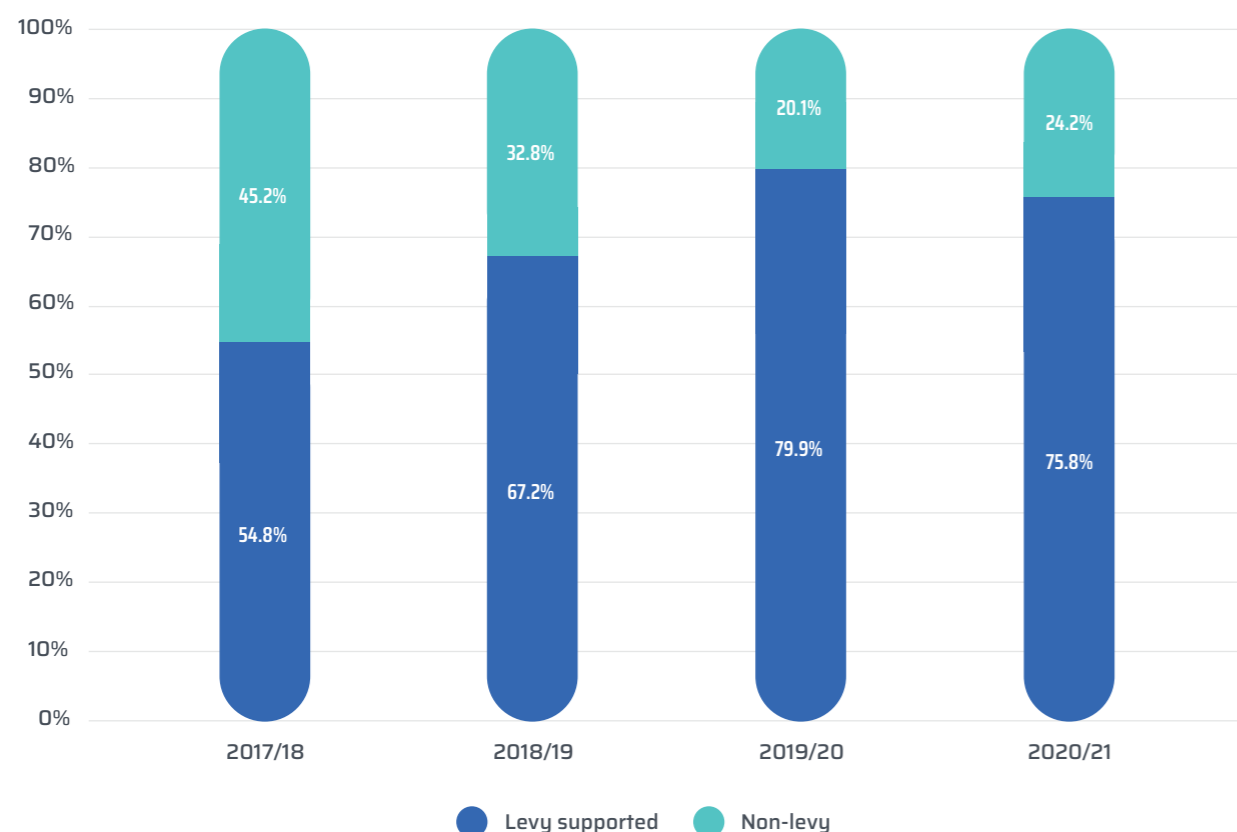
In contrast, the number of starts happening in the sector without Levy funding fell by nearly two-thirds (65%) from 1,719 in 2017/18 to just 606 in 2020/21. This decline has been more consistent with the numbers dropping further every year. Consequently, the vast majority of the overall decline in starts has come from non-Levy payers disengaging from the apprenticeship system. In 2020/21, approximately 76% of

apprenticeship starts in the sector were directly funded via the Levy. This compares to around 65% across all sectors of the economy.

Funding	2017/18	2018/19	2019/20	2020/21
Levy supported	2,084	2,545	2,639	1,897
Non-Levy	1,719	1,242	665	606
Total	3,803	3,786	3,304	2,503

Table 7: Breakdown of apprenticeship starts at science companies in England by funding source

Figure 2: Share of apprenticeship starts at science companies in England by funding source



Missed transfer opportunities

Employers have 24 months to use their funds once it enters their online account; after this point, their funds expire. Between April 2019 and March 2020, £2.7bn in Apprenticeship Levy was generated across all employers in the UK.⁴ 24 months later, between April 2021 and March 2022, nearly £1.32bn was lost as expired funds.⁵ Consequently, approximately 49% of all the money generated by the Levy was unused by contributing employers. The Office for Budget Responsibility recently forecast that by 2027-28 the Apprenticeship Levy will generate £4.1bn a year, showing the scale and potential of funding available.

In April 2018 the Government introduced the ability for Levy payers to transfer up to 10% of their annual funds to any employer that is not part of their group, including smaller employers in their supply chain and apprenticeship training agencies. This process relied on the transferring company finding an employer to support and agreeing which apprenticeship standard the chosen apprentice would undertake, as well as the price that has been agreed upon with both the training provider and end-point assessment organisation.⁶

Since April 2019 the maximum transfer amount has been set at 25%. In the three financial years between then and March 2022, the total value of funding available to transfer across all accounts registered on the apprenticeship service was approximately £1.88bn. The actual amount transferred was £66m, just 3.5% of the total available.⁷ Only 4.5% of the accounts registered had used some or all of their transfer pot during this period.⁸

In an attempt to stimulate greater engagement, the Government introduced a Levy 'pledge and transfer' function on the apprenticeship service in September 2021. This simplifies the process as you can now specify how much money is available for transfer and select (optional) criteria that reflect your priorities for a receiving employer, including sector, location, job role and qualification level. Each pledge is shown on a public website so qualifying businesses can apply for the funding.⁹

At this stage it is unclear whether the new pledge and transfer function has had the intended impact. However, SIP would encourage all employers with excess Levy to utilise it and ensure their funding is retained for use within the science sector.

Co-investment funding

Employers that are not required to pay the Apprenticeship Levy can still access funding to help them cover the cost of an apprentice. These employers must make a financial contribution called a 'co-investment' which the Government states is "essential to increase quality and employer engagement." The current arrangement sees Government funding cover 95% of the cost of the apprentice's training and assessment up to the funding band maximum. The remaining 5% (and anything above the funding band maximum) is paid for by the employer. Prior to April 2019, the rate of co-investment for employers was 10%.¹⁰

There is an exemption for small businesses (less than 50 employees) whereby the Government will cover 100% of the training costs if the apprentice is either aged 16 to 18 or aged 19 to 24 with an education, health and care plan from their local authority.¹¹ For context, learners aged 16 to 18 accounted for 20.3% of starts across all apprenticeship standards in England in 2020/21.¹²

Both Levy payers and non-Levy payers can only use the funding toward the cost of apprenticeship training and assessment. However, engaging with the apprenticeship system adds further layers of expenditure through things like equipment, apprentice wages, administrative and recruitment costs, and management time. In 2019 the Federation of Small Businesses revealed that 41% of small businesses employing apprentices reported that their costs related to recruiting and training an apprentice had increased since the reforms were introduced.¹³ SMEs are also more vulnerable to economic shocks, and there has been a significant amount of uncertainty and change in recent years with Brexit, the Coronavirus pandemic, and now the war in Ukraine and cost of living crisis. For some micro and small businesses, the co-investment model is still a significant cost which makes taking on apprentices less attractive, especially considering the explicit requirement for 20% off-the-job training.¹⁴

4. HM Revenue & Customs: Annual Report and Accounts 2020 to 2021
 5. https://www.whatdotheyknow.com/request/apprentice_levy_transfer_usage#incoming-2059541 [03 August, 2022]
 6. Education & Skills Funding Agency: Apprenticeship funding: rules and guidance for employers, May 2017 to July 2018 Version 3
 7. https://www.whatdotheyknow.com/request/value_of_apprenticeship_levy_ex_2#outgoing-1299774 [03 August, 2022]
 8. https://www.whatdotheyknow.com/request/value_of_apprenticeship_levy_ex_2#outgoing-1299774 [03 August, 2022]
 9. Education and Skills Funding Agency, Guidance: Transferring your apprenticeship levy to another business, 2021
 10. Department for Education: Apprenticeship funding in England from June 2022
 11. <https://www.apprenticeships.gov.uk/employers/funding-an-apprenticeship-non-levy> Date accessed: 25th October 2022
 12. Department for Education: Apprenticeships and traineeships: Academic Year 2020/21
 13. Federation of Small Businesses: Fit for the future: Making the apprenticeship system work for small businesses, 2019
 14. Department for Education: Level 2 and 3 apprenticeships A qualitative investigation, 2020

Removing the 5% co-investment contribution completely could help level the playing field and ensure there is no two-tiered approach to the apprenticeship offer. Similarly, enhanced apprentice incentives, which could consist of completion bonuses, or, optional maintenance loans to support relocation costs or purchasing materials for their studies, may help smaller and micro businesses recruit apprentices.

Accessing support

Until recently, a non-Levy payer could only access co-investment funding indirectly via a training provider that had been awarded an Education and Skills Funding Agency (ESFA) contract. This restricted access to the apprenticeship market for SMEs because many providers were never awarded funding to train apprentices at non-Levy payers. Equally, in 2018 nearly three-quarters (73%) of independent training providers reported that the amount of funding they had been awarded was insufficient to meet employer demand. Consequently, 53% of providers reported shifting their delivery model away from non-Levy paying SMEs and towards large Levy payers due to greater assurances around funding.¹⁵ By 2020, nearly two-fifths (39%) had reported turning away smaller businesses wanting to recruit apprentices because of a lack of Government funding.¹⁶ Overall, this meant that for some SMEs the specialist provider they had used was no longer available to them.¹⁷

Since 2020 non-Levy payers have been able to register on the Government's online apprenticeship service; something that has been available to Levy payers since 2017. This gives them more control over managing the relationship with their providers during the apprenticeship process.

The previous system whereby providers are awarded funding is therefore being phased out, and so all new apprentice starts with both Levy and non-Levy payers must be funded using the apprenticeship service instead. Non-Levy payers can now 'reserve' co-investment funding for up to 10 apprentices a year via their online account. This simplifies the process and provides greater certainty, although it is too early to know if this has made any tangible difference to start numbers.

It is worth stating that SMEs often lack the dedicated internal staff resource needed to understand the different aspects of the technical education system, and to set up and manage an effective apprenticeship programme. This is especially true given the constantly evolving nature of skills policy in recent years which discourages engagement, particularly from time-poor SMEs that simply can't keep up. In contrast, many large organisations have individuals or even teams of Human Resources and Learning & Development professionals whose primary responsibility is managing this process and finding

ways of utilising their often significant Levy contributions. This is not to say that the changes have been easy on larger companies, just that many SMEs need additional support and guidance to understand the complexities of the system and the options available to them.

A dedicated SME support service could provide businesses that lack internal capacity with access to the subject matter expertise they need to re-engage with the apprenticeship system and maximise its benefits. The support service could act as a one-stop shop for all workforce skills needs, offering end-to-end support, managing existing staff, exploring new development opportunities, shaping apprenticeship strategies, and supporting T-Level placement opportunities.

"We don't even have one dedicated HR person. We do everything ourselves. So having access to knowledgeable people is really important, and the simpler you can make it, the better." **SME Pharmaceuticals employer involved in Research & Development**

Transition onto standards

Another significant change has come through transitioning away from old style apprenticeship frameworks and the introduction of new apprenticeship standards. In 2016/17, there were 5,568 starts on frameworks within science companies and 121 starts on standards. The following year the number of starts on frameworks had dropped by 3,165, while the number of starts on standards had grown by just 1,227. Overall, this meant the number of apprenticeship starts in science companies fell by 34%, from 5,690 to 3,751, compared to the previous academic year.

As such, the data show that academic year 2017/18 is when science companies really began to transition away from frameworks, either through choice or through a lack of availability. There had also been a 17% drop in the number of science companies that registered apprentices compared to the previous academic year in 2016/17. And despite steady growth in the number of starts on new standards, total apprenticeship starts in the sector have continued to fall year on year. Thus, a significant number of employers disengaged from the apprenticeship system as frameworks were being phased out and have not returned.

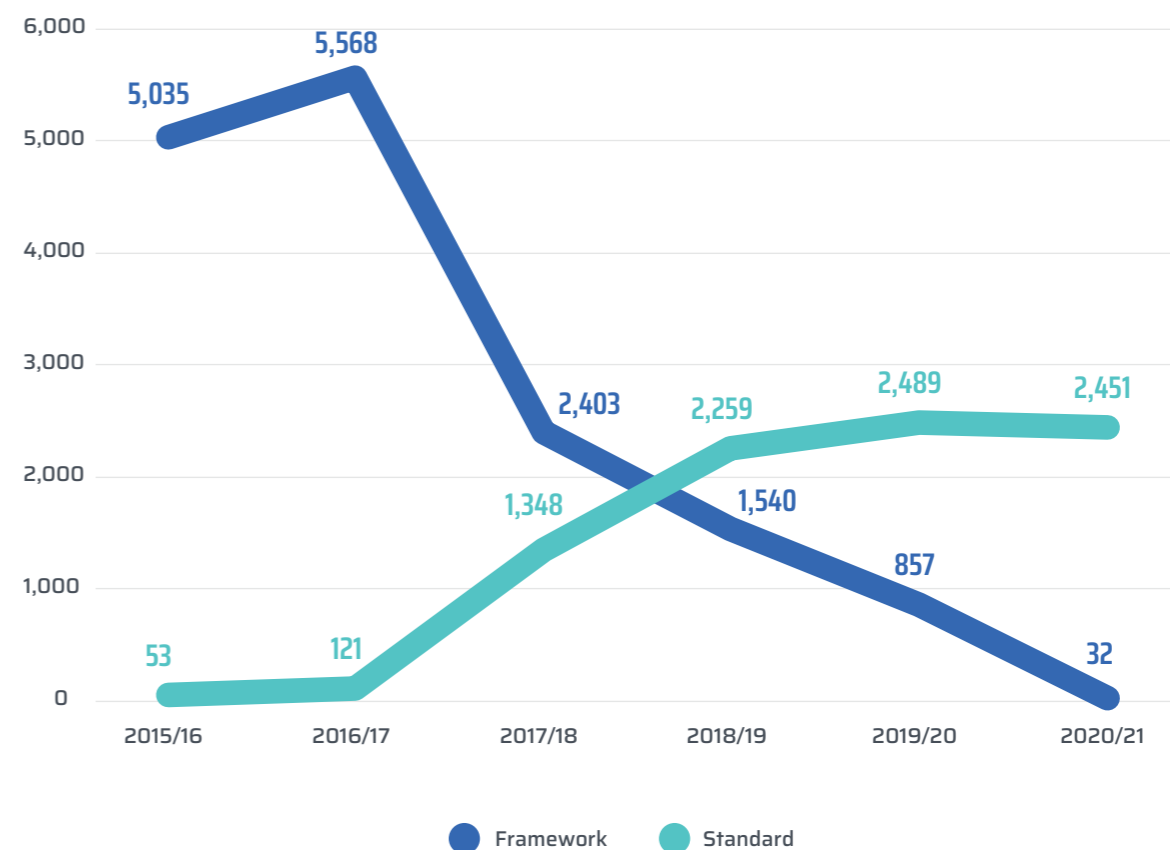
This also appeared to impact smaller employers in the sector as the number of starts on frameworks at SMEs fell by 1,708, while the number of starts on standards grew by just 333. This meant that the total number of apprenticeship starts at SMEs in the sector fell by nearly 46% in just one year.

15. Association of Employment and Learning Providers: Member Survey Results, 2018

16. Association of Employment and Learning Providers: Thousands of SMEs denied chance to recruit apprentices as a result of levy shortage, 2020

17. National Foundation for Educational Research: Putting Apprenticeships to Work for Young People, 2021

Figure 3: Breakdown of apprenticeship starts at science companies in England by apprenticeship type



This was also true for apprenticeship starts across the economy. In 2016/17, there were 470,240 starts on frameworks and 24,650 starts on standards. The following year the number of starts on frameworks had dropped to 212,030, while the number of starts on standards had increased to 163,740. As a result, the total number of apprenticeship starts fell by 24% from 494,890 to 375,770

compared to the previous year.¹⁸ Interestingly, the vast majority (109,860 out of 119,120) of this fall in apprenticeship starts were in non-STEM subject areas.

Table 8 shows that only 170 apprenticeship standards were available at this time to serve all job roles across all sectors. It is likely that a lack of availability of suitable standards contributed to the overall decline in employer engagement.

2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22
28	113	170	316	469	571	625

Table 8: The number of apprenticeship standards approved for delivery in time for the start of the academic year¹⁹

18. Department for Education - National Statistics: Apprenticeships and traineeships: Academic Year 2021/22

19. Institute for Apprenticeships and Technical Education, 2022

In 2015 when the Government set out its '2020 vision' for apprenticeships, there were approximately 230 apprenticeship frameworks and over 700 pathways within them, enabling different combinations within a framework.²⁰ One popular framework for science companies was 'Laboratory Technicians', which had various pathways, including: Analytical and Process Science; Clinical Analysis; Education Science; and Industrial Science.

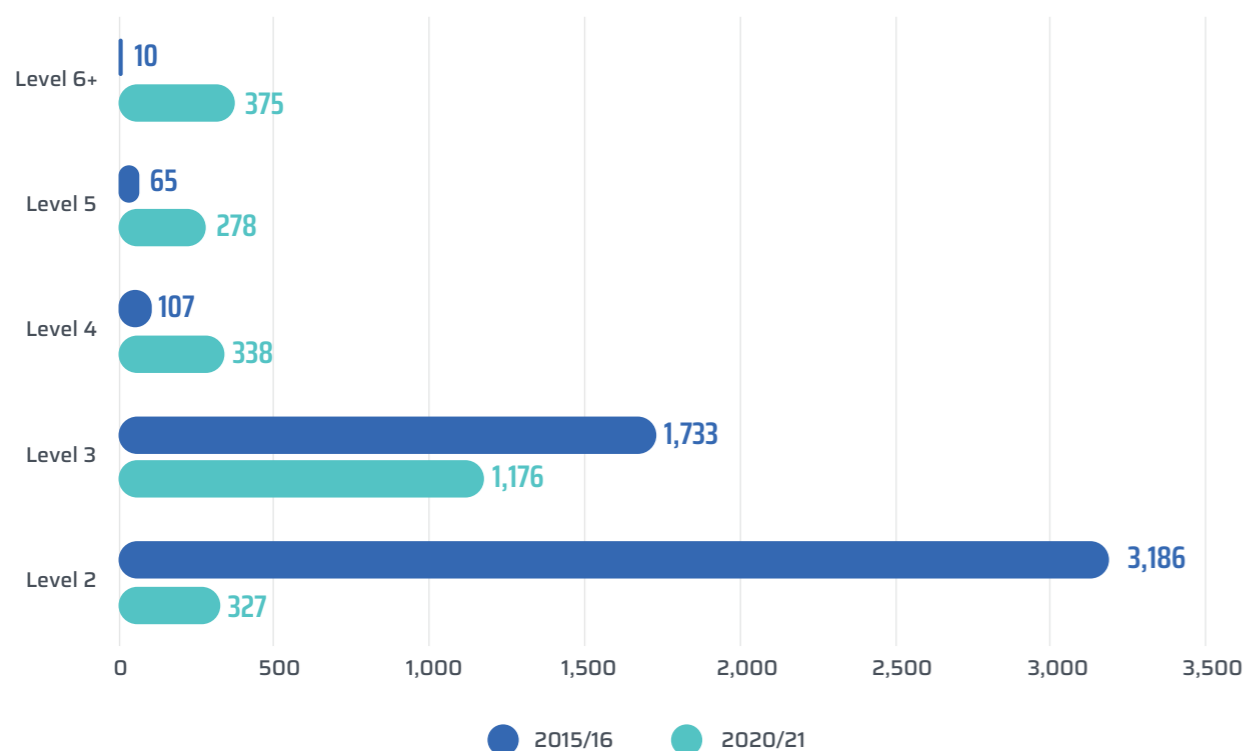
It has taken time to build up the library of apprenticeship standards. There were 652 approved for delivery at the start of the new academic year in September 2022, with a further 72 currently in development or with proposals in development. It is therefore possible that this issue was just a point in time. Even so, this speaks to the impact that changes and uncertainty can have on the overall number of apprenticeship starts. Having said that, the apprenticeship system should be focused on more than just the total number of starts. The quality of the training and breadth of available options are

also important, and we have seen growing support for higher-level and degree-level apprenticeship standards.

Level changes

Figure 4 shows a comparison of the number of apprenticeship starts registered at science companies for the different qualification levels between 2015/16 and 2020/21. As expected, with a much greater range of higher-level apprenticeships available, there has been significant growth in starts at Levels 4/5/6+. The growing popularity of higher-level apprenticeships is a positive trend for the sector. SIP has long advocated for parity of esteem between academic and vocational pathways into industry, and the growing variety of high-level apprenticeships is a vital component of that. In stark contrast, the number of Level 2 apprenticeships taking place within the sector fell by 90%. It is important to remember that many lower-level apprenticeship frameworks were highly valued and an important entry point into work.

Figure 4: Breakdown of apprenticeship starts registered at science companies in England by qualification level, comparison of 2015/16 and 2020/21



20. HM Government: English Apprenticeships: Our 2020 Vision, 2015

Qualification level	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21
Level 2	62.5%	60.2%	42.2%	28.9%	20.6%	13.1%
Level 3	34.0%	35.9%	46.4%	51.5%	47.9%	47.2%
Level 4	2.1%	1.7%	4.2%	5.7%	10.2%	13.5%
Level 5	1.3%	2.1%	4.7%	7.8%	7.3%	11.1%
Level 6+	0.2%	0.2%	2.5%	6.1%	14.0%	15.1%

Figure 5: Heat map representation of apprenticeship starts registered at science companies in England by qualification level

Degree-level apprenticeships have been widely welcomed and supported since their creation. In the three academic years between 2018/19 and 2020/21, there have been approximately 1,070 starts on apprenticeships at Levels 6 and 7 at science sector companies.²¹ Apprenticeships at these levels provide a valued entry point for talented individuals to gain practical experience in the sector. They also offer an opportunity for existing employees to achieve genuine continuing professional development.

The number of traditional academic graduates entering the science sector has also grown over the past few years. Official statistics show about 6,130 graduates from the academic year 2018/19 entering into employment within the science sector within 15 months of completing their course.²² This compares to approximately 4,440 using the same measurement for graduates from academic year 2015/16.²³ This speaks to the growing requirements for talented individuals within the sector that are educated to a degree-level.

“The lower-level apprenticeships are what we use; they are appropriate for our business. So the drop-off in starts is concerning because if we can’t fill viable cohorts of learners, then training providers will stop offering them altogether.”
SME Polymers employer

21. Department for Education: Apprenticeships in England by industry characteristics, Academic Year 2020/21

22. HESA Graduate Outcomes Survey Results Record 2018/19

23. HESA Destinations of Leavers Survey and Student Record 2015/16

Apprentice Demographics

Gender profile

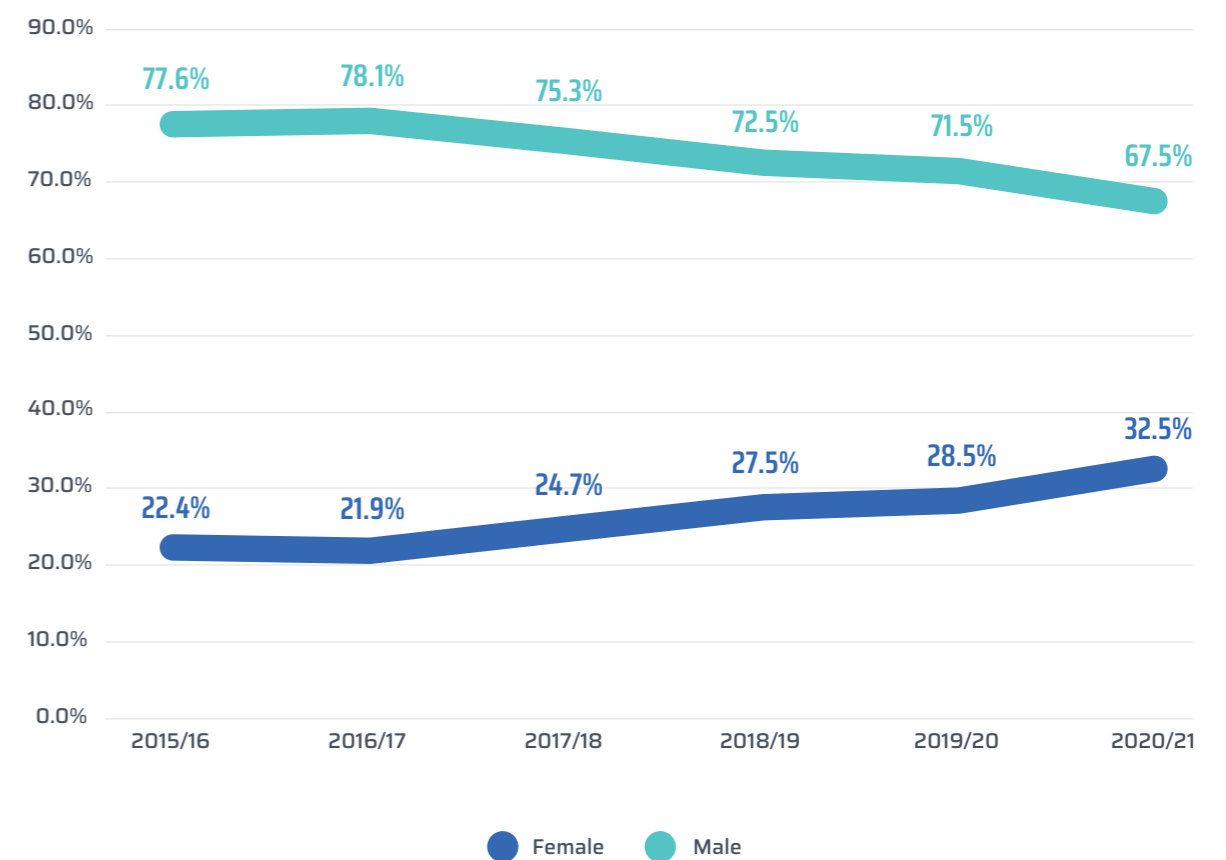
Trend data show that the gender profile of apprentices within science companies has been improving, with the share of female apprentices increasing in each of the past five years. In academic year 2020/21 the gender profile was approximately 67.5% male to 32.5% female.

This improving trend has been evident across each of the industries except for Downstream Petroleum. Having said that, the data for the sector as a whole are also influenced by the fact that a larger share of the apprenticeships at science companies are now happening within Pharmaceuticals

and Scientific R&D. In 2020/21 females accounted for approximately 40% and 43% of apprentices within these two industries respectively. This compares to 33% in the Chemicals industry, 24% in Polymers, and 20% in Downstream Petroleum.

For comparison, the gender split for all apprenticeship starts across the whole economy was 53.4% female to 46.6% male in 2020/21. Although the data for the science sector show an improving situation, more work needs to be done to ensure gender parity.

Figure 6: Share of apprenticeship starts at science companies in England by gender



Ethnicity profile

The ethnic diversity of apprentices within science has also grown over the past five years. In 2016/17, more than 95% of science apprentices identified themselves as being from a 'White' ethnic background. By 2020/21 this had changed to approximately 86.5%. At the same time, the proportion of every other broad classification of ethnicity had grown during this period.

Despite recent progress, the ethnic profile of apprentices within science companies is less diverse than the average for all apprenticeships across all sectors in England, where learners from a White background account for approximately 83.8% of starts.

Ethnicity	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21
Asian/ Asian British	2.4%	1.9%	2.5%	3.2%	4.1%	4.1%
Black/ African/ Caribbean/ Black British	0.8%	0.8%	1.1%	1.6%	1.6%	2.0%
Mixed/ Multiple ethnic groups	1.3%	0.8%	2.0%	1.9%	1.9%	2.0%
Other ethnic group	0.2%	0.2%	0.5%	0.5%	0.9%	0.8%
White	93.8%	95.4%	93.1%	91.0%	90.0%	86.5%
Not available	1.5%	1.0%	0.8%	1.7%	1.6%	4.6%

Table 9: Breakdown of apprenticeship starts at science companies in England by ethnicity

Deprivation status

National data allow analysis into the number of the sector's apprenticeships that go to learners with a home address in the most deprived 20% of areas in England. **Figure 7** shows that the share of apprenticeships that going learners from the most deprived areas has been falling each year, from 27.3% in 2015/16 to 15.5% in 2020/21. This compares to approximately 19.6% across all apprenticeship standards in the whole economy.

The number of apprenticeships taking place in the sector at Levels 2 and 3 has dropped by 69% since 2015/16, while starts at Levels 4/5/6+ have all shown strong growth. This creates a challenge regarding the sector's social mobility ambitions, with **Table 10** showing that learners from deprived areas are much less likely to attain an apprenticeship at these higher levels. In 2020/21, 19.1% of Level 2 & Level 3 apprenticeship starts at science companies went to learners from the most deprived 20% of areas, compared to just 8.6% of the starts at Levels 4-7.

The decline in lower-level starts is also linked to the fall in activity at non-Levy payers. National data show that apprenticeships taking place at SMEs are more likely to be at lower levels. A fall in SME engagement, therefore, means

fewer opportunities at lower levels and fewer opportunities for learners from deprived areas. This is evidenced within the science sector data too. The Chemicals and Polymers industries both have high levels of SME employment, both train a higher proportion of their apprentices at Levels 2 & 3, and both have experienced a significant drop in the number of starts taking place. As a result, the regions where these industries have a considerable footprint have experienced some of the largest falls in science sector apprenticeship starts. This limits the number of opportunities available for learners in regions that should otherwise be targeted for action to support the Levelling Up agenda.

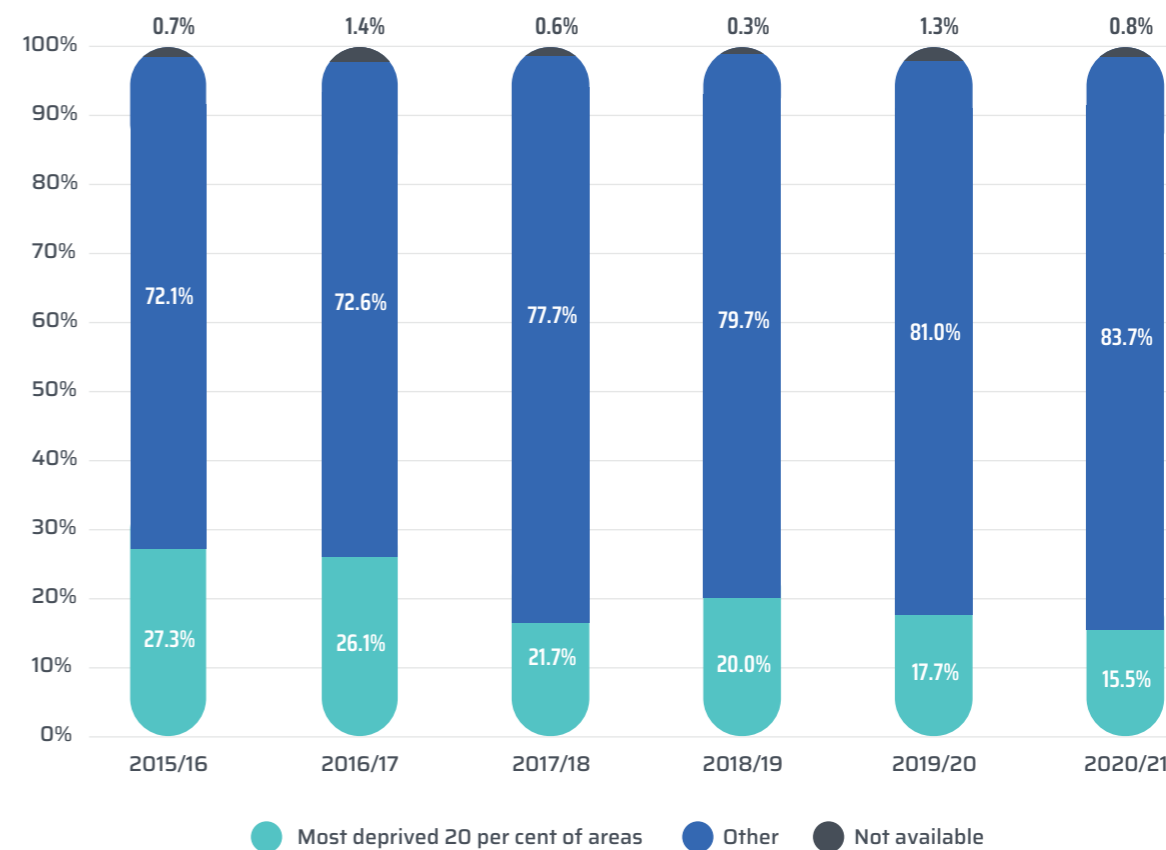
Apprenticeships are often considered a ladder of social mobility, supporting employability and enabling individuals to gain skills in a non-academic context. However, a considerable fall in the number of lower-level apprenticeships taking place in the sector risks removing an important entry point for individuals from disadvantaged socio-economic backgrounds.²⁴ To level up opportunities across the country, investment must be targeted to incentivise activity at lower levels. To ensure consistent access to the full range of apprenticeship standards and provide opportunities for learners from all backgrounds and abilities to build a successful career in the sector.

Deprivation status	Level 2	Level 3	Level 4	Level 5	Level 6+
Most deprived 20 per cent of areas	30.1%	16.1%	9.1%	8.6%	8.2%
Other	69.9%	83.9%	90.9%	91.4%	91.9%

Table 10: Share of apprenticeship starts at science companies in England, academic year 2020/21: Deprivation status vs qualification level

24. Social Mobility Commission: Apprenticeships and social mobility, 2020

Figure 7: Share of apprenticeship starts at science companies in England by deprivation status

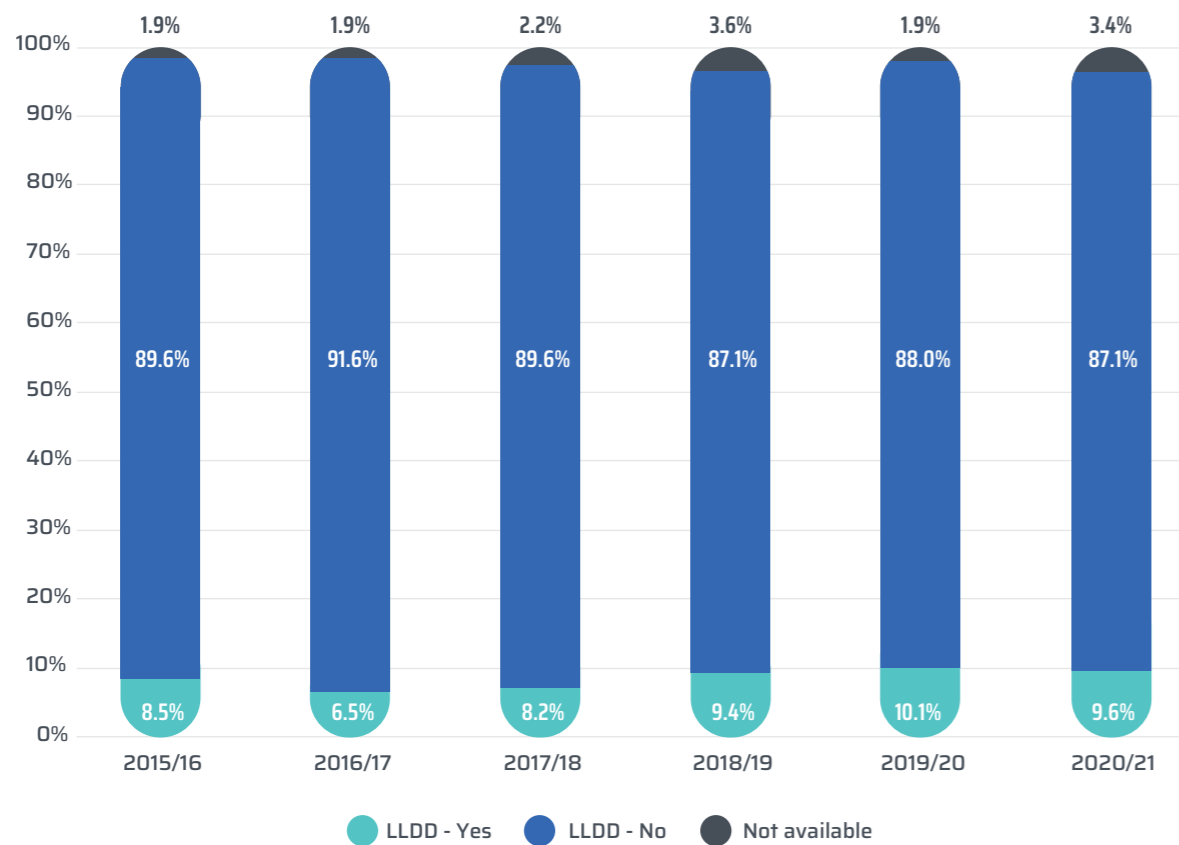


“The fall in starts means that not as many young people will have the opportunity to earn and learn whilst on the job. Not everybody can afford to go to university, especially with the increase in fees. So it just feels unfortunate that there will be less and less opportunity, especially for those young people who live in remote rural areas where there isn't a huge amount of industry anyway.”
SME Chemicals employer

Disability status

The proportion of apprentices within the science sector identifying as 'Learners with Learning Difficulties or Disabilities' (LLDD) has seen some modest growth from approximately 8.5% in 2015/16 to 9.6% in 2020/21. This compares to about 11.9% of apprentices across all sectors in England during the same period.

Figure 8: Share of apprenticeship starts at science companies in England by LLDD status



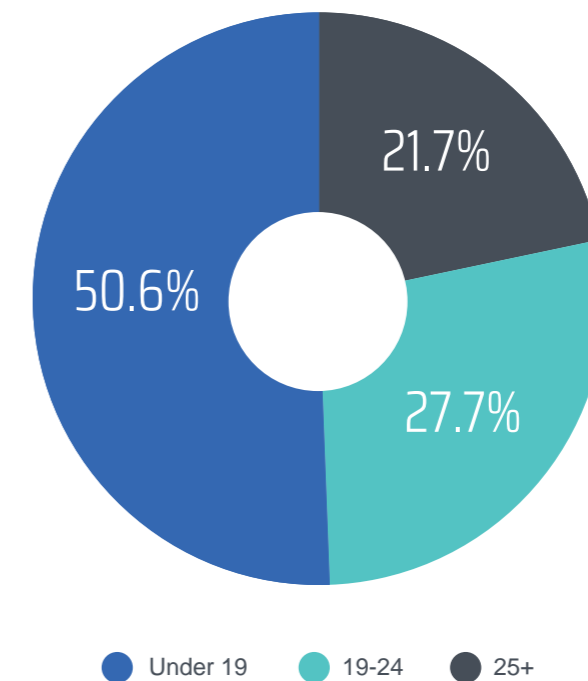
Age profile

Figure 9 shows an analysis of the age profile of science sector apprentices from academic year 2020/21 and reveals that approximately half (50.6%) were aged 25+. This compares almost exactly with the data for apprentices across all sectors in England, with 50.5% aged 25+. However, the science sector has a slightly higher proportion of young learners, with 21.7% of apprentices under the age of 19 compared to 19.9% across all sectors.

Unsurprisingly, the age profile changes across the different apprenticeship levels, with under 19s making up a higher proportion of apprentices at Levels 2 and 3. While more than two-thirds of apprenticeships at Levels 4+ are undertaken by learners aged 25+.

Having said that, the overall age profile hasn't changed much since 2015/16, when 53.1% of science sector apprentices were aged 25+. This is despite the fact that nearly all (96.5%) of the apprenticeships that year were at Levels 2 and 3. This may suggest that before the introduction and expansion of higher-level apprenticeships, some employers used lower-level apprenticeships for retraining and CPD when more advanced training was needed.

Figure 9: Share of apprenticeship starts at science companies in England by age, academic year 2020/21



Survey data analysis

Levy recovery

The first section of the survey focused specifically on the Apprenticeship Levy. Respondents were asked to state whether their organisation currently pays the Levy, what their annual liability is, how much they are currently recovering, and whether or not they are utilising the Levy transfer system.

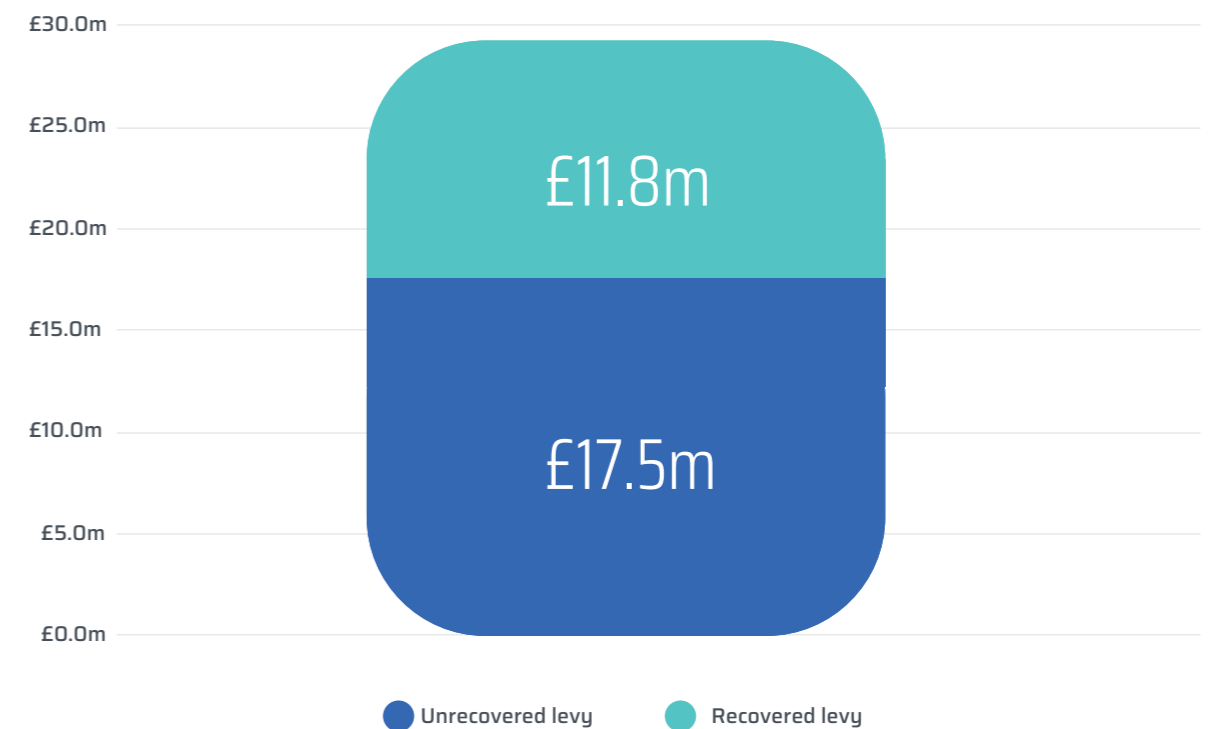
Overall, 74% of the respondents are currently required to pay the Apprenticeship Levy. In total, they raised approximately £29.3m in Levy funds during the 12 months prior to the survey. SIP has previously approximated that the total annual apprenticeship Levy raised in the sector is circa £60m.²⁵

Of the £29.3m total Levy liability, approximately £11.8m had been recovered to spend on apprenticeship training, equating to a recovery rate of approximately 40%. This is up from 28%

in 2020 and 13% in 2018. This is, of course, a positive trend. However, it is now more than five years since the introduction of the Levy system, and still, 60% of the funds raised within the sector are lost when they expire. This compares to an estimated recovery rate of 51% for the funds raised across all sectors between April 2019 and March 2020, as described on page 17 of this report.

SIP Apprenticeship Survey 2020 set a target for the sector's Levy recovery rate to surpass the national average for all sectors, which was estimated to be approximately 31% at the time. To achieve a recovery rate of 40% is fantastic progress and should be celebrated, albeit in the context that the average across all sectors has also grown and science continues to lag behind.

Figure 10: Breakdown of Apprenticeship Levy payments made by survey respondents, comparison of recovered funds and unrecovered funds



²⁵ Total annual Apprenticeship Levy raised calculated using information available via DueDil (<https://www.duedil.com>)

Although Levy payers are entitled to recover the full value of their liabilities, when designing the system, the Government expected employers would access up to around half of the funds in their accounts (on average).²⁶ The remaining unused or expired Levy is then used to fund the Government's 95% 'co-investment' contribution, meaning that the money raised by the Levy effectively has to pay for all apprenticeship training.²⁷

The survey responses include several large employers liable to pay an annual Levy in excess of £1m each, and in some cases, far more. On average, these employers currently train more than 180 apprentices each, with most already having well-established annual intakes. Despite this, the Levy recovery rate for these organisations stands at around 39%, with approximately £14.4m of potential funding being lost between them each year. These companies would need to regularly train an unfeasible number of apprentices to enable them to spend all of their Levy.

Respondents were also asked whether they were utilising the apprenticeship Levy transfer system. Nearly 70% of respondents are not using it at all, 22% are using it to transfer their funds to another organisation, and 8% were receiving transfers. In total, the respondents that had used the system to transfer funds had shared a total of £1.2m. The maximum transfer amount is currently set at 25%, meaning that approximately £7.3m out of the total £29.3m of Levy captured in this survey was available to transfer. In total, the respondents had transferred funds worth £1.2m, approximately 16% of what was available.

In 2018, we reported that 28% of the sector's Levy payers were not recovering any funding at all. By 2020 this figure dropped to around 12%. This time we estimate that only 3% of Levy payers within the sector are not recovering anything from their account funds. This, in combination with the increased recovery rate, suggests that Levy payers are becoming gradually more familiar with the Levy system and getting better at incorporating it into their training and development planning.

Apprenticeship usage

Between 1st September 2020 and 31st August 2021 survey respondents registered a total of 881 apprentices. This equates to 35% of the circa 2,482 starts registered by science sector companies in the 2020/21 academic year. Of these 881 apprentices, 519 (59%) were new recruits compared to 362 (41%) who were existing employees retraining or upskilling. In total, the respondents were training 2,142 apprentices across all intakes that were still live.

26. National Audit Office: The apprenticeships programme, 2019

27. <https://www.gov.uk/Government/news/key-facts-you-should-know-about-the-apprenticeship-levy>

Respondents were given a list of 55 relevant apprenticeship standards and asked to identify how many of their current apprentices were enrolled on each. We intend to track the most prevalent standards used across the science sector to enable more focused insight and further research into the quality of the standard, funding band and quality of provision across the country.

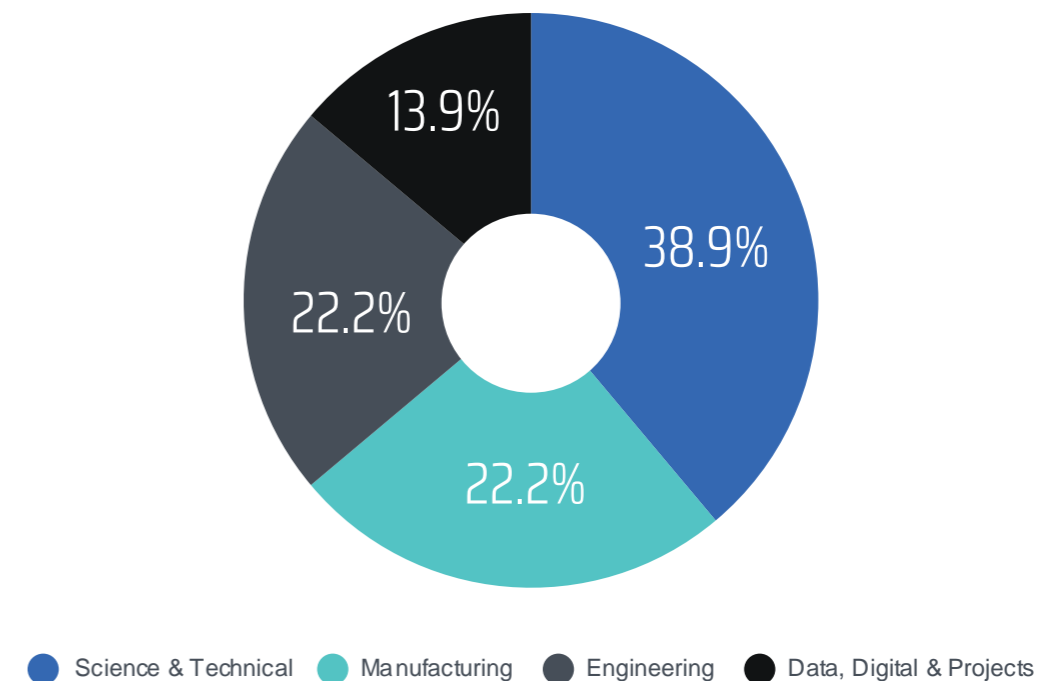
Table 11 shows (in ascending order) the ten apprenticeship standards with the most starts. Level 3 Science Industry Maintenance Technician was the most popular standard overall, with approximately 200 starts registered by the survey respondents across all 'live' intakes.

Apprenticeship standard
L3 Science Industry Maintenance Technician
L6 Laboratory Scientist
L4 Data Analyst
L3 Maintenance and Operations Engineering Technician
L5 Technician Scientist
L3 Science Manufacturing Technician
L7 Senior Leader
L2 Science Manufacturing Process Operative
L3 Team Leader or Supervisor
L5 Operational Departmental Manager

Table 11: Top ten apprenticeship standards with the most starts at survey respondents (all 'live' intakes)

The long list of standards were grouped into broad subject areas, such as 'Science & Technical', 'Manufacturing', 'Engineering' and 'Data, Digital & Projects'. Respondents were then asked which broad category they anticipated the largest growth in their future apprenticeship recruitment. Figure 11 shows the largest growth is expected within the 'Science & Technical' subject area, consisting of 8 standards in total, including L3 Laboratory Technician, L5 Technician Scientist and L7 Research Scientist.

Figure 11: Subject areas with the largest anticipated growth in future apprenticeship recruitment amongst respondents



Desired flexibilities

The Apprenticeship Levy was introduced to "create long term sustainable funding for apprenticeships and to give employers more control to provide their staff with a range of training opportunities."²⁸ We are now more than five years since its introduction and not only has the number of apprenticeships taking place decreased significantly but so has overall employer investment in workplace training. The CIPD estimates that employer-funded off-the-job training across all sectors in England fell by £2.3bn between 2017 and 2019.²⁹ While the Learning & Work Institute recently reported that training spend per employee has fallen 28% in real terms since 2005, from £2,139 to £1,530 per year, which is now less than half the EU average.³⁰

Despite this, approximately 60% of the Apprenticeship Levy funds raised within the sector are lost when they expire. The current system means that many large organisations have a substantial financial obligation to pay the Levy, with restrictions limiting their ability to spend it on the training that works for them.

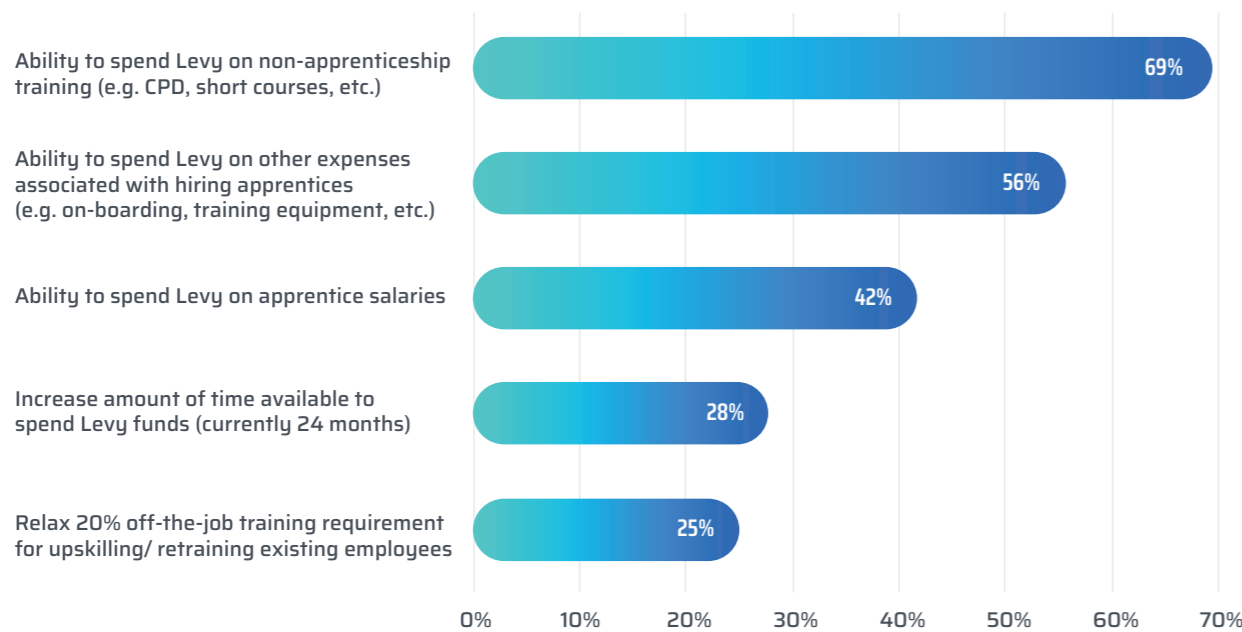
Respondents were presented with a range of potential flexibilities that could be built into the current apprenticeship system to help improve engagement. It is, perhaps, unsurprising that the top three flexibilities science companies want to see introduced all relate to the ability to access more of their Levy funds. Specifically, this includes spending Levy funds on; non-apprenticeship training (CPD/ short courses); other expenses associated with hiring apprentices (on-boarding/ equipment/ etc.); and apprentice salaries. Overall, more than 69% of respondents stated they would like the ability to spend their Levy funds on non-apprenticeship training in the form of continuing professional development and short courses for their staff.

28. <https://www.gov.uk/Government/news/key-facts-you-should-know-about-the-apprenticeship-levy>. Date accessed: 27/10/2022

29. CIPD: Apprenticeship Levy has failed on every measure - Press release, 2021

30. Learning and Work Institute: Raising the bar, Increasing employer investment in skills, 2022

Figure 12: Top five flexibilities that respondents want introduced to the apprenticeship system



Government guidance states that “any unspent Levy funds within each financial year are then used to support existing apprentices to complete their training, pay for apprenticeship training for smaller employers and additional payments to support apprentices.” This poses the question of whether funds raised within science should be used to boost skills in other parts of the economy when Levy recovery rates remain comparatively low in the sector and considerable skills gaps still exist.

Workplace training is critical to improving growth and productivity, building successful businesses, and increasing opportunities for individuals. For all their benefits and relative versatility, apprenticeships are not always the most appropriate way to reskill or upskill workers. Apprenticeship programmes must be at least a year in length, and those at higher levels can take several years to complete. Some workers only require an update or a top-up to the gaps in their skill set, and using apprenticeships may duplicate some of the functional and technical skills they have already gained. At the same time, off-the-job training requirements are often not conducive to business needs, with many organisations struggling to lose employees for long periods.

If the UK is serious about being a science and technology superpower, we need to address the skills shortages that are limiting growth and international competitiveness in the

sector. The evidence suggests that overall investment in workplace training has fallen significantly in recent years. And yet many contributing employers continue to lose access to vast amounts of potential funding while the Levy remains restricted only for use on apprenticeships. There is an opportunity to stimulate workplace learning by expanding the Levy so that a proportion can also be used for short courses and Continuing Professional Development (CPD). This flexibility would empower employers to provide more training and development opportunities for the workforce in a practical way that works for them.

Another interesting thing to note is that 25% of respondents want to relax the 20% off-the-job training requirement for upskilling/ retraining existing employees. Among the sample of respondents that stated that they are currently using apprenticeships to upskill or retrain their existing staff, this number rises to 32%. This suggests that a relaxation of this requirement could significantly increase the number of current employees using apprenticeships for their professional development while ensuring continued productivity for the organisation. Existing employees that are committed to their CPD are committed to learning in their own time, so the relaxation of current rules could support increased uptake of apprenticeships for upskilling, offering more progression opportunities in the future.

In March 2022 during its Spring Statement, the UK Government announced it would “consider whether the current tax system, including the operation of the Apprenticeship Levy, is doing enough to incentivise businesses to invest in the right kinds of training”. Since then there has been considerable change within Government and at this point it is unclear if a review of the Levy is still being considered. SIP would be keen to engage with Government on the Apprenticeship Levy and how greater flexibility can help to reverse the drop in engagement and enable companies to deliver more training and development opportunities.

Biggest barriers

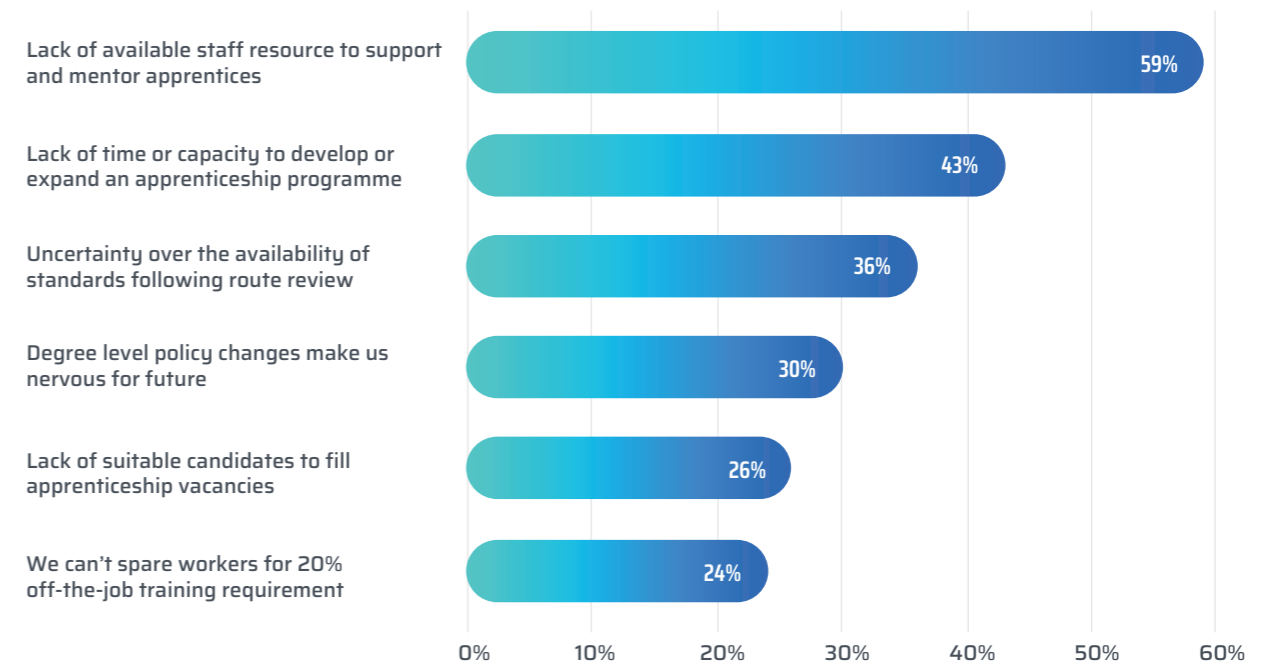
Respondents were also given a list of potential barriers and asked to identify all those (if any) that are preventing their organisation from training higher numbers of apprentices. The barriers were grouped into the broad areas of: business capability; funding issues; apprenticeship standards;

recruitment issues; provider capacity and capability; end-point assessment organisations, and; Government policy.

Figure 13 shows that three of the top six barriers were related to business capability. Specifically, respondents reported a lack of available staff to support and mentor apprentices, a lack of time or capacity to develop/ expand an apprenticeship programme, and an inability to lose the apprentice for 20% off-the-job training.

There were also two barriers related to Government policy that spoke to the concern around changes to the system. Specifically, the uncertainty over the future availability of standards following the engineering & manufacturing route review, and concern over recent changes to degree-level apprenticeship policy. This again highlights the importance of a consistent policy environment that encourages employers to engage and invest in the apprenticeship system.

Figure 13: Top six barriers preventing respondents from training higher numbers of apprentices



Experiences of the system

It is important to note that the majority of respondents are large Levy payers that, generally, are currently training apprentices. The national data show that the drop in overall apprenticeship starts in the sector has been predominantly driven by a significant 65% fall in the number of starts that are not directly funded via the Levy. The organisations most affected by this are mostly SMEs. In contrast, the number of starts at large Levy payers had been rising each year until a drop in 2020/21, which may be (at least in part) a temporary impact of the coronavirus pandemic. Therefore it must be said that, generally, large employers have navigated through the changes more successfully than SMEs and will likely have had more positive experiences of engaging with the apprenticeship system. This context is important as the survey responses more closely reflect the views of large businesses and not necessarily the experiences of companies that have

been most impacted by the changes. It suggests that the levels of satisfaction and confidence in the apprenticeship system displayed may be overstated.

Respondents were presented with the following statement *“The current apprenticeship system is employer-led. This means that employers set the standards, create the demand for apprentices to meet their skills needs, fund the apprenticeship and are responsible for employing and training the apprentice.”* and asked whether they feel empowered by the current ‘employer-led’ system. **Figure 14** shows that 37.5% of respondents answered no, suggesting a significant proportion of employers still do not see the skills system as being employer-led.

Similarly, when asked, 70% of respondents said they feel able to effectively communicate their organisation’s position on key elements of the system, including on standard development.

Figure 14: Respondents attitudes towards feeling of empowerment in their experiences engaging with the employer-led apprenticeship system

Do you feel empowered by the current employer-led system?

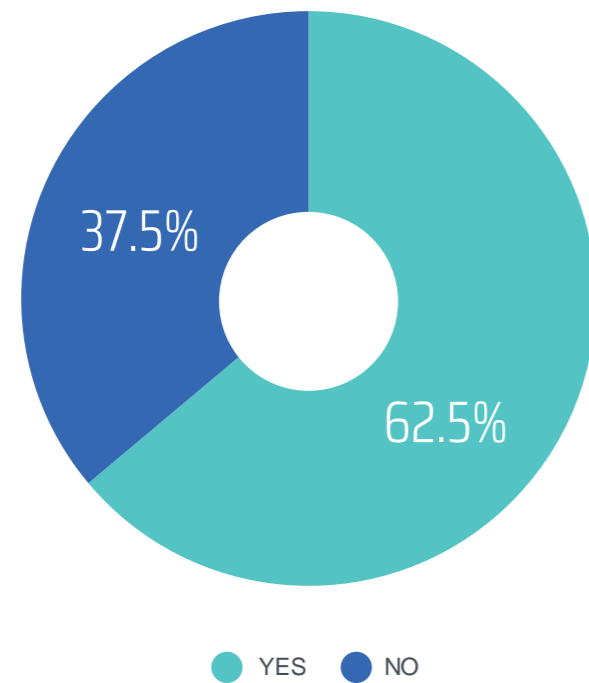
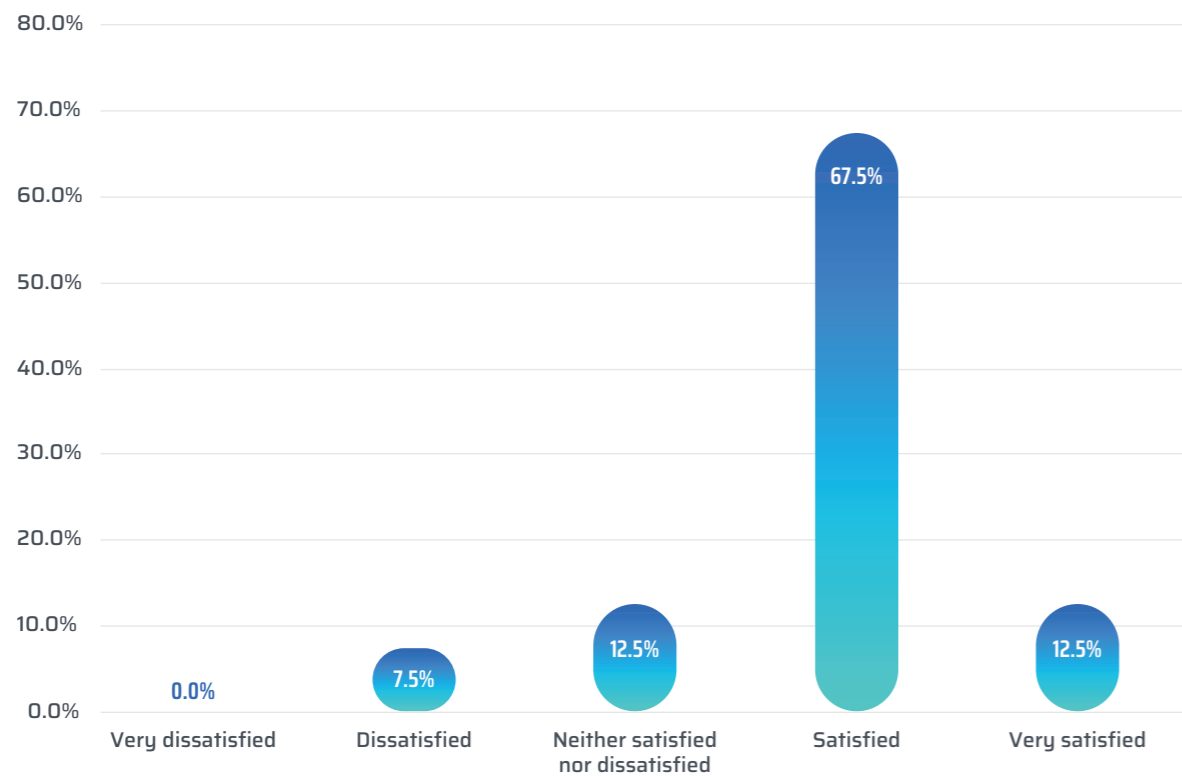


Figure 15: Respondent satisfaction levels regarding the current apprenticeship system in England

How satisfied are you that the current apprenticeship system in England works well for your business?



80% of respondents described themselves as either satisfied (67.5%) or very satisfied (12.5%) that the current apprenticeship system works well for their business. However, just 37.5% felt either moderately confident (32.5%) or extremely confident (5%) that they are getting the most out of the current apprenticeship system. This shows that even among large Levy payers, there are still challenges and a fair amount of uncertainty regarding how best to utilise the system.

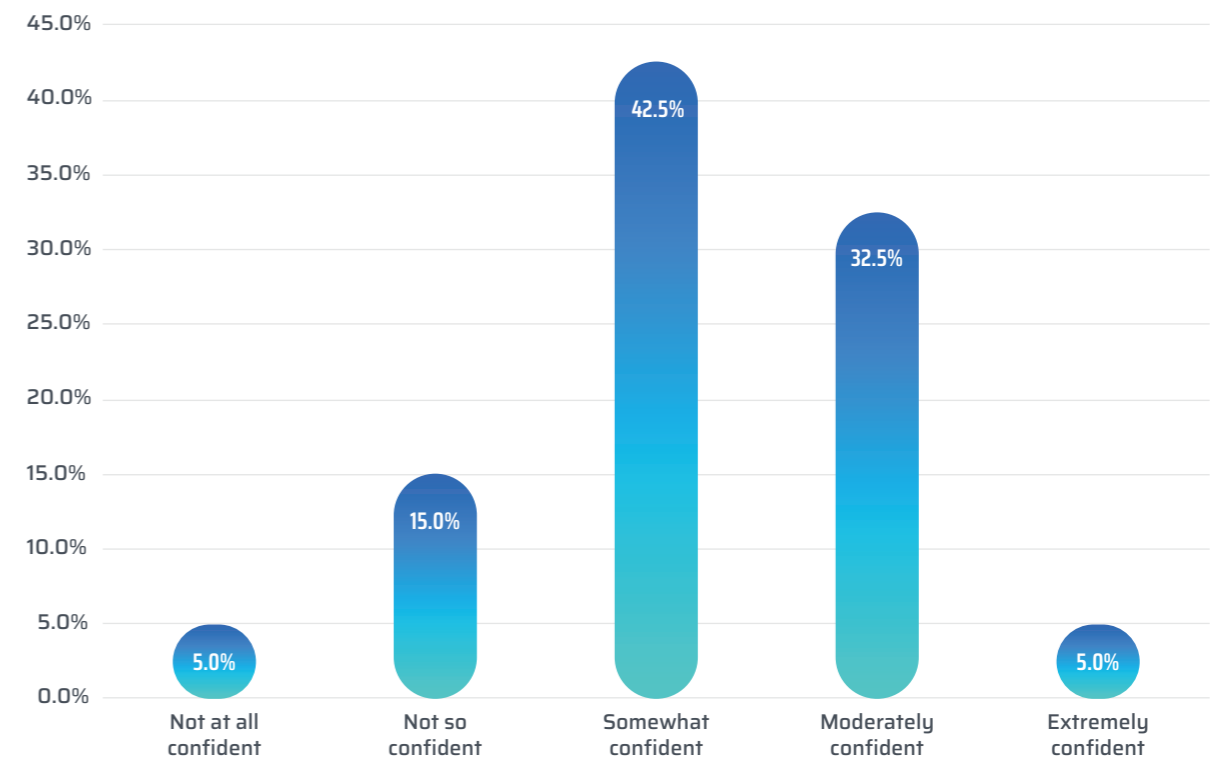
Employers need stability in the skills system to maximise its effectiveness and have the confidence to invest in long-term growth and development plans for their workforce. And although the Levy system is not perfect, employers are gradually becoming more familiar with it and getting better at incorporating it into their learning and development strategies.

Levy recovery rates are increasing, and, as previously stated, survey responses suggest a fair degree of satisfaction among Levy payers.

However, there is also considerable concern over several new changes that are still taking place. The national data clearly demonstrate how periods of change and uncertainty can impact both the number of companies engaging and apprentices being trained. To maintain confidence in the apprenticeship system, it is important to have a consistent policy environment that recognises and protects what is valued and works for industry.

Figure 16: Respondent confidence levels regarding the ability to get the most out of the current apprenticeship system

How confident do you feel that your organisation is getting the most out of the current apprenticeship system?



Removing qualifications

Before undertaking the end-point assessment (EPA), apprentices must meet the gateway requirements set out in the Apprenticeship Standard. This ensures that all apprentices have completed the mandatory aspects of the occupational standard and any work that underpins specified assessment methods. A common example of this across apprenticeship standards has been the achievement of a required qualification, such as an NVQ or knowledge based Diploma. This enabled standards to be designed with the overarching knowledge required to meet broader industry needs and then be supported with specific industry knowledge gained through an appropriate qualification. For example, when undertaking a L5 Technician Scientist apprenticeship, the learner could complete a Higher National Diploma in either Applied

Chemistry or Applied Biology. This approach has served the science sector well as qualifications are highly regulated, they hold currency due to their long-standing in the sector, and they have international transferability due to their widespread recognition.

The Institute of Apprenticeships and Technical Education (IfATE) is responsible for the policy implementation, including the 'rules' for the design of Apprenticeship Standards in England. Implementation is ongoing and ever-changing, and in line with a long-term desire to remove qualifications from apprenticeships, recent changes are making it harder to mandate a qualification. There are several reasons for this change. There is concern that mandating qualifications can disincentive learners from going on to complete the apprenticeship, which would negatively impact achievement

rates. IfATE also want the apprenticeship standard alone to hold equivalence to qualifications, and there is a perception that some current qualifications offer little or no value.

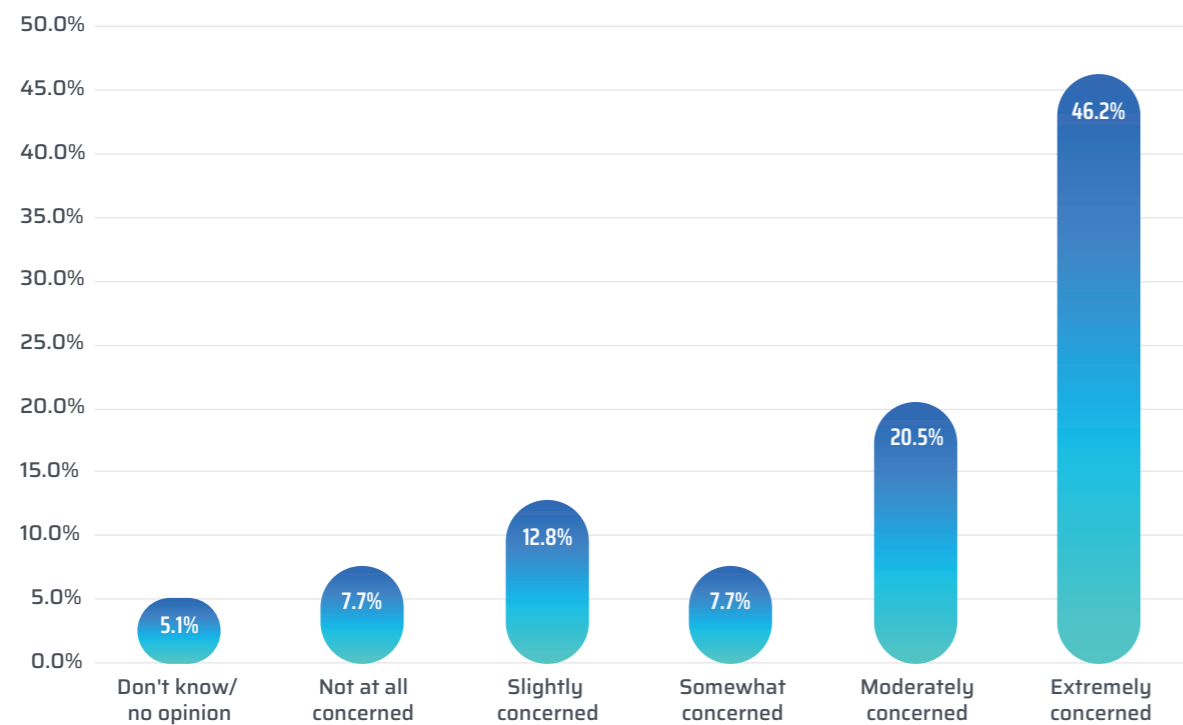
However, as a result of this policy change, some hugely popular apprenticeships within the sector have had their mandatory qualifications removed from the standard. The impact is that the underpinning science knowledge is now only stipulated in one knowledge statement, assessed via 'interview or professional discussion'. This raises concerns about the depth, breadth and quality of future progression opportunities for achievers when there are no standardised and quality assured knowledge requirements. This has triggered the development of an array of niche standards breaking away from the popular L3 Science Manufacturing Technician standard that has worked well with individual knowledge based qualifications since it was introduced in 2015. This is increasing the amount of standards available in what many now see as a crowded offer.

In total, two-thirds of employers described themselves as either moderately (46%) or extremely concerned (21%) over the potential implications of the general trend to remove qualifications from apprenticeship standards. This again illustrates how important it is to recognise and protect aspects of the apprenticeship system that are valued and work well for employers.

In December 2022, IfATE launched a further review into mandating qualifications within apprenticeships through a public consultation. This could mean further changes to the already complex system, making it harder for qualifications to be included in standards in the future.

Figure 17: Respondents level of concern over the general trend to remove qualifications from apprenticeship standards

How concerned are you over the potential implications to your business of the general trend to remove qualifications from apprenticeship standards?



Engineering and Manufacturing route review

Published in November 2021, IfATE reported on a review of the Engineering and Manufacturing route, which looked into 58 existing standards 'to ensure the occupations and skills matched the needs of the employers.' The board made recommendations that have already impacted many popular standards due to the move to turn apprenticeship standards into occupational standards, deviating from the previous sectoral focussed approach.

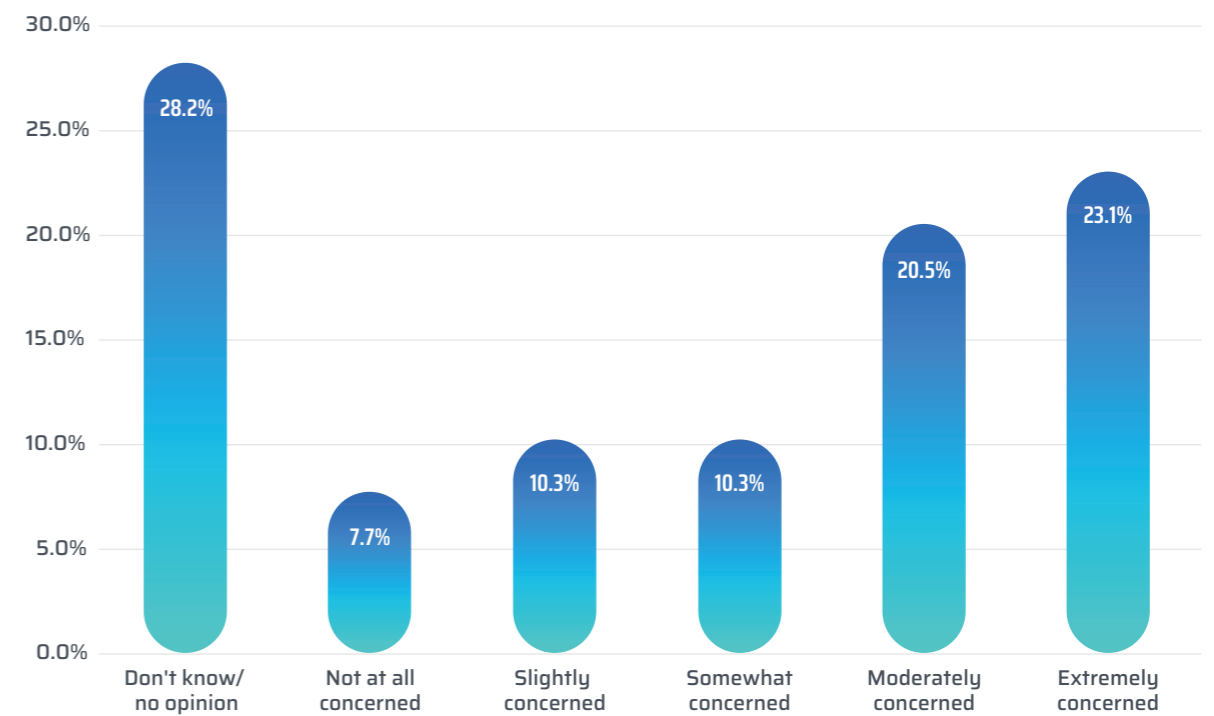
This has resulted in having to create new standards to meet niche requirements from certain areas of the sector due to the rule change around mandating qualifications, which dictates that trailblazer groups can no longer design a set of knowledge, skill and behaviours (KSB) to be underpinned with a qualification to meet industry-specific needs. Instead, the standard itself must address this aspect of the learner's development.

More changes are pending, with a generic engineering and maintenance standard being considered. Science employers are concerned about losing safety critical training requirements if KSB statements have to meet a range of sectors and industries, and we lose our science-specific knowledge, which is currently welcomed by industry; an example being the most popular standard we have reported on Science Industry Maintenance Technician.

More than two-fifths of employers described themselves as either moderately (21%) or extremely (23%) concerned over the potential implications of the outcomes of the engineering and manufacturing route review. Our conversations with industry suggest a big part of this concern is around the future availability of popular standards, and them remaining fit for purpose in respect of design and funding changes.

Figure 18: Respondents level of concern over the outcome of the recent engineering and manufacturing route review

How concerned are you over the potential implications for your business of the outcome of the engineering and manufacturing route review?



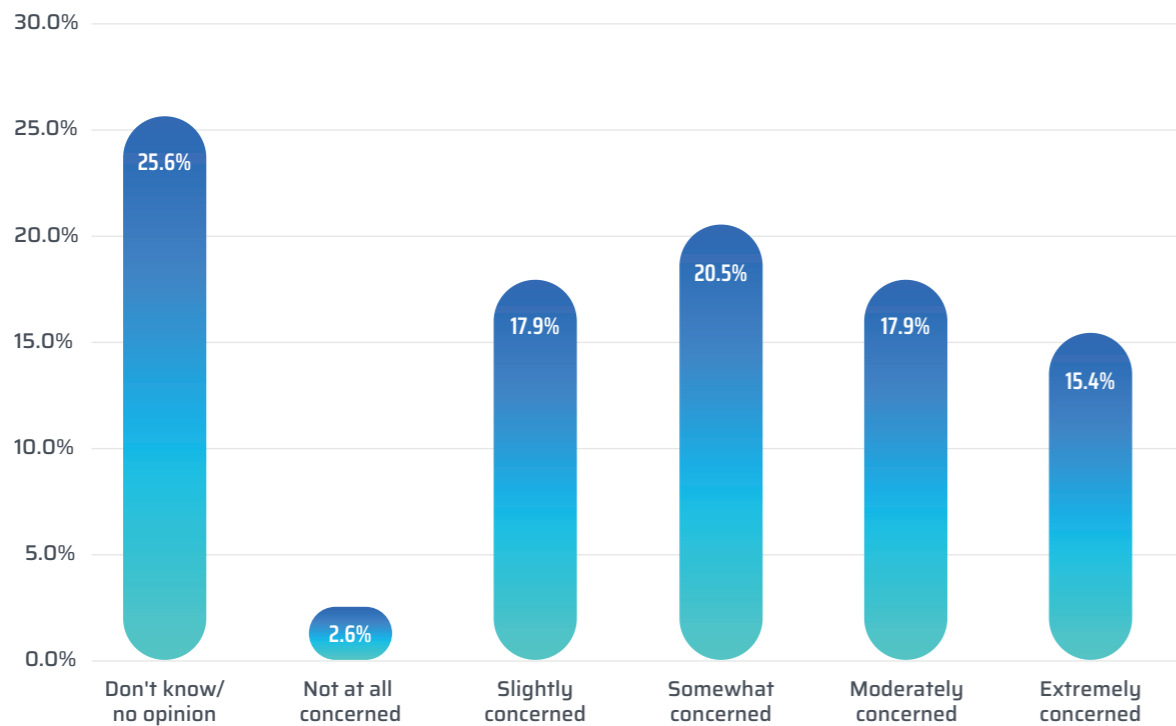
Funding band changes

Every apprenticeship standard is allocated to one of thirty funding bands ranging from £1,500 to £27,000. The upper limit of each funding band sets the maximum amount of digital funds an employer that pays the Levy can recover towards the cost of an apprenticeship. It also sets the maximum price that Government will 'co-invest' for non-Levy payers. This funding can be used to pay for the off-the-job training element as well as the assessment of an apprenticeship. If training and assessment costs go over the funding band maximum, employers will need to pay the difference.³¹

The funding team within IfATE are responsible for advising the Department for Education and recommending an appropriate funding band for each new apprenticeship standard. They also review existing funding bands with the aim of supporting high quality training delivery while still maximising value for money for employers and taxpayers. Ultimately, the Secretary of State for Education makes the final decision on funding bands.³²

Approximately one-third of survey respondents described themselves as either moderately (18%) or extremely (15%) concerned over the potential implications of the upcoming funding band policy changes. The concern stems from the fact that some of the sector's most popular standards (such as Level 3 Science Manufacturing Technician and Level 6 Laboratory Scientist) are going through revisions that involve a re-calculation. Funding band limits are already feeling the squeeze of inflationary pressures and the worry is that these revisions may result in the current limits being lowered further. This would mean that employers would need to pay the difference if the costs of training exceeded the maximum allowed. This will discourage employer engagement and may result in cuts being made to programmes, making it more difficult to deliver training at the required quality. All of this raises concerns about the future quality and availability of training delivery, its impact on learner outcomes, and all-round satisfaction levels.

Figure 19: Respondents level of concern over the upcoming funding band policy changes
How concerned are you over the potential implications to your business of the upcoming funding band policy changes?



31. IfATE: Current Funding Model Guidance, 2022

32. IFF Research: Cost of Apprenticeship Training - technical report, 2020

Degree apprenticeship policy

In 2021 IfATE launched a consultation for feedback on several proposed policy changes to the design, delivery and assessment of degree apprenticeships. After receiving more than 200 consultation responses from a range of different stakeholders, IfATE decided to proceed with implementing the proposed changes, which relate to the following:

- Amending the mandatory qualifications policy to better support graduate-entry occupations
- Integration of on-the-job and off-the-job training
- Alignment between apprenticeship knowledge, skills and behaviours and degree learning outcomes
- Integration of assessment
- Requiring participation of an independent assessor with occupational expertise

The Science Industry Partnership has engaged in consultation response and direct discussions with officials, expressing concerns that a newly categorised 'Occupational Degree' could:

1. Negatively impact the brand of degree apprenticeships and risk parity of esteem, which could detrimentally impact global transferability
2. Narrow the academic content with current funding models

leading to compromise within providers or with employers being asked to 'top up' funding

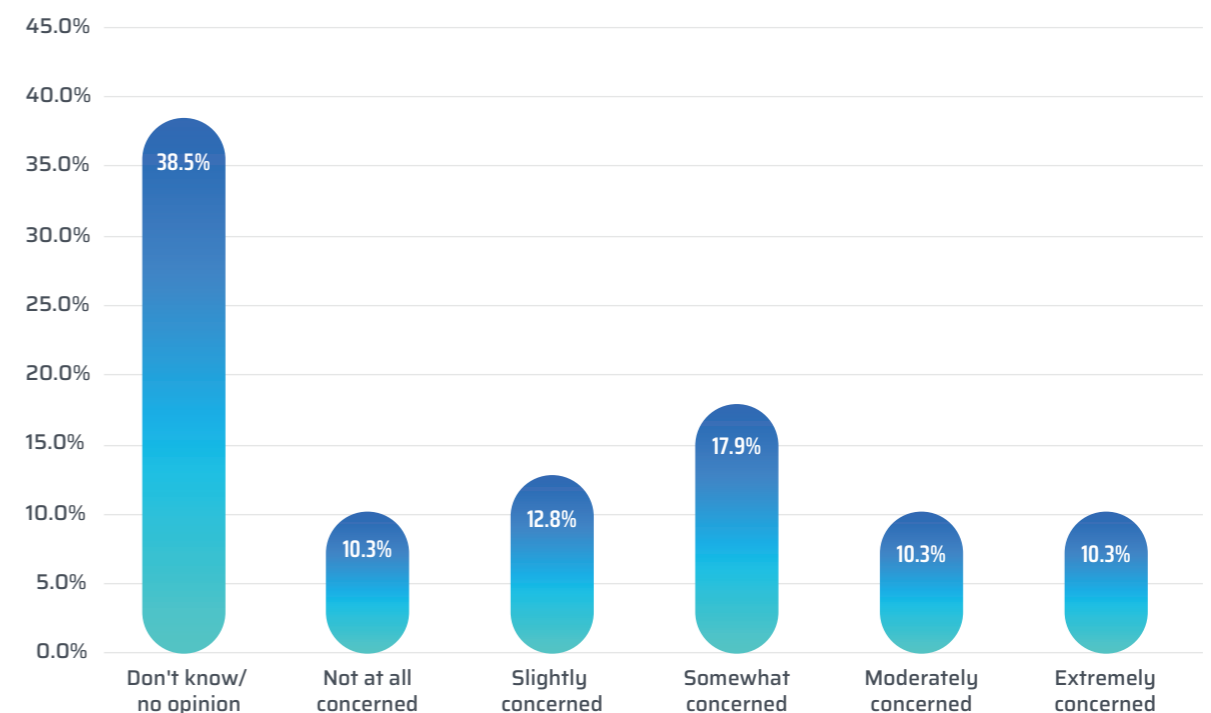
3. Remove independent end-point assessment, which is widely valued amongst industry

Approximately 21% of respondents described themselves as either moderately or extremely concerned over the potential implications of the upcoming degree apprenticeship policy changes. It is important to note that nearly 40% of respondents answered 'don't know/ no opinion'. This suggests that the level of concern amongst the population of employers that are actually using degree apprenticeships could be much higher than our survey results initially point to.

National data show that 79% of Level 6+ apprenticeship starts across all sectors in England were at large employers during academic year 2020/21. This suggests that disengagement and withdrawal from a relatively small number of large employers could have a pronounced impact on the overall number of starts on degree-level apprenticeships.

The new policy is still in its infancy after being introduced via a transition period that ran between March and September 2022. SIP will keep a keen eye on the national data to track the impact of the changes and will continue to voice the concerns of science sector companies.

Figure 20: Respondents level of concern over the upcoming degree apprenticeship policy changes
How concerned are you over the potential implications to your business of the upcoming degree apprenticeships policy changes?





Actions to accelerate apprenticeships and drive growth

1. Increase flexibility of the Levy

Since the Levy was introduced, not only has the total number of apprenticeships taking place decreased significantly but so too has overall employer investment in workplace training. And yet many employers continually lose access to vast amounts of potential funding whilst the Levy remains restricted only for use on apprenticeships. There is an opportunity to stimulate workplace learning by expanding the Levy so that a proportion can be used for short courses and Continuing Professional Development (CPD).

2. Protect qualifications in apprenticeships

Employers value the use of qualifications in apprenticeships as they help ensure that knowledge is taught to the expected levels. Protecting knowledge within apprenticeships needs to be the highest priority to ensure learners benefit from their training and can progress in the future.

3. Enhance the work of the 'Apprenticeship Strategy Group'

A new 'Pathways and Progression' strand will be added to the work of the Apprenticeship Strategy Group (ASG). This will support members by providing an enhanced understanding of the alternative vocational and technical education routes into the sector and give confidence that there are clear pathways for progression. ASG will also be asked to monitor Levy recovery in the sector annually. A realistic target for the sector should be to track and surpass the average Levy recovery rate for all industries, which currently stands at approximately 50%.

4. Introduce a new approach for engaging SMEs

A new support service targeted at SMEs is needed. This would provide businesses with access to the subject matter expertise they need to re-engage with the apprenticeship system. In addition, removing the 5% co-investment contribution altogether and providing enhanced incentives (e.g. completion bonuses or optional maintenance loans) may make it easier for some SMEs to attract and recruit apprentices.

5. Enable a stable and consistent policy environment

For employers to maintain confidence in the apprenticeship system, it is important to have a consistent policy environment. Keeping employers at the heart of standard design, protecting funding requirements and safeguarding the quality and consistency of options will be key to long-term investment and economic recovery.

6. Promote equality of opportunity across all levels and business sizes

Since 2015/16, the number of apprenticeships taking place in the sector at Levels 2 and 3 has dropped by 69%, presenting a challenge to the sector's social mobility ambitions. This has a disproportionate impact within the different regions of England and limits opportunities for learners from the most deprived areas. Many lower-level apprenticeships are highly valued and must be protected to promote fair and equal opportunities for all.

SIP Apprenticeship Strategy Group

The SIP Apprenticeship Survey 2020 set out a recommendation for greater collaboration on apprenticeships to create a shared understanding of the issues and delivery a strategy for the sector.

To achieve this, SIP launched the Apprenticeship Strategy Group (ASG) in February 2021 to give like-minded employers an opportunity to work together on the ever-changing apprenticeship landscape.

The ASG vision is...

“Collaboration, ensuring that every science business embraces inclusive, accessible, high quality apprenticeships funded through a fit for purpose levy, delivering career & progression opportunities.”

Meeting quarterly, the ASG have:

- Supported industry understanding of pending changes to existing apprenticeship standards when in review, actively responding to consultations where required
- Increased representation of science employers on trailblazer groups across popular standards
- Taken a proactive view to investigate data opportunities to learn more about apprenticeship take-up within science companies
- Formed positions on a number of live issues involving technical education policy, including qualifications, T Levels and the funding impacts for BTECs.
- Lobbied Government on the Degree Apprenticeship consultation and subsequent policy
- Created a careers map to show progression opportunities available

With the evolution of the Life Sciences 2030 Futures Strategy Group, the ASG has now become the workstream for all apprenticeship activity, and SIP members have welcomed the other stakeholders to meetings since late 2021.



“Collaboration is so important within our industry, and working together with like-minded people who are passionate about apprenticeships has been such a pleasure for the past 18 months.

As a group, we seek industry-wide views and form positions on key aspects of apprenticeship policy and wider technical education, which are fed into Government to help drive policy change.

The group comes together, engages in debate and topical discussions, and collaborates with ideas and suggestions on how to improve apprenticeships and their opportunities within our industry.

This report shows the good progress that is being made but also highlights the key concerns that we have on the ever-changing landscape. Working together, we will continue to raise questions and ensure our voices are heard to protect the apprenticeship brand for science apprentices.”

Kim Hardman, Director of UK Apprenticeships at AstraZeneca and Chair of the Apprenticeship Strategy Group

Case study

“ I was wanting to do a master’s degree but knew that it would be too much of a financial commitment. An apprenticeship is the best of both worlds. It’s part-time study, but you’re earning money at the same time and getting a great degree out of it. You’re also getting work experience out of it, which is hard to come by. ”

Case Study



Higher and degree-level apprenticeships give candidates a chance to gain the experiences, skills, and training to kick-start their careers without the barriers of student debt.

James Fox is a Bioinformatics Scientist at AstraZeneca. After leaving university with a first-class

degree, James knew he wanted to pursue Bioinformatics further but was worried about the costs of taking a full-time master’s degree. Being unaware of the options, a friend encouraged him to apply for a Level 7 Bioinformatics apprenticeship at AstraZeneca.

James was in the first cohort of the Level 7 Bioinformatics apprenticeship at AstraZeneca, a two-year course, part-time with face-to-face sessions, including university study. James excelled in his apprenticeship and, upon completion, secured a full-time role.

How was the study and work balance? Could you see what you had learnt being put into practice in your day-to-day role?

It was hard to balance going to university alongside my day-to-day role, and I definitely had to get the balance right. It’s like having to juggle two jobs in a week, but it worked out more as I delved into the apprenticeship. My manager really helped me reflect on what I had learned, and we would meet at the end of the week to go through everything. My manager also pointed me in the right direction of more resources and was very keen to help in any way possible.

How did AstraZeneca support you during your programme?

The apprenticeship team at AstraZeneca couldn’t have been more supportive or helpful. They make sure you really enjoy your apprentice experience. AstraZeneca have a dedicated apprenticeship team, and I tend to bump into them quite regularly in the building. They know all the apprentices and are happy to have a chat to see how things are going.

How did you find the end-point assessment?

It was a challenge in one sense as we were the first cohort for the Level 7 apprenticeship, and I wasn’t sure what to expect from the EPA. The nature of the work I do is very broad in respect of the knowledge, skills and behaviours of the standard. The report was quite simple to write as I had been given so much experience at AstraZeneca and essentially just had to talk about what I had done over the last couple of years. Similarly, the presentation element went well as

I was confident in what I had learned as well as the skills I had developed throughout the apprenticeship. The team I work with were also very supportive in helping me to prepare my presentation, helping me to practise by acting as the assessors.

What are your next steps?

I have been lucky enough to be offered a full-time position as a Data Scientist at AstraZeneca in the same team and doing the same work. It’s a great opportunity to do what I’m passionate about without the worry of end-point assessments and study! I will, of course, continue to upskill and keep developing in my role. I am also buddying up with the new Bioinformatics apprentice at AstraZeneca and hope to help them on their apprenticeship journey in the same way the team guided me through the whole experience.

How did you find the programme and experience overall, what overarching impact has it had for you?

Overall it’s had a positive impact on my career as it has helped to land me a job in a very competitive industry. I’ve been able to get quality experience over the past two years, which I think has been invaluable. Everyone from the Course Director, Apprenticeship Team and the Team in my day-to-day role made it a great experience, and I really enjoyed it.

What are the benefits of an apprenticeship for young people?

From the perspective of a Level 7 apprentice, I think it’s probably one of the best choices you can make because you know you don’t have to worry about missing out on the university experience. It’s also all paid for, so you’re getting paid to do a master’s rather than taking out another student loan. You’re still getting your degree, and it only takes an extra year and a half, so in my opinion, it’s like gold dust. In any apprenticeship you are avoiding debt and getting the on-the-job training you wouldn’t otherwise get when studying.

I think it’s vital that degree apprentices are offered in light of policy changes. Gaining the views of more apprentices could support this, and I think apprentices should be given more of a voice. The science industry needs to be accessible to all. Those who can’t afford to do further study could miss out on a successful career.

Background and Methodology

Survey responses

The Science Industry Partnership (SIP) is a powerful membership alliance of employers working together to establish the skills needed in the sector. By working in collaboration we are better placed to develop a world-class scientific workforce that enables our sector to compete, innovate and grow.

In 2018, SIP launched the Apprenticeship Survey project, a bi-annual survey of science companies to track apprenticeship usage in the sector and discover the impact of policy reforms. The insight we have gained over the previous two editions has helped to shed light on the issues that matter most to science employers and has informed our conversations with Government. For 2022 we have expanded the survey to also capture employer sentiment across key aspects of the apprenticeship system and reveal common areas of concern for the future.

The data were collected between February and July 2022 using an online survey tool. In total, we received responses from 42 separate companies from across the science sector. The top five industries represented within the survey data are detailed below:

- Pharmaceuticals: 31%
- Chemicals: 21%
- Polymers: 14%
- Medical Biotechnology: 12%
- Downstream Petroleum: 7%

By examining the size of the employers who responded, it is estimated that approximately 100,000 employees are captured within the survey, equating to around 19% of the total UK science sector workforce. Although 42 companies represent a small proportion of organisations within the science sector footprint, the survey has captured many of the sector's largest employers. Consequently, the workforce accounted for is much larger than the number of respondents initially suggests.

The vast majority of employers in the sector are SMEs, yet they account for a comparatively small share (29%) of our respondents. To address this, we have conducted several short interviews with SMEs to provide qualitative insight into their experiences dealing with the apprenticeship system. Any quotes included have been anonymised and not attributed to any individuals or companies.

This is an important source of information on the issues that affect the direction of apprenticeships in the science sector. These data are not available anywhere else, so it is vital that employers have again rallied to support the survey and provide us with valuable insight. SIP will continue to repeat a version of this survey on at least a bi-annual basis to obtain up-to-date and comparable datasets. We are keen to engage with as much of the sector as possible with this reporting.

A copy of the survey questions can be obtained from the SIP website: (www.scienceindustrypartnership.com)

Over the past few years, the Government has started to release National Statistics that reveal important insights into the characteristics of both learners and employers involved in the apprenticeship system.

This report, therefore, uses a combination of the 2022 apprenticeship survey findings and newly available National Statistics, along with data obtained via freedom of information requests, to provide a comprehensive review of apprenticeship usage by science companies in England.

National data

The Department for Education (DfE) now release National Statistics that detail the characteristics of employers with registered apprenticeship starts in England, including industry and size band. The datasets also allow an analysis of learner characteristics with the level of qualification, home region, and certain demographic data available. This is achieved by matching data from the Individualised Learner Record (ILR), Apprenticeship Service and Office for National Statistics Inter-departmental Business Register (IDBR). The process of accurately mapping the employment industry of apprentices using different Government data sources is a challenge, but it is something that DfE has got progressively better at.

For example, DfE successfully mapped the employment industry of 89.7% of all the apprenticeship starts in England during academic year 2015/16. There were a total of 509,360 starts across the whole economy, but it was only possible to accurately determine the industry of employment of 457,020. Therefore, 52,340 apprentices (10.3%) are not included in the DfE dataset that allows analysis of industry, employer size band, learner characteristics, etc. By 2020/21, DfE could show the industry of 94.5% of all apprenticeship starts, meaning only 5.5% of apprentices were excluded. This creates an issue

as the data provide an unequal representation of the total figures for each year, which is problematic when trying to compare between them. To combat this issue, we have applied calculations to the data to round the figures for each academic year up by the appropriate ratio so that every year stands at its potential '100%'.

Please note: DfE apply a rounding technique to the data to protect learner and employer anonymity. This means that every split of data are rounded either up or down to the nearest 10. When new detailed splits of data are individually rounded and then added back up, the new total can differ from the original figure that has only been rounded once. For example, the sum of each individually rounded figure for apprenticeship starts within the sector for the nine regions of England differs slightly from the figure given for the country as a whole. Consequently, some of the totals presented in this report do vary slightly.

The industry-specific data are pulled using two-digit Standard Industrial Classification (SIC) codes of economic activities. For the purposes of this analysis, the science sector consists of the below. Data for the Medical Technology industry are unavailable due to how it is categorised.

Industry	Two-digit SIC codes of economic activities
Downstream Petroleum	19: Manufacture of coke and refined petroleum products
Chemicals	20: Manufacture of chemicals and chemical products
Pharmaceuticals	21: Manufacture of basic pharmaceutical products and pharmaceutical preparations
Polymers	22: Manufacture of rubber and plastic products
Scientific R&D	72: Scientific research and development

Please note: Some activity within SIC code 72 falls outside the science sector footprint. Specifically, '72.20 Research and experimental development on social sciences and humanities'. We have calculated the share of employment that belongs within the sector and applied the appropriate proportions to the apprenticeship starts data for the Scientific R&D industry.

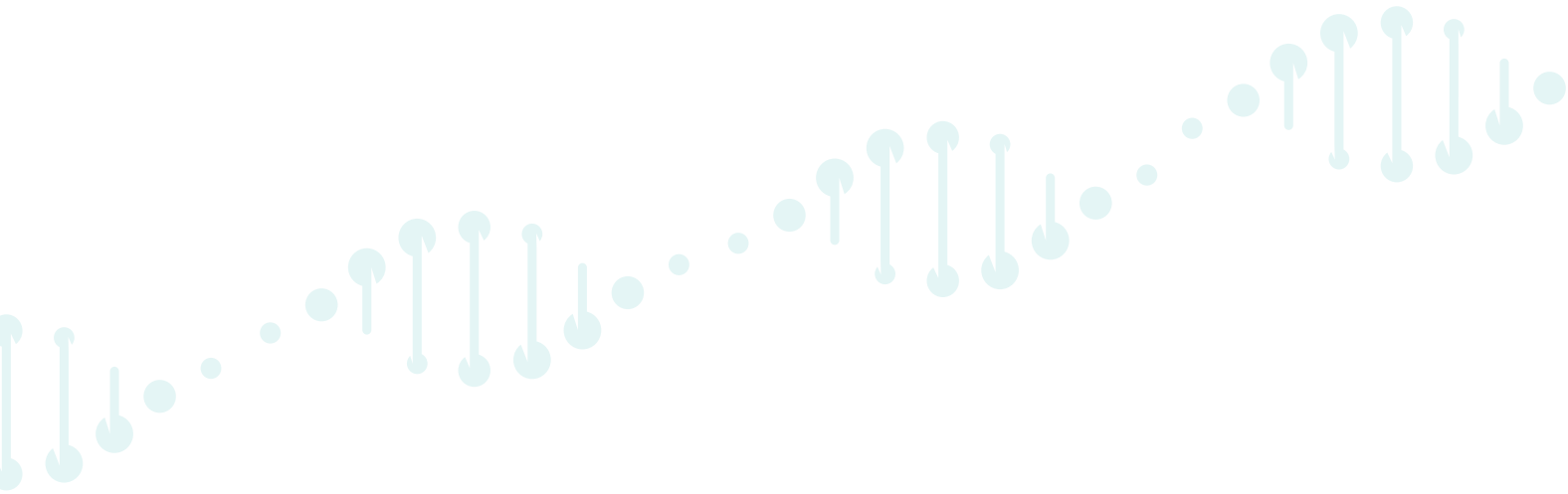
Any apprentices employed within the sector via an apprenticeship training agency are not included in the figures.

Therefore, the figures presented in this report should be considered as SIP estimates based on National Statistics.





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Cogent Skills



Science Industry Partnership

01925 515 220

sipmembers@cogentskills.com

www.scienceindustrypartnership.com