WINNING MOVES®

# Automation in Coventry & Warwickshire

## Research for Serco and CWLEP to inform the SSW programme

18/12/20 | Version FINAL

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# 1. Executive Summary

The Coventry & Warwickshire region has a larger than average presence of transport and logistics and automotive manufacturing firms. Within these sectors, a high proportion of current roles – equating to tens of thousands of jobs - have been predicted to be at risk from automation over the next decade and a half: *"The abundance of process, plant and machine operatives in the county makes the transportation & logistics and manufacturing sectors the biggest drivers of Warwickshire's high automation risk score."*[1]

Skills Support for the Workforce (SSW) is a programme developed to upskill employees within small and medium-sized employers. To inform the design and delivery of the programme in Coventry & Warwickshire, in the context of addressing the skills and re-training needs created by automation, Serco required research to explore five key questions. Responses to these from our research – comprising interviews with C&W employers, wider stakeholders, and secondary evidence review – are summarised here and explored further in the full report.

**To what extent the transport and logistics and automotive manufacturing sectors are looking at automating their processes, in particular when will the 'tipping point' be that would lead to significant automation of practices?**

- The implications from most literature and employer responses is that there is an important distinction to be made between the automation that *could* take place, and automation that is actually likely to go ahead in the next 5-10 years, considering the various barriers / disincentives to automate. A range of influencing factors are discussed across this report, and a number of these could have either an inhibiting or accelerating effect on automation plans.
- The tipping point has already occurred in a number of (particularly large) organisations within the sectors of interest, *for particular functions*. But this process is by no means uniform. Indeed, some sources contend that a specific 'tipping point' doesn't really exist, arguing instead that there will be incremental steps in organisations for particular functions as and when the cost benefit analysis is favourable. Other sources predict waves of progressively more extensive automation.
- Broadly, however, it was generally acknowledged that many of the roles most 'at risk' from automation are to be found in the sectors of interest to this research, and that there is likely to be growing disruption across the next decade, with a potentially significant disruption in the 2030s should autonomous vehicle technology become viable.
- That said, from the survey of CWLEP employers, automation planning is not ubiquitous and even stated plans are sometimes minimal in terms of scale / impact. The survey sample is too small to make generalisations for the sectors across the region, but it is clear

[1] Warwickshire Economics – The Risk of Automation in Warwickshire (2018)

that in some businesses, there has been little automation to date, and future automation is not currently in their plans.

- The most commonly reported barrier to automation was cost. Especially for some smaller businesses, even if substantial automation were technically affordable, based upon the scale and nature of their operations, it would not generate efficiencies significant enough to justify the investment.

**Which occupations are likely to be most affected and the core skill sets for these roles that are going to be most affected? What are the occupations with similar skill profiles, into which affected individuals could potentially be transferred?**

- The consensus from both primary and secondary sources seems to be that it is the relatively low-skill (levels 1 and 2) and roles which involve repetitive tasks that are most at risk from automation. Specific roles cited across primary and secondary research included assembly line workers, warehouse loading/unloading and picking, HGV / forklift drivers, and – in terms of non-physical roles – data collection and processing.
- It should be noted that many sources – across the employer and stakeholder respondents, and in the literature - did not accept that automation would necessarily mean a reduction in workforce. Roles can be created by the introduction of automation, and if automation generates growth then this creates jobs in the wider economy.
- However, it was clear that many roles created by automation within the sector would at least require re-skilling for existing workers to deliver such roles, and there was no consensus on whether such roles would be filled through upskilling or recruitment i.e. whether the existing staff could develop the skills required to uptake these new positions.
- Respondent discussion of potentially transferable skills focused upon more general softer skills – e.g. communications, interpersonal skills etc. – that might be applicable to entirely different sectors. Unless they were to upskill to take on the new roles in their organisations created by automation, it was not clear what other roles affected individuals could move to *within* their organisation / sector.

**The likely new jobs that will be created through automation or increased use of technology as well as the key skills/qualifications that will be needed, and the extent to which these skills currently exist sufficiently in the labour market with the CWLEP.**

- As discussed, several sources noted the possibility of more jobs being created in the wider economy through the growth generated by automation. Focusing on the logistics and manufacturing sectors, primary and secondary evidence was that automation will generally create roles in managing the new technology e.g. programmers, machine operatives, engineers etc., as well as requiring digital skills more generally. Requirements would vary by the technology, but some new roles will necessitate high skills levels / qualifications.

- The impression from both respondents and sources focused upon the sectors in the UK was that there are significant skills gaps and that these advanced engineering and programming roles are hard to recruit for, highlighting a substantial opportunity for SSW.

**Considering both the threats and opportunities for different roles and skills sets, what should be the focus for any re-training/upskilling initiatives, and what planning the sector is doing in this area to prepare for the impact and the scope for pro-active joint planning on re-training/career changes for affected individuals between industry and the public sector?**

- As discussed, there is a clear opportunity to support existing workers to develop the skills that will enable them to fulfil the more complex roles created by automation that may replace existing roles. That said, it was noted that many of the larger firms investing in the more substantial automation have formalised internal training programmes, and automation equipment suppliers often provide training in the use of their product as part of their offer.
- Regardless, there was a strong emphasis upon the value of / need for greater digital capability in the workforce and candidate pool, and the need for greater partnership working with educational institutions to align their training / teaching programmes (especially around STEM, IT and engineering) with the requirements of the sector. Stakeholders welcomed the concept of greater public and private sector partnership / coordination on re-training and supporting individuals affected by automation.
- Perhaps looking more widely than SSW support in the region, several stakeholders felt that a portion of national funding currently focused upon job creation should be targeted at training / re-training.

# 2. Introduction

## 2.1. Background

Skills Support for the Workforce (SSW) is a programme developed to upskill employees within small and medium-sized employers. The programme provides recognised accredited qualifications and bespoke training courses to enhance employees' skills, increase competitiveness and boost the local economy. Skills Support for the Workforce is co-financed by the Education and Skills Funding Agency and European Social Fund.

Serco's Employment, Skills and Enterprise business (Serco Ltd) is the Prime Contractor of the SSW programme in the Coventry & Warwickshire Local Enterprise Partnership (CWLEP) geographical region. Exemplified by the presence of companies such as JLR and Aston Martin, the CWLEP region is often considered the home of the UK's automotive industry, with a reputation as a world-class centre for advanced manufacturing and engineering. This - coupled with a strong transport and logistics presence in Coventry and Warwickshire - means any impacts from automation are particularly likely to be felt by the CWLEP region.

At its simplest, 'automation' can be understood as the replacement of tasks / functions previously conducted manually with automated systems / process. The example that most readily occurs is often robotics, but – as will be discussed in the report – there are a wide range of automation opportunities, with many affecting the types of roles and activities found disproportionately in the transport, logistics and automotive manufacturing supply chain.

## 2.2. Research objectives

In this context, to inform the design of SSW in the CWLEP, Serco commissioned Winning Moves to undertake research into the potential scope, timescales, impacts and possible policy responses on automation, specifically within the transport, logistics, and automotive manufacturing sectors operating in the CWLEP area. The principal research questions / objectives were as follows:

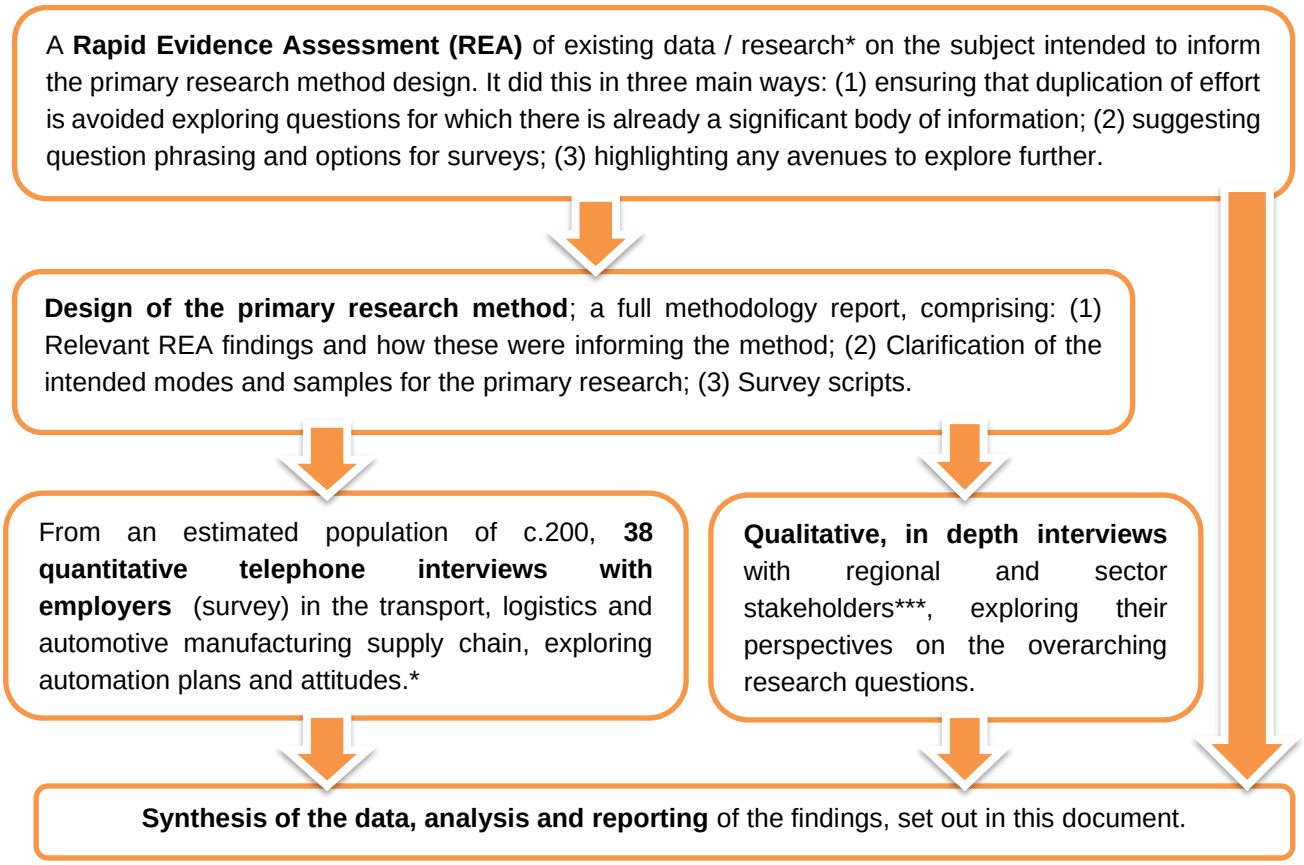
- To what extent the transport and logistics sector are looking at automating their processes, in particular when will the 'tipping point' be that will lead to significant automation of practices?
- Which occupations are likely to be most affected and the core skill sets for these roles that are going to be most affected? What are the occupations with similar skill profiles, into which affected individuals could potentially be transferred?

- The likely new jobs that will be created through automation or increased use of technology as well as the key skills/qualifications that will be needed. And whether the industry think that these skills currently exist sufficiently in the labour market with the CWLEP.
- Considering both the threats and opportunities for different roles and skills sets, what should be the focus for any re-training/upskilling initiatives, and what planning the sector is doing in this area to prepare for the impact?
- In particular, what is the scope for pro-active joint planning on re-training/career changes for affected individuals between industry and the public sector?

The research will contribute to better enabling collaborative working within different projects in the CWLEP area in terms of training/qualifications offered.

## 2.3. Methodology

**Figure 1: Overview of the CWLEP SSW research method approach**




*Specific sources are footnoted in this report and a full bibliography is included in the report appendices.

**Because the survey analysis looked at sectors discretely, and size splits within each sector broadly align with the population splits, the survey response data have not been weighted.

***Respondents comprised representatives of the regional Growth Hub, innovation bodies such as the Advanced Propulsion Centre and Manufacturing Technology Centre, trade associations for the sectors of interest, and recruitment agencies with specialist knowledge of the sector.

# 3. Perceptions of automation

## 3.1. Employer perceptions

All respondents to the employer survey were provided with the following definition of automation: *the use of methods for controlling industrial processes automatically, especially by electronically controlled systems*. They were then asked to describe what they perceived to be the main benefits of – and issues caused by – automation. Their responses are summarised in Table 2:

**Table 2: Respondent perspectives on automation [n=38]**

| | Transport and logistics | Automotive manufacturing supply chain |
|---|---|---|
| Perceived benefits | • Ability to track vehicles in real time<br>• Quicker / more efficient assignment of jobs to drivers<br>• Greater speed and fewer mistakes in warehouse picking<br>• Better monitoring through inventory / stock control systems | • Product quality and consistency of that quality (through removing any variation by individuals' ability)<br>• Potentially enables production of more complicated products<br>• Greater volume of output / productivity<br>• Related to this, a more easily implemented 24/7 operation<br>• Cost competitiveness / economies of scale<br>• Improved data to inform decisions<br>• Reduced labour costs |
| Perceived issues | • Up-front equipment cost<br>• Disruption during installation / transferring to the new system<br>• A precursor to redundancies<br>• Data security<br>• Loss of staff skills / understanding | |

Most respondents acknowledged that automation of their activities could produce speed and potentially benefits in terms of the quality of outputs.

Respondents in transport and logistics were less likely to perceive benefits compared to those in the automotive supply chain, at least to their operations. This was particularly for those focused solely on transport (where their suppliers / customers operate the warehouses) where the only significant opportunity for automation was felt to be driverless vehicles, which the respondents did not envisage in the foreseeable future.

Larger businesses seemed more likely to perceive efficiency benefits; their size means greater potential for economies of scale. Automotive manufacturing firms were very likely to perceive benefits; only those producing very specific / unique components did not.

Few respondents from either sector perceived issues arising from automation. Where they did, these tended to fit within the same broad categories – principally up-front cost, and that it might necessitate redundancies. Other issues cited by multiple respondents were potential data security / hacking risks, the challenge for automated systems in dealing with very variable / unique products (either making or picking / loading) and a general concern about loss of control over the business' activity. One respondent hypothesised a long-term detrimental effect of automation on staff skills and product knowledge, with potentially wide-ranging implications for product quality, especially should equipment malfunction.

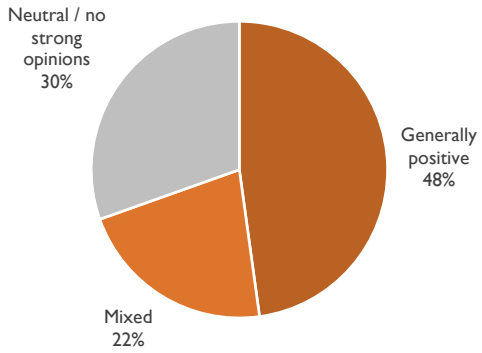
One stakeholder observed both efficiencies and risks. Regarding the former, robots can work 24/7 and don't take annual or sick leave. Regarding the latter, the robot can break down: *"one person off sick doesn't stop the other thirty working."*

## 3.2. Staff perceptions

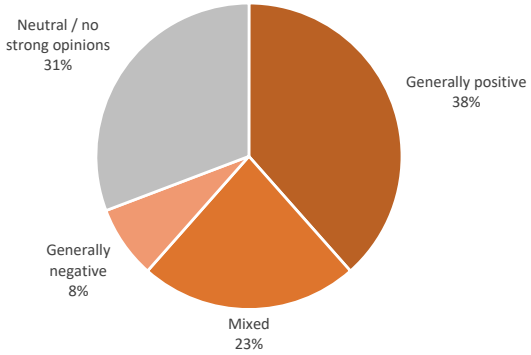
After providing their own perspectives, all respondents were asked to assess how their staff feel towards automation:

**Figure 3: Respondent assessment of staff feelings about automation**

**Transport and logistics [n=23]**




**Automotive manufacturing [n=15]**




Overall, the perception amongst respondents was that their staff are generally positive about automation, with only one respondent saying they thought staff would feel negatively. Where they felt staff were positive, respondents highlighted the benefits of automation in supporting staff with their roles, making tasks easier / more efficient. Balanced against this are staff concerns about automation replacing their roles entirely. Interestingly, there was no clear difference in the split of responses between those businesses that already have significant automation in place (explored in later sections) and those that do not.

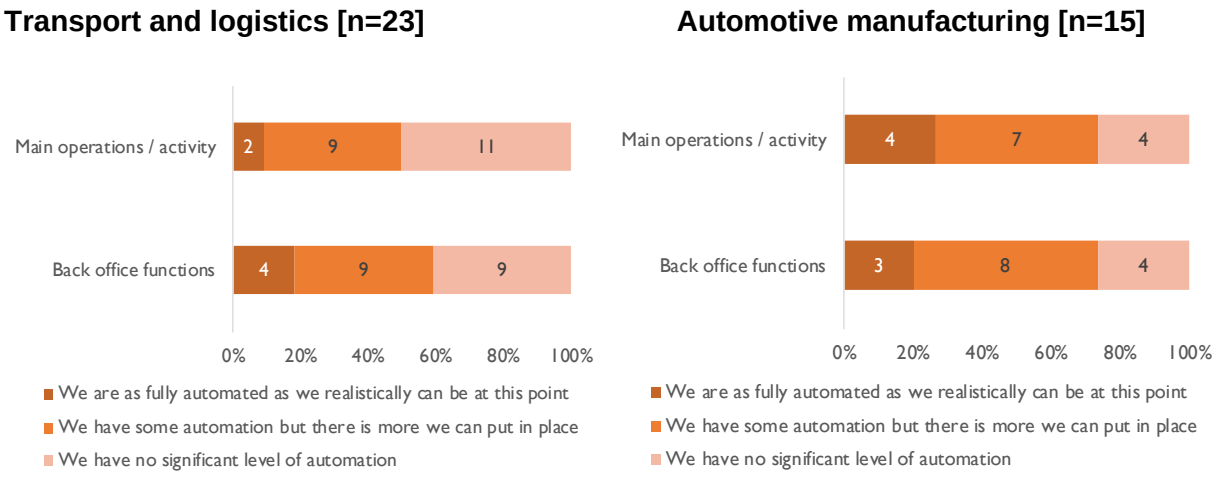
A recent survey[2] of employer and employee attitudes to digitalisation and automation also found employee respondents to be *generally* postive about digitalisation and automation, coupled with widespread recognition of the theoretical benefits of automation (the most commonly cited was 'improved productivity'). However, this doesn't necessarily equate to endorsement i.e. employees might be *aware* that automation can benefit their employer by enabling reduction of staff costs, but they are unlikely to be supportive. Linked to this, the same survey found that over one third of employers expected lack of staff support to be a barrier The survey found that women and older generations tended to be less positive about the prospect of automation.

[2] Hays Recruitment – What Workers Want report: Mindset Key for Digital Change (2019)

# 4. Existing automation in CWLEP

All emploter survey respondents were asked to select from one of three options to most closely describe their current levels of automation in (a) their main operations / activity; (b) their 'back office' functions e.g. management / administration. The breakdown of responses is shown in Figure 4:

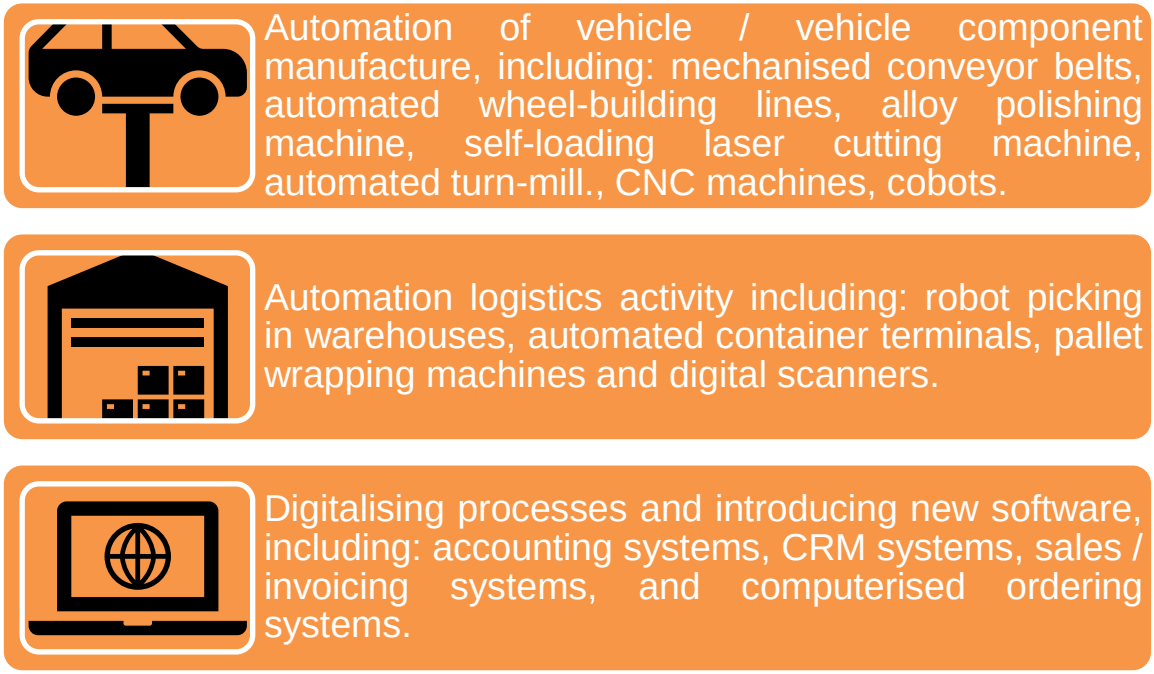
**Figure 4: Reported levels of current automation by employer survey respondents**




Some existing levels of automation were more commonly reported by respondents in the automotive manufacturing sector. Albeit the sample sizes are very small, the breakdown of responses did not differ noticeably by business size, though based upon the wording of options this may simply reflect the more restricted potential for smaller businesses to automate i.e. they are often as fully automated as they (feel they) can be.

Where respondents had indicated some level of automation across their organisation, they were asked to describe the last significant automation the business undertook. Responses varied by the size band and specific activity of the business; the descriptions provided by respondents was as follows:

**Figure 5: Examples of existing automation provided by respondents**




To ground their responses on the implications of automation (i.e. from the hypothetical to the experiential), respondents that could describe recent automation were asked what the consequences had been for the workforce.

By far the most common response was that the automation had had little impact beyond requiring some targeted upskilling of the existing workforce. This likely reflects the fact that much of the automation activity was either quite specific and limited in scope, or related to back office functions / processes; in five cases of changes to the core operations, the business had to recruit new staff / skills. However, only in one case[3] had the automation led to a reduction in workforce numbers: *"We installed a conveyor belt to transport the product from the furnace, through stamping and into the packing area. Previously this was a manual job."*

[3] Though it should be noted that four respondents did not know, or could not recall, the impact of the reported automation upon their workforce.

# 5. Automation: projections of scale and impact

## 5.1. Secondary / stakeholder evidence

There have been a number of studies in recent years discussing the likely trajectory for – and consequences of – increased automation, both overall and specific to the sectors of interest in this research. These analyses – coupled with the views of wider stakeholders interviewed as part of this research – are summarised below:

### What is automation?

In considering the implications of automation, several stakeholders pointed out that automation can often be viewed as synonymous with 'robotics'. In fact, it can comprise relatively undisruptive digitalisation measures (an example cited was replacement of clipboards with iPads) that do not carry any significant implications for workforce numbers or skills.

### When will automation happen?

This question could not be decisively answered by the literature or stakeholder; the 'tipping point' was a hard concept for respondents – stakeholders and employers – to articulate.

However, for many, the tipping point isn't a future watershed, but a present reality. As demonstrated in examples from both the literature, stakeholder descriptions, and responses from employers, many businesses have already introduced significant automation and many roles are part-automated. Across many, particularly larger, companies in the logistics and manufacturing sectors, substantial automation has already been implemented and operating for a number of years[4].

Larger companies, with higher labour costs and the potential for greater economies of scale from automation were recognised to be most likely to have already implemented substantial measures. Discussing transport and logistics specifically, one stakeholder noted that single-account warehouses (servicing one client) operate quite a standardised approach that lends itself to automation. It was acknowledged by multiple stakeholders that small firms in the logistics and manufacturing sectors, with an established and limited local supply chain, may be largely immune to automation pressures.

In terms of further automation, several sources explained that automation trajectories will vary considerably across different jurisdictions, often tied to income / wage levels (as this will be a consideration in cost-benefit analysis of automation investment) and the feasibility of

[4] In terms of becoming more widespread within sectors or significant further displacement of workers, as per the sub-section below, not all respondents accepted that these were inevitable.

commercialising a technology, and transferring it from the lab to the business. Even where projections were made in the literature, these varied in the units / way that were used to describe the prediction e.g. % of roles vs. % of working hours. Where projections are made in the literature, this has tended to be projections for the US. Some research projects a % of roles at risk of automation, but does not specify a timeframe.

Broadly, the literature and stakeholders concur that amongst larger sector representatives, significant automation is already underway, but there will be substantial additional automation (with disruptive effects on role viability and skills requirements) across the next decade. Driverless vehicles are not predicted to be imminent but may be viable in the 2030s.

One reason why the 'tipping point' is difficult to articulate is because it is tied to a number of variables. The literature highlighted the wide range of external factors and trends that might either hinder or accelerate automation, and will certainly affect the nature of it. A 2017 Nesta report[5] listed seven variables, all of which are likely to have a profound and varied effect upon automation – technological development, environmental sustainability, urbanisation, economic inequality, globalisation and demographic change.

More specifically, one stakeholder with a focus upon technology trends in the automotive manufacturing sector envisaged a number of trends affecting sector automation and so employee numbers:

1. **Electrification of vehicles,** as the manufacturing processes for these are less labour intensive and more easily automated (the stakeholder estimated that the workforce could reduce by around one third). The stakeholder did point out that there are dissenting voices who insist new jobs will be created in battery development, and accepted that some sites are struggling to find skilled employees to fill the new roles being created, but countered that: *"a shortage of engineers isn't the same as excess of plant workers."* The stakeholder projected that 2023 would be the 'tipping point' in terms of widespread adoption of electric vehicles, and there have been discussions about a regional fund to position the C&W as a leader in electric vehicle development.
2. **Digitalisation of the vehicle design, development and testing process**, *"so the whole car being designed, developed and tested before anything is physically manufactured."* The stakeholder felt this could lead to an increase in the roles required to deliver this virtual process.
3. **Autonomous vehicles.** In line with employers, the stakeholder did not view significant introduction of these as being imminent, estimating at least a ten year lead time considering the various commercial, technical, and legislative barriers. That said, if / when there is significant adoption, the stakeholder acknowledged that driver roles could be greatly

[5] The Future of Skills Employment in 2030 – Nesta (2017).

affected, even if some human control is retained e.g. one person in the lead vehicle of an automated convoy ('platooning').

And in relation to logistics, it has been predicted[6] that automation investment amongst traditional logistics firms may be slower than perhaps expected by the availability of technology. In particular, the volatility of e-commerce order volumes, and the squeezing of traditional firms (by companies such as Amazon) towards lower margin, shorter term contracts, are not conducive to a business case for significant investment in automation. Another factor is that whilst theoretically developed, a number of cutting edge automation technologies are yet to be manufactured at any scale.

### Who will be affected?

There is little consensus as to the extent to which the workforce will be impacted by automation; scenario models cited in the literature range from <10% of current workforce / roles being affected to almost 50%. That aside, the consensus across the literature and stakeholders is that automation – at least in the next decade or so - will predominantly affect lower-skilled / 'predictable' manual roles, and that these roles are disproportionately found in the sectors of interest to this research. Various sources cited specific job roles, including assembly line production, drivers, unloading / loading and picking of stock, and clerks. Non-physical predictable work may also be at risk of automation e.g. data collection and processing role.

Several trends in automotive manufacturing carry implications for the types of roles affected e.g. increasing use of cobots as well as traditional robots on the assembly line and 3D printing of components. Regarding transport and logistics, a number of automation technologies could become more prominent in the sector, in particular smart / automated storage and retrieval systems / robots.

Several stakeholders and sources downplay automation as a 'threat'. One report[7] cited examples of other sectors (e.g. banks, radiology, airlines) where automation has meant redeployment rather than a reduction in employees. One stakeholder focusing upon the logistics sector argued that automation created opportunity for new skills to be developed, not necessarily replacement of roles. Another stakeholder that works with the manufacturing sector said they were not aware of large-scale redundancies in any of the firms they have worked with on automation, saying instead that redeployment was more common. The same stakeholder also highlighted that when viewed in the global context, automation actually preserves / creates UK jobs, because if the firms didn't implement it, they would be at an ever-increasing disadvantage to global competitors. Finally, some economists contend that job losses from automation should be broadly offset by job gains arising from new technologies -

[6] [article] McKinsey - Automation in logistics: Big opportunity, bigger uncertainty (April 2019)
[7] McKinsey Global Institute – Jobs Lost, Jobs Gained: Workforce Transitions in a Time of Automation (2017)

not necessarily those related to the technology, but in service sectors where there may be a knock-on boost to demand.

To provide a perspective more focused upon the CWLEP region, employer survey respondents were asked if they had any plans to automate / further automate their activities; interviewers emphasised that they were interest in general ambitions as well as detailed / fixed plans.

## 5.2. Automation plans amongst the C&W transport & logistics sector

Around a third (8 of 23, or 35%) of CWLEP transport and logistics respondents stated that they had plans for automation[8]. The automation plans of those businesses that acknowledged them – the nature of the automation, and its anticipated timescales and workforce impacts - are set out below as mini-case studies:

Business A were expecting to install a new warehouse inventory management system within three months. The respondent expected the system to improve both productivity and efficiency, but did not envisage any detrimental effects upon the workforce, nor the need for any re/up-skilling.

Business B is planning to introduce new customs software by the end of 2020. The respondent expected this to positively affect the processing / operations team: *"their work would be more efficient".* The change will require up-skilling of the team, and external and in-house training will be conducted. Far from reducing the workforce, the respondents expected the change would necessitate recruitment of two further customs operatives.

Business C were planning two changes across 2021-25, with differing effects. The first, introducing handheld tablets to process unloaded pallets, is not felt likely to affect roles, aside from some light training: *"it just takes away the process of manually keying in things."* The second, introducing an automated process for labelling outgoing pallets, is anticipated to be more disruptive. Whilst new skills may be needed to programme the machine, there could be reduction in the numbers of staff currently

Businesses D and E are considering the introduction of an automated system for distributing jobs to drivers. The former within 3 years, the latter within 10. Neither envisaged any direct effects upon their workforce, though Business E hypothesised that the improved system could enable a greater number of jobs to be carried out, so the possibility of increasing driver numbers.

Business F has as yet unspecified plans to automate their design development processes in the next 3-5 years. The respondent did not envisage any workforce effects aside from helping to make existing roles more

Business G could begin to look at further automation of the pallet storage system from next year. This would necessitate the training of warehouse operatives to properly operate the system. They insisted that this change would only mean an *increase* in staff due to the

Business H have general plans for more mechanical engineering over the next 2-3 years. They are unsure of the effects, though the last significant automation required on-the-job training, so they anticipate something similar. They did not expect any effects on workforce numbers.

[8] Where they did not, the reasons given tended to be that they did not feel there was any significant potential or need for automation in their operations. Although the exploration of barriers to automation (later in this section) indicate a range of other considerations.

There were no obvious differences between size bands in propensity to be planning action, though the smaller scale of project aligned with smaller businesses. Taken together, the case studies would seem to indicate minimal impacts from automation on the workforce in CWLEP:

- Plans for automation, at least foreseen at this stage, were rarely substantial. Most respondents did not envisage any automation, with many of these stating earlier in the survey that they were already automated as far as reasonably possible. Even amongst those considering automation, half reported that this comprised general aspirations rather than fixed plans. And where automation plans could be articulated, this was sometimes digitalisation or a software upgrade rather than introduction of robotics etc. Several stakeholders cited larger logistics firms / distribution companies in the region implementing more wholesale and complex automation (e.g. supermarkets automating the picking process), but acknowledged that automation amongst smaller firms was limited, and was likely to remain so in the medium term.
- And even where ostensibly more substantial changes to processes were described, the impacts upon the workforce were claimed by respondents to be minimal, generally comprising a need for upskilling existing employees to manage / operate the new systems. The need for an increase in staff / recruitment of new skills was more commonly envisaged than workforce reductions, which were only anticipated to be a risk in one case. This sanguine picture for the sector workforce contrasted somewhat with the view from wider stakeholders; one cited that in their experience of firms introducing automated picking, some of the manual pickers might be retained to manage the new system, but generally those who possessed an existing level of IT literacy. The same stakeholder cited the example of new food packing machinery in one firm; the firm had retained some workers but on average the machinery had replaced 2-3 people per line. In addition, the firm required fewer team leaders as one individual could now oversee multiple lines.

Several stakeholders highlighted the possibility that the rapidly growing e-commerce accelerated by COVID could in turn accelerate automation in the sector. For example, meeting increased demand (in terms of volume but also expected speed and targeted delivery) may drive automation of processes: *"changing storage and operation within warehouses"*. In addition, one stakeholder noted that the necessary safety response measures introduced in warehouses have often had a detrimental effect on productivity, enhancing the business case for automating processes (which would negate the need for some of the safety measures affecting productivity).

## 5.3. Automation plans in the C&W auto-manufacturing sector

More than half (8 of 15, or 57%) of CWLEP automotive manufacturing respondents stated that they had plans for automation[9]. As with transport and logistics, stated barriers to automation (explored later in this section) indicate other considerations. Short case studies of the automation plans of those businesses that acknowledged them are set out here:

Businesses A and B are focused on short term consolidation / survival, but may start to look at cobots by 2023. In both cases this would necessitate upskilling those on the "shop floor", with training provided by the cobot supplier. The Business A respondent acknowledged that, depending upon the number of cobots purchased, the change could have major impacts on the workforce: *"We may lose two thirds of staff on the shop floor [approximately two per cobot]."* They did caveat this by noting that if the business grew over the next few years, the commensurate requirement for more staff would offset reductions, though they were not clear that new roles would be filled by the same 'shop floor' staff being

Business C expect to install five CNC machines within the next twelve months, though this is dependent upon the success of current efforts to expand their customer base. The respondent said they would attempt to train existing staff in how to programme the new machines, but noted the possibility that they would have to *"recruit someone new and even make older staff*

Business D develop technology for automated vehicles. They are not replacing an existing manual process with an automated one, but expecting to introduce automated manufacturing capabilities (which they currently outsource) by the end of the year. The respondent envisaged no effects on their workforce, though could not discuss effects on the workforce of

Business E also described an expansion rather than replacement, having won a new contract that will necessitate the purchase of new machinery (similar, though not identical, to that they already operate) within the next two years. This new operation will mean upskilling existing staff and may mean the recruitment of

Within the next six months, Business F are expecting to scale up their capacity to enable production of a new vehicle, though were not clear at this point as to exactly what new machinery this would necessitate – *"It'll depend on how we set up the production process and assembly line".* Based upon the most likely scenario, the respondent expects the need for retraining of fabrication teams (as well as their supply chain) and the creation of some new technical roles, which they expect will be challenging to

Businesses G and H are planning automation of polishing and press feeds respectively within the next five years. They envisage that this will require both reskilling of existing staff and hiring of new staff with programming

[9] Where they did not, the reasons given tended to be linked to the perceived affordability or cost effectiveness of any automation that would be feasible for their operations: "We could invest in automatic welders. But I'd use it twice a week at most and it just wouldn't be cost effective.".

Overall, the case studies and responses indicate that, certainly compared to the transport and logistics sector:

- The automotive manufacturing sector seem more likely to (a) report that they are considering automation; (b) be planning substantial automation i.e. introduction of robotics. At least amongst survey respondents, this was being considered by smaller firms as commonly as larger ones. Whilst in many ways increasing uncertainty, one stakeholder hypothesised that circumstances created by COVID (e.g. needing to maintain output with fewer staff) may have triggered some firms to more closely examine their processes and identify automation opportunities. At the time of interview this stakeholder observed the typical sector response was introduction of 'lean-working' methods rather than initiation of automation projects, but was aware of specific investments in CNC machines and was having conversations with the sector about upskilling staff to enable automation.
- Despite this, most of those planning action claimed this would not lead to a reduction in the workforce, with the emphasis being upon upskilling existing staff and even bringing in additional expertise. Even the one respondent who acknowledged that the planned automation would likely directly lead to some replacement of workers felt this might be offset by recruitment in line with anticipated business growth.

## 5.4. C&W employer acknowledgement of automation outside of specific plans?

The case studies of limited automation ambitions amongst transport and logistics respondents, comprising focused projects and carrying low workforce impact, seems to contrast with employers' responses when asked about automation expectations more generally. Survey respondents were asked to estimate the % split of their business activities between those carried out by people and those carried out by robots / automated. They were then asked to estimate the split in ten years' time.

More than half of respondents expected an increased proportion of their activities to be automated (the remainder expected the split to remain roughly the same) by 2030. And in some cases, the expected change is substantial; one respondent expected to move from 99% manual / 1% automated to a 50%-50% split, whilst another estimated that they might move from 80% manual / 20% automated to 10% manual / 90% automated. These responses indicate that significant parts of the sector anticipate automation at a level far beyond the specific projects / plans they can currently describe.

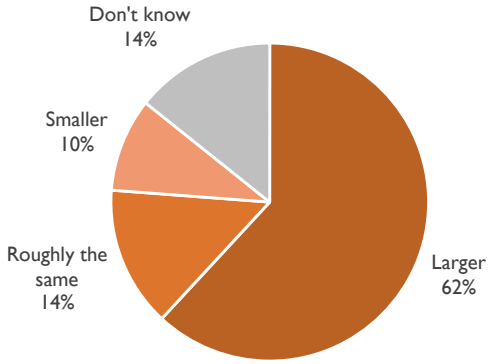
The significant planned automation projects in the automotive manufacturing sector are reflected in survey responses on more general automation expectations. Comparing respondents' current and predicted % splits of their workforce between manual and automated, more than half expected an increased proportion of their activities to be automated by 2030.

One respondent felt unable to answer; the remainder expected the current % splits to remain roughly the same. In most cases the expected change was relatively slight (5-10 percentage point shift), though several respondents expected to move from a predominantly manual set up to a 50%-50% split, whilst one respondent expected to move from 60% manual to 75% automated.

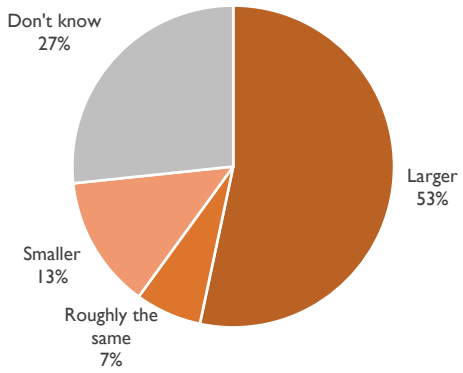
Of course, the % changes can only be usefully interpreted in the context of the total workforce size. Survey responses indicate optimism in the sector about future workforce size, even with most surveys having been undertaken in the midst of 2020. All respondents were asked to predict, in ten years' time, how the size of their workforce would have changed:

**Figure 7: Employer predictions of 2030 workforce size**

**Transport and logistics [n=23]**




**Automotive manufacturing [n=15]**




Amongst transport and logistics respondents. Only one respondent envisaged a smaller workforce due to automation. The rest of the 'smaller' and 'don't know' responses were due to the respondent contemplating retirement. Predictions of growth were common, directly linked to expectations that the business would have grown, sometimes substantially, with predictions of multiple new warehouses and requirement for many hundreds more employees.

Other evidence supports this optimism to an extent. As highlighted by one stakeholder, in contrast to the experiences of most sectors, because the pandemic has led to the acceleration of the existing trend of online ordering and distribution, this has led to a rapid rise in demand for some transport and logistics services.

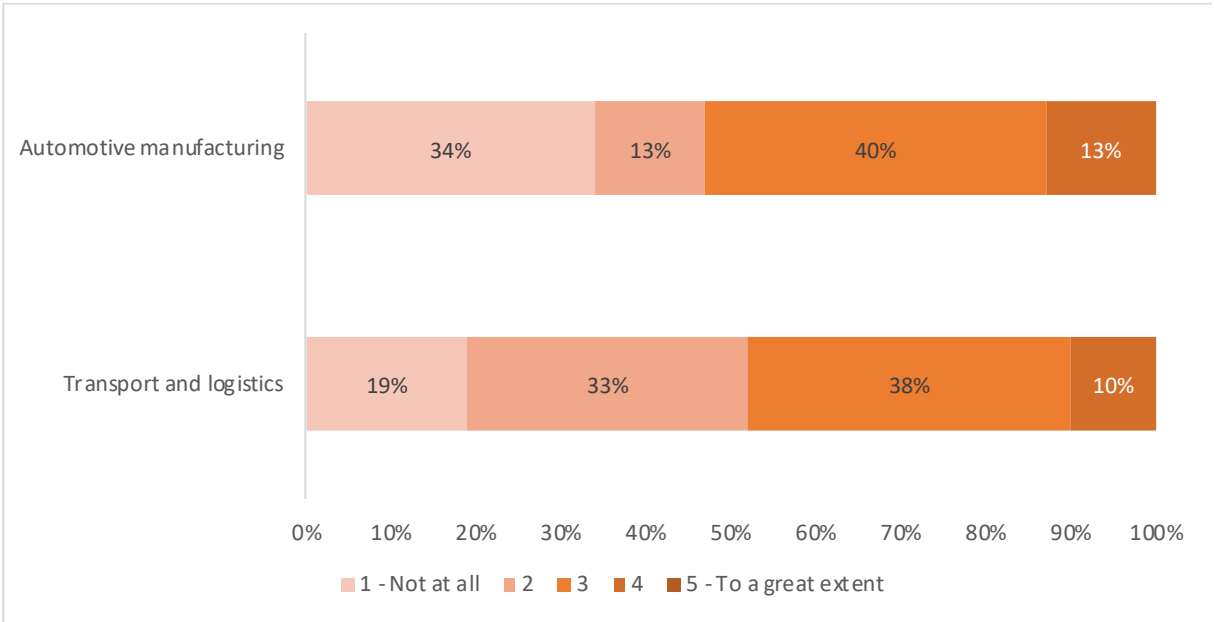
However, the same stakeholder sounded a note of caution on this, highlighting that the larger warehouse and distribution companies were often better set up to meet this high volume of demand in an efficient and low-cost way, and there was therefore a potential threat in the explosion of online ordering to smaller, less automated businesses in the sector. In addition,

the altered circumstances around COVID have only been beneficial depending upon the precise customer and product focus of the logistics firm, with many having to furlough staff / suspend operations.

Amongst automotive manufacturing respondents, a quarter could not predict future workforce size; COVID in particular was creating uncertainty. Neither of those predicting a smaller workforce attributed this to automation. Predictions of growth were usually linked to general growth ambitions, though several respondents cited specific contracts that they expected would generate that growth. One regional stakeholder did highlight that some manufacturing organisations in the region were sustaining revenues as they had diversified to meet COVID-related demand (e.g. PPE manufacture); though no employer respondents reported this and the same stakeholder also acknowledged widespread furloughing in the sector.

In another indirect way of exploring potential automation, all respondents were then asked to what extent they expected the skills required of their workforce would differ ten years from now:

**Figure 8: CWLEP employer expectations of the extent of changes to skills requirements between now and 2030**




In both sectors, respondents were split roughly equally as to whether they expected *some* changes to skills requirements (rating 3 or 4) or little change (rating 1 or 2); no respondents expected skills requirements to change to a 'great extent' in the sector (rating 5). Where they

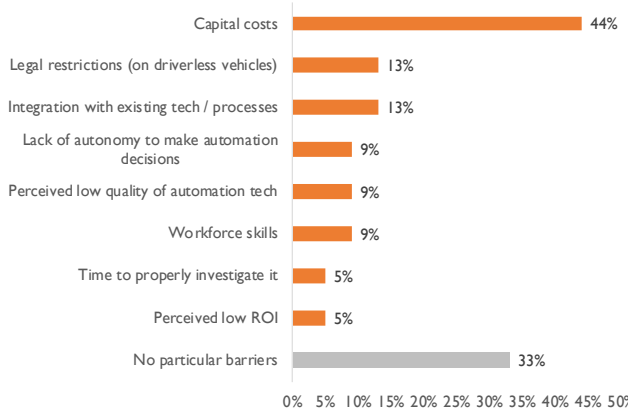
did expect some change, respondents generally referenced increased requirements for digital / AI skills, both those linked to automation of operations, but also for back-office functions.

## 5.5. C&W employer barriers to automation

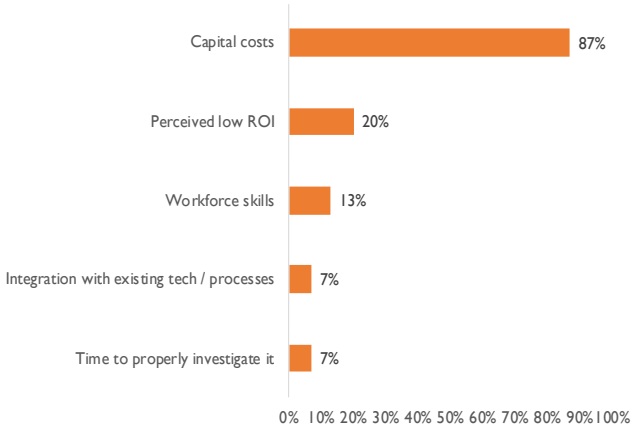
To explore potential reasons for limited plans – at least in the foreseeable future – all survey respondents were asked to select, from a prompted list, the typical barriers to automation for their business:

**Figure 6: Barriers to automation amongst CWLEP employers (multiple response)**

**Transport and logistics [n=23]**




**Automotive manufacturing [n=15]**




The most commonly reported barrier to automation was cost. Especially for some smaller businesses, even if substantial automation were technically affordable, based upon the scale and nature of their operations, it would not generate the significant efficiencies necessary to justify the investment. The respondents did not articulate what they saw as the efficiencies i.e. whether they included redundancies. Pertinent to this barrier, one stakeholder projected that 2021 / post-Brexit would bring a new perspective[10] on automation ROI for some firms, as there may be a reduction in migrant labour and commensurate increase in labour costs, altering automation cost-benefit calculations.

Perhaps also linked to perceptions of value for money, a third of respondents reported no significant barriers to automation, but that it was simply unnecessary / unfeasible for their business. Several automotive manufacturing respondents highlighted that they produce very bespoke parts, which would not be suited to a standard, automated process. A number of

[10] This will of course depend upon the survival of sites in the CWLEP region. Assessing sector viability in the region is not within the remit of this research, but it is worth noting that major automotive manufacturing sites have been fully or partly closed during periods of tighter COVID restrictions, coupled with widespread furloughing.

logistics respondents pointed out that driverless vehicles may be explored in the long run, but these are currently not commercialised / legal in the UK. Stakeholder responses emphasised this, with the consensus being that anything beyond trials of driverless road freight is at least five – and as many as twenty - years away.

In the two cases where respondents cited limited autonomy, this was because they were part of a global company that would make the decisions on automation; not a barrier to automation per se, but potentially a barrier to the respondent / CWLEP site(s) driving it.

Few employer respondents cited workforce skills as a barrier, despite hard-to-fill vacancies / skills gaps in programming and engineering being widely reported.

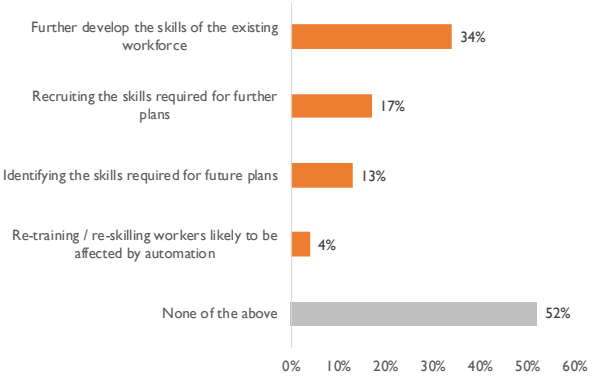
# 6. Implications for SSW

### What skills support might employers need?

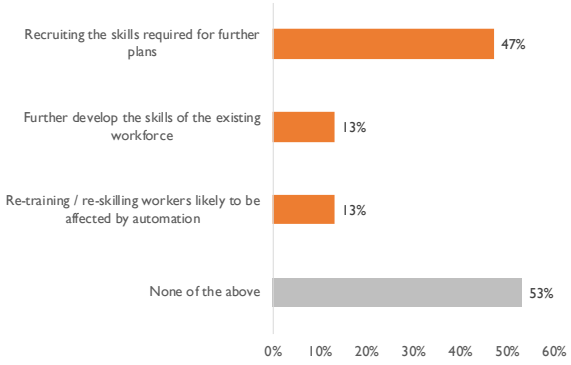
The final question in the employer survey prompted a number of ways in which employers could be supported on skills in their organisation. Whilst most prompts did not refer directly to automation, the question did close a survey that had focused on automation, and responses tended to reflect this. In that context, the extent of interest in different prompted support was as follows:

### Figure 12: Employer interest in prompted skills support

**Transport and logistics [n=23]**




**Automotive manufacturing [n=15]**




Further skills development needs were split between those specifically linked to automation (especially programming and the operation of new equipment and digital), and more general, softer skills, including marketing and project management. Several stakeholders seconded the need for improved IT skills (whether related to specific automation technology or general digital skills). One stakeholder, specialising in recruitment for the sectors pertinent to this research, described shortages of mechanical engineering and IT skills necessary for understanding and conducting QA of automated processes. This stakeholder also drew attention to the need for less obvious specialist roles, citing paint technicians requiring physics and chemistry education.

It was noted by several stakeholders that providers of automation equipment / technology will tend to provide training on the operation of this to all affected staff as part of their offer / package, but the general view was that training needs relating to automation run wider than the ability to use a specific piece of equipment.

On recruiting to meet future skills needs, specific skills of interest to employers included digital marketing, equipment programming, tool and maintenance engineers, and setter operators. More generally, several respondents requested support with using apprenticeships.

Several respondents talked about the perceived increased difficulty in finding candidates with the requisite skills, and expressed concern about the lack of emphasis upon – and so appetite for - skilled manual work in education. Interestingly, one secondary source recommended that employers attach greater importance in their recruitment criteria to candidate flexibility and willingness to learn (i.e. to embrace automation).

Addressing both employer and employee challenges around recruitment / job retention, the UK Automotive Council have previously recommended creating and promoting a single portal publicising the different jobs / career opportunities and skills information for the industry, including standardising job descriptions to better enable individuals to move around the industry. Another idea was firms engaging with their supply chains by offering training and work experience, and in return loaning surplus staff to strengthen the supply chain.

More broadly, the contrasting employer survey responses and stakeholders / wider literature views on the scale, imminence and impact of automation, indicates value in diagnostic support[11] to firms to understand where and how automation may be feasible, along with analysis of the skills necessary – and gaps to be addressed to realise certain automation. One stakeholder recommended support to employers in producing automation strategies i.e. ten-year plans which would include training plans to complement automation plans. Another advised organisations to have an iterative automation programme – *"do it in bitesize chunks"* - to ensure the team that would facilitate it are fully trained.

Across stakeholders and in wider literature it was noted that larger firms tended to be less in need of support, either in developing strategies for automation, or in ensuring provision of the training to enable it. These larger firms often have formalised internal training programmes that can new topics related to latest automation / innovations.

### How to engage employers

Whilst it was perhaps an unspoken assumption that if employers have a need for certain skills, they will proactively engage with support offers, several stakeholders noted that offers of direct financial support and / or signposting to it would be effective engagement tools: *"grants / finance is the conversation starter."* Related to financially incentivising training, two stakeholders argued that for existing financial support (the Shared Prosperity Fund and Apprenticeships Levy were highlighted), there should be as much emphasis upon training as job creation. One stakeholder emphasised the need for a culture shift amongst certain

[11] Such as that provided by the Manufacturing Technology Centre.

businesses in the logistics sector, to viewing training as a valuable investment (that will provide returns) rather than a cost.

The primary research respondents were not directly asked about ideas to engage individuals (as opposed to employers), and the secondary research on automation did not explore this. However, one source did recommend the establishment of a personal retraining allowance for workers made redundant / those with below level 3 qualifications in sectors deemed most at risk from automation.

### What support do workers need?

Support to firms in upskilling their workforce will by definition support those workers that continue their employment beyond specific automation projects. For those displaced by automation, based upon recommendations from stakeholders and reports, support is likely to need to take several forms:

1. One stakeholder talked about the importance of 'catching' redundancies at the time they are made, encouraging employers to signpost recruitment portals and pursue qualifications.
2. Support to ensure good understanding amongst individuals of their transferrable skills, especially to sectors at less risk of automation. One stakeholder discussed the importance of recognising and selling transferrable skills, though the example they gave was more related to retail and customer service.
3. Provision of training in skills that the individual may be lacking. This could be varied based upon the individuals' ambitions, interests and existing skillset. Digital / IT skills are not only increasingly in demand across a range of sectors, they are also the type of skills that would best position the individual to re-enter an increasingly automated logistics / manufacturing sector. Another recommended focus for skills training in the literature is on softer, transferrable skills e.g. interpersonal and communication skills, leadership skills, problem solving and analytical skills. And linked to this, working with education providers (public and private sector and at various levels) to embed these skills in teaching / training programmes.
4. Generally, encouraging and supporting continuous learning and improvement. This is especially pertinent as current and near-term automation may well be superseded by new technologies and processes that require new sets of skills. Linked to this, some sources recommend ensuring that careers advice to the future workforce reflects that multiple occupations and re-training may become the norm across a wide range of sectors and job types.

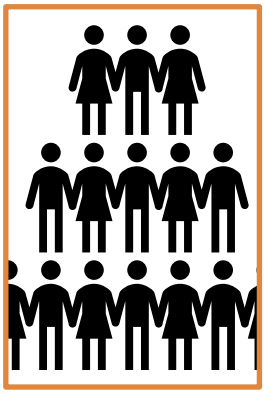
# 7. Appendices

## 7.1. Further detail on the employer survey method

Regarding the primary research with employers, the following key design decisions were made:

**Figure 2: Outline of key design decisions in employer surveys**

**Mode**: it was decided to conduct the employer survey by telephone, on the basis that the questions would be exploring some potentially sensitive topic areas (e.g. the prospects of redundancies). These are better explored through an in-person conversation, allowing a more nuanced discussion and appropriate reassurances on anonymity. Telephone interviewing is more conducive to the respondent fully articulating open-ended responses; it allows more nuanced and careful questioning, enabling questions to be adapted and framed within the context of the respondents' answers, thus ensuring a more relevant conversation and keeping respondents engaged.



**Target respondents**: the survey targeted employers in the transport, logistics and automotive manufacturing supply chain sectors. To ensure relevant and useful responses, the survey introduction filtered out those with no employees (as their decisions would be having less impact on the CWLEP workforce) and focused on those employers with an operational presence in (not necessarily based in) the region. In terms of the individuals targeted the survey sought participation from either owners, directors or HR leads i.e. those with a better sense of likely organisational direction on automation, and potential effects on the workforce.

### Sampling, COVID and survey limitations

The sample size is a key aspect of the survey that the reader should note in interpreting the findings. At the outset of the research, 2019 ONS figures were used to estimate the number of transport and logistics enterprises in the CWLEP region at c.2250[12]. On this basis, and accounting for the research budget, it was proposed that the telephone survey target 100

[12] Though as discussed in the remainder of this section, we suspect the population of employers that match the eventual eligibility criteria for the survey is much lower.

employers to achieve good representation of the population and thereby confidence in the survey results.

The database of contacts was built from two commercial database providers. A short pilot in mid-March highlighted useful tweaks to the survey script, but its principal effect was to agree that organisations employing less than 5 employees would be excluded from the research. The rationale was an extension of the reasoning outlined in Figure 2 i.e. conducting interviews with those employing very few individuals per organisation would not produce useful data for understanding overall workforce impacts in the region. It was also noted that micro businesses were less likely to be investing in significant automation.

The pilot also identified a number of businesses that were ostensibly in the right sector and had a presence in C&W, but most of their manufacturing – and so functions they might automate - were overseas. In these cases, any automation plans are unlikely to have a significant effect on the roles and skills required in C&W, albeit there may be slight indirect effects on overall managerial / operational functions in the UK.

Immediately following the pilot, the survey proper commenced. Unfortunately, this was almost simultaneous with the first national lockdown in response to COVID-19. On the basis that a number of organisations and / or key individuals within them were unavailable, surveying was quickly paused and resumed as lockdown eased in early June. However, despite the re-opening of many sectors of the economy, there continued to be a number of challenges to completing interviews:

- *Eligibility;* despite specifying the commercial databases to match the aforementioned profile, more than 50% of database contacts were not eligible for interview i.e. they were too small (<5 employees) or were not in the right sector (the databases included large numbers of couriers, removals companies, mechanics, and post office depots). As a result, from tailored ONS counts we estimate that the number of employers in the CWLEP region matching the survey's sector and size stipulations is c.200.
- *Availability;* the COVID-19 response measures had multiple detrimental effects on achieving responses, and these continued even after the easing of restrictions around June. Such effects included:
    - Organisations being uncontactable because they had either temporarily – or seemingly, on rare occasions, permanently – ceased to operate.
    - Target individuals (as per Figure 2, generally senior members of staff) working from home and being hard to reach directly.
    - In rare cases, the best placed individual being furloughed.
- *Appetite;* linked to COVID-19 impacts, it sometimes proved hard to engage potential respondents in a survey about current and future automation plans and effects, when the business was very much focused upon survival in the short term. Target individuals were

devoting their time to crisis management or HR such as furlough administration, and several were in the process of making redundancies.

A range of approaches were deployed to mitigate these effects and obtain responses:

- Offering a voucher incentive to those completing the survey.
- Promotion of the survey through a number of intermediary organisations, including recognised regional bodies (the LEP and Growth Hub) and trade associations.
- Requesting commitment to an interview date and time as part of sign up to a free sector event organised by Serco, specifically aimed at sector representatives in the region[13].

Whilst the latter proved somewhat effective in boosting response rates, overall, and despite calls to almost 1,000 contacts, in total 38 eligible[14] employers provided completed responses to the survey. It should be noted that in the context of the revised estimates of the eligible population, this represents a c.20% response rate.

The breakdown of responses by sector and size band[15] were as follows:

**Table 1: Breakdown of valid survey responses by sector and size band**

| | Transport and logistics / warehousing | Automotive manufacturing / supply chain |
|---|---|---|
| Micro (5-9 employees) | 11 | 2 |
| Small (10-49 employees) | 9 | 7 |
| Medium (50-249 employees) | 3 | 4 |
| Large (250+ employees) | - | 2 |

[13] https://www.finditincw.co.uk/events/coventry-and-warwickshire-driving-the-future-of-transport-and-logistics

[14] A number of organisations with links to the sectors of interest (e.g. removals, automotive repair, sector-specific recruitment agencies) began the surveys but it became apparent their activities were not directly relevant.

[15] Note that this is categorised based upon the number of employees in the CWLEP region, not in total i.e. some organisations that are 'large' in terms of global workforce are categorised otherwise here.

## 7.2. Secondary evidence review bibliography


- Warwickshire Economics – *The Risk of Automation in Warwickshire* (2018)
- Hays – *What Workers Want Report: Mindset Key for Digital Change* (2019)
- Bakhshi, H., Downing, J., Osborne, M. and Schneider, P. (2017) *The Future of Skills: Employment in 2030*. London: Pearson and Nesta
- Automotive Council UK / Automotive Industrial Partnership - *Employers' Views of the Jobs and Skills Required for the UK Automotive Industry* (2016)
- McKinsey Global Institute – *Jobs Lost, Jobs Gained: Workforce Transitions in a Time of Automation* (2017)
- *[article]* McKinsey - *Automation in logistics: Big opportunity, bigger uncertainty* (April 2019)
- PWC - *Will robots really steal our jobs? An international analysis of the potential long term impact of automation* (2018)

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