

Digital modernisation of Textiles and Fashion

Thursday 9 February 2023



InnovateUK
KTN

Welcome

Agenda

10.00 - Introduction at Henry Royce Institute

10.10 - Susan Postlethwaite, Manchester Metropolitan University: Setting up the Robotics Living Lab at Manchester Fashion Institute.

10:25 - Jenny Holloway, Fashion Enter: New sustainable manufacturing technologies in fashion today

10:40 - Madina Barker: CNC Robotics: Making Automation Fashionable

11.00 - Round table discussion: Challenges

11.45 - Coffee and networking - Give/get cards

12.15 - Round table discussion: Technologies/Solutions

13.00 - Lunch

13.45 - Tour of Henry Royce Centre (pre-booked) and Networking

14.30 - Concluding remarks (including Made Smarter CR&D Robotics Funding).

15.00 - Close at Henry Royce Centre

Evening reception at Manchester Fashion Institute

15:30 Tour (pre-booked)

16.00 Drinks and Networking

17.00 Close

Innovation Diffusion and Digitisation of UK Textile and Fashion Industry

“The story so far”

- Robots could reduce labour costs
- AI and online design mean a whole new approach to sizing
- 3D Modelling and Scanning
- 3D manufacture
- Shortening supply chains- agility and reduced waste/reduced costs
- Consumer behaviour versus industry pull
- Offshoring of fashion means current reduced skills and knowledge
- AI in Design
- Textiles (online) library
- Textiles, AI and creative design
- Digital data development
- New technologies and new materials
- Overseas automation
- Relevant adoption in other sectors - learning
- Design at the heart of change

Reshoring UK Garment Manufacturing With Automation

Challenges, Threats and Risks

- Integrated design, manufacture and digital technology
- Traditional manufacturing isn't suitable for digital design process
- Link academia and industry for new makers, designers and thinkers
- Testing new technologies in a commercial environment

Barriers to adoption

- Need to glamourize manufacturing

Solutions

- Networking and collaborations
- Government sponsored training
- Incentivize small business to engage

Royal College of Art
& Innovate UK KTN / Made Smarter

Reshoring UK Garment Manufacturing with Automation

Recommendations for Government

Susan Postlethwaite
Professor of Fashion Technologies,
Manchester Metropolitan University

Kat Thiel
Research Associate,
Royal College of Art

Douglas Atkinson
London College of Fashion
& UCL Knowledge Lab

Reshoring UK Garment Manufacturing With Automation

Recommendations

- Forum for stakeholders
- Open access labs
- Road mapping
- Lobbying
- Funding for innovation and supply chain development
- New methods of teaching designers
- Government support to trade shows and networks
- Dedicated funding for universities



Fashion Robotics Research at MFI

**Led by Prof Susan Postlethwaite &
Senior Research Fellow Kat Thiel**



Research -

Building robot capacity at MMU



Elephant Robotics, MyCobot 6 Axis articulated robot
Microtooling workstation
- testing of small scale robotics for fashion manufacturing



Dobot Magician
multitool desktop robot

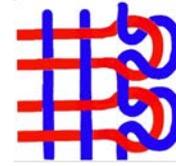
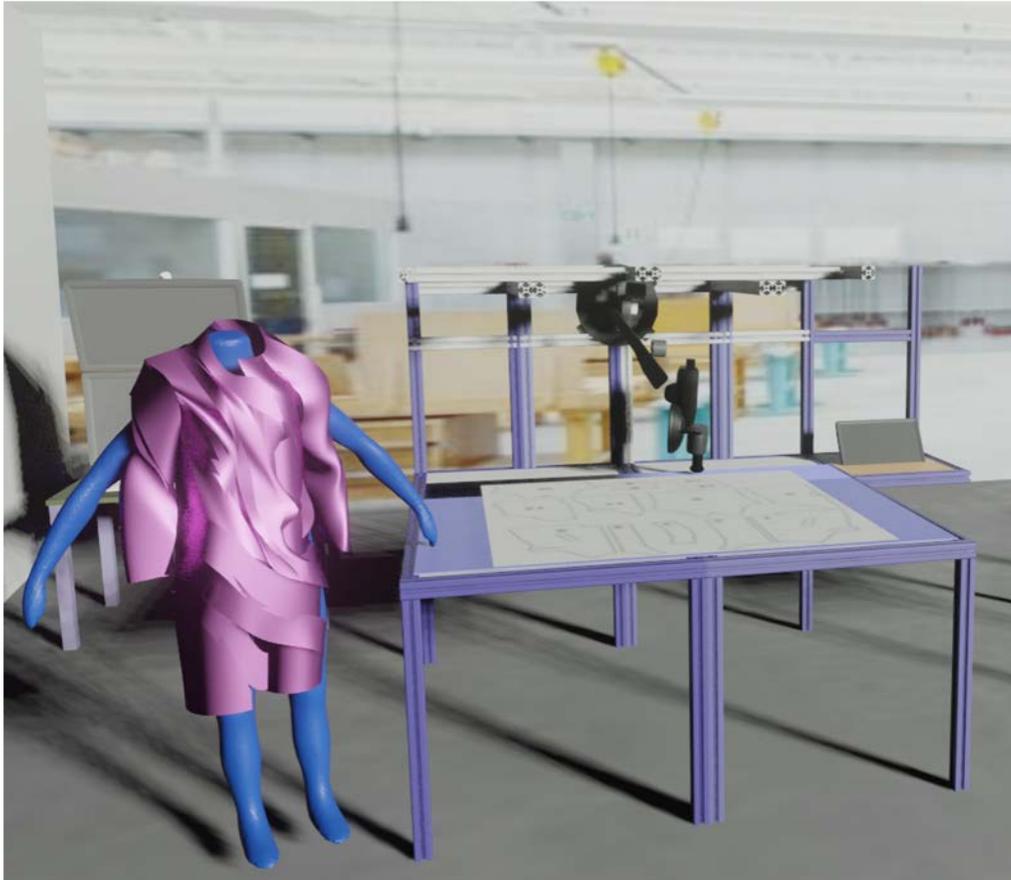


Research -

A HUMAN CENTRIC RESEARCH OF SKILLS AND DECISION MAKING CAPACITY



Research - Cobot end effector cutting tool



**COTTON
TEXTILES
RESEARCH TRUST**



**MANCHESTER
FASHION
INSTITUTE**



Vision

Micro scale, digitised fashion industry in which fashion researchers/designers/manufacturers collaborate with robotic technologies and digitally controlled fabrication for high value, low volume production.

- Modernisation of the UK fashion industry
- Become world leading in fabrication with robotic/cobot technologies
- Re-shore SME production & retain IP rights, boost UK economy
- Support carbon neutral manufacturing to aid meeting the net zero manufacturing target set for 2038 by Greater Manchester Combined Authority
- Circular economic business models realised - based in multiple business cases and linked micro factory scenarios

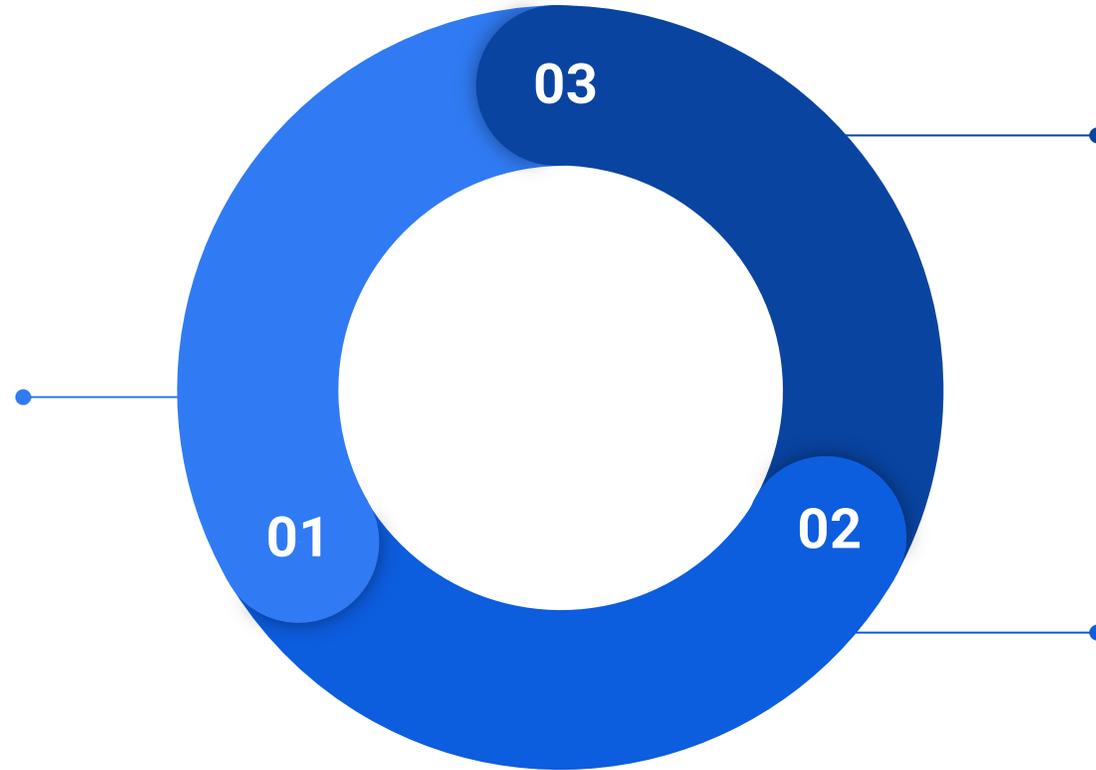
Opportunity

The current worldwide geopolitical situation provides a unique opportunity to reconfigure the UK fashion design and manufacturing industry for more **sustainable, digitally enhanced, flexible, collaborative, and resilient business models**, including reactive manufacture and demand driven making where the cost of robotics and automated systems is becoming cheaper.

- Access to automation solved, allowing UK SMEs to be competitive to attract new investment + UK industries stimulated
- Significantly improved robotic adoption in UK + facilitates job creation and re-skilling
- Innovation in garment assembly and design for disassembly
- Development of world-class Fashion Technologies research capability for processing of non-stable materials
- Build visibility and resilience for technology-enhanced, practice-led fashion design and manufacture
- Development of environmentally sustainable, flexible manufacturing tools as an alternative to costly mono-

Researcher in Residence Programme

AGILE TOOLING
DEVELOPMENT



HUMAN FACTORS
RESEARCH

CO-DESIGN with SMEs

February 2023

Fashion-Enter LTD

Digital Modernisation of Textiles and Fashion

Innovate UK



Fashion-Enter, an award winning social enterprise, has two aims; to provide outstanding British made quality production and to be a centre of excellence for training and development.





Fashion-Enter Limited

Fashion-Enter Ltd (FEL) is an award-winning social enterprise which is a centre of ethical garment manufacturing with a leading status in the Fast Forward audit and is also SMETA audited. FEL has a minimum order quantity of 1 for their Fashion Studio service and currently produces up to 30,000 garments a week for speed of response fashion from their three units in Haringey, North London and Wales.

Clients include ASOS, N Brown and Simply B, I Saw it First, Brora, Jaeger (M&S) and brands such as Louisa Parris and Gormely and Gamble.

FEL Has Two Missions;

FEL has two mission statements

+ To be a centre of excellence for design, patterns, grading, production. FEL's services can offer a client a one off sample to 30,000 garments a week.

+ To be a centre of excellence for education and learning from their sites in London, Islington, Leicester and Wales. Qualification attainment from level 1 - 5 plus apprenticeships.





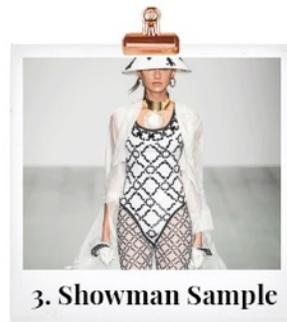
1. The Idea & Design



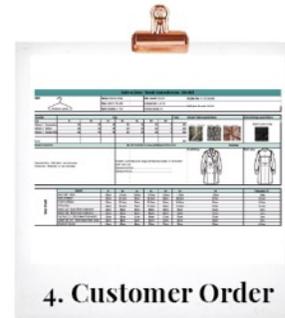
10. Feedback & Review



2. Sample & Fitting



3. Showman Sample



4. Customer Order



5. Grading & Scaling



6. Fabric Printing



9. Delivery



8. Fulfillment



7. Production

THIS IS WHAT WE DO!

The UK Fashion & Accessory market is today with £54.78 bn (Source: Statista) and set to grow by £10.8bn by 2026. The cost of a £30 purchase in the UK is an average cost of £20 return for the brand/retailer (Source: NRF, Roland Berger). 27% of the cost of a return is landfill. An estimated £140m clothing is sent to landfill in the UK every year (Source :WRAP)



80% of Charity Shop Donations go to Landfill

Across the UK, a Million tonnes of clothing is ditched each year. Some goes straight to landfill or we donate our used clothing to charity. Many thousands of us in the belief that it will be given to those in need or sold in the high-street charity shops to raise funds.

However, Oxfam quote that a **stunning 80%** of clothing donated to charity shops will end up in **landfill**.

- **This is due to poor quality and fit.**
- **Can be purchased new so cheaply that there is no retail value in these garments 2nd hand.**



..Or Shipped Abroad



Most of what is left is getting shipped abroad, as part of a £2.8bn second-hand garment trade that spans the globe.

Top destinations were Poland, Ghana, Nigeria, Pakistan and Ukraine.

This practice should be questioned as the second hand market made up mostly of cast offs from rich 1st world countries **can devastate the local clothing industry.**

Ghana is an example of a country where local industries have been particularly negatively affected – it's textile and clothing employment fell by 80% and in Nigeria 200,000-person textile workforce has also all but disappeared

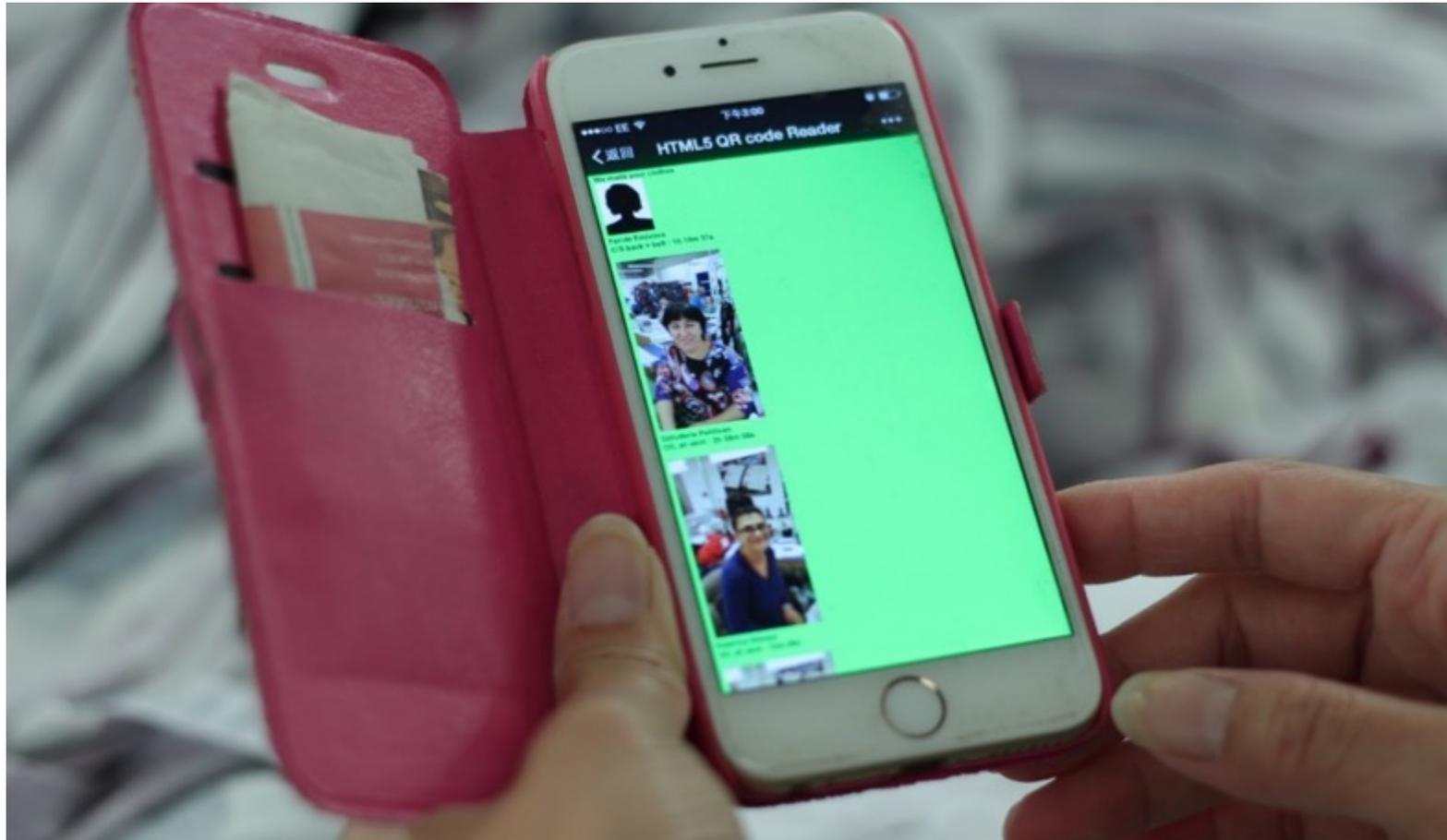
Clothing Waste

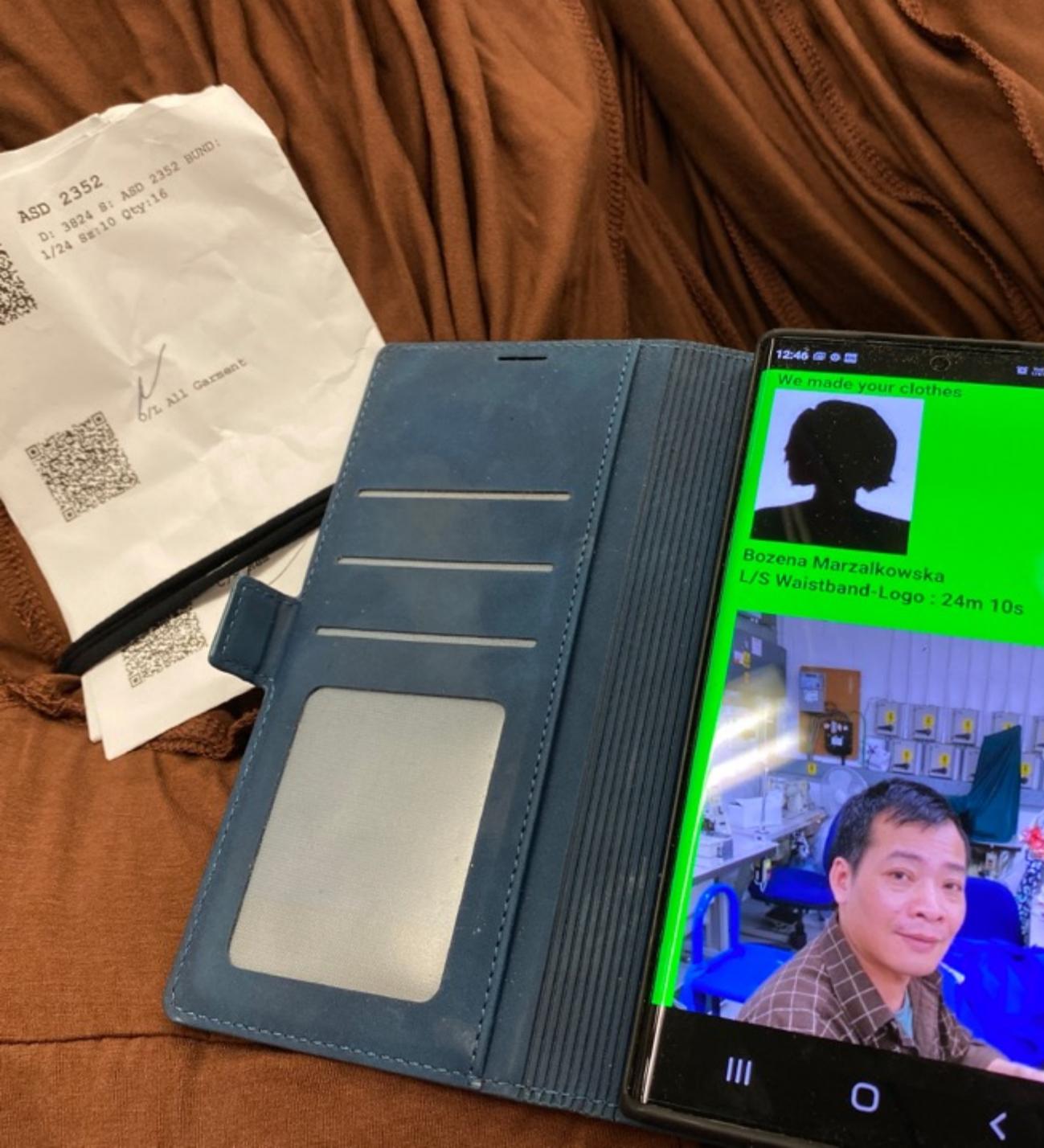
More than \$500 billion of value is lost every year due to clothing underutilisation & lack of recycling.

(Ellen MacArthur Foundation)



Transparency – Galaxius





Verification & Authenticity

Adding a secondary Identification at the end of the manufacturing process such as a SofMat 3D Matrix provides 2 factor Authentication removing the opportunity for fakes to enter the market when dealing with High Value goods.

Any access for data will require the 2 forms of ID to be verified as linked with failure denoting a suspect or fake item.

Potter Group & SMARTCymru

In February 2022 Fashion-Enter Ltd forged a relationship with Potter Group, the largest private waste management company in Wales to develop a Feasibility Study into the creation of a closed loop textile recycling system that will produce novel fibres for use in the production of new types of wool-blend yarns for manufacturing woven cloths for fashion apparel.

After 18-months in planning and development SMARTCymru gave the green light to further research and create this novel yarn with the Welsh Government.



Setting the scene for the
future of waste
management

Providing a sustainable and efficient service to the people of Wales and beyond

PotterGroup

FEL Wales Novel Yarn Project

Wool is sustainable in every way, from the environmental impact to the welfare of the sheep. Wool is robust, hard wearing and will last, lending itself perfectly to the ethos of buying less.

Despite this, farmers actually receive less for their wool than the cost of shearing forcing farmers across the country to plough their wool into the fields as fertilizer. Clearly we are not making the most of this natural, renewable and biodegradable resource.





A Sustainable Novel Yarn

- Fashion-Enter met with Dr Muhammad Tausif, Deputy Head of School: Academic and Enterprise, Professor in Sustainable Textile Manufacturing at his lab at Leeds University, and on 17 June 2022 the combination of SNR (Synthetic Nylon Rummage, from discarded clothing) and PET (polyethylene terephthalate, from clear plastic bottles) was successfully combined with good fibre strength.
- This green yarn has now been combined with virgin Welsh wool to create Fashion-Enter's novel yarn, which is over 50% virgin Welsh wool.
- We are now thrilled to present an excellent novel yarn with a sustainable USP to support the garment industry. This in turn will create employment advantages for Mid-Wales as well as supporting Welsh wool farmers and distributors.



**A NEW WAY
FORWARD FOR
FASHION TODAY**

New Technologies and Micro Factory capabilities

FEL works strongly with partners to constantly offer state of the art technologies to provide speed of response fashion that is ethical and sustainable.

Optitex - 3D avatars to allow virtual fitting to eliminate waste of samples and improve accuracy of fit.

Kornit - Digital printing technologies using Presto and Atlas for ethical and sustainable printing.

Zund cutting - micro cutting capabilities for lean manufacturing and minimising waste.

Galaxius - unique software technology that provides total transparency of the workforce; FEL knows who made what stitch on what garment, when and how much they were paid.



Kornit Digital Technology



Kornit Digital is a market leader in industrial textile printing with over one thousand Kornit printing systems worldwide. In the UK; Kornit customers print on approximately 12 million garments per year of which 97% of these are printed on demand only after the garment is sold. The digital textile printing industry globally is less than 5% of total printed and with the pressure on climate change this is a new way forward.

Micro Factory Concept

Fashion-Enter is committed to providing a vertical manufacturing experience so that we can offer every step of the process in house in order to reduce time, cost, MOQ, sustainability and environmental impact.

Using our collaborative partnership with Kornit Digital will allow us to print DTF (Direct to fabric) and DTG (Direct to garment) along with availability to DTM (Dye to match) using pre-approved fabric qualities which can be held as stock eliminating pre bulk testing which will reduce lead times by 2-5 days.

Printing and dying lead times will be 2-3 days and production 2 weeks (depending on style and quantity) which will give us a 2.5-week lead time.

In order to for-fill this lead time we would need to have pre-approved blocks to reduce development time to ensure we provide the perfect fit around the styling.

We are currently trialing this with two retailers.



Amazon Drop - One piece flow in action

DRESSES - Easy to wear silhouettes in sizes which are comfortable with classic shapes.



EASY TO WEAR SHAPES WITH STATEMENT PRINTS

POINT 2.1

POINT OVERVIEW

3% Elastane

POINT



Kornit Atlas MAX

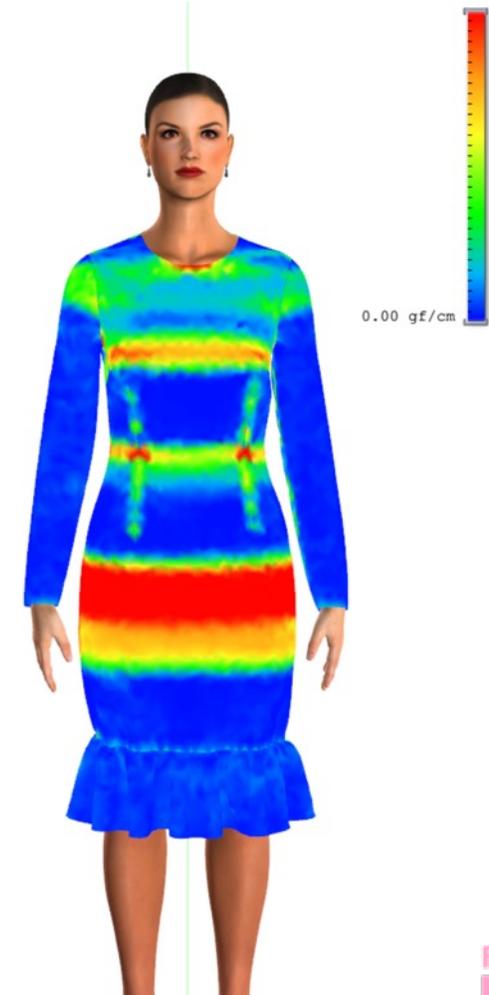
The Ultimate Mass Customization Solution, with
Unparalleled Total Cost of Ownership

The new quality standard for high-volume, on-
demand DTG production.

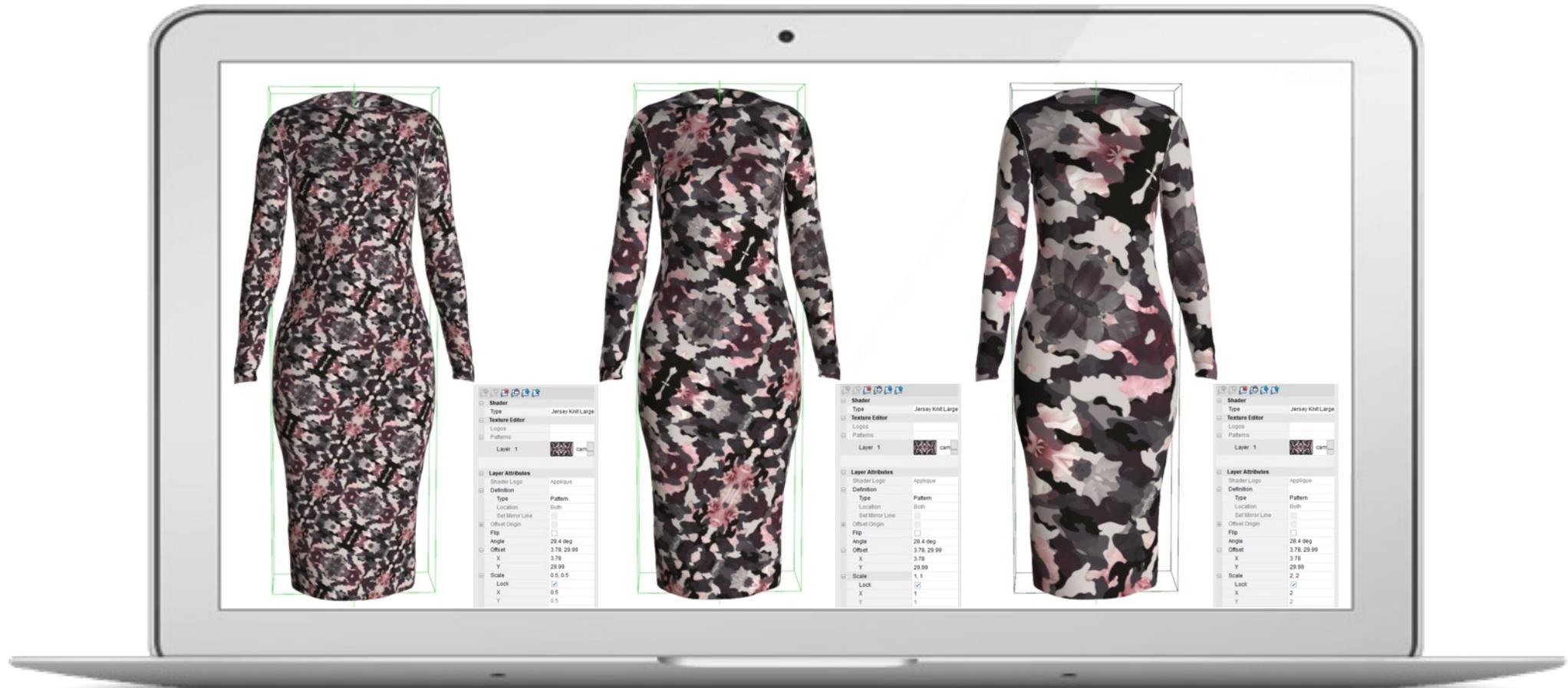


Optitex

- Improved Communication: We have seen improved communication with designers, pattern cutters and garment techs internally.
- Sustainable Workflow: benefits of a digital workflow and close the loop on sustainability by creating and approving entire collections without cutting a single piece of fabric.
- Increased Productivity: We have saved time, money, manual labour, and use of materials by creating true to life virtual samples at the push of a button.
- Faster Delivery: We have accelerated garment creation process and get faster to market by receiving early feedback, making instant style decisions, and automating processes.
- 95% Accuracy: Teams can leverage the use of digital technology to create true to life 3D virtual samples that can instantly be adjusted and fine-tuned according to your needs and desires.
- A reduced carbon footprint
- New skills opportunity for design and pattern cutting staff
- Innovative disruption to wasteful process of physical samples
- Accuracy for measurements
- Affordability of digital sampling compared to the costs for physical samples, transport, sampling, components, machine costs
- Sustainable supply chain: It is not only about speeding up product to market cycle, but opening up an opportunity to make apparel product development and manufacturing fully digitized, therefore more sustainable.
- Less room for error if designs are created digitally made - easier to incorporate amendments
- Keeping it all in-house as a vertical process



Optitex



Type of Audits

Ethical auditing
Quality auditing
Security auditing

Extended Producer Responsibility

With the rise of clothing consumption, a reduction in demand for the export of used textiles, and the resulting growth in UK textiles ending up in landfill, textiles is now a strong candidate for the application of an EPR or 'polluter pays' policy

This can incentivise waste prevention at the source and promote lower impact product design, and supporting wider public re-use and recycling.

EPR has the potential to influence design, encouraging products to be reusable, repairable, and durable plus recyclable



Fast Forward Audit

Fast Forward Complier Audit Tool - Follow up Comments

Produced on 14/06/2016 page 1 of 5

Date	10/12/2015	Auditor	Jill Banga
Company	ASOS		
E-Mail	jenny@fashion-enter.com	Phone No	0208 809 3311
Factory Name	The Factory	Address	Unit 14 Crusader Industrial Estate Hermitage Road London N4 1LZ
Factory Representative	Jenny Holloway		
Factory Rep Job Title	CEO		
Stranding	Leading		

Registered Details:

User name Jill Banga
Company TRN
E-Mail jill@re-assurance.co.uk

No	Description of Standard	Compliance Score	Compliance Rating	Corrective Actions	Follow up Notes
Right to Work					
Clause 1.1	Can the factory demonstrate that the statutory excuse has been appropriately established to show all workers are eligible to work in the UK?				
CCP 1.1.2	Do on-site factory personnel records show that the statutory excuse is established for all workers, prior to commencement of work, with a dated and signed copy kept of allowable original ID?	8	Standard Compliance	Statutory excuse is not always established prior to employee commencing work. Management to ensure statutory excuse is established for new starters prior to them commencing employment.	29.02.16 The company has submitted evidence showing ID for new workers is signed and dated / checked prior to commencement of employment. By: Nigel 14/06/2016
NMW					
Clause 2.1	Do factory records demonstrate that at least the minimum wage is paid to all workers in every pay reference period				
CCP 2.1.4	For workers who are told what hours to work but are paid according to piece-rate - Do contracts, timesheets, payroll records and payslips show that they earn at least NMW for the hours that they work?	16	Standard Compliance		
Employment					
Clause 3.1	Are workers provided with statutory employment				

What makes a factory compliant?

Sedex Members Ethical Trade Audit (SMETA) Report

(Version 4.0 May 2012, 2/4 Pillar Audit; replaces version 2.4. Sept 2010)

Supplier name:	Fashion Enter Ltd	
Site country:	UK	
Site name:	Fashion Enter Ltd	
SMETA Audit Type:	<input checked="" type="checkbox"/> 2-Pillar	<input type="checkbox"/> 4-Pillar

Audit Content:

(1) A SMETA audit was conducted which included some or all of Labour Standards, Health and Safety Business Practices and Environment. The SMETA Best Practice Methodology v.4.0 May 2012 was applied. Any deviations from the SMETA methodology are stated (with reasons for deviation) in the SMETA Declaration.

(2) The audit scope was against the following reference documents:
Please check appropriate SMETA Audit Type in the above box:

2-Pillar SMETA Audit:

- ETI Base Code
- SMETA Additions
 - o Management systems and code implementation,
 - o Entitlement to Work & Immigration,
 - o Sub-Contracting and Home working

4-Pillar SMETA Audit:

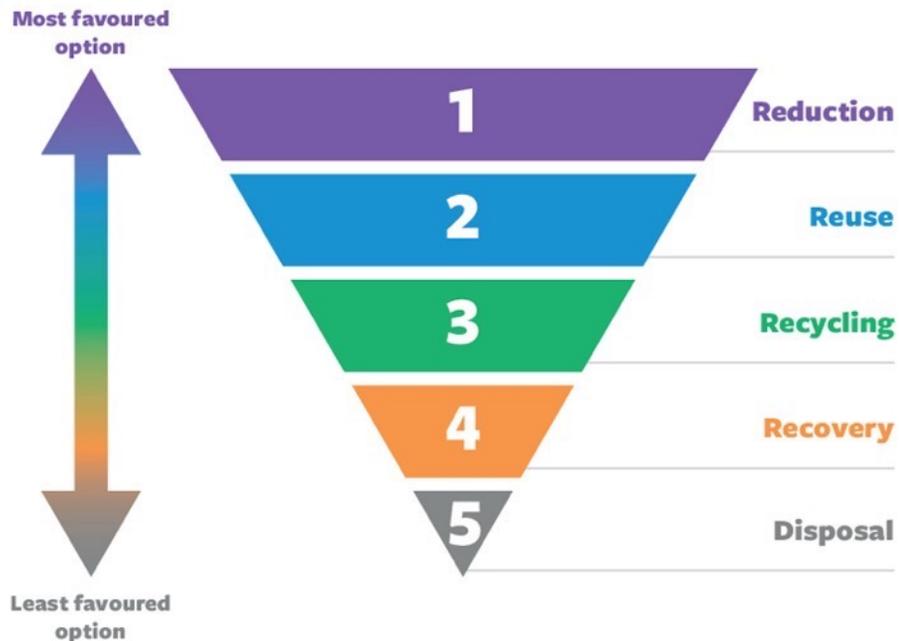
- o 2-Pillar requirements plus
- o Additional Pillar assessment of Environment
- o Additional Pillar assessment of Business Practices

Where appropriate non-compliances were raised against the ETI code / SMETA Additions & local law and recorded as non-compliances on both the audit report, CAPR and on Sedex.



EPR - How?

THE WASTE HIERARCHY



For EPR systems going forward, products have to be scored against a set of criteria as part of a system called [eco-modulation](#). Under eco-modulation, the fees paid by the producer vary according to specific criteria relating to aspects of their products' environmental performance. The more 'environmentally-friendly' products are charged at a lower rate than those that are less 'environmentally friendly' to incentivise eco-design. We will need to incorporate recycled content, improving durability, making products more repairable, and integrating reuse into business models. Another key area is in relation to so-called 'product passports'- providing detailed information on materials for users and recyclers; particularly important given the known inaccuracy of garment labels today."

We will need to use more durable and lower carbon materials, including organic and recycled materials, and making clothing genuinely recyclable. Single materials are so much easier to deal with than mixed materials such as poly-cottons and cotton-elastane mixes, it may be that the very worst materials, from an environmental performance point of view, will actually be excluded in the future through minimum eco-design requirements for market entry.

Contact us!

Fashion-Enter Ltd | FashionCapital | FCFTA (HO)

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FCFTA (Leicester)

A: Top Floor, Black and Yellow Building, 30 Stonebridge Street, Leicester, LE5 3PA

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E: Fcftaleicester@fashion-enter.com

Fb: [@FashionTechnologyAcademy](https://www.facebook.com/FashionTechnologyAcademy) | In: [@fashiontechnologyacademy](https://www.instagram.com/fashiontechnologyacademy) | Tk: [@fashiontechnologyacademy](https://www.tiktok.com/@fashiontechnologyacademy)

FC Designer Collective

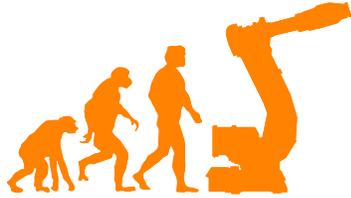
A: 113-115, Fonthill Road, London, N4 3HH

T: 0203 026 0388

E: FCdesignercollective@fashion-enter.com

In: [@fcdesignerworkspace](https://www.instagram.com/fcdesignerworkspace)





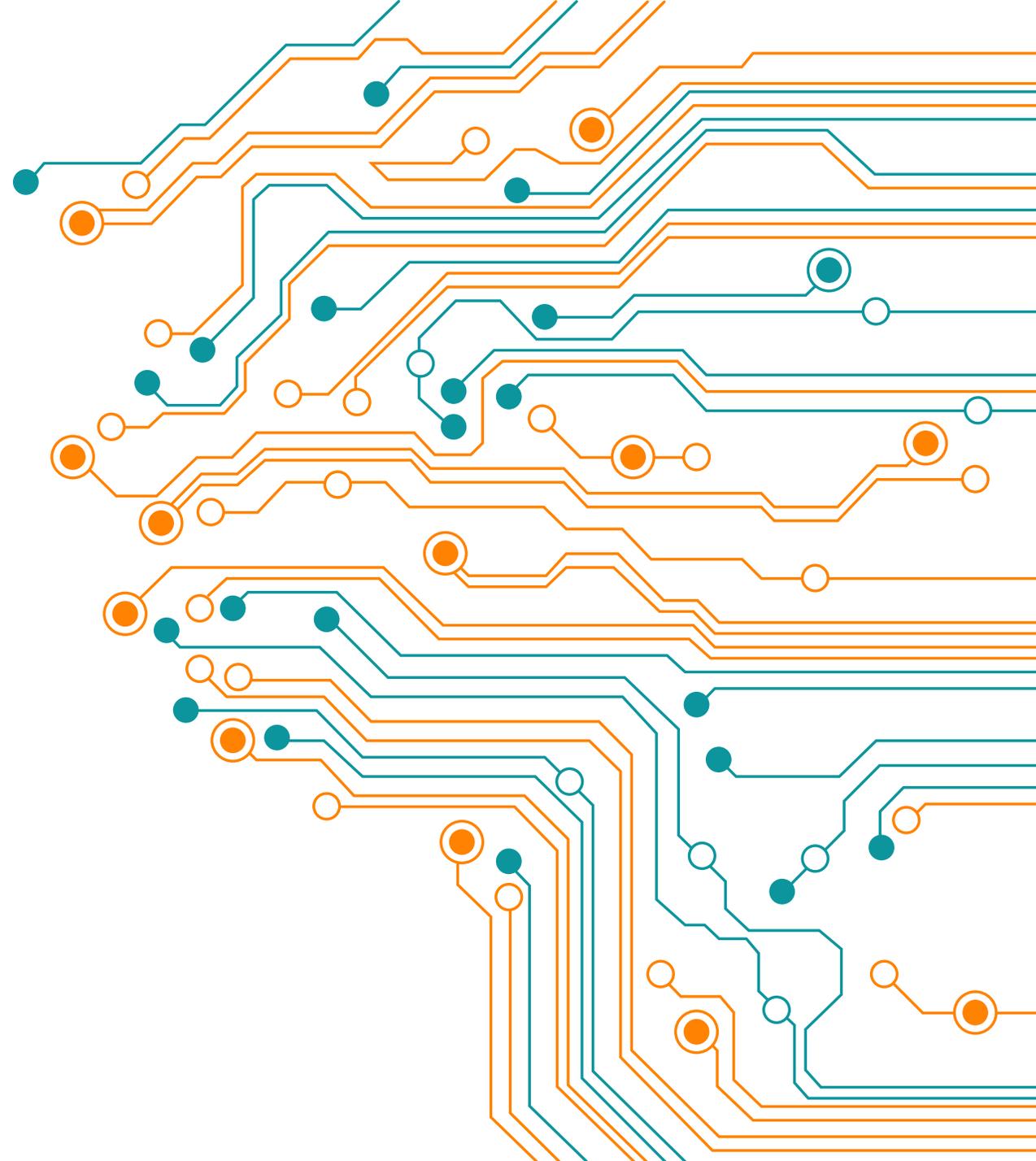
CNC ROBOTICS LTD
MANUFACTURING EVOLUTION



MAKING ROBOTS FASHIONABLE

Madina Barker

cncrobotics.co.uk





CNC ROBOTICS LTD
MANUFACTURING EVOLUTION

Introduction

- Established in 2010, by Founder Jason Barker
- Project Based organisation specialising in advanced robotic machining and additive manufacturing processes
- Active members of MAKE UK, Composites UK, BARA, PPMA & the wider network.





CNC ROBOTICS LTD
MANUFACTURING EVOLUTION



Our Services



Turnkey Robotic Machining and large format additive manufacturing solutions



R & D Services, Design and Bespoke robotic solutions



Technical Consultancy



Training and Support





CNC ROBOTICS LTD
MANUFACTURING EVOLUTION



Robotics in Fashion and Textile Industry

- Automated Fabric Inspection
- Automated Fabric Spreading
- Automated Fabric Cutting
- Laser Cutting
- CAD & CAM
- Pattern Making
- Material Handling





CNC ROBOTICS LTD
MANUFACTURING EVOLUTION

Case Study

- **Manufacturer looking to fully automate production of tights.**
- **Existing process was labour intensive**
- **Wanted to reduce the amount of energy and water that was used**
- **Residual waste from chemical dyestuffs**



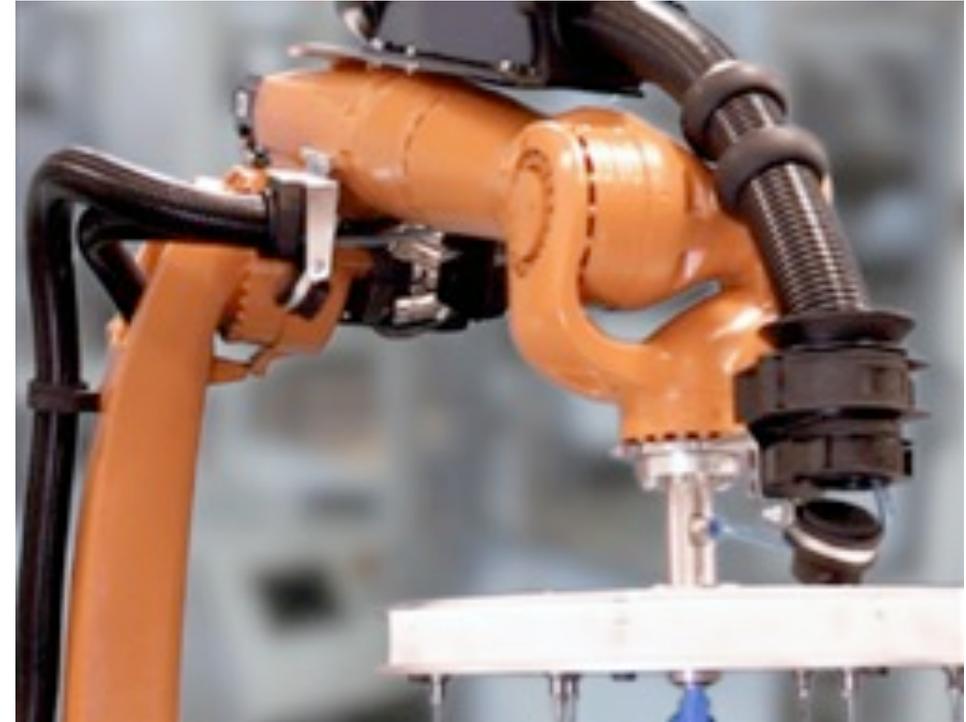


CNC ROBOTICS LTD
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Research and Development

- Stage 1 – Woven Hosiery Handling
- Stage 2 – Hosiery Waistband Handling

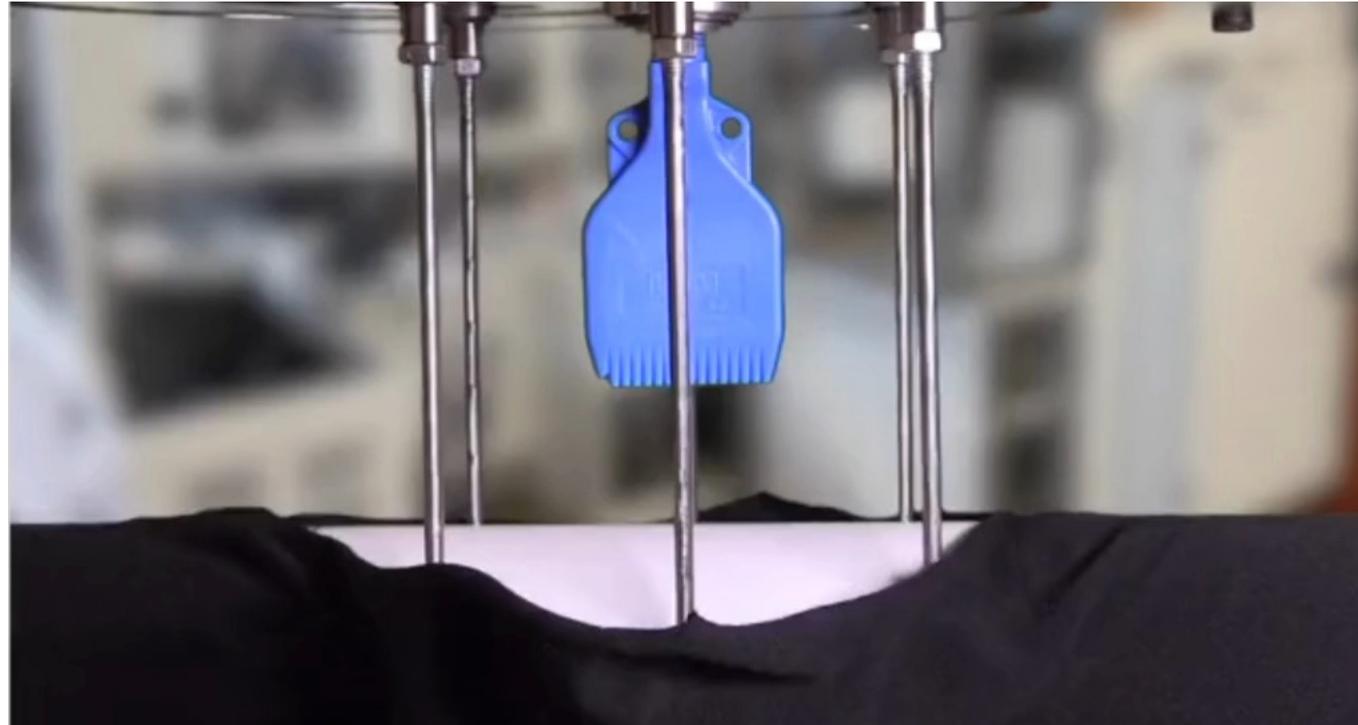




CNC ROBOTICS LTD
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Technical Challenges and Final Process



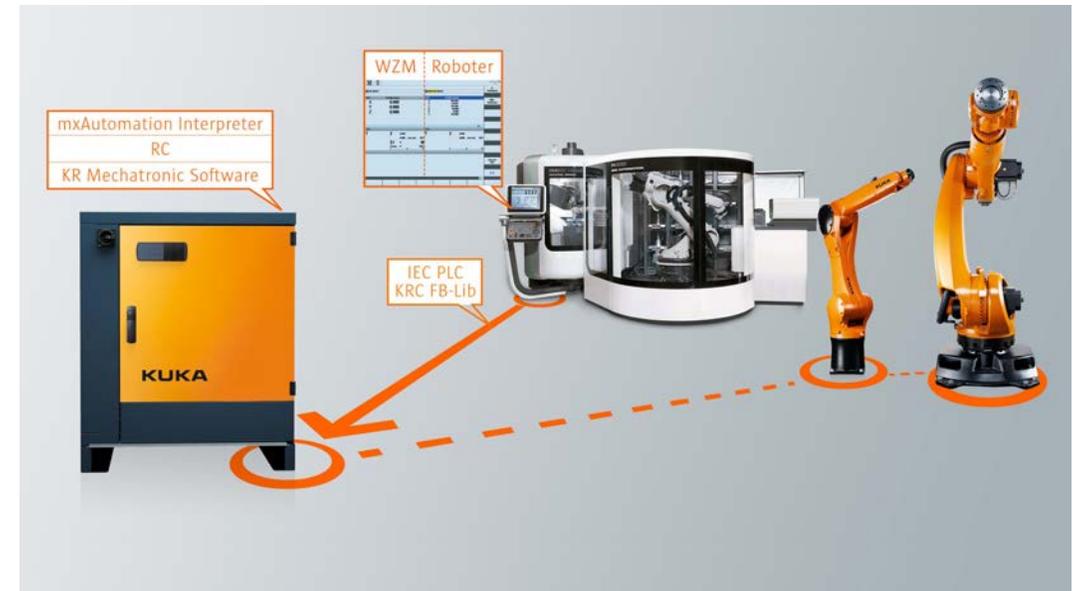


CNC ROBOTICS LTD
MANUFACTURING EVOLUTION

The role of the integrator



- Develop concepts and plans
- Perform feasibility studies on your project
- Identify the right robot type and tooling for your application needs
- Provide helpful cost saving tips
- Provide training on the systems
- Fully commission the system into your factory or manufacturing facility





CNC ROBOTICS LTD
MANUFACTURING EVOLUTION



Key Take-Aways for Fashion and Textile Manufacturers

- Identify potential for automation
- Analyse and optimise your process
- Define the process
- Start small – choose your quick wins
- Find the right integration partner





CNC ROBOTICS LTD
MANUFACTURING EVOLUTION

cncrobotics.co.uk



Roundtable discussion

Challenges



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Aims of the discussion

- Housekeeping rules
- Looking for the priorities
- Seeking common goals/interests and therefore collaborations
- Seeking to understand the community needs
- 45 min discussion

Textiles and Fashion and Digital Challenges

- Skills and training (including in digital technologies) and courses/qualifications relevant to the industry to attract young people
- Innovation lies within SME's Start-ups and Micros, who find it difficult to find support/funding/collaborators
- Lack of knowledge of AI and robotic technologies and what they can do
- Cost balance of fashion and new technology
- Lack of coordinated activity across the sector in embracing and testing new technology

Coffee & Networking



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Roundtable discussion

Technology



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Aims of the discussion

- Talk about experiences of technology used for fashion and textiles
- Learn about the latest advances from the experts at the table
- Discuss use cases and meet potential supplier/partners

Technology

- Robotics and Automation
- Virtual reality and augmented reality
- Artificial Intelligence
- Horizon scanning

Lunch Break



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Tour of the Henry Royce Institute & Networking



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Closing Remarks

Summary of discussion groups

- Textile and Fashion Challenges
- Digital solutions

Next Steps

- Follow up event - IOM3 in March (Start-ups and Micros)
- Business Plan 2023-2025 - Made Smarter

Give/get cards

Funding competitions in digital technologies

Close at Henry Royce Institute



Made Smarter Innovation: Collaborative Research and Development Funding

- Industry Ready Robotics and Automation
- Research projects from £200K to £4M
- Grant rate is 50% of project costs
- Projects are to develop novel, robotic or automation-focused solutions to production environment challenges
- *Collaborative R&D*: Lead applicant is a business, and partners are other businesses and / or research organisations

Full Competition Briefing

<https://ktn-uk.org/events/made-smarter-innovation-crd-briefing-webinar/>

STRONGLY ADVISE

- ALL applicants and partners to visit and **watch, read and absorb** to be aware:
- **Scope** is clear
- Choice of **Research Category** is clear
- Your **finances** meet competition requirements
- ASK if you are unclear

Made Smarter Innovation CR&D Briefing Webinar

Online full briefing of scope, eligibility, application and appraisal processes. Opportunity to raise any questions.

Event Details

When
18/01/2023
10.00 - 12.30

Where
Online

Share this event



Recording now available



Slides from the event are also available:

[IFS Applicant Briefing part 1](#)

[IFS Applicant Briefing part 2](#)

About the Events

The Industry Ready Robotics and Automation funding call from the [Made Smarter Innovation programme](#) aims to develop industrially ready solutions deployable within manufacturing production environments.

Manchester Metropolitan University

- 3.30
- Tour of Manchester Fashion Institute

- 4.00 - 5.00
- Drinks and networking

Keep in Touch

<https://iuk.ktn-uk.org/materials/technical-textiles/>

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