



Labour Market Intelligence: Perspectives from Major Contractors

November 2019



Cert No: QEC19593371/0/Q



A report prepared by:

Pye Tait Consulting

Registered in England, Company No: 04001365, VAT No: 755 8312 14

Registered office: Royal House, 110 Station Parade, Harrogate, North Yorkshire, HG1 1EP

Tel: 01423 509 433

email (enquiries related to this report): n.charleton@pyetait.com

email (general enquiries): info@pyetait.com

website: www.pyetait.com

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Contents

1. Introduction	4
1.1 Background	4
1.2 Methodology & respondent profiles	5
2. Workforce demand and supply	7
2.1 Workforce balance	7
2.2 Workforce numbers	8
3. Recruitment, skills gaps & apprentices	11
3.1 Recruitment issues	11
3.2 Apprenticeships	13
3.3 Existing skills gaps	15
4. Future of the sector	20
4.1 Economic outlook	20
4.2 Technology & drivers of change	21
4.3 Adapting to technological change	24
4.4 Working with the supply chain	27
4.5 Occupational changes	29
5. Trade & professional bodies	33
5.1 Priorities for action	33
6. Summary	35
Appendices	37
A. Participating organisations	37
B. Survey	38

1. Introduction

1.1 Background

Small and medium enterprises (SMEs) comprise the vast majority (>99%) of companies in the electrotechnical sector. As part of its recent commission to gather labour market intelligence (LMI) for The Electrotechnical Skills Partnership (TESP),¹ research undertaken by Pye Tait Consulting indicated that there could be as few as 40 large companies (with 250+ employees) in the UK, depending upon how the sector is defined.

The sector has changed dramatically in the last twenty years against a backdrop of rapid technological development. Two decades ago, work mainly consisted of traditional wiring and installation. Fast forward to today and the digital revolution is resulting in wireless systems and smart technology becoming increasingly commonplace, and many processes are now performed and monitored remotely. The drive for greater sustainability and increased efficiency is also impacting the sector, affecting the ways in which design, construction and maintenance of buildings and systems are undertaken. The pace of change within the industry, and the breadth and complexity of the sector means that a highly skilled workforce is required to support future capability more than ever.

While 2% of the sample used for the earlier LMI research comprised large companies – thus over-representing this group – feedback from major contractors following the publication of the report suggested that the results did not always align with their perceptions or expectations. It is perhaps unsurprising that major contractors see the electrotechnical world through a different lens to smaller companies. It is arguable that, due to their greater human resources, they have the ability to step back to look at the bigger picture, and to take a more informed view of the future. There is also, however, the contrasting possibility that larger companies may be more divorced from the everyday realities of the life and work of small business and that this skews their perception of the industry.

To obtain a more detailed understanding of major contractors' attitudes, and where they align to or differ from those of SMEs, two TESP member organisations – ECA (Electrical Contractors' Association) and JIB (Joint Industry Board) – decided to undertake further exploratory research with this group and commissioned Pye Tait Consulting to undertake this work. The research broadly focused on similar topics to the initial LMI research, namely:

- Current and future workforce trends;
- Current and future skills needs;
- Impact of technology on the sector and on future job roles; and
- Reasons for these.

TESP is an industry collaboration which supports electrotechnical employers to develop and drive skills in this sector. Its five partners are ECA, JIB, NET (National Electrotechnical Training), SELECT and Unite the Union. TESP has three core functions: shaping policy; promoting career opportunities; and raising standards and promoting professionalism.

¹ TESP, Labour Market Intelligence Research, 2019.

1.2 Methodology & respondent profiles

To obtain views from major contractors, detailed depth interviews with nominated organisations were undertaken. Participants were initially informed of the research and its intent and context by the Chief Executive of JIB or the Director of Employment and Skills at ECA, before Pye Tait then followed up with these key contacts to schedule interviews.

In total, 13 interviews were conducted with participants between mid-July and mid-September 2019. Of these, eight interviews were conducted face-to-face, while the remaining five interviews were conducted over the phone.

This contrasts to the method used for the main LMI research, part of which comprised quantitative CATI-based research with 443 organisations from across the UK followed by 36 in-depth telephone interviews with employers. The face-to-face interviews utilised in the current research allowed for much richer information to be gathered from major employers so as to understand their views in greater detail.

Appendix A outlines the companies which participated in this research, and Appendix B contains the questionnaire which acted as a structure for the interviews. The job roles of those participating in this research include, but are not limited to:

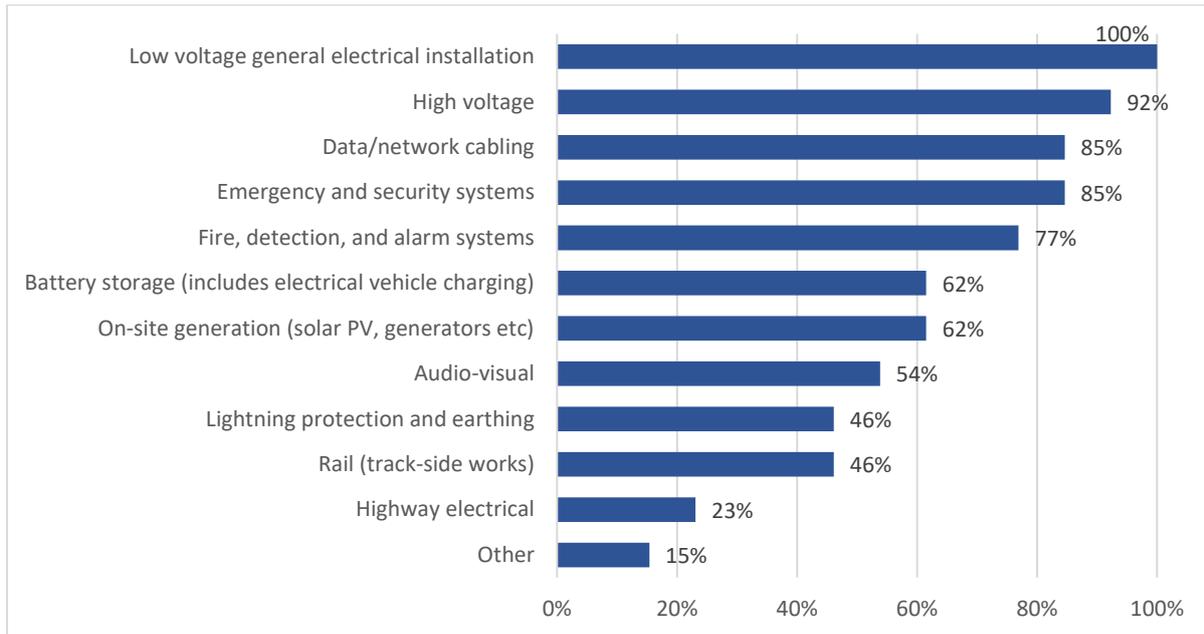
- CEO
- Chairman
- HR Director
- Labour Manager
- Production Manager
- Operations Manager
- Talent Director

Following completion of each interview, participants were provided with a summary of their findings for validation. These validated findings were then collated and used to shape the analysis contained within this report. Quotes used throughout the report have been drawn from these validating summary papers.

IMPORTANT NOTE: The reader should bear in mind that the original research – involving 479 companies – was conducted in line with standard research practice, in which the respondents were selected at random from a large database of sector companies. The present research – involving 13 companies – was, however, highly selective in that the respondents were nominated in the main by JIB or ECA. The two approaches are both valid in research terms when considered as separate exercises, but the research formats should be borne in mind when reading the findings and comparisons. In addition, the reader is advised to treat percentages given in this report with great caution in that, while they are valuable indications of the weight of feeling and experience within the respondent group, they are based on only thirteen respondents.

Participating companies undertake a broad range of activities. All respondents undertake low voltage general electrical installation, while the vast majority also conduct high voltage work (92%). Most of the organisations perform work in the areas of data/network cabling and in emergency and security systems (85%) while highway electrical work is conducted by only a small number of firms (23%). Other activities include switchboard and motor control. Generally, all proportions in the figure below are higher than was found for large employers in the 2018 LMI research.

Figure 1 Activities of participating organisations



Base: 13 respondents (multiple selections were permitted in the response). Pye Tait research, 2019.

Note: Due to rounding, some chart totals in this report may not total 100%.

2. Workforce demand and supply

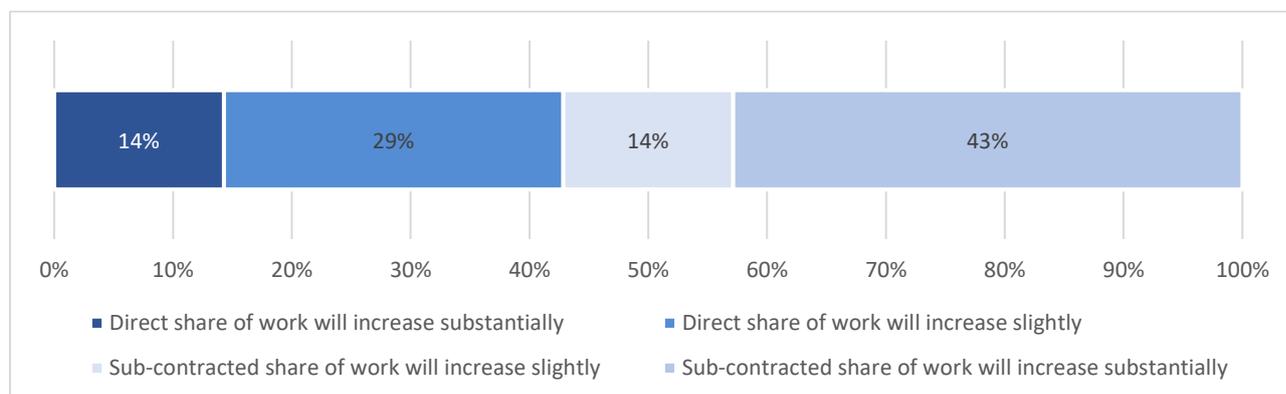
2.1 Workforce balance

Major companies in the electrotechnical sector may be the main contractor, i.e. Tier 1 company, or might, instead, be a large sub-contractor, i.e. Tier 2 company in any given piece of work. One implication of this is that the split of work undertaken directly/indirectly by the organisations interviewed for this research varies widely. For instance, the largest Tier 1 contractors sub-contract 90-95% of their work and act largely as project managers, while Tier 2 contractors may undertake anywhere between 40-100% of their work themselves.

Of the thirteen companies interviewed, the average/mean value of work undertaken directly is 56% (44% sub-contracted), and the mode (most common) is 80% direct, 20% indirect (i.e. through sub-contractors).

Over half of these firms expect their split of direct/indirect work to change in the next five years. Of the seven who foresee this dynamic altering, there is a variance in exactly how they foresee the balance of their workforce shifting. Three firms believe that they will increase the proportion of work undertaken directly (43% of those expecting a change), while the other four believe they will sub-contract more (57%), with most of these noting this will be a substantial increase. The vast majority of respondents heavily caveated their response to this question, noting that it is exceedingly difficult to accurately forecast numbers so far ahead.

Figure 2 Views on how split of work will change over 5 years



Base: 7 respondents. Pye Tait research, 2019.

Where labour is concerned, most companies explain that their current balance of direct/sub-contracted labour is derived from a requirement to be flexible in terms of the labour and resources available for specific projects. They note that there are peaks and troughs in labour requirements, and that sub-contracting to a certain extent mitigates the risk of being over-resourced at any point in time.

A further advantage of sub-contracting a proportion of work is that it allows companies to ‘package up’ work differently, thus giving their projects greater flexibility in this regard. It also reduces risk for

the company in terms of project completions and can help to drive up productivity on projects to thereby increase efficiency. With the tight margins in the industry, sub-contracting also reduces the internal costs for own-staff training and development.

However, other companies intimate that winning major contracts provides surety of work for coming years, thereby offering guaranteed work for directly employed staff.

Some companies are not confident in making a prediction regarding the future balance of their workforce as, they argue, it depends on several unknowns such as the sector and location of projects which are won, and the availability and quality of labour in these areas.

An increase in sub-contracted labour as at times [company] can be over-resourced due to natural peaks and troughs in the workflow.

A recent major contract won covering both installation and maintenance means that more staff will be employed directly.

2.2 Workforce numbers

A second finding of the research with both Tier 1 and Tier 2 contractors is the large variance of workforce numbers.

Of the thirteen companies responding, total PAYE staff range from 250 to 3,300 people. The mean/average number of total staff is 1,276, however, this number should only be taken as an indicator given the small sample size.

Most, but not all, companies also currently employ agency and self-employed staff, with a range of between 30 and 300 such workers being on their books. Similarly, the mean/average value of 131 agency and self-employed workers should be treated with extreme caution.

Table 1 Current workforce numbers

	Average/mean	Minimum	Maximum
<i>PAYE (labour)</i>	681	130	2,000
<i>PAYE (staff)</i>	519	75	1,000
<i>Agency/self-employed (all)</i>	131	30	300
TOTAL	1,276	250	3,300

Base: 11 respondents. Pye Tait research, 2019.

Respondents are very cautious in predicting future workforce numbers, and indeed few are able (or reluctant) to provide approximate figures at all. Forecasting challenges which firms cite include external factors such as the economic uncertainty created by Brexit, the unknown impact that technology might have, and the difficulty of future-gazing when tenders only extend two years into the future at most.

However, over half of the organisations responding (58%) anticipate that their workforce numbers will generally increase over the next five years. The most common reason for this is due to strategic growth of organisations as the firms seek to increase their turnover. Firms also cite large infrastructure projects as driving future workforce numbers upwards.

Hundreds more skilled, semi-skilled and unskilled workers will be required if they are involved in large projects such as Hinkley Point C from 2021 onwards.

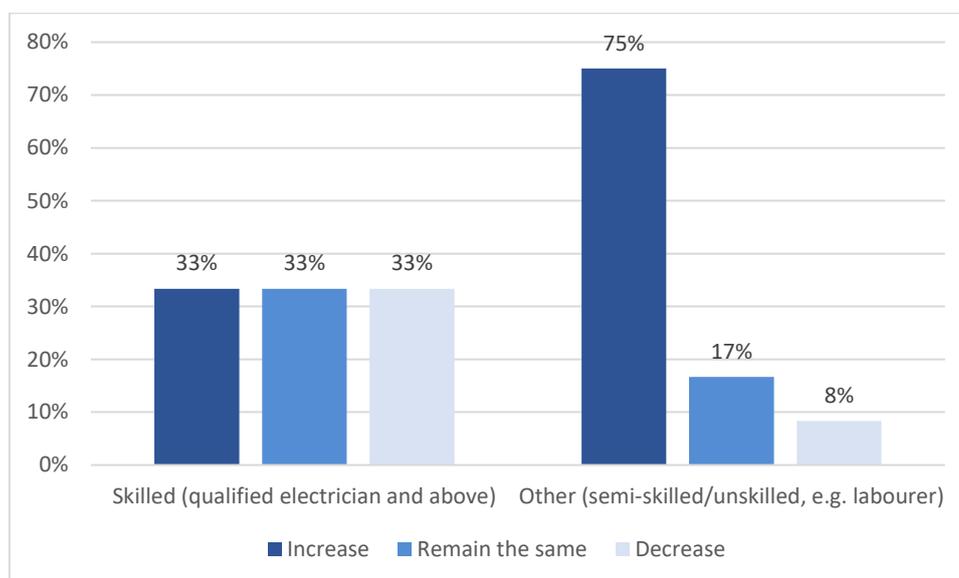
One in three organisations anticipates that their workforce numbers will remain the same; such companies explain that this is either in line with their current business model/strategy, or that it is difficult to predict a large increase or decrease so far into the future. One firm believes their workforce numbers (directly employed) will decrease, explaining that this will be due to an increase in the proportion of sub-contracted work (also reflected in Fig. 2, above).

None of the firms interviewed anticipate a large upheaval to their business which would significantly affect workforce numbers.

When questioned on the future demand for electrical labour, as in the main survey, respondents are split evenly as to whether demand for skilled labour (electricians and above) will increase, decrease or remain the same. However, the majority of respondents (75%) believe that the demand for 'other' labour (semi-/unskilled workers) will increase over the next five years.

For comparison, the large companies participating in the 2018 LMI research generally believed demand for skilled workers would increase, and that demand for semi-/unskilled workers would remain the same.

Figure 3 Workforce demand over next five years



Base: 12 respondents. Pye Tait research, 2019.

The increasing prevalence of offsite manufacturing and prefabrication is a commonly cited reason for the anticipated increase in demand for semi-/unskilled labour and decrease in demand for skilled labour. Coupled to this, the emergence of new technologies will mean that such workers will take on

tasks that skilled labourers (electricians) may have performed historically. More detail regarding the direct impact of technology on job roles may be found in section 4.5.

Other reasons given for predicted changes in demand centre around strategic company growth within the sector, or pursuance of current business models. One firm notes that an ageing workforce means that there is a need to replace these workers and the skills, knowledge and experience they hold.

A combination of increased offsite and prefabrication manufacturing, and also due to large projects coming online and the strategic growth of the company.

3. Recruitment, skills gaps & apprentices

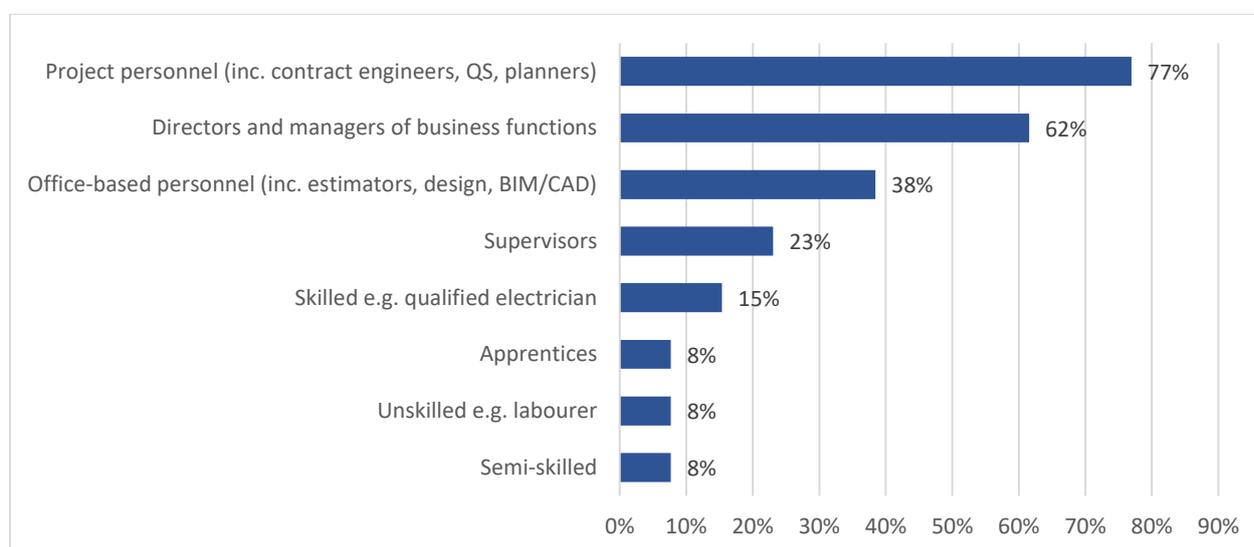
3.1 Recruitment issues

Respondents were asked to comment on the difficulty of recruiting for a range of roles across their companies. Across the thirteen companies interviewed, the most difficult roles to recruit for are project personnel, as mentioned by 77% of firms; specifically, quantity surveyors and engineers are commonly mentioned in this group as being hard-to-fill roles. Well over half of respondents (62%) also note that directors and managers of business functions are more challenging positions to fill. Just under two in five firms (38%) note that office-based technical personnel can also be hard to find, and both BIM and CAD specialists are mentioned in this regard.

Respondents note that, in general, other roles including skilled, semi-skilled, and unskilled labour are more straightforward to recruit. This contrasts to the 2018 LMI research where qualified electricians were cited by large employers (250+ employees) as being the most hard-to-fill roles. The difference may well be due to the difference in relative recruitment-power between the major companies participating in this research and smaller companies, which constituted the bulk of the respondents to the larger 2018 survey.

A common theme across a number of organisations in this research is that good quality supervisors, engineers, surveyors and managers with expertise in the commercial sector are hard to come by.

Figure 4 Roles most difficult to recruit



Base: 13 respondents (multiple selections were permitted in the response). Pye Tait research, 2019.

When questioned on the reasons for such recruitment difficulties, there is generally consensus among major contractors that there are not enough quality applicants available, mentioned by 85% of firms. Respondents note the labour pool for certain roles is limited, and that the very best workers are always in high demand. Firms will commonly use recruitment agencies to hire for these

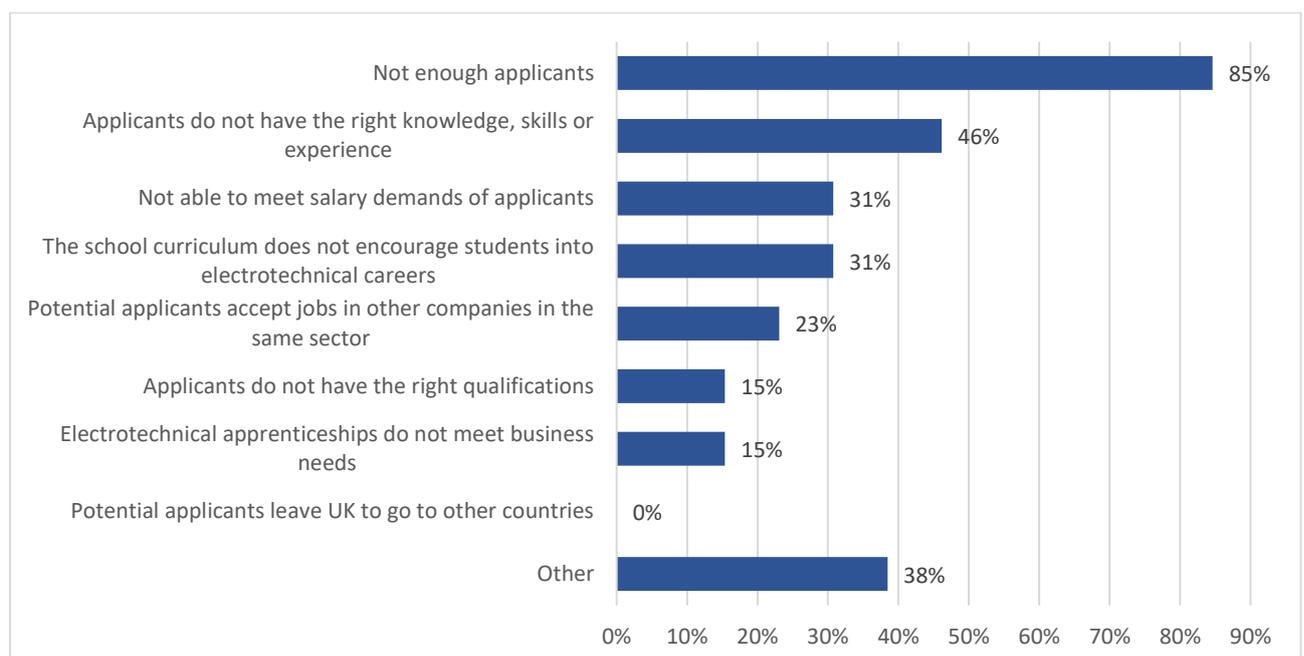
hard-to-fill roles. Some respondents also note that the pool of workers is male-dominated, and that there is a lack of female workers in the sector.

There is a small pool of quality people, which is limited further by [company] not recruiting from its own supply chain.

Nearly half of responding organisations (46%) note that applicants do not have the right knowledge, skills or experience to perform the role, while just under a third (31%) mention that they cannot meet the salary demands of applicants, which often results in such workers going to competitors. Indeed, one firm notes that electricians and semi-/unskilled workers can now define their own lifestyle by picking and choosing contracts which are convenient to them.

Around one in three major contractors (31%) comment that the school curriculum and the understanding of teachers and careers advisers does not encourage students into electrotechnical careers. These firms note that the sector involves less manual work than in the past, and that perceptions within schools of the industry and its culture may not be wholly accurate. One firm notes that it has encountered difficulties in finding candidates who want to work in the sector, and finding those who have suitable grades.

Figure 5 Reasons for recruitment difficulties



Base: 13 respondents (multiple selections were permitted in the response). Pye Tait research, 2019.

A minority of firms (15%) also mentions that apprenticeships only partly meet business needs and that more ‘real-world’ focus is required for them to undertake training that is relevant to the workplace.

To overcome potential recruitment difficulties, companies often seek to promote staff internally. However, organisations comment that workers who are trained and developed in-house are often lost to other companies in the sector once they are fully qualified and competent.

‘Homegrown’ staff are commonly lost to competitors once fully trained.

Among ‘other’ reasons not cited above, one respondent notes that a lack of quality training available locally has meant that trainees who might potentially join the company and so enter the electrotechnical sector are being lost.

3.2 Apprenticeships

Across the board, apprentices are viewed as being extremely valuable to all the major contractors interviewed. They are viewed as being critical for these businesses and their future. Although respondents acknowledge that such entrants do not initially have a high output, apprentices are seen as long-term investments by the organisation in these people and their future (and that of the business), as the company supports them to develop into fully rounded staff with broad experience.

They are viewed as a long-term investment by the firm, with many in the past working their way up to management positions.

One respondent notes that apprentices – typically being young workers – enable workforce planning and management, particularly with regard to an ageing workforce. Another comments that all electrotechnical companies – big and small – should be obliged to take on apprentices, as they are the lifeblood of the sector.

Most organisations that were interviewed currently have a total of around 30-40 electrotechnical apprentices engaged, although three firms invest in over 100 such apprentices. One major company does not engage any electrotechnical apprentices directly but does ensure – through contractual obligations – that its supply chain takes on a certain number per project.

Table 2 Current total apprenticeship numbers

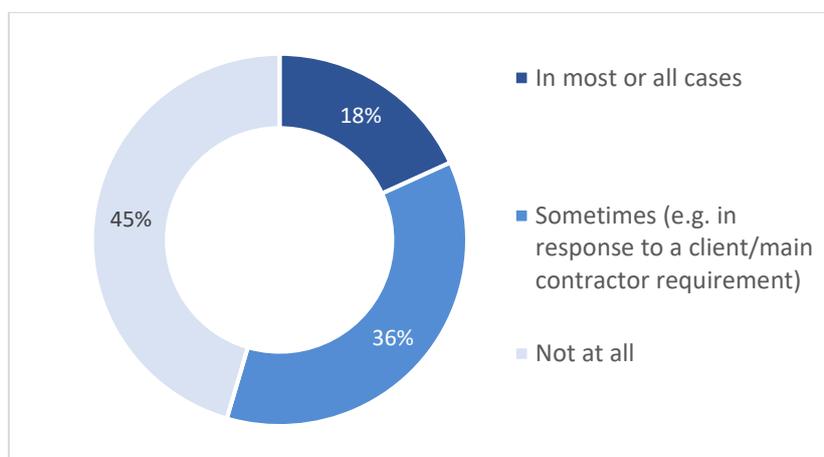
	Average/mean	Minimum	Maximum
<i>Electrotechnical apprentices/trainees</i>	58	0	240
<i>Other apprentices/trainees</i>	57	6	160
TOTAL	88	10	240

Base: 13 respondents. Pye Tait research, 2019.

Apprentices and trainees are also taken on in other areas of the business by six of the companies interviewed, for instance in mechanical engineering or building services, with some also being taken on in other departments such as HR.

When questioned about their level of involvement and monitoring of the number of apprentices taken on by organisations within their supply chain, almost half of respondents (45%) say that they do not monitor this at all. Just over one in three (36%) monitors the number of apprentices taken on by sub-contractors on an occasional basis, and more often than not this is to ensure that contractual obligations have been met. Only two organisations monitor the number of apprentices taken on by their supply chain in most or all instances.

Figure 6 Extent of monitoring of apprentice numbers within supply chain



Base: 11 respondents. Pye Tait research, 2019.

Employers cite a number of challenges in taking on apprentices. With an apprenticeship lasting four years, having sufficient volume of current and future work is raised as an important issue by employers to ensure that apprentices have a steady and continuous flow of work throughout their training period. This involves forward-planning and security of business to ensure that apprentices can be guaranteed work over their four years.

The main challenge in taking on apprentices is having the volume and steady supply of work available for them during their study.

This problem mirrors that of smaller companies who invariably cite the need to have sufficient work to justify taking on apprentices as one of the major barriers.

As Tier 1 contractors, several responding firms send their apprentices to work for supply chain organisations and build this into contracts. One challenge arising in this regard is ensuring that apprentices are well-monitored, supported, and supervised during their training. To solve this issue, some firms now ensure that apprentices are mentored directly by project managers, thus ensuring that trainees see a range of work and are not used as a general labourer onsite.

There is a challenge with regard to the monitoring and support of apprentices/trainees placed with sub-contractors.

Apprentices aged 16 and 17 are particularly challenging to take on as contractors perceive there to be greater risk to these young people. Employers explain that, due to tighter health and safety regulations, there are perceived limitations as to what an apprentice of that age can do – or is allowed to do – onsite. A further issue is that under-18s may have limited mobility if they have yet to obtain a driving licence. Indeed, a number of organisations state that, for the above reasons, they will only take on apprentices who are aged 18 and above.

Main contractors perceive there to be a greater risk and are more reluctant to let these school leavers onsite compared to 18+.

Finding apprentices who are committed to a programme of four years can also be difficult.

Employers note that some young people are potentially put off from entering the sector due to the manual labour aspect, or as one with limited earning potential. One company notes that, by taking apprentices only from age 18 upwards, these people have shown commitment by being at college for two years already. Another company notes that it can struggle to fill all its apprentice vacancies due to a lack of quality candidates. This again mirrors the challenges found by smaller firms – they say the lack of ‘quality’ means candidates who have enthusiasm and are willing to learn.

Another issue is the general lack of females in the pool of apprenticeship candidates, and such organisations noted they would like to see increased diversity within the sector.

One employer believes it is at a competitive disadvantage in taking on apprentices as it is obliged to pay JIB rates to its apprentices which, it argues, can be double the wage paid to such workers by non-JIB member companies.

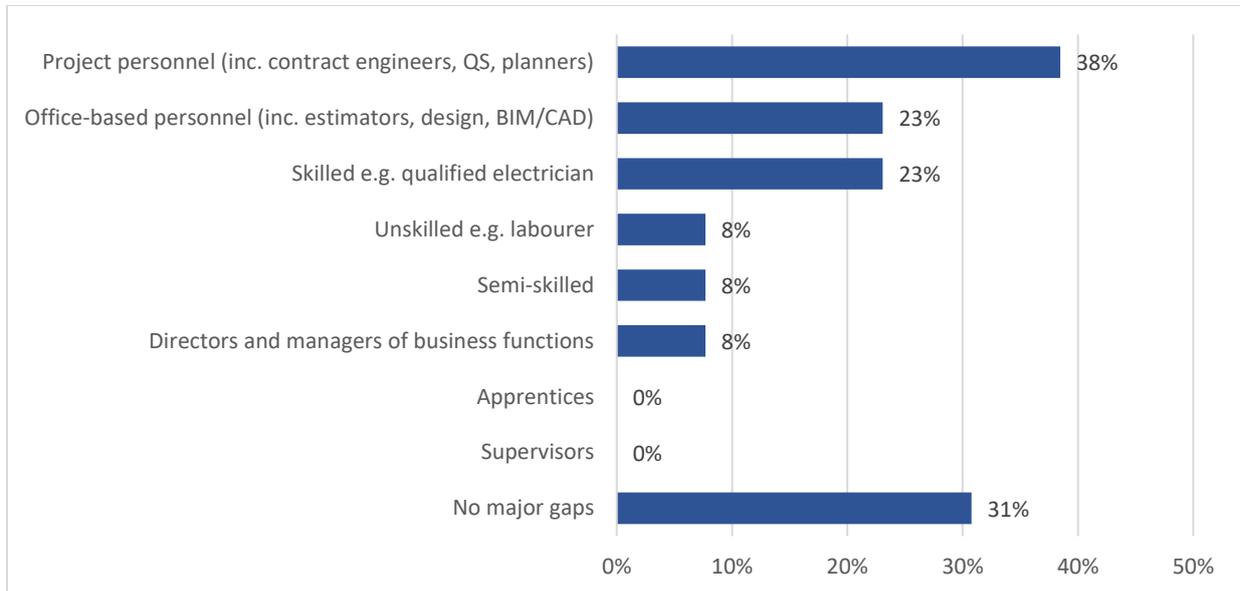
A final issue raised concerns the content of Apprenticeships. With the pace of change in the industry due to technology, this employer states that training can quickly become redundant and therefore the UK needs to change and adapt the way it is training people.

3.3 Existing skills gaps

Organisations were asked whether they perceived there to be any major skills gaps within their current workforce. Perhaps understandably, a large minority of companies (31%) believe that no such major skills gaps exist and that all staff are trained and competent to perform their roles.

Of the remaining major contractors, major skills gaps are perceived to exist most commonly amongst project personnel staff (38%) with planning and engineers being mentioned specifically within this job family. Technical office-based personnel roles and skilled workers (such as electricians) are next most commonly mentioned (both by 23% of respondents); with regard to the former, roles involving design, BIM, CAD and offsite manufacturing are mentioned specifically. A small minority of organisations comment that there is a lack of take-up and integration of digital technologies in general across all roles.

Figure 7 Roles with perceived major skills gaps

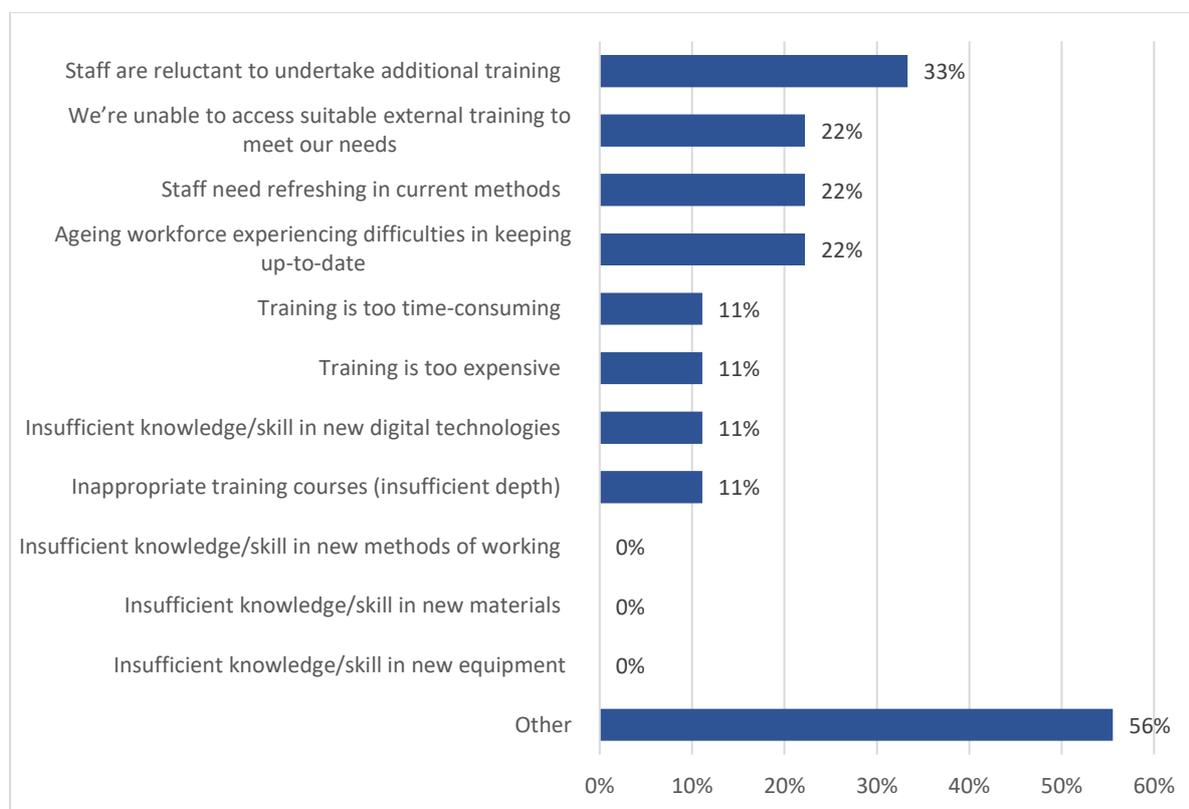


Base: 13 respondents (multiple selections were permitted in the response). Pye Tait research, 2019.

In instances where major skills gaps are perceived to exist within the current workforce, respondents were asked to explain the potential reasons for such skills gaps. A wide range of reasons is provided by employers and there is no clear trend amongst responses. Most commonly, respondents note that skills gaps arise when staff are reluctant to undertake additional training (33%). Meanwhile, reasons for major skills gaps provided by more than one organisation include:

- staff need refreshing in current methods;
- an ageing workforce has difficulties in keeping up-to-date; and
- organisations being unable to find/access suitable external training that meets their needs.

Figure 8 Reasons for major skills gaps in current workforce



Base: 9 respondents (multiple selections were permitted in the response). Pye Tait research, 2019.

A variety of other reasons for major skills gaps in the current workforce are suggested by several employers. Where a lack of skill, training or qualification in new technology is highlighted it is noted that it can take time for the workforce to fully embrace technology, to understand its capabilities, and to integrate it fully into their daily work.

Some companies note that existing staff are reluctant to move along a defined career path into higher roles, e.g. from an electrician to a project personnel role, and are content with their current position. One respondent notes that the former may not view the latter as an attractive profession, while others note that existing staff may lack the aptitude and capability to move to higher roles.

In this regard, one company notes that softer skills can be more difficult to teach compared to technical skills. It notes that such softer skills are essential to succeed in higher roles (e.g. project management) and that workers to require an initial aptitude and a willingness to progress and embrace these skills.

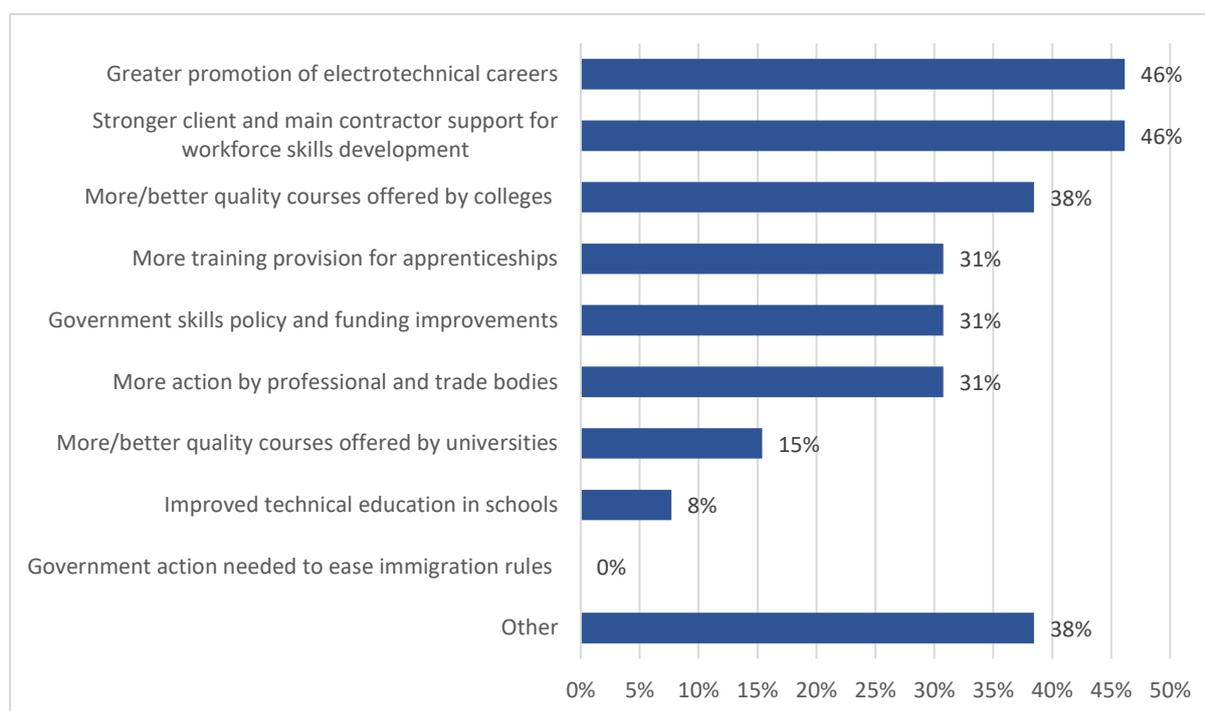
For comparison, the main reason – from a set list of options – cited by large employers in the 2018 LMI research for skills deficiencies in their existing workforce was that training was perceived to be too time-consuming or too expensive.

All employers interviewed for this research believe that there is a skills shortage to some degree within the electrotechnical sector and suggest a number of ways in which this shortage could be addressed.

The most common actions suggested by just under half of respondents (46%) are for greater promotion of electrotechnical careers to young people within schools and colleges, and for stronger client and main contractor support for workforce skills development. These two are often interlinked by respondents, who propose that employers should go out to engage directly with schools and colleges to promote the industry and the types of work available to young people.

More action is required to encourage young people into the sector, for instance with major companies going into schools/colleges, and greater emphasis of the sector in school curricula.

Figure 9 Actions required to tackle skills shortages in the electrotechnical sector



Base: 13 respondents (multiple selections were permitted in the response). Pye Tait research, 2019.

More/better quality courses at colleges is the next most commonly suggested means of addressing the perceived sector skills shortage (38% of respondents). These companies note that there should be a much closer link between education and industry so that a) the content of the apprenticeship framework reflects the industry needs of today (e.g. modularisation), and b) specific courses (e.g. for estimators) should be offered which offer skills outcomes relevant for the sector, particularly as established staff are often pushed for time to train new starters internally.

Current courses offered by colleges are not fit for the industry; the result is that bridging units are required for students. Qualifications need to be reviewed by professional bodies, and industry and education need to work closer together to create one, overall qualification that is fit for purpose.

Two major employers note that the current workforce often perceive a jump between a role which is primarily based “on the tools” and a higher skilled role. They suggest that this gap could be softened

to an extent, partially through offering appropriate training (and support to do so), and partly from a change in the mindset of current workers to encourage them to follow career pathways.

The bridge between operative and engineer needs to be softened, with many operatives not wishing to drop a wage to go to re-train.

For comparison, a smaller proportion of large employers in the 2018 LMI research called for greater promotion of electrotechnical careers, with many instead believing skills shortages could be addressed by adjusting apprenticeships standards to give a greater focus on new technologies and processes.

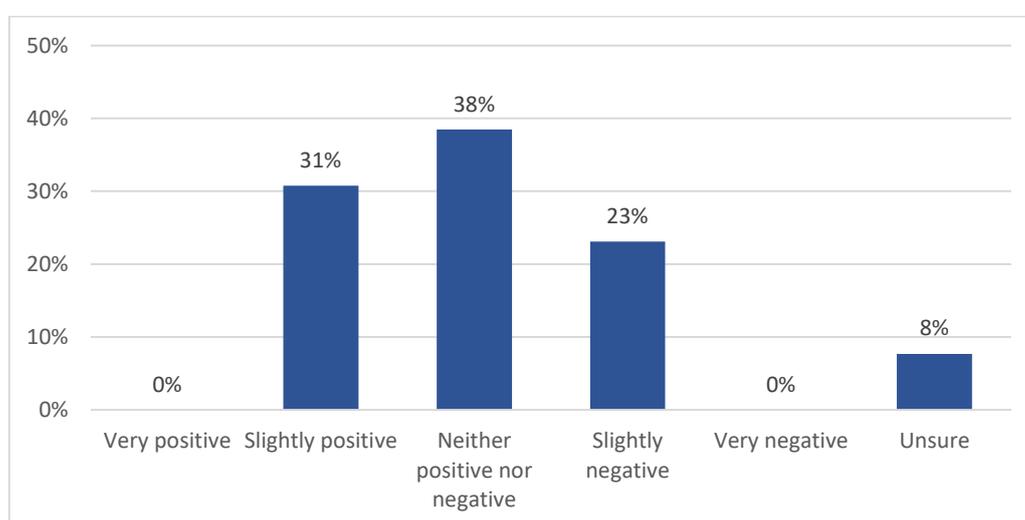
Overall, a collaborative approach between industry, trade bodies and government is suggested by respondents of this research to be the best means of both encouraging school and college leavers into industry, and to improve the skills of the existing workforce by improving the educational offering.

4. Future of the sector

4.1 Economic outlook

Employers were asked for their views on the economic outlook for the electrotechnical sector over the next three to five years. No organisation is overwhelmingly positive or negative in their response, with most being extremely cautious in their answer. About two in five organisations (38%) are 'neither positive nor negative in their outlook', while a higher proportion are 'slightly positive' than 'slightly negative' (31% and 23%, respectively). This reflects the outlook of large companies in the sector from the 2018 LMI research.

Figure 10 Economic outlook for the electrotechnical sector



Base: 13 respondents. Pye Tait research, 2019.

Two main themes arose across responses. Reasons for caution in respondents' outlook tend to focus on the high degree of uncertainty and indecision created by the United Kingdom's anticipated exit from the European Union. Companies note that many organisations are holding off making decisions, and that this is resulting in a lack of investment spending. In addition, organisations highlight that the current political climate means that government and policy could possibly change in the short term, thereby potentially impacting on worker restrictions.

The current indecision on Brexit and the way the government could potentially change is having a negative impact on the market overall and there is a high degree of uncertainty, with a noticeable slow-down in the amount of commercial and residential work.

There is, however, a note of cautious optimism amongst respondents. They note that large infrastructure projects and injection of spend into the economy will have a positive impact for the electrotechnical sector. More generally, some employers note that electrotechnical work will be in demand and required for the foreseeable future, and that there are many opportunities available.

However, some respondents caution against such optimism, commenting that projects need confirmation of go-ahead before they can view the economic outlook more positively.

The outlook is very much tied into major projects such as Hinkley Point C, HS2, and the Heathrow expansion going ahead, and if government commits to these, it would provide a lot of work.

While government has spoken about putting money into the industry, [company] has noticed a considerable slow-down over the last few years.

Major, government-funded infrastructure projects like HS2 would have a positive impact for the business.

The difference between the outlook of larger and smaller companies may, to a large extent, be a result of the different markets addressed by the two segments of the industry. Larger companies tend to look at much larger projects, often government backed, than smaller companies and larger projects generally mean large-scale local, regional and national government spending. Smaller companies, on the other hand, tend to focus on local and regional commercial work and on local domestic projects. As the market for the larger companies is highly reliant on political circumstances – at present extremely vulnerable to Brexit uncertainty – it is not surprising that these larger companies are slightly more cautious than the smaller companies' reaction in the main survey.

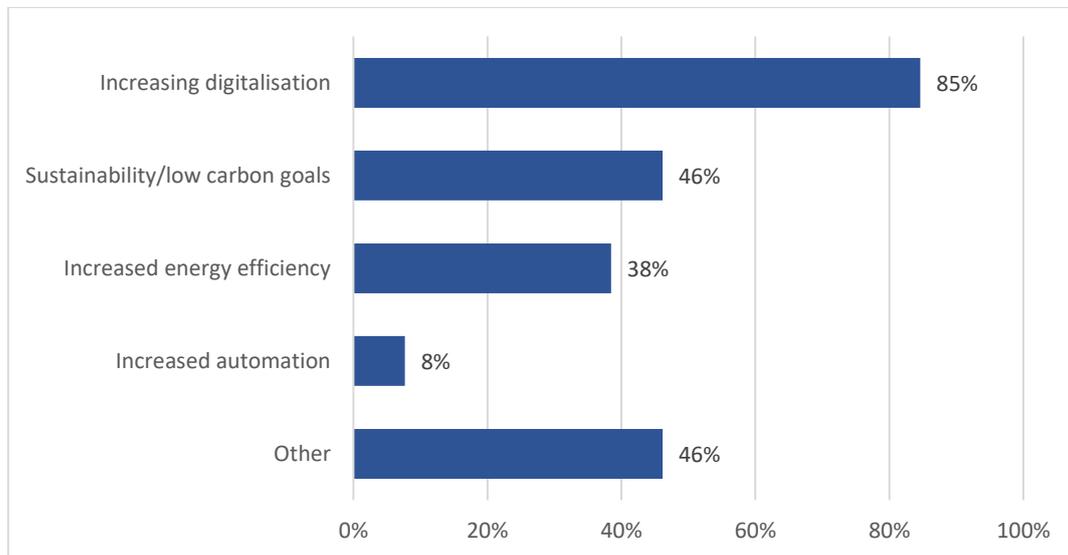
4.2 Technology & drivers of change

Looking to the future over the next three to five years, there is general agreement among major contractors that increasing digitalisation will be the biggest driver of change; this is mentioned by 85% of respondents who note that technology is becoming increasingly embedded within ways of working in the industry. This aligns to findings from the 2018 LMI research.

A push for greater energy efficiency, and an increased focus on sustainability to 'green-up' the industry are both mentioned by just under half of companies as being important influencers for the sector in the coming years (38% and 46%, respectively).

Another driver over the next three to five years which several organisations mention is the increased prevalence and innovation around offsite manufacturing which will not only boost productivity but will also help to realise greater cost efficiencies. One company believes that economics will drive the sector to become leaner and more connected.

Figure 11 Drivers of change for the industry



Base: 13 respondents (multiple selections were permitted in the response). Pye Tait research, 2019.

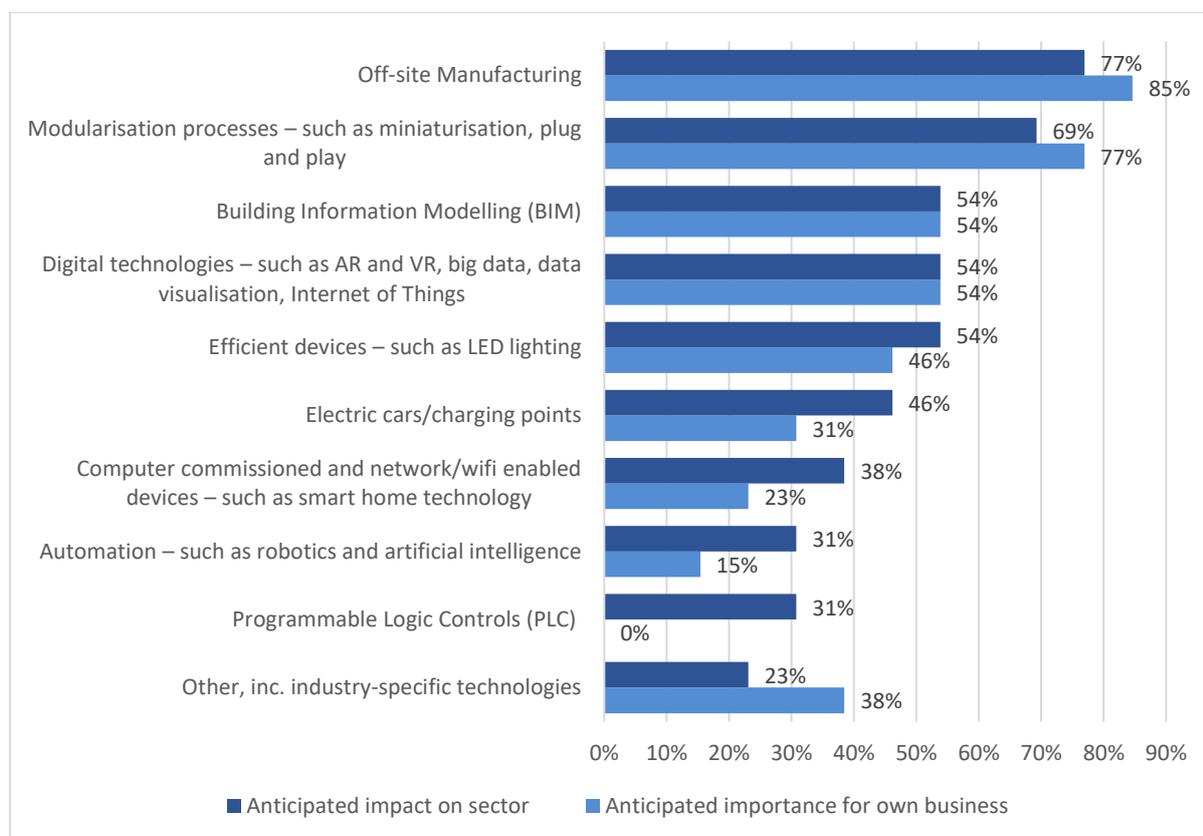
With digitalisation generally perceived as the most significant driver of change within the sector over the next three to five years, companies were asked which specific technologies they believe will a) be of greatest importance for the electrotechnical sector as a whole, and b) have the most significant impact on their own business. With so many uncertainties and potential influences and other unknowns, respondents are cautious about predicting much further than three to five years down the line, especially given the pace of change within the industry.

Offsite-manufacturing and modularisation are the two highest-rated technologies/techniques, both in terms of importance for the sector, and for individual businesses. Respondents note that these technologies are becoming increasingly prevalent in the industry, and that there is a great drive towards take up of these processes as they can increase efficiency and productivity and so reduce cost, as well as being a safer method of construction. Many respondents note that this change is already happening within the industry and that it will only become more commonplace.

Building Information Modelling (BIM) and digital technologies (e.g. AR, VR, Internet of Things) are rated equally as the next most important processes for both the sector and individual companies. In the 2018 LMI research, large companies also suggested the possibility of super-conductivity systems and quantum computers becoming more predominant, but few 'other' technologies or processes were mentioned in this latest research.

While respondents anticipate that technologies such as Programmable Logic Controls (PLCs), automation and computer commissioned devices will be important for the sector in the coming years, a much lower proportion of respondents believe that they will have an impact on their own business in the same time frame.

Figure 12 Anticipated impact of specific technologies on electrotechnical sector/own businesses



Base: 13 respondents (multiple selections were permitted in the response). Pye Tait research, 2019.

Among other technologies and processes which respondents mention specifically – and linked to offsite manufacturing – both offsite design and a push towards increasingly advanced materials are perceived to be important for businesses in the electrotechnical sector in the future.

Against this background of technological change, respondents were asked to predict the direct impact that new technology and processes would have on demand for job roles. Taking all responses together, major contractors believe that demand for most roles will either remain the same or increase; the two roles which are exceptions to this trend for the interviewed major contractors are skilled roles (e.g. electrician) and semi-skilled roles for which 46% of respondents believe that demand will decrease.²

For most roles, employers do not see technology replacing people, rather they see it as tool to complement work and to aid people to perform tasks with greater efficiency. This will mean that more work can be achieved while still employing the same number of people. Demand is expected to increase for some roles as technology becomes more prevalent (e.g. more BIM experts may be

² While this may appear to be an apparent contradiction to the findings in Figure 3 (that 75% of respondents believe demand for ‘other’ workers will increase), that research question was much broader, and further, it did not split out semi-skilled and unskilled workers. The findings in Figure 13 are the perceived impact that technology *specifically* will have on demand, and respondents had opportunity to provide more granularity by role.

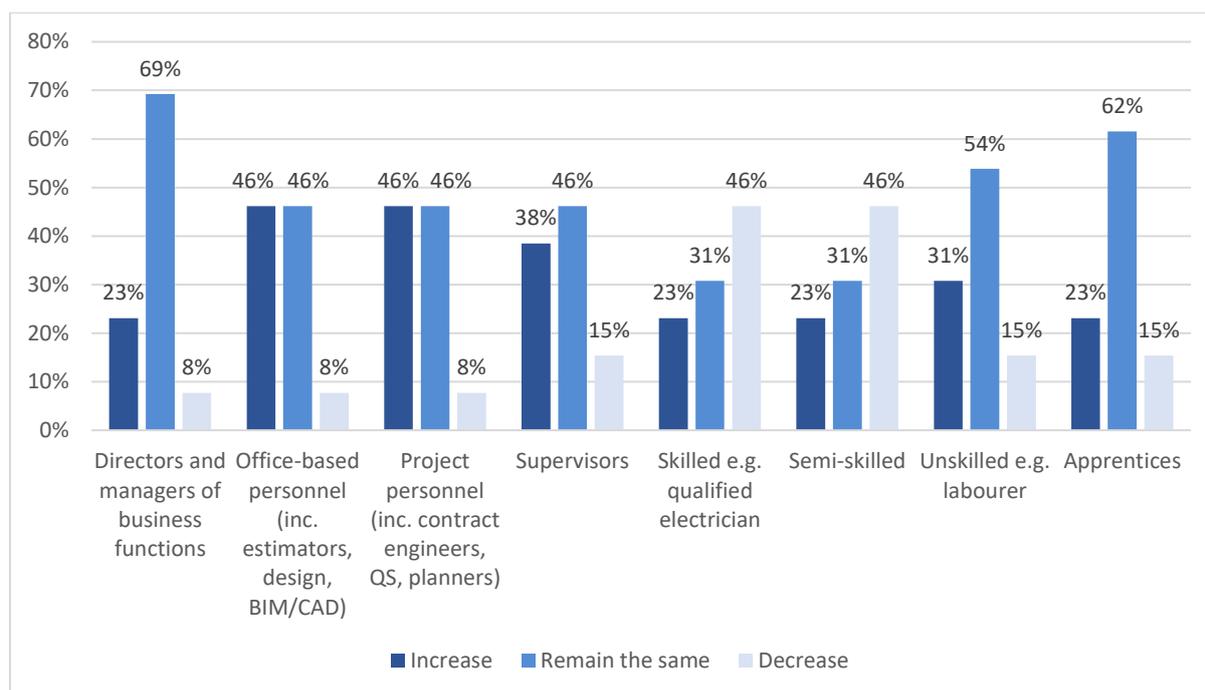
required) and also due to strategic growth and company expansion. Other respondents predict an ‘hourglass’ shift in demand as higher-skilled roles are empowered by technology, middle roles are squeezed as they are replaced by automation/AI, while unskilled roles (e.g. labour) will still be in demand. In addition, smarter materials and manufacture may mean that less maintenance is required.

Expect demand for many onsite roles to decrease as these are replaced by increased remote supervision and automation.

It could thus be tentatively concluded that major contractors foresee that the direct impact of technology (solely in isolation) will result in an increase in demand for unskilled job roles, a slight decrease in demand for semi-skilled roles, while demand for skilled roles will remain approximately steady. However, respondents note that wider market and environmental factors – besides technology – must also be taken into consideration to estimate future demand changes.

For comparison, large companies interviewed for the 2018 LMI research anticipated an increase in demand, as a result of technological changes, for supervisors, apprentices and unskilled workers (as above) but also for skilled workers.

Figure 13 Anticipated impact of technology on demand for various job roles



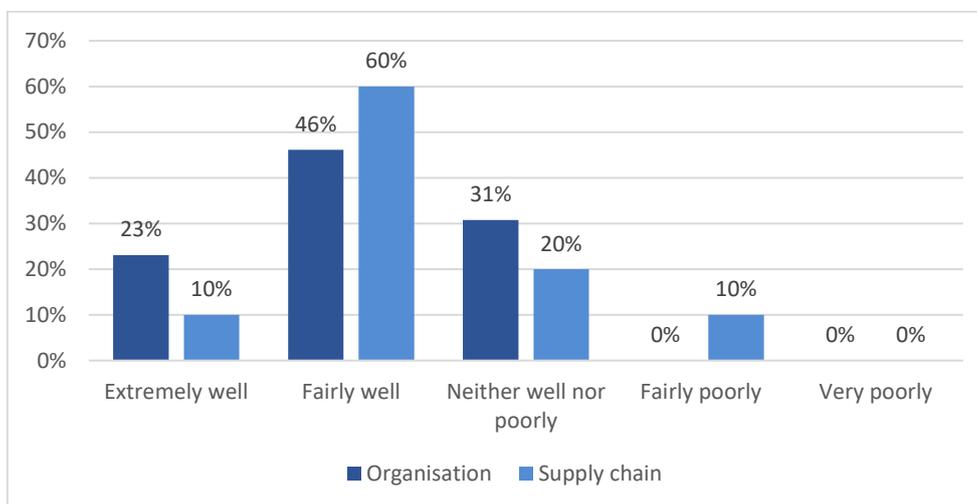
Base: 13 respondents. Pye Tait research, 2019.

4.3 Adapting to technological change

A large minority of the major employers interviewed believe that they are responding and adapting to technological change fairly well (46%), just under a quarter (23%) believe their organisation is responding extremely well, and around a third (31%) perceive their firm is responding neither well nor poorly. The same general trend is perceived by employers of their supply chain, although one

respondent did note its sub-contractors are responding fairly poorly to technological change as it does not perceive them to react quickly enough to such change.

Figure 14 Perceived response to technological change



Base: 13 respondents. Pye Tait research, 2019.

These major contractors generally believe themselves to be trend-setters and leaders in terms of innovation and development, undertaking research into various different and emerging technologies. Several companies note that they are strategically choosing to invest in a broad spectrum of technologies as it is unclear as to which will emerge as a game-changer for the sector.

On the back of this, most of the companies interviewed believe that they are taking up most technologies well and cannot cite any specifically that are not being as well taken up. However, two respondents note that their organisations still have a ‘paper mindset’ which has yet to be overcome. In addition, and as noted above, while companies may be focusing on a broad range of technologies, they can lack greater in-depth knowledge of specific technologies with Virtual Reality, robotics and artificial intelligence mentioned in this regard. Such employers note they keep up-to-date on the latest developments in this area, but are not fully versed in the technicalities until these become more widespread.

Among the challenges which employers cite with regard to adopting new technologies and processes, a common issue is a lack of time to make big changes to made and to filter down through and across the organisation. Coupled to this, the workforce can often lack the skills or the desire to embrace technological change, and employers note that the ageing workforce can be more reluctant to change their ways of working in this regard.

In terms of staff embracing and adapting to new technology; this can be more problematic amongst the ageing workforce.

Other difficulties more commonly cited include a lack of finance/resources to make wholesale changes across an organisation (e.g. investing in hardware for all employees), and several employers also note that they will tend to research and invest in new technology as dictated by client demands.

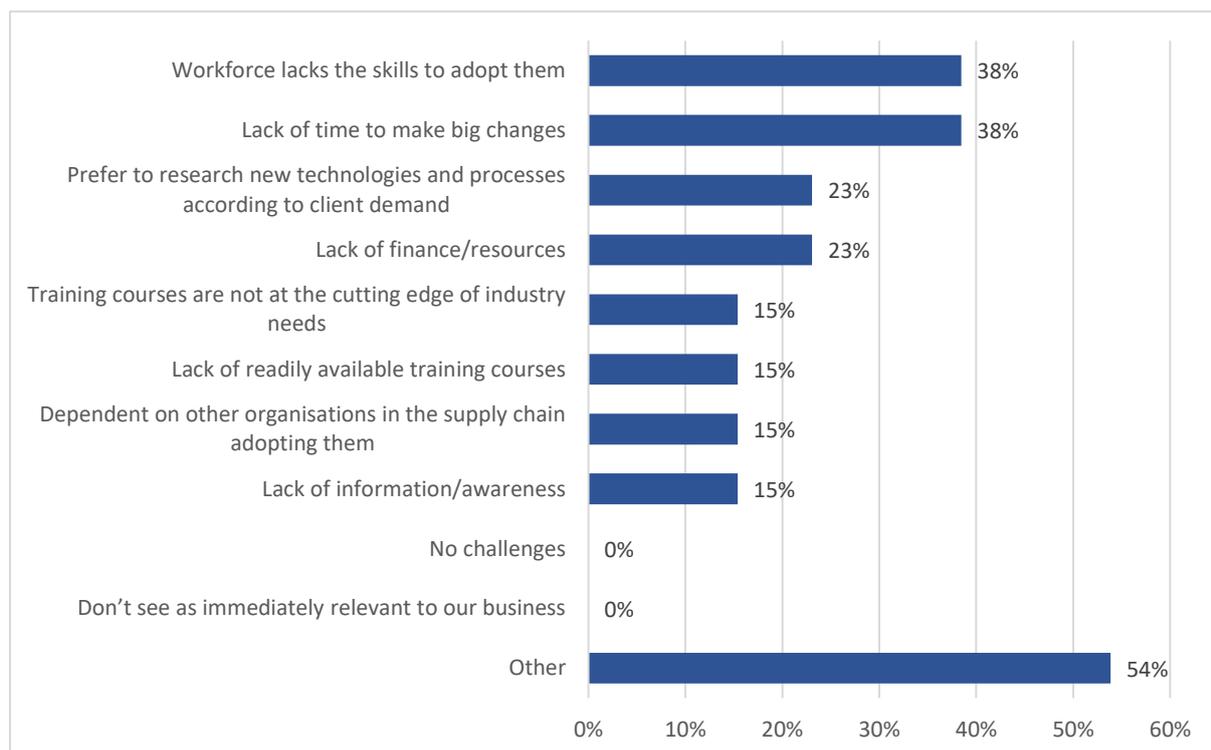
More broadly, employers note that there is a lack of information and awareness of which technologies and processes are making waves in the industry, and they comment that there are few touchpoints and little overarching guidance for the industry against which to make informed decisions, meaning that each company instead has to plough its own furrow.

A lack of information and awareness of what’s available to try, and in knowing what is beneficial to adopt in terms of cost and efficiency.

Two employers note that new technologies and processes also raise challenges for them around training. One comments that adequately trained trainers are first required before their workforce can be brought up-to-speed on new processes; another notes that available course offerings need to be continually reviewed and refined so as to meet sector job requirements.

These main challenges align to the findings from LMI research in 2018, with large companies then also citing that major challenges centre on a lack of time, and on the workforce lacking the skills to adopt new processes/technologies.

Figure 15 Challenges to adopt new technology and processes



Base: 13 respondents (multiple selections were permitted in the response). Pye Tait research, 2019.

Of the challenges which employers cite, employers were asked to name the single largest challenge and the most common response centres around the workforce. Aside from having to keep staff up-to-date with new technologies and processes via training, employers further note the workforce first needs to have the skills, aptitude and capability to upskill in this regard, and has to ensure it recruits and retains the right people for these roles. Employers also comment that there can be a reluctance – particularly among an ageing workforce – to embrace technological change. With regard to

training on new processes, one company notes there is a lack of readily available training courses locally.

Having the right people in place who can actually implement the technology; it does take calculated gambles to recruit the right people with the right expertise.

Several major contractors highlight that their largest challenge is in working with clients. Employers note that clients can be unclear in what they specify or ask for and can demonstrate a lack of full understanding of technologies. As such, employers have to work with and guide clients through the capabilities and limitations regarding new processes. In addition, on projects involving new processes, companies can themselves face challenges to get up-to-speed on new technologies for projects with a shorter lead time. At the other end, one company notes that the biggest challenge – perhaps unexpected – centres on the aftercare required following installation, with more time being required than anticipated to fix teething problems and ensure smooth operation, this can sometimes take up to 18 months following project completion.

There is common consensus among companies that embracing technology and moving with the times is a critical necessity and are proactive in this regard. All companies agree that, were they not to take up new processes and technologies, they would be viewed as ‘lagging behind’, they would be less competitive in tenders and win less work, eventually going out of business as they are overtaken by competitors.

4.4 Working with the supply chain

The major contractors interviewed for this research take a variety of different approaches to influencing their supply chain and their take-up of technology. The most common approach, taken by 38% of companies, is to refer the supply chain to external sources of information and support on new technology. Employers in this group either signpost sources of information, or demonstrate technologies directly to supply chain, and then leave them to train their own staff. Sometimes, supply chain can already be up-to-speed on new processes.

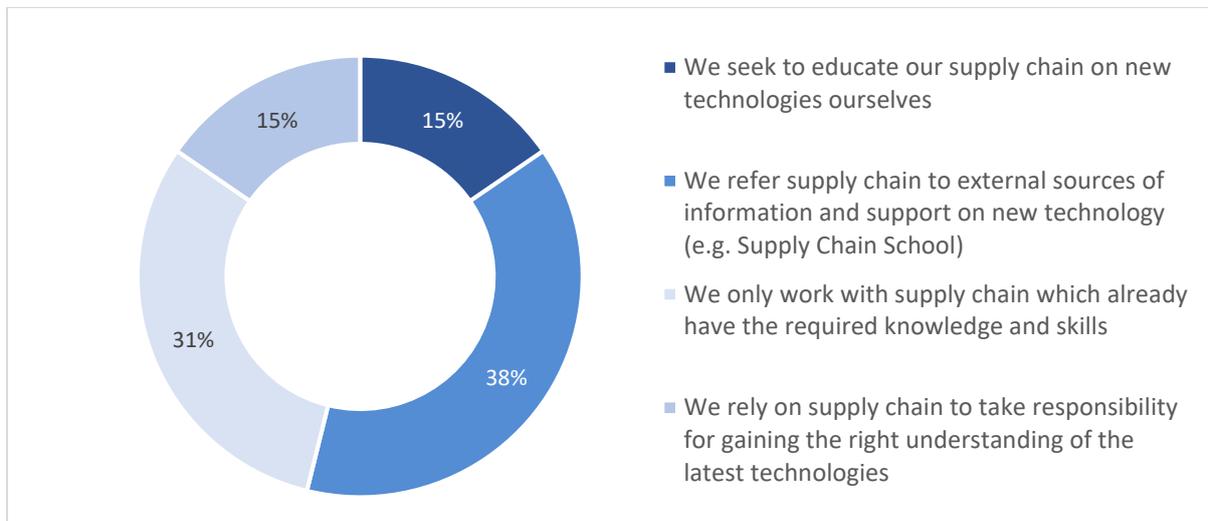
We feed information to the supply chain about upcoming forecasts and trends, but generally sub-contractors – particularly specialists – are already up to speed on these.

Just under one in three major firms interviewed (31%) only work with supply chain companies which already have the required skills and knowledge. These employers will work with sub-contractors who are up-to-speed on the latest relevant technologies and processes; they expect the supply chain to already have the right knowledge and skills and, furthermore, to bring ideas to the table as subject experts if they are a specialist sub-contractor.

A minority of employers (15%) educate the supply chain directly themselves, for instance through using Trimble, or buying in new technology specifically for training purpose; these companies explain that they view this relationship as a partnership.

In contrast, a minority of employers (15%) relies on its supply chain to take responsibility for gaining the right understanding of the latest technologies.

Figure 16 Companies' influence on their supply chain's adoption of technology



Base: 13 respondents. Pye Tait research, 2019.

Just under half the employers interviewed (46%) believe their relationship with their supply chain with regard to technology will change in the future. Most of this group foresee the evolution of closer partnerships with supply chain organisations in response to the emergence of new technologies and niches within the wider electrotechnical sector. They believe that these closer working relationships will be required so that a greater understanding of processes is shared between the main contractor and the supply chain such that client requirements can be met more efficiently. It is envisaged that this will be a two-way conversation, with both parties learning from each other.

Major electrotechnical organisations are split into three equal-sized camps with regard to their views on how well supply chain have embraced technology and the impact on the ease of business with them. The first group of companies generally feel that the supply chain have fully embraced technology, are up-to-speed with the latest processes, and as such are easy to do business with.

In contrast, the second group of employers comments that their supply chains have not fully embraced new technologies within the industry – perhaps due to financial constraints or a lack of capability – which can then hinder business and adversely affect quality and delivery times.

They only respond/adapt to change when they need to. This has occasionally resulted in projects being adversely affected by knock-on impacts.

Meanwhile, a third group of employers is experiencing both extremes, noting that some of their supply chain have embraced technology, particularly specialist sub-contractors, while others – perhaps more ‘traditional’ SMEs – can require greater support.

More broadly, and away from technology specifically, employers have other suggestions for improved, collaborative ways of working with supply chain.

One group of employers would like to see their company values and standards embraced within its supply chain to a greater extent in the future; for instance, this could be through implementing the

main contractors' training targets e.g. by agreeing to have a certain percentage of the workforce as trainees/apprentices, thereby showing a commitment to direct employment and training.

A second group of employers would like to see the relationship with its supply chain evolve to be more two-way in the future. Going forwards, these employers would like closer partnerships to develop whereby supply chain proactively look to improve processes and seek to develop and strengthen relationships, e.g. through lessons learnt meetings or continual feedback.

The supply chain could bring more to the table in the future, for instance by seeking to develop a more collaborative relationship, particularly at the tender development stage.

Following the collapse of Carillion, employers are acutely aware of the potential risks of sub-contracting work and take their responsibility very seriously. To improve ways of working in this regard, one major employer within the electrotechnical sector would like to see its supply chain place greater emphasis on the administrative side of work so that they give greater weight to planning, communication, progress reports etc. Another employer would like to see more stringent processes introduced – and possibly even legislation – to ensure that all companies within the supply chain have the capability and the capacity to undertake the work required of them.

One final group of employers notes that existing relationships with supply chain are good and that they already work very closely and collaboratively on projects, with no further suggestions for improvement.

4.5 Occupational changes

There is consensus amongst major employers in the electrotechnical sector that the role of the electrician will evolve in the next three to ten years. The majority of such employers (77%) anticipate that electricians will cede some of their work to semi-skilled/unskilled operatives. Responding organisations point to the fact that there are currently two JIB grade definitions, 'labourer' and 'electrician' with no formal grade defined between these, meaning that electricians ultimately currently undertake a blend of both skilled and semi-/unskilled work e.g. installing or containment work. A major driver for this change will be economics, it is argued, as companies foresee the emergence of a semi-skilled 'installer' role as electricians cede some of their work to this grade, thereby decreasing overall project costs.

There is a niche for a role between electrician and labourer which would decrease overall project costs as electricians cede some of their current tasks to semi-skilled workers.

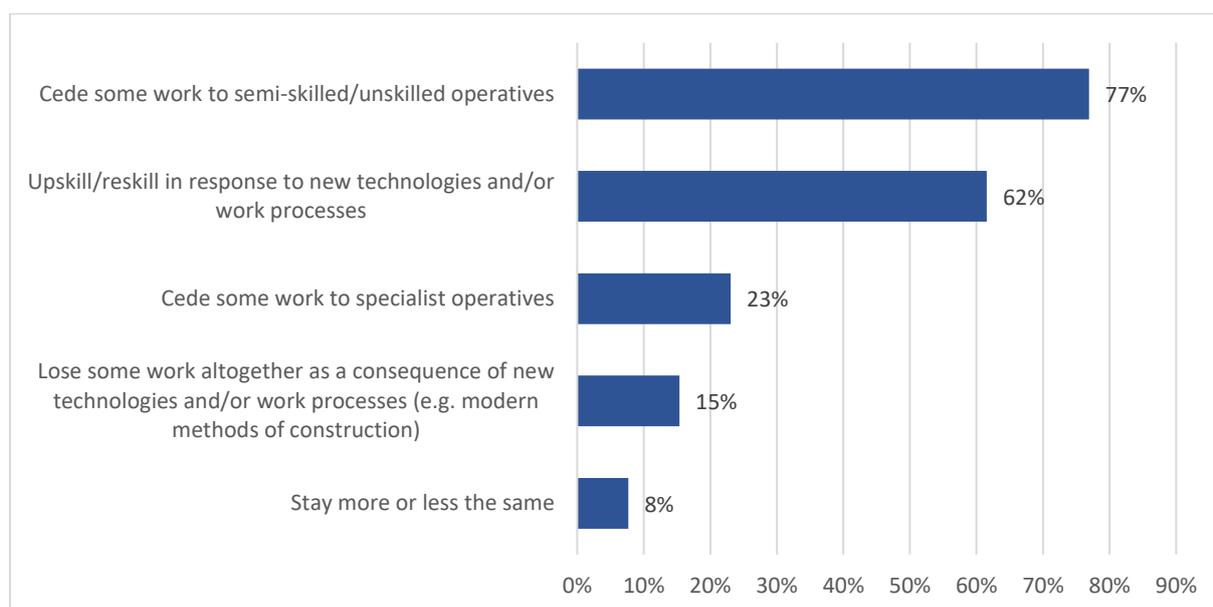
A slightly smaller majority of major electrotechnical organisations interviewed (62%) further believe that the current, broad role of the electrician will evolve into a number of specialist electrotechnical roles, each with their own niche for a particular technology or process. They envisage that it will be difficult to find an electrician who can do everything in the electrical market, and that while workers will re-/upskill, they will each develop their own area of specialism.

The mix of work electricians undertake will change, and some elements will develop into more specialist roles.

Employers also anticipate that offsite design and manufacture will shape the role of the electrician in the coming years. With such methods becoming increasingly prevalent in the industry, fewer skilled workers will be required on site, some tasks currently undertaken manually will be replaced by automated processes, and tasks which may have traditionally been performed by skilled workers may instead be performed by semi-skilled or unskilled operatives.

A major driver for this is modularisation/pre-fabrication which will result in lower costs and increased efficiencies by employing semi-skilled workers instead of skilled workers.

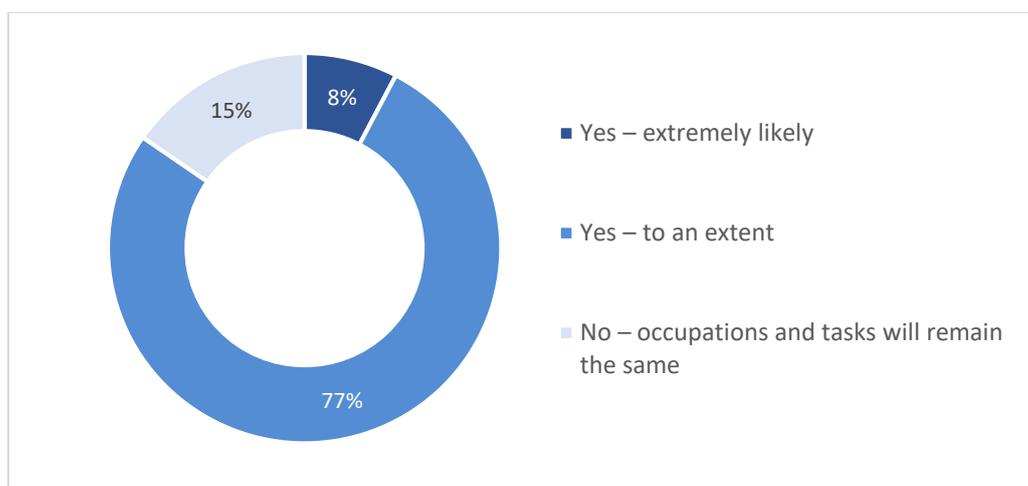
Figure 17 Companies' views on how the role of the electrician will change



Base: 13 respondents (multiple selections were permitted in the response). Pye Tait research, 2019.

More broadly, the vast majority of employers (85%) foresee that it is extremely likely that electrotechnical occupations will be restructured in the next five to ten years or that they will at least be restructured to an extent. Two employers do not believe that occupations will be restructured in the coming years.

Figure 18 Companies' views on whether electrotechnical occupations will be restructured



Base: 13 respondents. Pye Tait research, 2019.

As discussed above, several companies believe that technology will have a significant impact on the structure of job roles within the electrotechnical sector, with a number of specialisms and niche roles emerging for those on the tools. It is anticipated that electricians will cede work to semi-/unskilled labourers, and that an 'installer' grade – between an electrician and a labourer – will emerge. Further, 'traditional' electricians will evolve into a number of more specialist roles. However, companies do caveat that labour will always be required to an extent.

With new technologies and processes, [company] anticipates that electrical occupations will move away from the current format and that increasingly niche roles will emerge due to the complexity of work involved.

Employers note that multi-skilling, i.e. where workers have expertise in both the electrotechnical sector and one or more other sectors (e.g. mechanical), is already present to an extent within the electrotechnical sector, but that this will become increasingly prevalent in the coming years. The major contractors interviewed foresee multi-skilling being increasingly commonplace, for instance with mechanical operatives have basic electrical skills, and vice versa; one respondent notes that it will be easier to move from electrical to mechanical than the other way round. Another area of potential multi-skilling mentioned is the installation of both wires and pipes by the same person. One respondent notes that project management teams are holding an increasingly wide range of skills and backgrounds, making projects more efficient to run.

Multi-skilling is already occurring in the industry to an extent but will become increasingly common in the future to increase efficiencies.

In terms of which roles will be impacted as electrotechnical occupations are restructured, employers foresee the workforce on the tools will be most affected as technological change results in the reshaping of existing job roles. Responding companies note that technology will affect all roles to an extent. Indeed, as multi-skilling becomes increasingly prevalent within the industry, respondents anticipate that higher skilled roles might also be restructured; integration of both mechanical and

electrotechnical knowledge will assist the performance of staff in management or engineering positions.

While technological change could potentially affect all roles, it will likely impact those on the tools most of all.

With the pace of change in the electrotechnical sector, employers acknowledge that training and apprenticeships will have to evolve to meet the future needs of the industry. They note that apprenticeships will have to have a broad beginning to cover a range of skills bases, such as mechanical and electrotechnical engineering, before trainees can then choose within which particular area to specialise. The content of apprenticeships is also expected to evolve to have a greater focus on new and emerging technologies to prepare workers for entry into the sector. This has direct implications for the potential future shape, duration and depth of apprenticeships, and such changes – although not specifically mentioned by respondents – would result in a model that is similar, in a way, to the model that T Levels is taking with a broad-brush beginning, but with a more focused approach to specialising.

This multi-skilling approach will mean that apprentices have a choice in which area to specialise and will also mean that the workforce has a broader skills base to complete a wider range of tasks.

Of the two employers who foresee no change, they perceive that this is not due to a lack of will to change among employers in the industry, but that such change will be met with resistance. These employers perceive that the current industry structure of having two JIB-defined grades of ‘labourer’ and ‘electrician’ is outdated and reflects the structure and culture of the 1960s. They express frustration at the perceived reluctance of both the JIB and the unions to embrace change and believe that increased flexibility is required within the sector to accommodate the concept of a ‘mate’. This increased flexibility would also allow companies to shape their own needs and to be most cost-efficient.

[Company] notes that the current JIB structure of having two grades can be frustrating at times, but that any change to this set-up would likely be resisted by the unions.

5. Trade & professional bodies

5.1 Priorities for action

Respondents from the major electrotechnical companies were questioned on what actions trade and professional bodies should focus on in the coming years. A broad range of answers were received which covered several themes. It should be noted that some responding organisations have minimal interaction with some of the trade bodies mentioned,³ but were able to offer actions they perceive to be required more generally across the sector.

On the whole, there is a call for trade and professional bodies to offer greater support to the industry and to move with and embrace change across the sector as the majority of employers believe these organisations are holding the industry back to a degree. There is a general perception among the larger employers within the electrotechnical sector that trade and professional bodies are somewhat less embracing of change which may be a potential limiting factor.

One emerging major theme focuses on a call for trade and professional bodies to lead by example and be proactive in driving change within the industry by providing employers with information and guidance on the latest technologies, processes and news. Some respondents explained that these bodies should adopt a strong leadership style in their approach to drive (what is perceived as) necessary change within the sector. Greater collaboration and increased communication between employers and sector bodies would enable closer discussion of what the sector might look like and how skills needs might change accordingly. Providing a baseline of what technology is currently used and overarching guidance on current/future trends is requested.

Get out more amongst customers and clients, be more proactive, and listen and respond to what the industry wants.

As well as collaboration with employers, companies also call for greater collaboration between electrotechnical and mechanical trade bodies to acknowledge the increasing prevalence of multi-skilling and to reflect the building services sector as a whole, with specialism then handled by separate bodies.

There should be a collective body to offer greater integration of mechanical and electrical trades for common areas.

Another major theme for action focuses on attracting young people into the sector. Employers would like greater promotion of the electrotechnical industry within schools and colleges so as to raise awareness of the sector, to dispel any myths that young people might have, and to promote the diversity of career paths and diversity of roles available. They note the sector needs to be sold to be 'attractive' to young people, and this promotion may help to drive a higher proportion of female entrants. In addition, there was also a call for greater support and a more consistent service across the UK to support people undertaking their apprenticeships.

³ Prompts included: ECA, JIB, ECS, JTL, NET, IET, and CIBSE.

The goal here is to showcase that apprenticeships can lead all the way up to management in the future.

Coupled with this, some companies believe that training may need reforming, and that an ongoing review of all training courses offered across the UK should be undertaken to ensure that these courses are necessary/required for the sector, and to more clearly define which qualifications are required for particular roles.

Finally, there is a call for trade and professional bodies to promote greater professionalism within the industry, and also a call for these bodies to acknowledge that longer working lives mean that people now regularly move between careers, a development which may mean that the sector may require a greater focus on creating defined career paths and routes to switching between roles, managing these and providing support for lifelong learning.

6. Summary

- The split of direct and sub-contracted work varies enormously amongst major employers in the electrotechnical sector (i.e. those with over 250 PAYE staff). There is no consensus among these employers as to whether this split will change and if it will, in which direction the proportions might shift, however, being flexible to cope with peaks and troughs in workflow is critical.
- Most employers anticipate their workforce numbers will either increase or remain the same in the next five years as they either follow business strategies to grow or pursue similar models to currently.
- There is agreement that the combined demand for semi-/unskilled work will increase, while there is an even split on whether demand for skilled workers will increase, remain the same, or decrease.
- The majority of major employers note that project personnel roles are difficult to recruit for, as are directors and managers; common reasons cited include candidates lacking appropriate skills, knowledge and experience, or being unable to meet salary demands.
- Employers note that there is a limited pool of quality candidates available particularly in the commercial sector, and that the talent pool is very male-dominated.
- Apprentices are viewed as extremely valuable, and also as an investment. Larger companies recommend that SMEs be obliged to take on apprentices to invest in the workforce for the future of the sector.
- Challenges cited around taking on apprentices include: ensuring a continuous supply of work, ensuring a range of work, sufficient mentoring and support, and the perceived health and safety risks of having under 18s on site. Most employers do not monitor their supply chain apprentice number unless contractually obliged to do so.
- While no major skills gaps are perceived to exist by some major contractors, project personnel roles are cited. Reasons include a reluctance from staff to either undertake training or to progress upwards to higher skilled roles within this job family.
- Employers believe there is a general skills shortage across the sector and believe the best ways to address this are through greater promotion to schools/colleges, stronger company support for workforce development, and a closer link between industry and education in general.
- Employers in this study highlighted the relative lack of female applicants.
- Across the board, there is a mildly positive feeling in relation to the economic outlook for the sector. Employers note, however, that Brexit is creating a high degree of uncertainty, and also that large infrastructure projects, if confirmed, would promise an uplift for the industry.

- The biggest driver of change for the industry mentioned by employers for the coming years is perceived to be increasing digitalisation. The technologies which will have the greatest impact for both the sector and for individual companies are offsite manufacturing and modularisation, followed by BIM and digital technologies.
- As a direct result of new and emerging technology, employers anticipate that demand for most job roles will either stay the same or increase; technology is seen to be a tool or an enabler to complement roles, rather than as replacing certain roles. The exception to this is for skilled and semi-skilled roles, where the direct impact of technology is anticipated to decrease demand as certain repetitive tasks are replaced by automation.
- Most companies believe they are responding fairly well to change. These major employers view themselves as trend-setters and as sector leaders in terms of technology.
- Challenges cited in terms of taking up new technology and processes include a lack of time to make changes, or a lack of desire to embrace change among the workforce. The main risk of not embracing new technology is being left behind and winning less work and so companies take a proactive approach to invest in new processes, however, employers note they do lack overarching guidance on emerging technology and would like more of a steer on this from trade and professional sector bodies.
- Major employers in the sector generally believe their supply chain is responding fairly well to technological change. Going forwards, they envisage that closer links and partnerships will develop to enable smarter and more efficient ways of working and would like to see greater emphasis on the administrative and planning side from sub-contractors.
- Employers perceive that occupations within the electrotechnical sector will be restructured in the next five to ten years with electricians ceding work to semi-/unskilled workers through the emergence of an 'installer' grade between 'electrician' and 'labourer'.
- They also see the evolution of the traditional electrician into a number of specialist roles, each with a technological niche. To accompany this, apprenticeships will have to evolve to have a broad multi-skill base, before trainees specialise in one area; as such, multi-skilling will become more prevalent in the industry. Note that this revised approach to apprenticeships is related, in a way, to that taken by T Levels (although this is not specifically mentioned by the companies interviewed). While T Levels will begin with a broad base before students choose their area of specialty, the suggested approach for apprenticeships is slightly more focussed.
- Major companies in the electrotechnical sector are generally lukewarm about the sector's representative organisations. They would like trade and professional bodies to provide greater steer and overarching guidance on the latest trends in the sector, particularly with regard to technology. They would also like these bodies to promote the sector more among young people, and ideally in a way that is meaningful to young people, to make it an attractive industry for new entrants to join.

Appendices

There are two appendices within this section. Appendix A outlines the companies which participated in this research, while Appendix B contains the questionnaire which was used with participants as a basis for the semi-structured interview.

A. Participating organisations

The following companies participated in this research:

- Balfour Beatty
- Crown House
- Essex Services Group
- Gratte Brothers
- Imtech
- Lorne Stewart
- Mace MEP
- NG Bailey
- Parker Technical Services
- Phoenix ME
- Skanska SRW
- SPIE UK
- SSE Enterprise

B. Survey

TESP Large Contractor Research Employer Interviews

Context

The Electrotechnical Skills Partnership (TESP) is a not-for-profit industry partnership formed by the [ECA](#), [Joint Industry Board \(JIB\)](#), [National Electrotechnical Training \(NET\)](#), [SELECT](#) and [Unite the Union](#) to support electrotechnical employers to develop and drive the industry's skills agenda. Following labour market intelligence research undertaken last year, two TESP member organisations – ECA and JIB – have commissioned Pye Tait Consulting to gather more detailed feedback from larger employers within the electrotechnical sector.

The findings of this research will provide up-to-date insight on large companies' attitudes towards: current and future workforce trends; current and future skills needs; the impact of technology on the sector and job roles, and the reasons for these; and the extent to which these align with, or diverge from, SMEs.

Reassurances

Your responses will be treated confidentially by Pye Tait Consulting. Responses will be reported anonymously in an aggregated manner in line with General Data Protection Regulation (GDPR) and the Market Research Society (MRS) Code of Conduct. Any personal data you choose to provide (where asked) will be on a voluntary basis, treated in the strictest confidence by Pye Tait Consulting, and only used for the purpose(s) stated in the questionnaire.

Name(s):

Role(s):

Organisation:

Telephone:

Email:

Date:

Workforce demand and supply

1. What sort of activity does your organisation undertake? (Tick all that apply)

- Low voltage general electrical installation
- High voltage
- Fire, detection, and alarm systems
- Emergency and security systems
- Highway electrical
- Rail (track-side works)
- Data/network cabling
- Audio-visual
- On-site generation (solar PV, generators etc)
- Battery storage (includes electrical vehicle charging)
- Lightning protection and earthing
- Other

a. If Other, please specify.

2. What proportion of this work does your organisation currently:

- Perform directly
- Perform indirectly via sub-contractors

3. Do you expect these proportions to change at all over the next five years?

- Yes
- No

4. If yes, what change do you expect? (Only ask if Q3=yes)

- Share of work that is directly performed to increase slightly
- Share of work that is directly performed to increase substantially
- Share of work that is sub-contracted to increase slightly
- Share of work that is sub-contracted to increase substantially

5. Thinking of your answers to the previous question, could you briefly explain the reasons for this balance between direct performance and sub-contracting, both currently and in the future?

e.g. – employ more in-house, or engage with more sub-contractors/suppliers

6. By splitting your organisation's own workforce (i.e. excluding supply chain) into "PAYE direct employees" and "agency & self-employed", how many people within each of these categories does your organisation....

	...Currently employ	...Hope to employ in five years' time
PAYE direct employees (labour)		
PAYE direct employees (staff)		
Agency + self-employed (labour)		
Agency + self-employed (other)		
Auto-total		

7. Thinking of your answers to the previous question, could you briefly explain the reasons for this balance of your current and future predicted workforce?

e.g. – reasons to employ more direct or engage more agency/self-employed

8. Thinking of your own workforce and that of your supply chain, how do you think the demand for electrical labour will change in the next five years?

	Increase	Decrease	Remain the same
Skilled (qualified electrician and above)			
Other (semi-skilled/unskilled, e.g. labourer)			

9. Thinking of your answer to the previous question, could you briefly explain the reasons for this balance of the current and future predicted workforce?

e.g. – reasons to employ more skilled or semi-skilled/unskilled

10. Thinking of your own skilled workforce and that of your supply chain, how do you think the role of the electrician will develop over the next three to ten years? (Tick all that apply)

Stay more or less the same
Upskill/reskill in response to new technologies and/or work processes
Cede some work to semi-skilled/unskilled operatives
Cede some work to specialist operatives
Lose some work altogether as a consequence of new technologies and/or work processes (e.g. modern methods of construction)

11. Thinking of your answer to the previous question, could you briefly explain the drivers for any predicted changes to the electrician's role?

e.g. – reasons for new sources of work and/or losing former areas of work (e.g. technological, economic/commercial, skills shortages drivers, etc.)

Training and Development

12. On a scale of 1 to 10 – where 1 is not at all valuable and 10 is extremely valuable – how valuable are electrotechnical apprenticeships to the future of your and/or your supply chain's workforce?

13. How many apprentices and trainees does your organisation currently employ?

Apprentices/trainees – electrotechnical
Apprentices/trainees – other

14. What challenges are there for your organisation in taking on electrotechnical apprentices?

15. To what degree does your organisation monitor numbers of apprentices employed by your supply chain?

In most or all cases
Sometimes (e.g. in response to a client/main contractor requirement)
Not at all

Recruitment and skills shortages

16. On a scale of 1-10 – where 1 is incredibly difficult and 10 is extremely easy – how difficult do you find the following roles to recruit?

Directors and managers of business functions
Office-based personnel (inc. estimators, design, BIM/CAD)
Project personnel (inc. contract engineers, QS, planners)
Supervisors
Skilled e.g. qualified electrician
Semi-skilled
Unskilled e.g. labourer
Apprentices

17. What are the reasons for these recruitment difficulties? (Tick all that apply)

Not enough applicants
Applicants do not have the right knowledge, skills or experience
Applicants do not have the right qualifications
Electrotechnical apprenticeships do not meet business needs
The school curriculum does not encourage students into electrotechnical careers
Potential applicants accept jobs in other companies in the same sector
Potential applicants leave UK to go to other countries
Not able to meet salary demands of applicants
Other

a. If Other, please specify.

18. In what roles, if any, do you believe that major skills gaps exist in your current workforce?

(Tick all that apply)

Directors and managers of business functions
Office-based personnel (inc. estimators, design, BIM/CAD)
Project personnel (inc. contract engineers, QS, planners)
Supervisors
Skilled e.g. qualified electrician
Semi-skilled
Unskilled e.g. labourer
Apprentices

19. What would you say might be reasons for skills gaps in your workforce? (Tick all that apply)

Ageing workforce experiencing difficulties in keeping up-to-date
Inappropriate training courses (insufficient depth)
Insufficient knowledge/skill in new digital technologies
Insufficient knowledge/skill in new equipment
Insufficient knowledge/skill in new materials
Insufficient knowledge/skill in new methods of working
Staff are reluctant to undertake additional training
Staff need refreshing in current methods
Training is too expensive
Training is too time-consuming
We're unable to access suitable external training to meet our needs
Other

a. If Other, please specify.

20. What actions do you think are needed, if any, to tackle skills shortages in the electrotechnical sector? (Tick all that apply)

More action by professional and trade bodies
Government action needed to ease immigration rules
Government skills policy and funding improvements
Stronger client and main contractor support for workforce skills development
Improved technical education in schools
More/better quality courses offered by colleges
More/better quality courses offered by universities
Greater promotion of electrotechnical careers
More training provision for apprenticeships
Other

a. If Other, please specify.

The future, and impact of technology

21. How do you view the economic outlook for the electrotechnical sector over the next three to five years?

- Very positive
- Slightly positive
- Neither positive nor negative
- Slightly negative
- Very negative
- Unsure

a. Please can you briefly explain your reasons for the above answer?

e.g. – impact of Brexit

22. What are the major drivers of change facing the industry over the next three to five years?

(Tick all that apply)

- Increasing digitalisation
- Increased energy efficiency
- Sustainability/low carbon goals
- Increased automation
- Other

a. If Other, please specify.

23. Thinking of specific technologies, please rate from 1 (little importance) to 10 (extremely important) the importance of each of following technologies on the electrotechnical sector as a whole over the next three to ten years?

- Digital technologies – such as AR and VR, big data, data visualisation, Internet of Things
- Automation – such as robotics and artificial intelligence
- Electric cars/charging points
- Programmable Logic Controls (PLC)
- Computer commissioned and network/wifi enabled devices – such as smart home technology
- Efficient devices – such as LED lighting
- Modularisation processes – such as miniaturisation, plug and play
- Building Information Modelling (BIM)
- Off-site Manufacturing
- Other, inc. industry-specific technologies

a. If Other, please specify and give rating.

24. Thinking about specific technologies and processes, please rate each of them from 1 (no impact) to 10 (significant impact) to reflect the expected impact on your business over the next three years and the next ten years.

Next 3 years Next 10 years

- Digital technologies – such as AR and VR, big data, data visualisation, Internet of Things
- Programmable Logic Controls (PLC)
- Computer commissioned and network/wifi enabled devices
- Electric cars/charging points
- Automation – such as robotics and artificial intelligence
- Carbon-efficient devices such as LED lighting, etc.
- Modularisation processes – such as miniaturisation, plug and play
- Building Information Modelling (BIM)
- Off-site Manufacturing
- Other, inc. industry-specific technologies

a. If Other, please specify and give rating.

25. As a direct result of new technologies and processes over the next three to five years, for each of the following job roles please state whether you expect demand for these roles to increase, remain the same, or reduce.

Increase Decrease Remain the same

- Directors and managers of business functions
- Office-based personnel (inc. estimators, design, BIM/CAD)
- Project personnel (inc. contract engineers, QS, planners)
- Supervisors
- Skilled e.g. qualified electrician
- Semi-skilled
- Unskilled e.g. labourer
- Apprentices

26. How well is your organisation and its supply chain responding and adapting to technological and process change?

Organisation Supply chain

- Extremely well
- Fairly well
- Neither well nor poorly
- Fairly poorly
- Very poorly

27. Are there any specific technologies that are not being well taken up?

e.g. – both basic smartphones and laptops etc. to advanced tech including robotics and AI

28. What challenges, if any, does your organisation and its supply chain face in adopting new technologies and processes? (Tick all that apply)

	Organisation	Supply chain
Lack of finance/resources		
Lack of time to make big changes		
Lack of information/awareness		
Workforce lacks the skills to adopt them		
Dependent on other organisations in the supply chain adopting them		
Lack of readily available training courses		
Training courses are not at the cutting edge of industry needs		
Don't see as immediately relevant to our business		
Prefer to research new technologies and processes according to client demand		
No challenges (no other boxes can be ticked)		
Other		

a. If Other, please specify.

29. What would you say is the most important challenge ahead for you in adopting new technologies?

30. What are the risks to your company of not tackling these challenges quickly?

If rely on sub-contractors:

31. As a large electrotechnical contractor, which statement most accurately reflects the influence you currently have on your supply chain and their take-up of new technology?

- We seek to educate our supply chain on new technologies ourselves
- We refer supply chain to external sources of information and support on new technology (e.g. Supply Chain School)
- We only work with supply chain which already have the required knowledge and skills
- We rely on supply chain to take responsibility for gaining the right understanding of the latest technologies

32. How might this change in the future, and why?

33. Which statement most accurately reflects how your supply chain deals with new technologies?

- It has fully embraced all the latest technologies so is easy to do business with
- It has embraced most, but not all, technologies and is easy to do business with
- It has embraced some technology and is easy to do business with
- It has not embraced the right technology which hinders business
- It is significantly lagging behind embracing the latest technology and this hinders business
- Unsure

34. What would you like them to be doing?

e.g. – workflow management, business models

Occupational changes

35. Do you foresee electrotechnical occupations being restructured in the next five to ten years?

- Yes – extremely likely
- Yes – to an extent
- No – occupations and tasks will remain the same

36. What might your workforce and roles look like then, and why? (don't ask if previous q = no)

*e.g. merging of occupations/emergence of new occupations? Which roles?
 necessary or desired changes?
 Impact of technology e.g. BIM, OSM
 Systems integration, multi-skilling*

37. Which occupations/job roles do you think will be most affected by technological and economic change?

Final questions

38. On a scale of 1 to 10 – where 1 is not at all effective and 10 is extremely effective – how effective does your organisation perceive the following industry institutions to be:

ECA
JIB
ECS
JTL
NET
IET
CIBSE

a. Please could you briefly explain your reasons for these ratings?

39. What changes or improvements should trade and professional bodies be prioritising currently with regard to the topics we have covered today?

40. Do you have any final comments about workforce, training, skills or technological change in the industry?