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Advancing Automation and Robotics for Sustainable Manufacturing

Strategic Pathways for the UK
Fashion and Textile Industry

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This paper discusses work undertaken by researchers from Manchester Metropolitan University's Robotics Living Lab (RoLL) to understand the current use of automation and robotics in the UK Fashion and Textiles Industry, providing an overview of companies' engagement with contemporary technologies, and desire to modernise their production capabilities. It identifies key barriers to adopting automation and offers strategic recommendations to UK Fashion and Textile businesses for implementing agile tooling and collaborative robotics. These solutions have the potential to make the UK more competitive in international markets and drive sustainability, net zero manufacturing and a reshoring agenda.

Supported and funded by the Manufacturing Technology Centre (MTC), part of the High Value Manufacturing Catapult, and UK Research & Innovation (UKRI) as part of the sustainable manufacturing pillar of the Circular Fashion Innovation Network (CFIN), this paper primarily reports the findings of a workshop which paralleled the MTC's Sustainable Innovation Conference which took place in April 2024. The event looked to explore avenues to 'Enhancing existing UK manufacturing capacity' and was organised by CFIN and the UK Fashion and Textile Association (UKFT) in partnership with RoLL and MTC. It brought together over 30 representatives of the UK Fashion and Textiles sectors to discuss the potential use cases for robotics in the UK, including leading fashion and textiles manufacturers and retailers. These discussions were supplemented by a follow-up survey and interviews, offering deeper insights into key themes and challenges.

The paper draws on quotes gathered from participants throughout the three research stages, individuals and roles are identified where appropriate. A review of the current research literature and government publications is used to substantiate the context and conclusions of the paper.

Key recommendations include:

- UK Fashion and Textiles companies could increase efficiency, reduce production costs, improve production quality and consistency using robotics with the right financial support e.g. inward investment.
- The UK Fashion and Textiles sector needs support to modernise across the supply chain. Automating fabric cutting, sewing, bonding and pressing tasks as well as the sorting of raw materials, identifying textiles for recycling, and defect detection in textiles can all be carried out by robots.
- There is an opportunity to upskill the workforce in the Fashion and Textiles sector, developing a new narrative around modern industry and industrial practices, where UK firms may lack expertise in the latest technologies.
- Success metrics for the UK Fashion and Textiles Industry include adoption of more advanced machinery and tooling across the sector.
- UK Fashion and Textiles firms could move from prototype to scaled production with the efficient use of collaborative robotics.
- Ease of use is crucial for the adoption of collaborative robotics as companies are more likely to invest if systems are intuitive and accessible.
- Engaging with industry to identify skills gaps, working in tandem with universities to develop new courses in sustainability and circular economic models.
- Recognising that the UK has emerging strengths in a combination of AI technologies, advanced manufacturing, and creative industries as a driver for Fashion and Textiles sector growth.
- Inclusion of the Fashion and Textiles sector in new Industrial Strategy policy.
- The UK Fashion and Textiles Industry and a wider manufacturing ecosystem could become a scaled-up innovative business sector that could develop circular economic models for sustainable growth.

The image shows a spacious, modern industrial research facility. In the foreground, there is a large, multi-tiered metal frame structure on wheels, possibly a mobile workstation or a robotic platform. The background features several white shelving units filled with books and equipment. A robotic arm is visible on a table in the distance. The ceiling is equipped with numerous bright, linear LED lights, and various pipes and conduits are visible overhead. The overall atmosphere is clean, organized, and technologically advanced.

The Robotics Living Lab (RoLL) led by Susan Postlethwaite, Professor of Fashion Technologies and Director of RoLL, Manchester Fashion Institute, Manchester Metropolitan University, is a new fashion research facility to help support micro-scale and SME fashion businesses to develop high value, low volume garment production using agile collaborative robotic technologies for more sustain-able production. Opening in February 2025, the Robotics Living Lab (RoLL) was awarded £3.8m by the Arts and Humanities Research Council (AHRC) to build and equip the new facility as part of the CResCa World Class Lab series. The funding enables new research into highly responsive, sustainable solutions for garment manufacturers. RoLL are supported by the Manufacturing Technology Centre (MTC) through in-kind contributions. RoLL seconded Dr Caitlin McCall from MTC to support the development of the lab.



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List of Participating Businesses at the MTC Workshop:

Mulberry
John Smedley Ltd
Heathcoat Fabrics Ltd
Fashion Enter
Loop Kinetics Lts
C&C Textiles
LLUK Ltd
Stella McCartney
AE Sewing Machines
Pentland Group
MAES London
PANGAIA
Self Made Studio
Selfridges
Vivienne Westwood
Albion Cycling
British Footwear Association
and Others

1. Uses of Automation and Robotics within the Fashion and Textiles Sector

A wide range of speculative uses and applications of Automation & Robotics (A&R) like drone and swarm technologies were presented during the workshop and as part of the questionnaire. Some workshop attendees already use highly automated facilities internationally to manufacture clothing but find it challenging to find commercially viable alternatives in the UK. For other event attendees, it was the first time they had seen this level of automation, even though not fashion or textiles-focused, and the event was pivotal in their perceptions of the Automation & Robotics industry and how it could aid them in their businesses. Results from the questionnaire suggest firms are using or plan to use automation and robotics in manufacturing facilities, in the supply base and end-of-life facilities. However, many firms believe creating business cases for investing in technology is a challenge, particularly in identifying the business-specific benefits and trade-offs in terms of Return on Investment (ROI), floor space, number of personnel, personnel skill levels, training on new equipment and agility of equipment (e.g., set up times for each new order as each one is potentially different and sometimes have very low Minimum Order Quantities (MOQs)). The questionnaire revealed that increased efficiency, reducing production costs, improving production quality and consistency were among the main drivers for firms wanting to modernise.

“There’s a lot of technology out there that needs to be explored, especially for fashion businesses, and even the way in which we prototype, develop and create. I feel like automation could be used across all of our business procedures.”

— Senior Apparel Engineer at Pentland



“The restriction will be in how flexible the reprogramming can be. For example, if there are 100 templates and someone just needs to select a template and then move the robotic arm somewhere to operate, then I can see [robotic integration] happen really easily, but it has to be an internal decision around systems and processes. Everything has to be streamlined and standardised.”

— Chief executive at MAES London

Firms have suggested that while the development-to-production time is generally decreasing, the slow speed of machinery setup in the UK is seen as a disadvantage. Robotics could speed the changeover in production from one task to another. Firms saw that time wasted in production could be ameliorated by robotics, but they needed to be very easy to implement and use. Firms asked how they might facilitate fast switching to support small batch production in an efficient way and were very interested in quick tool changers as a shift away from existing inefficiencies. Companies recognised end-of-life as important beyond production and that automation and robotic technologies could be used, for example, in sorting and pre-processing of textiles for reuse and recycling.

“With the advent of digital craft and automated robotic technologies within a studio setting, I’d like to think we’ll be able to get more precise and higher quality products at a quicker rate, which might actually mean that we could then upscale micro factory production. The collaboration that’s occurring at the intersection of very advanced manufacturing processes mixed with fashion and textiles is going to have some amazing benefits for the fashion industry.”

— Graeme Raeburn, Design Lead at Albion

Due to the nature of the industry, there is a desire for collaborative automation that assists with tasks rather than fully replacing human effort. These collaborative robots would ideally have adaptable robotic tooling — so-called end effectors — to handle different stages of garment production and developed software/interfaces to enable ease of human interaction.

“I haven’t seen many things like this within a factory environment.... we’ve seen examples of videos of [robots] working in perfect conditions with perfect materials. But how well do those function in less than perfect conditions? Because within a factory environment there are tolerances. There are slight anomalies that can be worked around, and people are able to use their visual judgement on whether something is acceptable or unacceptable.”

Companies are aware that these technologies are still in their infancy and are therefore eager to see the technology evolve. Working with diverse, flexible fabrics presents the greatest

challenge in their view. Deformable (floppy) textiles pose challenges when using robotics and automation. Performing tasks such as stitching, sewing, and cutting, require bespoke approaches to each fabric. Despite these obstacles, there is interest in seeing if robotics could be adapted successfully to meet these unique demands. Participants expressed interest in future research on Automation and Robotics and how these technologies could address current bottlenecks in manufacturing.

“There’s so much potential around how this tooling can really transform how product is made in the future.”

“What infrastructure do we need in place beforehand? It is about having the resources and the knowledge to also program those robotics.”

“It’s really interesting to see how designers can play a very integral role in how we evolve these machines for future product applications. And so, when you think about considerations around the tooling evolving, what are those material applications of the future? I think where we can start to marry this thinking on both sides is where we can actually create some really interesting new product.”

— Chelsea Franklin, Head of Advanced Concept Design at PANGAIA

From the questionnaire and workshop results, companies felt that the cutting tools demonstrated at the workshop were where they currently had most interest. Several participants had specific hardware questions about RoLL’s proof-of-

concept cutting tool. They could imagine implementation in various use cases and suggested mechanical adjustments and requests for system extensions to enable pattern recognition and material quality checks through vision systems. Feedback revealed the cutting tool has potential to be a steppingstone in transforming and improving fashion manufacturing as cutting is widely recognised as one of the biggest bottle necks in the production process.

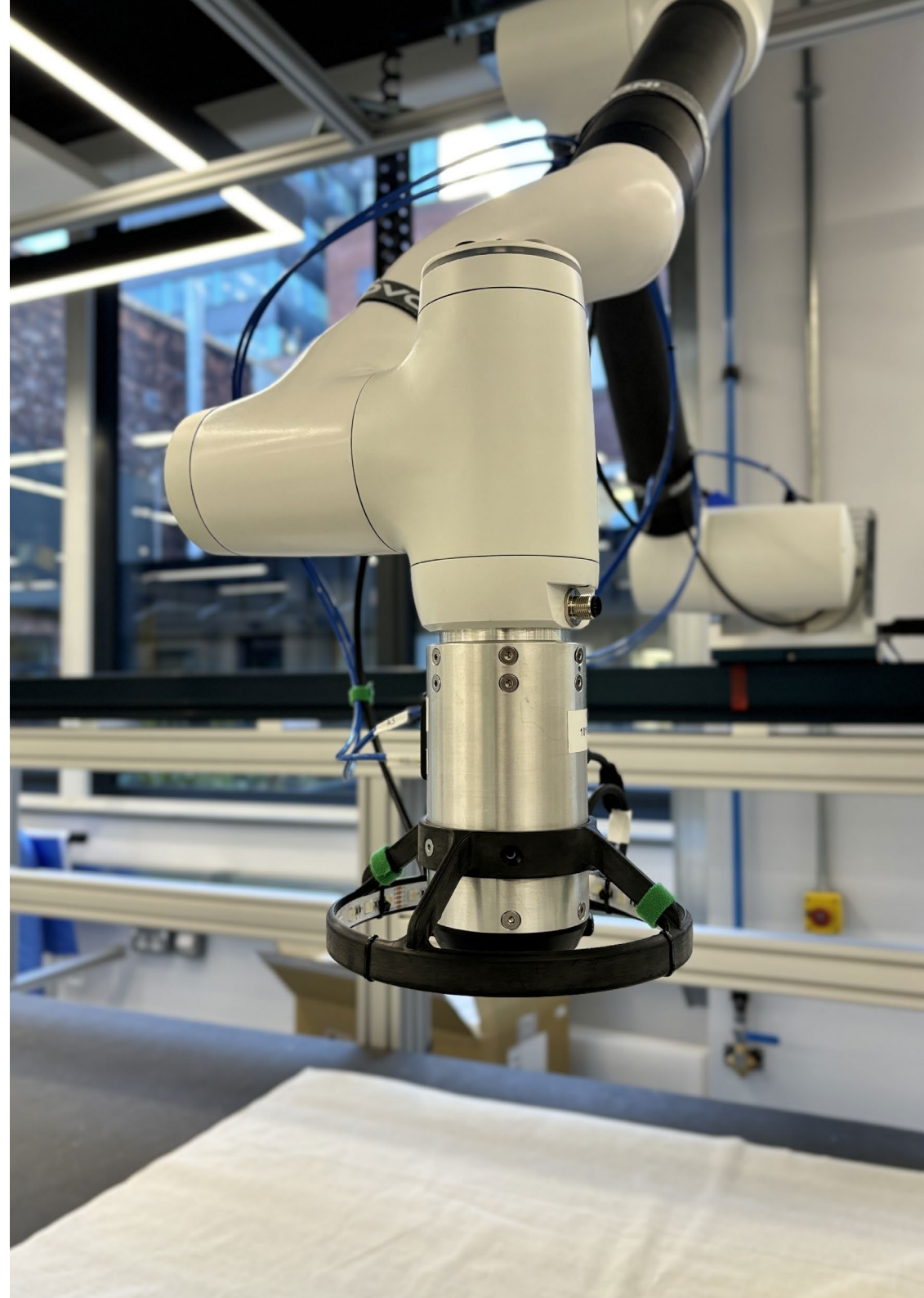
Drone technologies and swarm robotics were more difficult for firms to imagine, as presented during the workshop, beyond a very speculative engagement. More obvious uses like packaging, sorting, warehousing, digitalisation generally, and improved reporting were favoured.

“Over the past years/months, we’ve used intelligent technology solutions to eliminate waste, excessive lead-times and PD (product development) costs from our product life cycle.”

CUTTING TOOL END-EFFECTOR

This project is a collaborative effort by Glasgow-based robotics integrator company POMO Robotics and the Robotics Living Lab at Manchester Fashion Institute, funded by the Cotton Textiles Research Trust. Spanning a development period of 18 months, engineers together with fashion researchers co-designed a tangential rotary cutting tool end-effector for collaborative robots (cobots). The tool underwent 3 iterative design stages, continuously improving operability, ease of use and health and safety of the end-effector and is currently at Technology Readiness Level 6-7. It supports low-volume/high-value garment manufacturing by enabling small companies to transition to local, small-batch production.

Image page 15





SUMMARY

- Highly automated factories are used by the sector offshore; however, some attendees had not seen this level of automation before.
- Robots doing dull and repetitive jobs so that human skill could be brought to the fore and celebrated.
- Collaborative robotics need to be easier to use and more intuitive.
- Quick change solutions for end effectors tools to aid workflows were recognised as a viable potential use of robotics. Firms proposed the design of agile equipment that takes less than a few minutes to reconfigure for the next job and low code and no code tooling for ease of use.
- AI learning combined with robotics to enable e.g. defect detection in textiles or leather.
- Humanoid robots were at once a source of concern and interest.
- Firms felt robotics could play a valuable part in improved identification and characterisation of waste and then recycling the waste. Robotics could be used in identifying different textiles for recycling.
- The proof of concept cutting tool demonstration generated a lot of interest.
- Firms suggested need for co-design of machine applications, working alongside designers and manufacturing facilities.

2. Likelihood of the uptake of robotic technologies in the UK Fashion and Textiles Industries

When asked how soon firms envisioned automation, cobots or agile tooling could be fully usable by designers and manufacturers, responses varied from “We already have a cobot in production” “We are using today!” and “Our Chinese company already have [robots]” to “Within the next 10 years”. Attendees conveyed enthusiasm for the potential of innovative, low-carbon manufacturing techniques; however, they emphasised that existing solutions are not yet sufficiently developed for practical implementation in the Fashion and Textiles Industry.

“There are certain techniques that you can achieve through robotics that we have yet to discover that might lead to a product whose footprint is much smaller in regards to carbon.”

“I think [cobot tools] are very far away from playing a role in designing. A lot of that has to do with exposure actually. A lot of designers/students do not have any exposure to these types of tools to [get a sense of] what can be created from them.

The reality of innovation in any context - be it robotics or a new material - is about readiness levels and whether it can be dropped into an existing supply chain. Or an existing infrastructure versus something requiring a heavy amount of hardware investment.

And those things are capital intensive. Exploring a new tool or new equipment at a product level is only ever going to have a ROI if you are able to scale it within a reasonable time frame.”

Workshop attendees also suggested bringing robot developers to manufacturing sites to discuss the production challenges. Pathways for familiarisation at student and start-up level could be facilitated by the Robotics Living Lab. There were also questions about access to funding and how SMEs might know about labour saving devices and how small firms might invest in collaborative robotic solutions.

When deciding on where to source and manufacture products, UK based firms felt they had to make extra efforts to convince their own teams to make in the UK and invest in onshore production.

The introduction and implementation of robotics is projected to significantly impact the industry. However, there are several barriers to overcome, one of which is human perception. There are strong perceptions in environments where there is limited or no automation that the introduction of robotics means the human operator is replaced. Many businesses use this as an opportunity to automate the 'dull, dirty and dangerous' tasks, which include repetitive tasks.

CIRCULAR ECONOMY

Financial and cultural perceptions are both considerations in making decisions around the circular economy. Incentives contributing toward improving the uptake of sustainable practices in Fashion and Textiles include the Circular Fashion and Textiles Program a £15 million trilateral program by AHRC, Innovate UK and NERC.

The Circular Fashion Innovation Network (CFIN)¹, led by the British Fashion Council (BFC) and the UK Fashion & Textile Association (UKFT), was established in 2023 to help drive transformation within the Fashion and Textiles industry to accelerate the UK towards a circular fashion ecosystem by 2032.

Work being carried out by the Circular Fashion and Textiles Network Plus², a collaboration between University of Leeds, University of Exeter and Northumbria University aims to establish a baseline to examine the current status of sustainability practices in the UK industry, embed environmental sciences at the heart of fashion, wider apparel and textiles sectors, and collate, analyse and assess data to advance reliability and authenticity of environmental impact measures.

1. <https://instituteofpositivefashion.com/uploads/files/1/CFIN-Interim-Report-2024.pdf>

2. <https://www.ukri.org/news/ukri-funds-research-for-a-sustainable-fashion-and-textiles-industry/>



SUMMARY

- Most companies agreed that automated processes and robotics were likely to significantly impact the industry.
- Existing solutions are not yet sufficiently developed for practical implementation.
- Companies agreed that zero carbon manufacturing was important.
- There is still anxiety about workforces losing their jobs to technology.
- A scaled-up ecosystem involving diverse business sectors might support further growth for the UK Fashion and Textiles industries.
- RoLL/UK Government/UKFT/CFIN/MTC could play a key role in bringing people together to continue discussions and disseminate accurate information about the industry.

3. Reshoring manufacturing to the UK

A new report from MAKE UK³ suggests that the introduction of a long-term industrial strategy will bring a surge of offshore manufacturing production back to the UK. This is according to a major annual survey on the investment landscape for UK industry published by Make UK and RSM UK (Rhodes, Salustro and McGladrey - audit, tax and consulting services).

'Investment Monitor 2024: Using Data to Drive Manufacturing Productivity' finds that almost three quarters of companies (70%) would accelerate the re-shoring of production back to the UK in response to an industrial strategy, with just 3% saying it would make no difference.'

“Technology companies should realise that the textile industry is growing again in the UK and there is a huge marketplace for them that will help to achieve the goal of onshoring textiles to the UK again.”

— Tony Boon, Group Operations Director of LLUK

Two groups within the workshop setting had opposing views on 'Made in UK' label on products. One said it adds cost to the consumer and their customers were not always prepared to pay it (the tag line is perceived as an outdated view of quality). Another attendee offered that in the UK, skills have been declining for a very long time and might therefore naturally be more advanced offshore where quality manufacturing is more readily found. The implication is a compelling case to

3. <https://www.makeuk.org/insights/reports/investment-monitor-2024-using-data-drive>

start upskilling with the unique opportunity to directly rebuild a workforce with new Creative Technologies (CreaTech) oriented skills.

“How can we make it more attractive for brands to produce here or for the supply chain to produce in a better way? Because as soon as we unlock that there can be a lot of innovation. Both brands and manufacturers need to innovate with the same sole purpose. But manufacturing does not have the same level of representation as the design side of the industry.”

Made in UK can only sustain if things are made in the UK and the skill sets remains, so manufacturing needs a stronger voice within government.

Another group expressed support for Made in UK as it signified quality and local production. In the view of one contributor, for some products, particularly those made of wool and cashmere, the UK is seen as world leading and still holds a good share of global production.



SUMMARY

- Reshoring of textiles production is seen as a viable proposition.
- Made in the UK is seen as a mark of quality and often seen in a positive light, but not by all businesses.
- Reshoring of UK Fashion and Textiles manufacturing needs a stronger lobbying group focused on Government.

4. Skills Levels in UK Fashion and Textile Manufacturing

Businesses felt they did not have sufficient knowledge about robotic capabilities to make informed decisions about implementation and would like further training to understand potentials.

Attendees of the workshop suggested there were no webinars or workshops available to the Fashion Industry to showcase new technologies. To make sure the Fashion and Textiles Industry are supported by new and innovative agile tooling, collaborative robots and automated technologies, these seminars and workshops together with further content development, could be a vehicle for discussion and brainstorming. Results from the questionnaire suggest enthusiastic support for this approach which could be facilitated at the Robotics Living Lab (RoLL), developed with support from UKFT, CFIN, MTC, and Manchester Fashion Institute.

“How does everything link together e.g. software, coding. How do we make things intuitive?”

“Limited skilled workers within the UK. No youth going into that aspect of trade.”

Perceptions of factory work are still negative and there is perceived to be a huge skills shortage across the whole Fashion and Textiles Industry. These beliefs were supported by the questionnaire results, confirming the idea that skilled worker recruitment was challenging.

High level skills are required in many operations, and businesses “would like to see if that is possible with robotics”.

“Robots and automation could have an immense impact on the textile industry, certainly to close a skills-based gap which a lot of companies are suffering from. The minute you introduce automation to a job; a lot of people seem to think that you are looking to remove them. What you're actually doing is making them more productive, more efficient. And you are also giving them a new skill by using and integrating with that technology.”

—Tony Boon, Group Operations Director of LLUK

Workshop participants regarded it as important for the UK Fashion and Textiles Industry to up-skill staff. Businesses also mentioned that it is hard to retain staff. Apprenticeships are seen as a sound investment for the industry but usually not tailored to the businesses specific needs and require lots of administrative attention, which SMEs do not always have time to carry out. SMEs feel lots of skills required for the Fashion and Textiles Industry are not being addressed by education providers. Businesses reported that they thought multidisciplinary courses were needed e.g. fine arts, fashion design, F&T manufacture etc. Lots of machinery used in manufacturing sites and design studios is very old, and workshop attendees felt the equipment students see in educational courses is not relevant.

One attendee noted that the offshoring of manufacturing led to a loss of perceived value in manufacturing roles within the Fashion & Textiles sector, making it challenging to attract talent. However, modern manufacturing roles, such as those involving advanced technologies like robotic tools offer immediate opportunities for upskilling. These technologies

not only elevate the skill level required but also help to shift outdated perceptions and stigmas around manufacturing. Workers using robotic machinery are now recognised as skilled robotics operators building on their skillset in Fashion and Textiles, enhancing the appeal and status of contemporary manufacturing roles.

Skills England: Driving growth and widening opportunities report⁴

Key take aways from the Skills England executive summary include that employer investment in training has been in steady decline over the past decade; training expenditure is at its lowest since the introduction of the Employer Skills Survey (ESS) in 2011, with investment per employee down by 19% in real terms.

Skills England intend to engage with the new Industrial Strategy Council, the Department for Business and Trade, The Department for Energy Security and Net Zero and the Office for Clean Energy Jobs where they suggest '*Essential employment skills are foundational capabilities that enable the competent performance of tasks across all areas of work. Employers often refer to these as "transferable skills" and they can include skills such as team working, creative thinking, leadership, as well as digital literacy, numeracy and writing.*'

RoLL is providing critical opportunities for transferable

4. https://assets.publishing.service.gov.uk/media/66ffd4fce84ae1fd8592ee37/Skills_England_Report.pdf

and essential skills for the emerging collaborative robotic CreaTech sector.

- Speculative scenario development or horizon scanning for automation and robotics tools.
- Offering bespoke solutions tailored to specific business needs through a residency programme.
- Visiting manufacturing sites to better understand and address industry requirements.
- Better liaison and feedback between industry and education providers on the requirements to train industry ready students.

The Fashion and Textile Industry's Footprint in the UK⁵

A report conducted by Oxford Economics and commissioned by UKFT underscores the skills gap in the Fashion and Textiles sector stating, 'We find that barriers to exports and skills, and barriers to workforce and skills shortage are the biggest impediment for businesses.'

Amongst the key findings for why businesses were unable to supply skilled workers was the failure of education to teach making skills.

"At the same time, opportunities for innovation are burgeoning. The fashion and textile industry is built on creativity, and is now adding more science to the mix, embracing technology like artificial intelligence (AI), bio textiles, and robotics, as well as

5. <https://ukft.s3.eu-west-1.amazonaws.com/wp-content/uploads/2023/11/16120718/OE-Report-executive-summary.pdf>



finding innovative ways to strive for circularity in the product lifecycle, zero waste, and zero emissions.”

"Lack of access to government funding was the most important reason firms said they did not invest more. R&D and innovations projects are often expensive, long-term, highly specialised, and require large initial outlays on equipment, physical space, or people. R&D projects, due to their innovative nature, often fail."

SUMMARY

- Skills levels in the UK need urgent attention from the Government, universities, and Inward Investors to change the narrative around modern industrial practices and processes.
- Expertise in the Fashion and Textiles Industry must be brought back to the UK supported by investment in up-skilling the workforce.
- Bite-sized education pieces for SMEs with limited time to learn about new automation technologies and their benefits need to be urgently developed.
- The majority of questionnaire respondents and workshop attendees suggested they would need additional education and training in automation and robotics to help them effectively implement these technology solutions into their manufacturing.

5. Supporting Literature – a review

“What are the UK strengths in F&T manufacturing and what can we leverage further?”

Adoption of new technologies in UK F&T is slow, especially for AI and robotics. There are also gaps in legislation which provides uncertainty on where Intellectual Property ownership lies for companies, as some human activities are replaced with Automation and Robotics.

Invest 2035⁶ is the Green Paper published by the new Labour Government to garner industry feedback for its new industrial strategy proposal. A ten-year plan that ‘is supportive of Net Zero, regional growth, and economic security and resilience’.

The report identifies **Greater Manchester** as a center of modern industry and creative industries clusters whilst also recognising multiple shocks to the UK economy.

Since the last Industrial Strategy in 2017 and the Plan for Growth in 2021, global shocks and trends, alongside stagnant UK output and productivity growth and persistent regional and income inequality, have strengthened the case for a more targeted approach.

The North South divide is illustrated by the following statistic drawn from *Ending Stagnation: A New Economic Strategy for Britain* (resolutionfoundation.org) which suggests London is 41% more productive than Manchester.

6. <https://assets.publishing.service.gov.uk/media/6711176c386bf0964853d747/industrial-strategy-green-paper.pdf>

However, the new **Labour Government proposes to support the levelling up agenda.** ⁷ Greater Manchester is recognised as *'one of the places where devolution has existed for the longest and powers are deepest, [it] has been one of the UK's fastest growing areas over the last 20 years and is forecast to grow by more than the national average in coming years.'*

'This has been driven by powers allowing the Greater Manchester Mayor to encourage investment into the city, boost skills, and work towards an integrated transport system.'

Local leaders in the North of England are proposing a **Northern Creative Corridor.** ⁸ A background briefing paper by Creative PEC sets out the potential. The work is supported by the Royal Society for Arts, Manufacture and Commerce (RSA) and the Design Council. There are 30 signatories to a charter to deliver skills, finance, innovation, and communication including the mayors in Liverpool, Greater Manchester, West Yorkshire, South Yorkshire, and the North of Tyne. The claim is that this initiative can fuel better supply chains, stronger Research & Development partnerships and develop labour market networks. The RSA proposes to work with partners across government, civil society, and creative industries to catalyse inclusive growth.

The new Labour Government suggests its **Growth Mission** (and other missions) as addressing low levels of investment, regional

⁷ https://www.gov.uk/government/news/deputy-prime-minister-kick-starts-new-devolution-revolution-to-boost-local-power?utm_source=substack&utm_medium=email

⁸ <https://www.thersa.org/press/releases/2023/11/grand-coalition-formed-to-create-a-northern-creative-corridor>

growth, adoption of technologies and market dynamism. Creative Industries are recognised as a 'growth driving sector'.

The Government is focusing on international partnerships, skills, inward investment, and a trade strategy in parallel. Taking a place based approach to policy and working in partnership with national and regional leaders e.g., Mayoral Combined Authorities and sectoral cluster. The government will develop an Industrial Strategy Council with a Spending Review expected in the Spring of 2025.

The report **Creating Growth: Labour's Plan for the Arts, Culture and Creative Industries** ⁹ outlines how Creative Industries contribute more to the UK economy than the life sciences, aerospace and automotive industries combined, suggesting there is room for sustainable growth which brings good jobs and additional income to Britain.

A Labour Government suggests it will address the gap in availability of growth capital by unlocking institutional capital and leverage existing public and private funds working with the sector, the Creative Industries Council, Arts Councils and other public funders, investors, and donors to create a private finance model to attract more funding.

⁹ https://labour.org.uk/wp-content/uploads/2024/03/Labours-Arts-Culture-Creative-Industries-Sector-Plan.pdf?utm_source=substack&utm_medium=email

¹⁰ <https://manifesto.wearecreative.uk>

Creative UK Report Our Creative Future. The Manifesto ¹⁰

Understanding the Creative Industries financial contribution to the UK, Creative UK calls for the government to facilitate innovation, increasing investment in research and development funding, supporting new products, services, and intellectual property. Real growth comes when companies and organisations can scale through testing and developing new ideas.

The Creative Industries Clusters ¹¹

The Creative Industries Clusters programme, supported with at least £50 million and delivered by the Arts and Humanities Research Council on behalf of UKRI, will continue to fund creative clusters in new sub-sectors and regions over the next six years. Further clusters will be announced, and DCMS will continue to fund London Fashion Week. The Government is interested in backing industries that export. However, there is a longer ROI when investing in SMEs over larger organisations, which can make SMEs less attractive to invest in. Government supports the funding of SMEs, but it requires a lot of engagement from the industry to make the case to Government.

The UK's emerging strengths in new technologies systems and processes are demonstrated in key sectors such as Advanced Manufacturing, Creative Industries, and Digital Technologies. Corresponding with this shift, fashion design and manufacturing can be identified as potential growth areas where designer-led use of agile tooling and collaborative

robotics could be supported.

Workshop participants proposed that local clusters with the backing of constituency representatives were critical in supporting industry; the drive and information needed to come from businesses to excite and engage constituencies. A more adequately funded Arts and Humanities Research Council as part of UK Research and Innovation could further support Creative Industries and CreaTech. Higher Education has a vital role to play in future innovation, where research partnerships between industry and universities should be supported.

SUMMARY

- RoLL could support liaison with Government to provide better clarity on legislation around emerging technologies and engagement with standards, along with working groups to develop standards that are applicable to the Fashion and Textiles industries.
- RoLL/UKFT/CFIN/MTC can support firms in demonstrating the value of the industry to the government. Finding ways of working and engaging with government over longer terms than election periods. Facilitating conversations and information transfer between businesses and government will be hugely important.
- Local clusters development with constituency engagement was seen as a key driver for Fashion and Textiles Industry businesses to thrive.

¹¹. <https://www.gov.uk/government/news/funding-for-uks-growth-driving-creative-industries-confirmed-in-the-budget>

Inward investment / Financial support

UK Fashion and Textiles firms could increase efficiency, reduce production costs, improve production quality and consistency using robotics with the right financial support. UK-based firms are aware that robotic technologies are still in their infancy and therefore very interested to see the technology evolve. Working with diverse, flexible materials e.g., deformable textiles presents the greatest challenge, which will need inward investment.

Support to modernise

The UK Fashion and Textiles sector needs support to modernise. Automating fabric cutting, sewing, bonding and pressing tasks as well as sorting of raw materials, identifying textiles for recycling, and defect detection in textiles can all be carried out by robots as recognised by Fashion and Textiles firms internationally. Robots have the potential to also streamline manufacturing processes such as fabric cutting, sewing/bonding and pressing.

Up-skilling / New narrative

Up-skilling the workforce in the Fashion and Textiles sector, developing a new narrative around modern industry/ modern industrial practices with the support of UK Universities and local, regional, and central government. UK Fashion and Textiles firms could move from prototype to scaled production with the efficient use of collaborative robotics, rather than completely replacing a human workforce, as a celebration of human skills. Up-skilling a workforce becomes fundamental to this process.

Adoption of advanced machinery

Wider adoption and integration of robotic tooling and advanced machinery reflects a future-ready approach within the UK

Fashion and Textiles Industry, with the potential to positioning itself as a leader in adopting novel technologies to drive sustainable growth and competitiveness while meeting the challenges of modern manufacturing.

Scaling production

UK Fashion and Textiles firms could transition from prototype development to scaled production with the efficient use of collaborative robotics. By automating key tasks with precision and consistency, these technologies reduce production time and ensure high-quality, and support reshoring efforts. The flexibility and efficiency provided by collaborative robotics allows manufacturers to respond swiftly to design changes and market needs, helping to scale operations, and support growth in a dynamic and fast-paced industry.

Ease of use

Ease of use is vital for adopting for collaborative robotics as companies are more likely to invest if systems are intuitive and accessible. Developing low-code and no-code solutions is key to simplify robot set-up and make robotics accessible for non-technical staff. R&D investment is needed to enhance usability and intuitive integration of workflows. Key UK organisations and academic institutions such as MTC/ CFIN/ UKFT and RoLL can offer education and interactive opportunities, bringing together sector experts to showcase new technologies in a workshop or conference format.

Industry / Academia

Engaging with industry to identify skills gaps, working in tandem with universities to develop new BA, BSc, MSc and MA

courses in sustainability and circular economic models, to include collaborative robotics and speculation on agile tool use is highly desirable. Bringing together sector experts to showcase new technologies in a workshop or conference scenario could be developed by the MTC/ CFIN/ UKFT and RoLL as a continuous knowledge exchange programme (short term), or designer in residence programmes (longer term).

Growth through CreaTech

Recognising that the UK has emerging strengths in a combination of new AI technologies, advanced manufacturing and robotics and creative industries as a driver for Fashion and Textiles sector growth as CreaTech - for example solving the deformable textiles problem with AI. Working with diverse, flexible materials e.g., deformable textiles presents the greatest challenge, which will need inward investment.

Policy inclusion

Inclusion of the Fashion and Textiles Sector in new Industrial Strategy produced by the new Labour Government. Recognising its potential for innovation, sustainability, and skilled job creation, tailored policies can support advanced manufacturing, investment in technologies, and training initiatives, ensuring long-term growth and global competitiveness.

Scaled-up innovation / Circular economic models

Addressing the needs of manufacturing to include sportswear and aerospace, and emerging sectors like space travel might be where the UK Fashion and Textiles industry and a wider manufacturing ecosystem could become a scaled-up innovative business sector that could develop circular economic models for sustainable growth.



Database of reports

<https://www.ukri.org/news/ukri-funds-research-for-a-sustainable-fashion-and-textiles-industry/>

<https://www.makeuk.org/insights/reports/investment-monitor-2024-using-data-drive>

https://assets.publishing.service.gov.uk/media/66ffd4fce84ae1fd8592ee37/Skills_England_Report.pdf

<https://assets.publishing.service.gov.uk/media/6711176c386bf0964853d747/industrial-strategy-green-paper.pdf>

https://www.gov.uk/government/news/deputy-prime-minister-kickstarts-new-devolution-revolution-to-boost-local-power?utm_source=substack&utm_medium=email

https://labour.org.uk/wp-content/uploads/2024/03/Labours-Arts-Culture-Creative-Industries-Sector-Plan.pdf?utm_source=substack&utm_medium=email

<https://instituteofpositivefashion.com/uploads/files/1/CFIN-Interim-Report-2024.pdf>

<https://ukft.s3.eu-west-1.amazonaws.com/wp-content/uploads/2023/11/16120718/OE-Report-executive-summary.pdf>

See also:

2024. Postlethwaite, S. Fashion Thinking: Design for Educational Change in Design Education in the Anthropocene. Routledge/Taylor & Francis. Editor Paul Rodgers.

2024. Thiel, K., Postlethwaite, S. Navigating Skills Shortages: Bridging Human Factors and Fashion Practice Research for Collaborative Innovation in UK Fashion Manufacturing. Taylor and Francis. Human Factors in Design, Engineering, and Computing Series.

2022. Reshoring UK Garment manufacturing with Automation. Advice for Government. Jointly published policy document funded by RKEI Strategic Priorities Fund / Research England. Co funding in kind from KTN/ Manufacturing Made Smarter. <https://ktn-uk.org/news/big-designs-for-reshoring-uk-fashion/>

2022. UK Textiles Manufacturing: Opportunities and Challenges for the UK and Midlands. Published by the Industrial Policy Research Centre, Loughborough University, The Manufacturing Technology Centre, and The High Value Manufacturing Catapult.

2020. Postlethwaite, S. Investigating Creative Processes and Pedagogy in the UK: Fashion Thinking. Fashion Practice Journal. London: Taylor and Francis.

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| A&R | Automation and Robotics |
| F&T | Fashion and Textiles |
| NDAs | Non-Disclosure Agreements |
| PD | Product Development |
| R&D | Research and Development |
| ROI | Return on Investment |
| RoLL | The Robotics Living Lab. Manchester Fashion Institute |
| CFIN | Circular Fashion Innovation Network |
| UKFT | UK Fashion and Textiles Association |
| MTC | Manufacturing Technology Centre |
| SME | Small and Medium Size Enterprises |
| Medium sized | Turnover less than €50 million, or balance sheet total less than €43 million. Fewer than 250 employees |
| Small | Turnover less than €10 million, or balance sheet total less than €10 million. Fewer than 50 employees |
| Micro | Turnover less than €2 million, or balance sheet total less than €2 million. Fewer than 10 employees |

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| Automation: | The use of technology to perform tasks/ processes efficiently, in fashion and textile manufacturing, this could mean reshoring production to the UK, shortening supply chains and manufacturing to a very high standard. |
| Collaborative Robots (cobots) | Collaborative robotics are programmed to work with humans to solve tasks together. |
| CreaTech | Creative Technology is where creativity meets technology. It brings together creative skills and emerging technologies to create new ways of engaging audiences. |
| Drones | Unmanned aerial vehicles (size ranging from insect-like machines to large aircraft) that can be remotely controlled and used for diverse tasks like surveillance and mapping. |
| Robotics | A branch of technology that involves the design, construction and operation of robots for carrying out a series of tasks autonomously or semi-autonomously, often mimicking human or animal behaviours. |
| Swarm robotics | Multiple robots that behave as a swarm. These can vary in size, enabling them to operate in different environments, from micro-robots for medical use to larger robots for agriculture or search and rescue. |

Phase 1 – Workshop with UK Fashion Industry stakeholders

On May 15, 2024, a workshop was held at the Manufacturing Technology Centre (MTC) in parallel with their annual Automation and Robotics Sustainability Conference and robotics showcase. This workshop focused on exploring engagement with automation and robotics in the UK, with the further aim of evaluating ways to enhance existing UK Apparel and Textile Manufacturing capacity.

Fashion and Textile businesses were introduced to robotic integrator firms and automated systems/demonstrators, to engage them in proposing how they might use robotic processes, collaborative robots (cobots) and agile tooling within their businesses.

Participants rotated through 4 thematic stations:

- engaging with small-scale tooling that could support innovation and invention through speculating on possibilities of collaborative robotics, small-scale drone technologies, and swarm robotics.
- engaging with policy and exploring how government might be encouraged to include Fashion and Textiles design and manufacturing in a new Industrial Strategy, focused on Creative Industries/CreaTech.
- a demonstration of the Robotics Living Lab's cutting tool end effector, funded by the Cotton Textiles Research Trust, developed by POMO Robotics and demonstrated by Inovo Robotics.
- speculation on the potentials of soft robotics for material handling.

Phase 2 – Survey on automation and robotics in the UK Apparel and Textile Industry

The survey formed an integral part of this research to evaluate the validity and importance of the key findings identified during the workshop phase. The key areas covered included the ability to recruit skilled workers, use of and plans to use automation and robotics in manufacturing facilities, supply-base, or end-of-life facilities. It explored knowledge about automation and training needs for new technology. Further sections investigated the use of drones, swarm robotics, and AI technologies as part of cobots' function with potential to implement these within the UK fashion and textile industry.

Open to all UK fashion firms, the survey was distributed via the UKFT newsletter (sent three times to 6,500 members), UKFT social media (reaching over 25,000 followers), and targeted emails. Most respondents came from medium and large businesses, with one-third from small and micro-sized businesses.

Phase 3 – Interviews with UK Fashion Industry stakeholders

Interviews were conducted with representatives from across the UK apparel and textile supply chain – manufacturers, designers, and service firms – aiming to gather qualitative data elaborating on the previous findings from the workshop. Interviewees could choose to remain anonymous or have their name and company included in the report.

Key themes were identified through data coding and included: education about robotics, current industry challenges like skills

gaps and compliance with European supply chain legislation, the potential for automation and robotics to support low-carbon manufacturing and required government support for these advancements. Engagement opportunities with the Robotics Living Lab (RoLL) and future collaborative educational needs were also explored. The findings provide insights on key developments within the UK fashion and textile manufacturing industry.

Links

https://www.instagram.com/robotics_living_lab/

<https://www.linkedin.com/company/robotics-living-lab>

