1. Summary:

- Employers in many parts of advanced manufacturing often struggle to fill technician roles by recruiting skilled workers from the external labour market.
- Such employers are increasingly looking to train apprentices. However, they often struggle to find high-quality training.
- One successful approach to dealing with this problem, which is quite widely used in advanced manufacturing in the UK but is not well known, involves the ‘over-training’ of apprentices by large employers with well-established, high-quality apprenticeship programmes, who play a significant role in the training of apprentices not just for themselves but for other firms who would otherwise struggle to access the apprenticeship system.

2. I am Reader in Economics and Public Policy at King’s College London and I have a long-standing interest in technician skills and training. I have spent a good deal of time over the past few years examining the duties of technicians in various parts of the UK advanced manufacturing sector, interviewing over 150 employers in the process. This work, which has been sponsored by the Gatsby Charitable Foundation, has led to reports on technician skills and training in the aerospace, chemicals, cell therapy and regenerative medicine, composites, industrial biotechnology, and space sectors. The findings of my research are significant for the Committee because they concern both some of the problems that employers in those sectors face in the meeting their needs for skilled technicians and also one of the ways employers have attempted to meet those needs.

3. I shall briefly explain what I mean by a technician. Technicians are workers who apply proven techniques and procedures to the solution of practical problems. They carry supervisory or technical responsibility and competently deliver their skills and creativity in the fields of science, engineering and technology. As the term ‘technician’ is currently used, it denotes people occupying technical roles that require ‘intermediate’—that is, level 3-5—STEM skills.

4. First, many of the firms I visited complained that it is hard to recruit experienced, high-quality technicians from the external labour market. Some examples are listed below:

- many aerospace, space and composites firms struggle to hire experienced, high-quality manufacturing technicians;
- most employers in the chemical industry, and in industrial biotechnology, struggle to recruit control and instrumentation technicians (i.e., people who maintain and repair the distributed control systems through which many modern industrial plants are operated);
- lots of maintenance, repairs and overhaul organisations—which are the organisations that maintain, repair and overhaul commercial aircraft—struggle to hire aircraft mechanics and licensed aircraft engineers to carry out maintenance and repair work on commercial airliners;
- firms in industrial biotechnology struggle to find manufacturing technicians skilled in fermentation;
- employers in the chemical industry report that they struggle to recruit able, experienced mechanical and electrical maintenance technicians;
firms in the aerospace and automotive industries that make, or use, composites parts find it hard to hire technicians who are skilled at working with that kind of material.

5. The difficulty of recruiting such workers is only exacerbated by two other factors. First, many of the firms in the less established industries, such as space, cell therapy and industrial biotechnology as well as composites, are expanding. However, in those relatively youthful industries there is not a significant pool of experienced, high-quality workers from which to select, simply because the industries in question have not been established long enough for such a pool to develop. Second, in some of the more established industries, such as aerospace and chemicals, there is an increasingly pressing succession planning problem, created by the fact that many firms companies scaled backed, or closed entirely, their apprenticeship training schemes in the 1990s and 2000s, relying instead on recruiting experienced middle-aged technicians who are now approaching retirement. The need to replace these ageing workers adds further to the demand for the limited supply of technicians.

6. Some employers have attempted to deal with recruitment difficulties by filling technician roles with graduates, as for example in the case of laboratory technician roles in the chemical industry and manufacturing technician roles in industrial biotechnology and cell therapy. However, all too often, the employers in question they have often found that hiring graduates to do technician jobs is not a good solution, both because the graduates in question lack the practical skills required to do the job well and also because they quickly become dissatisfied with the often mundane, highly routinised nature of the work and with the relatively low wages on offer.

7. More and more employers are responding to these difficulties by turning to apprenticeship training as a means of acquiring the skilled technicians they need. However, evidence from several industries suggests that such employers, especially when they are SMEs from emerging industries, have difficulties finding a training provider willing to offer the requisite training. For example, manufacturers in the space industry have found it difficult to persuade colleges to offer the off-the-job technical education they would like their apprenticeship manufacturing technicians to receive (Lewis 2012b: 31), as have employers in industrial biotechnology (Lewis 2016: 39-40). Similarly, employers that make use of composite materials have struggled to obtain training for their workers in the practical skills required to make use of that material (Lewis 2013a: 46-48). Moreover, where such training is on offer, all too often it is of sub-standard quality, involving colleges teaching apprentices out of date-techniques so that apprentices do not learn current best practice methods of working (Lewis 2012a: 31-32, Lewis 2013a: 47). The reason for these problems lies in what one might describe as the ‘tyranny of small numbers’, namely the fact that often in these industries the total number of apprentices demanded by employers in any one geographical area is too small to make it worthwhile for the relevant colleges to offer the training in question, given the prevailing apprenticeship funding regime.

8. It is also worth noting that small and medium-sized enterprises (SMEs) in particular tend to have little involvement in apprenticeship training in the UK. A major challenge confronting policy-makers who wish to increase the number of STEM-related apprentices, therefore, is that of increasing the supply of places on high-quality apprenticeship training programmes in STEM subjects, both in order to make such
training available to more of the young people who want it, and also to help SMEs in particular to take on apprentices and thereby acquire the skilled technicians they need.

9. In what follows, I briefly describe one way in which some employers have attempted to overcome some of the problems described above, with some success. Details can be found in Lewis (2013b) and Lewis (2014). The approach in question involves the ‘over-training’ of apprentices by large employers with successful, well-established apprenticeship training programmes. More specifically, as defined here, ‘over-training’ involves large employers that currently offer high-quality apprenticeships playing a role in the training of more apprentices than they themselves require to meet their own anticipated business needs, with the extra apprentices being employed and paid from the outset by other firms in their sector and/or supply chain (often, though not always, SMEs).

10. More specifically, over-training involves both:

• a host employer (always a large employer)

and

• a home employer (typically an SME)

The home employer employs the apprentices, pays their wages and gives them a full-time role at the end of the apprenticeship. Typically, where ‘over-training’ has been adopted, the home employer’s apprentices spend the first year of their apprenticeship being trained in basic practical skills and workplace health and safety by the host employer in its facilities alongside the host employer’s own apprentices. Nearly all this training takes place at the host employers’ own training workshops. Apprentices usually return to their home employer for the second and third years of their training. However, the host employer usually continues to manage and oversee their training, advising both the home employer and the apprentice about what on-the-job training needs to be provided and carrying out the assessment of the apprentice’s practical skills. Some of the host employers also take back apprentices for two- to three-week blocks to give them additional technical training, while a small number of host employers also offer the opportunity to continue fully training the apprentices during the second and third years of their apprenticeship.

11. The most obvious benefits of over-training for the home employer are twofold. First, throughout the apprenticeship, the home employer benefits from being able to draw on the host employers’ expertise in managing an apprenticeship programme. Especially when the home employer in an SME and/or is taking apprentices for the first time, it may lack the training ‘infrastructure’—the human resource managers who understand apprenticeships, assessors, and experienced instructors—required to be able to manage the apprenticeship training to a high standard. Having the host employer manage its apprentices enables the home employer to draw on their expertise. Second, in those cases—typically involving apprentices in engineering—where the apprentices spend their first year on ‘block release’ learning basic hand skills and workplace health and safety, home employers can be confident that their apprentices are receiving high quality training from good instructors using the latest equipment. Host employers with state of the art
facilities are often a much more attractive option than inadequate, and (as noted above) sometimes non-existent, local provision.

12. The research also reveals that some home employers are using their host employers as ‘clearing houses’ for the recruitment of their own apprentices. Home employers—typically SMEs, and largely unheard of amongst young people—sometimes struggle to attract good quality applicants for apprenticeships. The opposite is true of host employers, which are often household names and usually have to turn away good candidates because their programmes are heavily over-subscribed. In some cases, host employers pass on applications to their home employers, giving the home employers a better pool of applicants from which to choose. In this way, over-training can help to improve the quantity and quality of applicants received by SMEs, as well as helping to ensure that more of the young people who wish to take an apprenticeship can access one.

13. Host employers not do choose to over-train apprentices as an act of charity, but rather because it benefits their business. More specifically, there seem to be two main reasons why host employers become involved in training for other firms. The first is that over-training is often a good way for a host employer to assure the quality of the technicians who work in firms in its own supply chains. This helps to prevent skills shortages and gaps occurring in supply chains firms that can damage the quality and/or reliability of the products those firms supply to the host. Second, over-training can also help host firms to sustain the financial viability of their own training schemes and facilities. Host employers have their own apprenticeship training programmes, with specialist instructors and assessors who are employed by the firm to provide training for their own apprentices. Many also have their own dedicated training workshops. The reason why host employers in this second category over-train is because it helps to cover the fixed costs of running their in-house training programmes, thereby helping to ensure the latter’s continued financial viability.

14. Examples of over-training schemes of the kind described above can be found in the aerospace, automotive, chemicals, engineering and steel industries. They provide an example of genuine ‘employer-leadership’ in the field of vocational education and training. More large employers need to be made aware of how such models of over-training work and of the potential benefits, both to them as hosts and to SMEs as home firms, of being involved in over-training. It is important too that the regulations governing the implementation of the government’s apprenticeship levy, and of who can receive funds for training apprentices, does not disrupt this source of high-quality apprenticeship training.

15. I trust that you find the above useful. I would be very happy to elaborate on any aspect of what I have written, either in person or in writing.

January 2017
REFERENCES


