

Comparative institutional disadvantage: Small firms and vocational training in the British manufacturing sector in comparative perspective

Chiara Benassi^{1,*}  | Niccolo Durazzi²  | Johann Fortwengel¹ 

¹ King's Business School, King's College London, London, UK

² University of Edinburgh, Edinburgh, UK

Correspondence

Chiara Benassi, King's Business School, King's College London, 30 Aldwych, WC2B 4BG London, UK.
Email: chiara.benassi@kcl.ac.uk

Abstract

This article asks why British manufacturing small and medium-sized enterprises (SMEs) struggle to meet their intermediate technical skills needs. While the comparative political economy literature typically attributes the failure to train in Britain to collective action problems, we complement this perspective by pointing at the ill-conceived policy design of the quasi-market for vocational education and training. In particular, we shed light on the role of training providers, as they respond to the incentive structure of the quasi-market, especially the output-based nature of standards and the system of funding distribution. To strengthen our argument, we compare the British case with the Italian statist system, which enables SMEs to access technical skills through school-based vocational education, and with the German collective system, in which SMEs develop skills through apprenticeships.

*I am the first author.

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1 | INTRODUCTION

It is well established that small and medium-sized enterprises (SMEs) face greater difficulties than large employers in meeting their skills needs: they struggle to attract talent from external labour markets and they have fewer resources to develop skills internally through training (Edwards & Ram, 2006; OECD, 2019). For manufacturing firms, this materializes in problems to meet intermediate technical skills needs, which are typically developed through a rather long vocational curriculum combining on-the-job/practical training and school education (Jones & Grimshaw, 2012: 6). Yet, the kind and degree of SMEs' disadvantage varies across countries as a function of country-specific institutions and policies, which support SMEs to varying extent.

The comparative political economy (CPE) literature on vocational education and training (VET), indeed, suggests that SMEs can receive institutional support to enable their participation in the VET system. For example, governments may direct subsidies at SMEs, while large employers typically contribute more to the governance of VET systems, thereby maintaining structures that also benefit SMEs (Cognard, 2011; Thelen & Busemeyer, 2012; Traxler et al., 2007). Yet, most of the CPE literature that focuses on the relationship between firm size and VET policy typically looks at the effect of inter-employer cleavages on institutional change in skill formation systems of coordinated market economies (CMEs) (Busemeyer & Trampusch, 2012; Culpepper, 2007; Emmenegger & Seitzl, 2019; Graf, 2017; Trampusch, 2010). We thus lack a systematic cross-country perspective on the institutional and policy environment supporting SMEs, particularly beyond the universe of CMEs. Building on existing CPE literature, this article wants to expand our comparative understanding of the mechanisms that help or hinder SMEs source intermediate technical skills. We do so by focussing on the case of manufacturing SMEs in the UK, where the gap in training provision between SMEs and large employers is particularly pronounced compared to other European countries (Eurostat, 2019). We compare the institutional and policy arrangements available to British SMEs with their peers in the Italian statist skill formation system, which is characterized by an institutionalized path to *access* skills provided via the school system; and with the German collective skill formation system, which is characterized by an institutionalized path to *develop* skills, typically via participation in workforce training programmes, chiefly apprenticeships. The comparison sheds light on those features of VET systems that – through a well-embedded path to either access to or development of intermediate technical skills – lower the barriers for Italian and German SMEs towards meeting their intermediate technical skill needs compared to their British peers.

The CPE literature would explain the disadvantage of British SMEs [and of firms more generally in this liberal market economy (LME)] in sourcing intermediate technical skill through collective action problems. On the one hand, the state does not provide vocational skills as collective goods, leaving their provision to the market instead; on the other hand, due to the absence of coordinating institutions, firms do not invest in long broad-based training for fear of poaching (Finegold & Soskice, 1988; Hall & Soskice, 2001). Our in-depth qualitative analysis of the British case complements this established body of literature by offering a more nuanced picture. Failure to exert collective action is not the only problem of the British VET system. Rather, we point at the overlooked role of training providers and show that the policy design of the *quasi*-market for training – in particular the nature of training standards and the distribution of funding (see Section 5) – creates an incentive structure for private training providers that has detrimental effects for manufacturing SMEs.

The article is organized as follows: the next section sets out why the British case offers an interesting research puzzle; Section 3 discusses the relevant literature and introduces our argument; Section 4 outlines the research design and methodological approach; Sections 5 and 6 provide the findings from the case studies; the final section discusses the empirical findings and broader theoretical implications.

2 | COMMON WISDOM ON BRITISH VET AND THE DISADVANTAGE OF SMES

The British VET system has typically been described as unable to provide the technical skills necessary to support high-tech manufacturing companies. The reforms during the Thatcher government abolished the tripartite bodies at the sectoral level – the Industrial Training Boards – that were responsible for the development of VET standards and that also imposed a training levy on their members (Gospel & Edwards, 2012). Alongside, both trade unions and employer associations saw their membership and influence decline (Goberman et al., 2019). Thus, institutions that could contribute to coordinating the training activities of companies progressively weakened or disappeared. Finegold and Soskice (1988) attributed the notorious British ‘low-skill equilibrium’ to these changes. Without interfirm networks to develop trust and share information and collective bargaining to set industry-level wages, employers are discouraged from investing in (technical) skills due to ‘fear of poaching’ (Finegold & Soskice, 1988; Hall & Soskice, 2001: 25–31). Because of their superior resources to train and poach employees, large manufacturing employers were able to cope with the British market-based VET system (Ryan et al., 2007). In contrast, SMEs were much less well equipped to thrive in such an environment (Lange et al., 2000).¹

Data confirm that British SMEs engage with the VET system much less than their European counterparts. The training participation rate among large employers (> 250 employees) stands at 68.8%, and it drops to 26.6% for SMEs (20–49 employees), yielding a training gap of 42 percentage points. This gap is 10 percentage points higher than the average training gap between large firms and SMEs across the EU (Eurostat, 2019). Unfortunately, reliable cross-country data on training participation by sector and firm size are not available. However, if we zoom into British data for the manufacturing sector, we note an even greater gap of 46 percentage points, although training participation rates for both large firms and SMEs are higher than the national average, confirming the centrality of apprenticeship for manufacturing (OECD, 2011: 45). Hence, we identify a significant training gap between SMEs and large employers in the British manufacturing sector that is not confined to those parts of the economy commonly depicted as low-skilled services.

Strengthening training provision among SMEs has been one of the most consistently recurring themes in training policy in Britain. In a report commissioned by the Department for Business, Innovation and Skills (BIS), Sir John Holt, the businessman who chaired the review for the government, penned this emphatic sentence in the foreword: ‘Just imagine the impact if we were able to align SMEs uptake with that of larger businesses’ (BIS, 2012: 4). In 2010, the UK Commission for Employment and Skills (UKCES) noted that British SMEs faced particularly high barriers ranging from excessive costs of training to the unwillingness of training providers to engage with small firms (UKCES, 2010: 10). Similarly, OFSTED noted in 2015 the severe difficulties that hampered a meaningful relationship between training providers and SMEs (OFSTED, 2015). In 2017, the Federation of Small Business (FSB) published a study on the training experience of SMEs, which reported virtually the same barriers that had been identified in the 2010 UKCES document:

excessive costs of training and lack of suitable off-the-job training offered locally by training providers (FSB, 2017).

These reports suggest that the main problems faced by SMEs are less the fear of poaching, as discussed in the CPE literature; rather, they point to the problem of high costs of training as well as to a number of other institutional and policy arrangements that hinder the cooperation between SMEs and training providers. A recent employer survey in the manufacturing sector conducted by the association of manufacturing business confirms the claims in those reports: SMEs indicate costs (41%), management time constraints (46%) and employees time constraints (35%) as main obstacles to training, followed by the lack of appropriate training courses (almost 20%). Only 12% of SMEs indicated poaching as barrier to training (EEF, 2012). A report published after the apprenticeship levy reform in 2017 (see Section 5) confirms that ‘constraints on the pool of funding’ as well as the complexity of the training system constitute the main challenges to training (Battiston et al., 2020). These findings suggest that we may need to look beyond coordination problems among firms to explain the difficulties faced by SMEs in the British VET domain. As we set out to paint a more nuanced picture, we draw on the existing CPE literature to develop a comparative perspective of the disadvantage faced by British SMEs.

3 | THEORIZING THE INSTITUTIONAL COMPARATIVE DISADVANTAGE OF SMES IN VET

Empirical analyses of the British VET system often describe it as a *quasi-market* – rather than a market – for training. In quasi-markets, the government allocates the resources centrally through a competitive process among a plurality of public and private sector actors (Lewis, 2017: 2). The British government is also heavily involved in shaping the rules of the quasi-market to such an extent that employers are sometimes considered ‘victims’ of government’s policy intervention in the VET arena, rather than of the ‘free’ market (Gospel & Edwards, 2012; Keep, 1999, 2006; Ryan & Unwin, 2001). These analyses have not focused on SMEs specifically though; they have either analysed the causes of limited engagement of British firms with VET without differentiating by size (Gospel & Edwards, 2012; Keep, 1999, 2006; Lewis, 2020), or they have identified the conditions leading to successful training initiatives, usually led by large (manufacturing) employers (Lewis, 2014; Ryan et al., 2007). Yet, this literature provides a useful starting point for the argument that we develop in this section, namely that SMEs’ challenges originate from shortcomings in policy design. To conceptualize these challenges, we briefly illustrate SMEs’ weaknesses and then discuss what mechanisms can support them using the CPE literature.

SMEs typically struggle both to access and develop intermediate technical skills, which are expensive to provide and high in demand (e.g. engineering skills in the manufacturing sector). SMEs struggle to recruit skilled workers because they offer lower wages and non-wage benefits and suffer from lower reputation compared to their larger peers (Edwards & Ram, 2006). Furthermore, compared to large employers, they have fewer resources to provide training and do not benefit from substantial economies of scale (Culpepper, 2007). The latter enable large employers to reduce per unit costs, for example the costs of investing in specialized training equipment and in-house trainers or external providers. Thus, SMEs are more dependent on externally provided resources, including input from their institutional context (see also Josefy et al., 2015: 741).

The CPE literature on skill formation (Busemeyer & Trampusch, 2012) allows us to identify two ‘types’ of skill formation systems, whose institutional and policy setting, respectively, support companies – small and large – in either accessing or developing the skills they need through

different institutions.² School-based systems (e.g. France, Italy and Sweden) allow companies to access a pool of skilled workers upon completion of school-based training while being little involved because state-funded schools are the primary provider of training. Thus, SMEs can shift the costs of training onto the state without contributing much to developing skills.

In collective skill formation systems (e.g. Austria, Germany and Switzerland), companies are the primary training providers, while governments, compared to school-based systems, are relatively less involved. These systems are, therefore, more resource-intensive for firms, especially when it comes to technical as opposed to service skills. Given the significant investments and the portability of certified occupational skills, collective action problems among firms are likely to arise in those systems (Emmenegger et al., 2019; Marsden, 1999). Thus, the CPE literature argues that several institutions and policies need to be in place to ensure firms' commitment and cooperation (see Emmenegger et al., 2019 for an extensive review). Compulsory membership in chambers and collective agreements, which define the quality and quantity of training, help to prevent free-riding; furthermore, employer associations and, most of all, workers' bodies in the sector and workplace contribute to develop the standards and monitor the implementation of the those agreements (Cognard, 2011; Marsden, 1999: 223). Employers' associations as well as more informal local networks contribute to trust building through information sharing and best practices (Crouch, 2005; Culpepper, 2003).

These institutions do not only solve collective action problems among firms but they also reduce costs for SMEs. For instance, Thelen and Busemeyer (2012) showed that large employers in Germany contribute the staff to committees in charge of developing and monitoring training standards. While this implies a greater influence of large employers on how VET systems are shaped, SMEs can 'free-ride' on this service. In their study, Traxler et al. (2007) found that SMEs rely more on the services provided by business associations than large employers, even though the latter pay higher fees. For instance, large employers' contributions finance the German Chamber of Commerce and Industry (IHK), which then provides examination services at the same costs for everyone (Cognard, 2011). Similarly, SMEs are more likely to be the beneficiary – rather than the producers – of best practices and knowledge shared through business associations and networks.

In conclusion, the CPE literature suggests that publicly funded training provision – typical of statist systems – helps SMEs to access the skills they need, while strong interfirm networks and business associations – typical of collectivist systems – support skill development in SMEs. VET institutions in school-based or collective skill formation systems, therefore, do not only solve collective action problems around the investment in technical training, but they also act as equalizing instruments between SMEs and large employers. The CPE literature would, therefore, explain the disadvantage of British SMEs through the lack of the above discussed institutional support to either access or develop skills. This article acknowledges the importance of those institutions but also highlights some aspects that have been neglected so far. After the methodology section, our empirical analysis throws light on the institutional and policy setting of the quasi-market for training created by the British government; in particular, it points at the crucial role of training providers, while traditional CPE literature has dedicated little attention to educational organizations so far (see Emmenegger et al., 2019 for a similar observation). Despite specific adjustments for helping SMEs, the incentive structure of the quasi-market training providers prevents SMEs from both accessing and developing skills. Two previously overlooked elements are identified as especially important: the output-based nature of standards and the mode of distribution of government funding.

4 | RESEARCH DESIGN AND DATA COLLECTION

We conduct an in-depth case study of the British quasi-market VET system, and we contrast it with the cases of a statist (Italy) and a collective (Germany) skill formation system. We pick these three cases as they allow us to leverage a ‘diverse’ cases design, which can be used for both exploratory and hypotheses-testing research. Essentially, a diverse case design aims at selecting cases that maximize variation in the X/Y relationship (Gerring & Cojocar, 2016; Seawright & Gerring, 2008). Importantly, ‘[d]iversity may also be understood in terms of various causal paths’ (Seawright & Gerring, 2008: 300), meaning that different ‘independent’ variables X may all cause Y, but constituting different pathways. This is important for our purposes, because based on the CPE literature, we expect both statist and collective VET systems to produce the same outcome of interest: SMEs’ ability to meet their intermediate technical skill needs.

As discussed in our theoretical framework, we differentiate the ability to meet intermediate technical skill needs further in terms of accessing or developing those skills. Our research design covers, therefore, three X/Y relationships that are of primary theoretical interest. Firstly, statist systems, like Italy, primarily support SMEs by offering them a path to successfully ‘access’ intermediate technical skills. Secondly, collective skill formation systems, like Germany, set a path for SMEs to successfully ‘develop’ intermediate skills. Thirdly, where the VET system is primarily organized around (quasi-) markets, like in Britain, neither the ‘access’ nor the ‘develop’ path satisfactorily serves SMEs, resulting in an overall greater SMEs’ inability to source intermediate technical skills in this skill formation system compared to their peers in statist or collective skill formation systems.³ Thus, we compare the (unsuccessful) British paths to skill access and skill development with, respectively, the (successful) Italian path to skill access and the (successful) German path to skill development. Each case study pays particular attention to the policy and institutional features of the VET system that determine the varying (in)ability for SMEs to source intermediate technical skills.

Empirically, the British case is developed in greater detail for two main reasons. Firstly, the policy field of VET has been subject to frequent and substantial reforms in Britain, allowing us to ‘stress-test’ the argument that it is policy design that explains the observed consistent outcome. For example, our empirical analysis of the British case illustrates the features of the VET system before and after the apprenticeship levy reform, which came into force in 2017; by doing so, we show that SMEs’ challenges do not originate from the last reform but that they are deep seated in the design of the quasi-market characterizing the British system since the 1990s. Secondly – and theoretically most importantly – the British case is where our analysis departs from prevalent CPE conceptualizations, which have tended to focus on market mechanisms, rather than policy design.

To maximize comparability across cases, we focus on mechatronics training (often generically labelled as ‘engineering’ in Britain) across the three countries. Mechatronics qualifications are a paramount example of intermediate technical skills that are required by companies in a variety of high-tech manufacturing settings. Indeed, interview data from the three countries suggest that mechatronics technicians comprise the most sought-after occupational profile. Furthermore, the mechatronics curriculum clearly exemplifies the challenges linked to acquiring technical skills as it is more resource-intensive than most apprenticeships, because it includes modules in, among others, mechanics, electronics and computing, and it requires investments in specialized machines and laboratories. By focusing on the mechatronics curriculum, we consider only companies in a similar range of industries across countries, such as automotive, machine tool building

TABLE 1 Comparing SMEs' paths to access skills in the UK and Italy

	UK	ITA	Implications for British SMEs
Standards	Output-based, vague, quality poorly inspected	Input-based, detailed, externally assessed	Difficult to verify the quality of the curriculum
Training providers	Private and public, competing	Public, no competition	Training providers offer qualifications to maximize profit instead of addressing local skill needs
Funding distribution	Tendering for government funding	Allocated by central and regional governments	The criteria for government funding lead to low-quality curricula as well as to a limited offer of technical qualifications

and aerospace, which can be expected to have similar skills and production requirements and, therefore, should have similar incentives to train employees.

We rely on documents and 37 semi-structured interviews as key data sources (see online Appendix for more information). All interviews were conducted in the native language of the respondent (i.e. English, German or Italian). They were conducted face-to-face or over the phone and then transcribed verbatim. The first author also visited five training centres and four schools and attended a 2-day employer association meeting on training in Germany. In the UK, she attended a meeting of an association of training providers, two open days for apprentices and two manufacturing fairs, including training-related information events.

We used NVivo11 to code our data. We used the source classification to achieve a better overview of the number and type of items by country case. We used theme nodes, which essentially are text codes, to describe and categorize the content of the data. The theme nodes were grouped in four main nodes. Three nodes emerged as the core categories with explanatory relevance. The node 'coordination' is derived from the CPE literature and includes the role of institutions, such as state actors, chambers and employer associations in building networks with/among SMEs and coordinating/supporting their training activities; and two categories, which emerged from the analysis of our data and concern the policy design, referring, respectively, to the role of 'skill suppliers' (e.g. schools or training providers) and to the 'standards' regulating the quality, content and structure of VET. We analytically link these elements to the relative ability of SMEs to access and develop skills across the three countries (our fourth node). These categories appear throughout the case studies in Section 5 and they are subsequently brought together in Tables 1 and 2 to provide a summary of the findings.

5 | THE BRITISH CASE: MANUFACTURING SMES IN QUASI-MARKETS

The British VET system is characterized by two paths: school-based training, which should allow companies to access skills, and the apprenticeship system, which requires business involvement in skill development. Section 5.1 illustrates the shortcomings of the former path, which is unable to provide high-quality technical skills neither for large employers nor for SMEs. As a response,

TABLE 2 Comparing SMEs' paths to develop skills in the UK and Germany

	UK	GER	Implications for British SMEs
Standards	<p>Pre-levy (NVOs): output-based, vague, quality poorly inspected</p> <p>Post-levy (trailblazers): output-based, detailed, externally assessed</p>	<p>Input-based, detailed, externally assessed</p>	<p>Difficult to ensure the quality of the technical curriculum unless SMEs are directly involved in its development, which constitutes an additional burden</p>
Training providers	Pre-/post-levy: mainly private	Public	SMEs struggle to find training providers, as they are not very attractive clients
Funding distribution	<p>Pre-levy: tendering for government funding</p> <p>Post-levy: tendering for large employers' funding and for government funding through SMEs</p>	Allocated from central and regional governments	The criteria for government funding lead to a misalignment between the offer of training providers and the demand of SMEs as well as to low-quality qualifications
Networks among firms/between firms and training providers	Pre-/post-levy: weak	Strong interfirm training networks even subsidized by state	SMEs do not develop a trust-based relationship with training providers, are unable to share the administrative costs with other firms and cannot aggregate their skill demands, at the expense of greater bargaining power vis-à-vis training providers
Business associations	Weak	Strong intercompany training centres hosted by chambers subsidized by state	SMEs experience limited service provision of employers' associations and cannot aggregate their skill demands, at the expense of greater bargaining power vis-à-vis training providers

the British government has in recent years emphasized skill development over access by promoting the apprenticeship model. The apprenticeship path relies on a quasi-market for training, in which companies can (theoretically) choose between different training providers. Section 5.2 illustrates the key features of this quasi-market, focusing on those aspects that were indicated as problematic for SMEs in the interviews. Even though some of those features have evolved over time, especially since the introduction of the levy in 2017, both the pre- and post-levy apprenticeship systems present similar challenges for SMEs, as explained in Section 5.3.

5.1 | The problem of ‘accessing’ intermediate technical skills

Historically, and most prominently since the 1990s, British (manufacturing) firms have faced several problems in sourcing high-quality vocational skills from the school-based system (Wolf, 2011). Vocational qualifications in the UK are developed within the framework provided by National Occupational Standards. These standards are developed by various government-funded Standard Setting Organisations and indicate the competences that need to be acquired by the end of the vocational qualification. Thus, these competence-based standards leave ample room to private and public schools and training providers to develop their own curricula, leading to great variation in the content. The quality of the curriculum is, therefore, difficult to assess for employers, and frequent government reforms, which often changed the qualification system, further contributed to making the system ‘extraordinarily complex and opaque by European and international standards’ (Wolf, 2011: 19), and therefore difficult to navigate for employers as well as for prospective students. Furthermore, the quality is poorly assured by the bodies awarding the qualifications because they are competing among each other and are worried to lose their ‘clients’, meaning they have little incentive to enforce high-quality standards (Gambin & Hogarth, 2015; Wolf, 2011).

The quality of vocational qualifications is further undermined by the distribution of government funding on a competitive basis to public *and* private schools and training providers offering pre-18 vocational education. The funding is assigned based on the number of qualifications offered and awarded. Thus, rather than improving quality, organizations competing over the same ‘funding pot’ have increased the number of qualifications on offer and focused on ensuring high completion rates. The incentive system has, therefore, led to a proliferation of low-quality qualifications as well as of qualifications that are well-funded but are not expensive to provide in terms of teaching costs and infrastructures, stirring the educational offer away from technical qualifications (Unwin et al., 2004; Wolf, 2011).

Assessing the quality of VET in comparative perspective is notoriously difficult, but the teacher/pupil ratio suggests a poor state of the British vocational school-based system. The ratio of 25 in the UK is the highest in Europe, and 13% higher than the European average (Eurostat, 2019). Furthermore, almost 85% of the attainment in the school-based system is at Level 2 or below (Gambin & Hogarth, 2015: 7), while most technical school-based vocational qualifications (e.g. Italy) as well as technical qualifications from dual vocational systems (e.g. Germany) correspond to at least Level 3. The school-based system is, therefore, unable to provide high-quality technical skills, including those in mechatronics. To address this shortcoming, governments have been trying to revitalize the apprenticeship system since the mid-1990s, promoting employer participation in skill development (Fortwengel et al., 2021). As a result, today, apprenticeship is the main route for the mechatronics curriculum, as illustrated below.

5.2 | The quasi-market for apprenticeship training

In 2000, the government introduced the framework for National Vocational Qualifications (NVQs), based on the abovementioned National Occupational Standards. NVQs (usually up to Level 3) constituted the central element of government-funded apprenticeships, in combination with the more 'academic' Technical Certificate and Key Skills Qualifications, including IT and numeracy. NVQs were outcome-based and delivered and assessed in the workplace; furthermore, the standards were vague, for example the hours of 'guided learning' included in an engineering apprenticeship could vary from 240 to 1250 for the same qualification (Ryan et al., 2006: 364). Hence, they left significant room for variation in the content and quality of training even within the same occupation.

The vagueness of NVQ standards worked to the advantage of training providers, which could capture government funding while reducing the quality of their educational offer (Lewis, 2020; Wolf, 2011). Furthermore, training providers did not even have to match the educational offer with local skill demands to attract government funding, which was the main funding source given that employers' contribution used to be voluntary, because the agencies distributing the funding focussed on meeting government targets in terms of apprenticeship starts (Cedefop, 2005: 57). Thus, training providers were incentivized to compete for government funding through 'quantity' (i.e. by enrolling as many apprentices as possible) rather than through 'quality' (i.e. by addressing the skills demand of local employers). As a result of this incentive system, training providers offered training courses in subjects that did not require a sizeable investment in infrastructure, for example business administration rather than mechatronics (AIP, 2016; Interview 1; Lewis, 2020).

Employers' reactions to such an 'unresponsive' system varied. Some large manufacturing firms became certified training providers to capture government funding. Others preferred to deepen their partnership with training providers, for example by collaborating on curriculum development or providing technologies and teaching staff (Interviews 2–6 and 12). However, as we discuss later, these are not viable options for SMEs. Hence, SMEs tended to withdraw from the apprenticeship programme promoted by the government and instead purchased specialized and shorter courses from private training providers to address their most immediate needs. This contributed to watering down the market value of apprenticeships and, similarly to the school-based system, to a proliferation of various forms of training, ultimately making the VET market difficult to navigate for employers and students alike (UKCES, 2011).

Since the 2010s, VET reforms tried to address these flaws by providing employers with more power to influence training provision and to design coherent standards (DfE & BIS, 2013). The NVQ framework was replaced by apprenticeship standards developed by so-called trailblazer groups, which are mainly constituted by (large) employers. In the case of mechatronics standards, currently re-labelled as engineering technician standards, the trailblazer group includes employer associations and the Institute of Mechanical Engineers, but most of the members are large (automotive) companies, such as Jaguar Land Rover and Toyota. The trailblazer group developed competence-based standards accredited by the Institute of Apprenticeship. They also defined the content of the end-point assessment, consisting of a workplace-based portfolio, a Viva, and a competence-based exam performed by an externally accredited institution, which also conducts a quality check on the Employer Viva Documentation.

The funding structure was progressively decentralized, culminating in the introduction of the Apprenticeship Levy in 2017. Under the new system, all employers receive a £15,000 allowance to be offset against payment of the levy, which is payable at 0.5% of the pay bill for those firms

whose pay bill is above £3 m. The government set funding caps and the maximum estimated fee for a mechatronics/engineering apprenticeship is £27,000 in total, excluding the fee for the end-point assessment (around £3000). The levy can be used only for trailblazer apprenticeships, and levy-paying employers release the funds directly to the training provider from their digital service account. The new system forces training providers to become more responsive to employers (Interviews 5 and 6). However, SMEs, which do not pay the levy, are covered by the co-investment plan of the government for 95% of the apprenticeship costs (90% before 2019). This funding is allocated directly to training providers, similarly to the previous system, leading to specific challenges explained in the next section.

5.3 | SMEs' challenges in 'developing' intermediate technical skills

Despite numerous reform attempts, aimed also at improving participation among SMEs (see Section 1), the British apprenticeship system has presented SMEs with several challenges. Firstly, as both NVQs and trailblazer standards are based on outputs, employers and training providers need to develop the curriculum, which requires considerable knowledge and coordination efforts from the employers' side. This is particularly problematic for SMEs, especially in the context of high-quality technical skills. This problem sharpened with the introduction of trailblazer standards, which are more complex than NVQs, especially for the mechatronics curriculum (Interviews 2, 3 and 7). At the same time, the trailblazer apprenticeship includes an external end-point assessment, so it is crucial that apprentices achieve a standardized level of competence. Thus, the outcome-based nature of standards increases the initial costs of setting up an apprenticeship.

The introduction of more holistic standards and the end-point assessment represent a hurdle for manufacturing SMEs because the funding received by the government is insufficient for expensive curricula, such as a mechatronics apprenticeship (Interviews 7–10); SMEs in particular are typically offered the maximum rates because they have very limited bargaining power (FSB, 2017: 17). Indeed, in 2012, the cost of an engineering apprenticeship was estimated at around £11,300 a year (Gambin & Hogarth, 2017), while government funding is capped to £27,000 for the 3-year curriculum. In addition, the end-point assessment, which does not have a clear added value for employers, is not covered by government funding (Interviews 7 and 8). Thus, many SMEs still prefer purchasing ad-hoc training courses, rather than participating in the apprenticeship system, as in the pre-levy system (Green & Hogarth, 2016). This contributes to a further fragmentation of SMEs' skills demand, which is a pitfall of the system, as explained below.

Besides being scarce, government funding for apprenticeship in SMEs is still centrally allocated. Therefore, once SMEs assess the need for an apprenticeship, they must find training providers open to non-levy paying employers, given that not all providers accept government funding because it is more likely to run out and is strictly capped (FE Week, 2019, 2019ab). But even if the training providers accepted non-levy paying employers and SMEs had sufficient funding, there are further obstacles. In a survey conducted by FSB in 2018, 51% of SMEs reported as major obstacle the 'availability of courses or places at training providers', and a quarter of the respondents pointed at the 'distance to the nearest training provider' (FSB, 2019). SMEs, especially in manufacturing, are more likely to be in rural areas (DEFRA, 2019), yet training providers have an interest in establishing their operations in areas with a higher population and employer density, which entails a potentially larger demand. Hence, providers offering relevant training might be far, forcing the company to incur additional transportation costs; indeed, SMEs in rural areas reported higher costs for an apprenticeship than those in urban areas (FSB, 2019). As a final – and

crucial – hurdle, even if SMEs find a close enough training provider with an appropriate training offer, training providers might require an entire cohort to start the apprenticeship programme, which SMEs often do not have. A training provider offering the mechatronics curriculum clearly explains the incentive system tied to the levy funding:

'We have had companies that 'yes, we would love to work with you to deliver a bespoke training programme and we want to use our levy pot for it'. Well [...] if it's just for one company, we can't get an apprenticeship to it and you want five people on it, no we can't do it'. (Interview 9)

Due to their limited funding and facilities, which prevent them from purchasing bespoke training, SMEs would need, instead, to coordinate their skill demands. However, facilitating organizations, such as chambers and associations, are very weak in the UK. For example, an official of the small employers' association describes the limits of its responsibility as follows:

'We are an organisation that represents their interest, we don't help them with [training], unless they have queries and they call the call centre customer services and ask questions, specific questions on apprenticeships or training. We are not a provider, we don't help them with finding apprentices or recruiting them so that's not the kind of thing we do'. (Interview 11)

The government set up organizations to coordinate SMEs and to stir training providers to meet the local skill demand, but they are not representative and, therefore, benefit of little employers' buy-in (Almond et al., 2015); furthermore, they were often re-configured over time. The most recent example of these agencies is the Local Enterprise Partnerships, which were set up by the government in 2010 to substitute the Regional Development Agencies to better overlap with local labour market areas. These partnerships should promote local development by assessing local economic priorities, improving infrastructures, stimulating job growth and raising the skills of the local workforce. While Local Enterprise Partnerships should be 'business-led', they do not have a mandate to represent all local business actors and have been criticized for being dominated by large employers, which possess ample human as well as financial resources to actively participate in these partnerships (FSB, 2014; NAO, 2016). When asked about Local Enterprise Partnerships, our interview partners in the manufacturing employers' association and government bodies were, indeed, sceptical about their effectiveness (Interviews 7, 8 and 13).

To sum up, without the institutional resources to coordinate their skill demand at the outset, manufacturing SMEs are unable to influence the offer of training providers and to build the economies of scale necessary to reduce the costs per apprentice. Government data show how these institutional disadvantages translate into high training costs for SMEs: the smaller the firm, the higher the costs associated with training management and provider fees. Conversely, larger firms face lower management costs and devote a higher share of their expenditure towards apprentice salaries. Indeed, companies with between 5 and 24 employees spend £3800 per employee/year, companies with between 25 and 99 employees spend £2800 per employee/year and employers with above 100 employees spend £1800 per employee/year in the UK (UKCES, 2016: 113).⁴

6 | HOW MANUFACTURING SMES SOURCE INTERMEDIATE TECHNICAL SKILLS IN ITALY AND GERMANY

6.1 | Italy: SMEs' access to skills in a school-based system

In Italy, the mechatronics curriculum is typically offered by technical schools, which are part of the national school system and, therefore, exclusively reliant on public funding. The qualification standards are developed centrally by the Ministry of Education in consultation with a national committee of representatives of teachers and schools and prescribe in detail the content of the minimum national curriculum (including the annual number of teaching hours for each subject), which ends with a national-level assessment. Within that prescriptive framework, schools develop their educational offer, adapting it to the specificities of the local labour market (Cedefop, 2016; Indire, 2014). For instance, the mechatronics curriculum typically focuses on the machines used in the local manufacturing industries, which are made available to the schools by the local companies (Interview 15; observation data during site visits).

In 2015, a reform (107/2015) introduced 400 h of mandatory workplace-based training in the last 3 years of technical schools (*alternanza*). This allows schools to access up-to-date technologies, which is particularly important for the mechatronics curriculum (Interviews 16 and 17). The Italian Ministry of Education made EUR100 Million/year available for *alternanza*, which were matched by the same amount from the European Social Fund in 2018 (Il Sole 24 Ore, 2018; MIUR, 2018).

Technical schools apply for the funding with a project developed in collaboration with employers, which often are already part of their local network, as technical schools often cooperate with manufacturing employers to offer their students some work experience. Large employers are more likely to coordinate with schools also for *alternanza* projects because they have more resources and can accommodate a large number of students (Interviews 15, 18 and 19).

Yet, while SMEs are less likely to be involved (Interviews 15 and 20), their participation is facilitated in different ways. Manufacturing employers' associations have developed *alternanza* projects at the regional level with the regional education offices and the local chambers, or at the national level with the Ministry of Education. Schools are then invited to use those frameworks, adapting them to their needs and those of their partner companies, which, therefore, need to invest less time and resources in developing the project. For instance, in 2015, the metal employers' association, the Ministry of Education, and the National Institute of Education Research launched the *alternanza* programme 'Traineeship' in mechatronics, which was then implemented in 50 selected technical institutes (Indire, 2016). Most importantly, SMEs are embedded in local networks, which are formed and/or activated to organize the training. The 'leader' of each network is the school, which needs to find business partners, coordinates with them and manages the funding (Interviews 15, 18 and 22). Local chambers and associations of small employers often serve as intermediaries between SMEs and the schools. Local chambers, in particular, have the responsibility to manage online platforms where companies willing to participate in the projects can register and manage vouchers, provided by the Ministry of Education, which SMEs can use to employ tutors (Camera di Commercio di Torino, 2018; Interview 23).

Furthermore, as part of a network of companies and the school, SMEs do not have to develop a project from scratch, but they can 'piggyback' on already existing projects in their local schools (Interview 24). In most cases, these projects were initiated by a large employer and then extended to its suppliers and other local SMEs (Interviews 17 and 18). The dimension of 'network' or even

'supply chain' is often built in the *alternanza* project itself; a rotation is organized across different companies belonging to the same supply chain to reduce the costs for SMEs. Such projects, which involve the lead firms as well as their small suppliers, have been promoted by the Ministry of Education through additional funding (MIUR, 2018).

In summary, given the central role of the Italian state in the VET system, SMEs (as well as large employers) can shift most of the costs of training onto the state. Indeed, the state provides free vocational education up to level ISCED-4, and *alternanza* projects are narrower and easier to develop and coordinate (400 h max.) than the entire apprenticeship curriculum, as required from SMEs in Britain. The state works, therefore, as a powerful 'equalizing' force: around 30% of SMEs engage in training, which is a similar percentage as in Britain (26.6%), but also large employers rely on the state, as their participation rate is only 8 percentage points higher than SMEs, a very small participation gap compared to the UK (42%). For the same reason, metal and machine tool building companies report low training costs between €1071 and €1300/year per trainee (ISTAT 2015). Furthermore, when SMEs' direct involvement in skill formation is required due to the *alternanza*, the local networks of schools, companies, employers' associations and chambers help them to navigate the system and reduce the cost of participating.

6.2 | Germany: Business and state support for SMEs' skill development

In Germany, a vocational qualification in mechatronics is usually achieved through the dual apprenticeship system. The mechatronics curriculum lasts 3.5 years and integrates theoretical training offered by vocational schools (30%) and practical in-firm training (70%). The standards for the content of the qualification as well as for the final assessment are centrally developed, ensuring the high quality of training across schools and federal states. The content of the school-based component is developed by the Conference of the Ministers of Education in consultation with regional committees constituted by workers' and employers' representatives and officials of the regional government; and with vocational training committees, constituted by six employers' representatives, six workers' representatives and six teachers (Büchter, 2018: 42). The standards for workplace-based training and the examinations are also discussed and agreed upon by employers' representatives, trade unions and the government at national level (Govet, 2018). The exam is administered by the local chamber (IHK), which also nominates the exam committee constituted by employers, workers' representatives and teachers (BIBB, 2017). Membership in the local chamber is compulsory and involves a yearly lump sum in addition to the annual contribution of 0.2% of the yearly business earnings. The mid and final exam cost around 700€ each (Interview 29; Prueferportal, 2018).

The education system is publicly funded so, unlike in Britain, schools do not have the incentive to adapt their curriculum to the needs of large manufacturing employers, even if they provide an entire 'class' of mechatronics apprentices every year as it was the case in the vocational schools visited during the fieldwork. Furthermore, regional governments intervene to ensure that the educational offer matches the skill demand of local firms as well as the educational needs of the local population. Thus, in rural and structurally weak regions, given the declining number of apprentices, the Conference of the Ministers of Education recently suggested mergers between schools and tried to coordinate employers' demand by encouraging companies to start an apprenticeship cohort every 2 years (rather than each year) (Büchter, 2018).

Employers bear similar costs as in the UK for the mechatronics curriculum, around €14,300/year per apprentice (Govet, 2018). It might, therefore, be plausible to think of costs as a

reason for German manufacturing SMEs to drop out of the VET system. Indeed, across the entire German economy, 59% of companies with between 10 and 49 employees provide training compared to 93.6% of large companies. This is a notable training gap of 34 percentage points, although it is still 8 percentage points lower than in Britain (Eurostat, 2019).⁵ However, existing research suggests that, unlike the British training gap that applies across the entire economy, in Germany, it is primarily driven by SMEs in low-end services for which apprenticeship costs represent a barrier, especially given low expected returns (Thelen & Culpepper, 2008). In contrast, German manufacturing SMEs are keen to provide training, and when they fail to do so, they report lack of suitable candidates as the main reason – not the high costs of training as their British counterparts (BIBB, 2015: 7).

Indeed, there are institutionalized arrangements that help manufacturing SMEs to train: inter-company training centres, which is a state-led instrument, and network-based training, which is primarily business-led. These instruments are crucial for complex apprenticeship curricula, such as mechatronics, because they enable SMEs to compensate for the missing economies of scale and limited in-house infrastructure to facilitate practical training.

Intercompany training centres were set up in 1973 to offer specialized high-quality training modules for integrating the apprenticeship curriculum of SMEs. Hence, they represent the third ‘learning site’ in addition to vocational schools and companies, which SMEs can use if they lack the required staff and infrastructures. These centres are funded primarily by the federal and regional governments but also by local chambers, which are typically responsible for their management (BMBF, 2016).

Institutionalized forms of network-based collaboration among firms (*Verbundausbildung*) were introduced in 2005 to encourage firms to share the ‘burden’ of apprenticeship (Interview 30). The government considers the network-based apprenticeship an instrument to counteract the decline of apprenticeships, and it offers additional funding to participating companies (BMBF, 2016). For example, in North-Rhine Westphalia, each apprenticeship position can be supported with a one-off payment of up to EUR 4500 (MAGS NRW, 2009). Local chambers register the contracts among the companies in addition to the contracts between apprentices and their employers (Interview 29). Furthermore, they provide services aimed at connecting SMEs; for instance, the chamber in Berlin has an online platform, where companies can post their offers in terms of training modules to find a match with other SMEs (Marktplatz-Verbundausbildung, 2019).

In sum, unlike their British counterparts, German SMEs can resort to different institutional arrangements that support their training endeavours: interfirm networks to achieve economies of scale and share the costs of an expensive apprenticeship programme; interfirm cooperation through intercompany training centres and targeted financial support; finally, the public school system ensures that school programmes in mechatronics of comparable quality and content are accessible to SMEs and large employers alike.

7 | DISCUSSION AND CONCLUSION

This article offered a comparative analysis of the institutional and policy features supporting manufacturing SMEs in accessing and/or developing technical skills. It focused on the design of the British VET system for explaining the disadvantage of manufacturing SMEs in sourcing those skills compared to manufacturing SMEs in, respectively, Italy and Germany. Our findings point at the following features of the British VET system: the characteristics of standards (input vs. output-based) and the principles governing the distribution of public funding, both creating

specific incentives for training providers that have detrimental effects for SMEs' ability to source intermediate technical skills. Table 1 summarizes the difficulties faced by British SMEs to access skills compared to their Italian counterparts.

The comparative assessment of the 'access path' shows that British SMEs have to face the failure of their school-based system in providing high-quality technical skills. While the state intervenes in the skills arena by providing funding as well as setting occupational qualification standards, *how* the funding is distributed as well as *how* standards are formulated and assessed based on outputs provide specific incentives to training providers, which are prompted to focus on lower quality and less expensive training profiles. The Italian public school system, instead, allows SMEs to tap into mechatronics skills formed in technical schools, whose quality is standardized and comparable across schools.

In recent years, the British government has encouraged employers to develop skills through apprenticeships. Here, the term of comparison is Germany. The new British apprenticeship system has some features in common with the German apprenticeship: in particular, large employers play a crucial role in setting standards for the occupational curriculum and the state, in the absence of trade unions and collective agreements, forces large employers to contribute to the system. Yet, there are important institutional and policy differences between the UK and Germany, with implications for British manufacturing SMEs, as summarized in Table 2.

Similarly to the 'access to skills' path, output-based standards and the competitive allocation of government funding to for-profit training providers limit the ability of British manufacturing SMEs to partner up with training providers for a high-quality mechatronics apprenticeship. The disadvantage of SMEs in the VET arena, not least in terms of a structural weakness vis-à-vis training providers, is worsened by well-known institutional characteristics of LMEs, such as weak interfirm networks and employers' associations (Hall & Soskice, 2001). Indeed, only tight cooperation among SMEs could help them aggregate their skill demands, achieve economies of scale and make (networks of) SMEs more palatable clients for profit-seeking training providers. In contrast, their German counterparts can benefit from mechatronics apprenticeship programmes in vocational schools, whose appropriate geographical distribution is ensured by the government. Furthermore, manufacturing SMEs in Germany can rely on greater institutional inputs in the form of national and regional government funding for intercompany training centres and networks, as well as greater support from local chambers and employers' associations.

Our findings enrich our understanding of the comparative disadvantage of British manufacturing SMEs in the VET arena. The CPE literature explains SMEs' inability to source intermediate technical skills with collective action problems in the VET arena rooted in either the dominant role of the market over the state or in lacking employer coordination leading to the 'fear of poaching' (e.g. Finegold & Soskice, 1988; Hall & Soskice, 2001). Yet, we argue that this explanation should be complemented by looking at the shortcomings of VET policy design. In particular, we have highlighted training providers as a crucial actor in the British VET system and yet one that has been hitherto neglected in the CPE literature, which traditionally focuses on employers, trade unions and governments. Training providers respond to the incentive structure of the quasi-market characterizing both paths, and our analysis suggests that two elements in particular play an important role: the output-based nature of standards, which are, respectively, set by the government for the school-based path and by employers for the apprenticeship path, and the mode of distribution of government funding. Our findings suggest that, due to these pitfalls in policy design, British SMEs struggle to source intermediate technical skills not only because they do not meaningfully engage with apprenticeships but also because they are poorly served by the school-based system – hence, the problem is more complex than the often suggested 'failure to train'.

Relatedly, our analysis points at more extensive state action in terms of shaping and funding the British VET system, especially for SMEs, than the typical CPE accounts of LMEs would suggest. Yet, the state is very active in setting up special arrangements for SMEs also in Germany, where the literature has typically focused on employer coordination or labour–management coordination. There, the state seems to have recently intervened more decisively to counteract segmentalist trends, a development which had been predicted by Thelen and Culpepper (2008). These findings add to an emerging body of research on the role of the state in VET policy aimed at ensuring that VET systems remain attractive for business and young people alike (Bonoli & Emmenegger, 2021; Carstensen & Ibsen, 2019).

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DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available on request from the corresponding author. The data are not publicly available due to privacy or ethical restrictions.

ORCID

Chiara Benassi  <https://orcid.org/0000-0001-7038-3084>

Niccolo Durazzi  <https://orcid.org/0000-0001-7581-5595>

Johann Fortwengel  <https://orcid.org/0000-0002-0765-1274>

NOTES

- ¹ Finegold and Soskice (1988: 29) mention SMEs in their seminal work only to suggest that SMEs are the worst offenders when it comes to poaching but they do not provide any evidence in support of this claim. Evidence points instead at SMEs being the victims of poaching from large employers, as it emerged also from our interviews. This finding is consistent with the common wisdom that SMEs have scarce resources to train, attract and retain talent.
- ² It should be noted here that the distinction between ‘access’ and ‘development’ refers to the primary goal of a given VET system and not to the actual firms’ strategies, which might partly diverge from it. For instance, companies in collective skill formation systems, which are primarily oriented towards skill development, might be able to access skills by poaching qualified workers from competitors. Yet, this is not the purpose of the institutional system and, as discussed in this section, there are, indeed, institutions in place that aim to prevent this collective action problem and reduce the risk of poaching. The distinction thus takes the form of an ideal-typical distinction introduced for analytical purposes.
- ³ Technically, there is also a fourth configuration, that is one where SMEs can successfully both ‘access’ and ‘develop’ skills. This X/Y combination implies that a given country has a relatively large and effective school-based VET alongside a well-embedded apprenticeship system. Austria would be a case in point (Graf et al., 2012). However, this configuration does not provide additional information of theoretical relevance. Compared to the three ideal-typical scenarios that we examine in the article, in this setting, SMEs do not have a *different* route to

sourcing intermediate technical skills but they can rather pick one of the two 'successful paths' that are already accounted for in our case selection. The three cases that we select are, therefore, in themselves jointly exhaustive of the X/Y relationship that we are interested in.

⁴ Data refer to the whole economy, not to the manufacturing sector. Data on training disaggregated by sector and size are, unfortunately, not available.

⁵ Similarly to the UK, these data refer to the whole economy as they are not available only for the manufacturing sector and/or for the mechatronics curriculum disaggregated by company size.

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