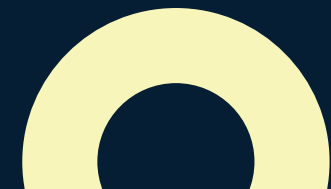# LCR4.0

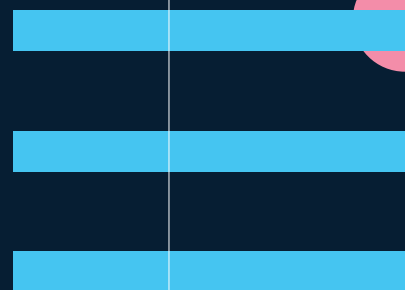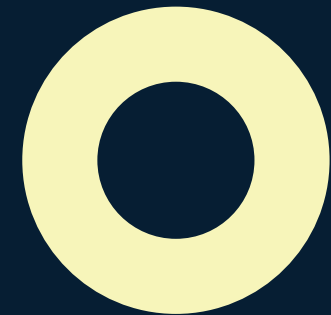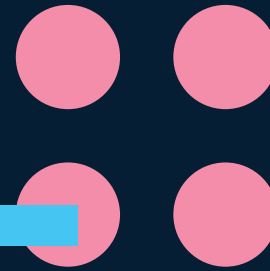**European Union**
European Regional
Development Fund

Transforming advanced manufacturing in Liverpool City Region

VIRTUAL
ENGINEERING
CENTRE

LIVERPOOL
JOHN MOORES
UNIVERSITY

Liverpool City Region
Local Enterprise Partnership

UNIVERSITY OF
LIVERPOOL

SENSORCITY
Making the future happen

Hartree Centre
Science & Technology Facilities Council

LCR 4.0's multi-million-pound impact

Andy Levers
Technical lead for LCR 4.0

Technology is changing the way we make and produce goods globally. Liverpool City Region innovation players have collaborated to embrace Industry 4.0 and create a community of businesses to seize the opportunity with LCR 4.0, a part ERDF funded business support programme.

Set up three years ago, the project has supported almost 300 manufacturing organisations and their supply chains to date, playing a pivotal role in driving business growth and job creation in the region.

LCR 4.0 has given SMEs the tools and resources to explore the opportunities and challenges of Industry 4.0 technologies, such as big data, systems integration, Internet of Things (IoT), augmented reality (AR) and 3D printing. In using this advanced technology, we have seen start-ups increase productivity, reduce costs and pioneer first-of-its-kind innovations.

In 2018, the LCR 4.0 programme was hailed as an 'exemplar project' in the Made Smarter report and featured in the Top 100 European Digital Champions list by the Financial Times.

80
Jobs created to date

£2.6m
Net GVA generated to date

250
Businesses supported to date

LCR 4.0 Shining stars

Many LCR 4.0 projects have surpassed expectations, leading to impressive business results and fast growth as a result of support from the programme and partners.

Connect 4.0 Ltd

£2m 3D printing contract secured through LCR 4.0

Working with LCR 4.0 delivery partner the Virtual Engineering Centre (VEC), Liverpool-based software start-up Connect 4.0 secured a £2-million contract for its integrated augmented reality and 3D printing platform for the automotive industry, 'Co-Fabrico'.

"LCR 4.0 and the VEC have helped us to gain a better understanding of the real-world applications of augmented reality and how we could use it to enhance our own digital supply chain platforms.

"Not only has this work enabled us to take the Co-Fabrico platform to market, but it's been instrumental in securing a £2-million client contract; we couldn't be happier with the results."

Irma Gilbert, Business Development Manager at Connect 4.0.

Technology: Augmented reality   Systems integration

Hi-Tech Steel Services

£3-million turnover increase for Hi-Tech Steel

St Helens-based steel stockholder and processor Hi-Tech Steel Services enjoyed a record-breaking £3-million increase in turnover in 2018, a 12% rise on the previous year, after working with LCR 4.0 to embrace Industry 4.0 technologies.

"Digital transformation is making waves through every industry and ours is no different. Our customers were looking for more advanced solutions than we had traditionally offered.

"We knew the technology we needed to introduce, and we knew that there was a significant growth opportunity for us to expand our offer. But what we didn't know was how to implement it without disruption, so it was great that the LCR 4.0 team at LJMU was there to help."

Andy Flatt, General Manager at Hi-Tech Steel Services.

Technology: Systems integration   Autonomous systems   Internet of things

---

CNC ROBOTICS LTD

CNC Robotics expands team with LCR 4.0

CNC Robotics, the UK's leading robotics integration company specialising in advanced robotics systems for machining, worked with LCR 4.0 and partner Sensor City to design, collaborate and develop a market ready cloud-based machine monitoring device, CNCR-Live.

CNC Robotics has also welcomed a new Systems & Applications Engineer as a result of its work with LCR 4.0.

"Being able to utilise the specialist skills and resources at Sensor City has been a game-changer for us. It's enabled us to develop our technology and given us the impetus to expand our team with the appointment of a new Systems and Applications Engineer."

Madina Barker, Director, CNC Robotics Ltd

Technology: Cloud computing   Systems integration

CHANUA

Chanua creates 3D printed brain to educate on mental health

Healthcare innovation company Chanua Health has built a 3D printed brain to teach students about mental health in an interactive and engaging way, with support from the LCR 4.0 project. The company has expanded into new sectors as a results.

"Harnessing the technology at Sensor City through LCR 4.0 has enabled us to create a product that encourages young people to be more active in understanding their thoughts, behaviours and emotions.

"We have worked hard to put young people at the core of what we do, and we're thrilled to be expanding into new sectors and creating programmes that can benefit their health and emotional wellbeing."

Naomi Mwasambili, co-founder of Chanua Health

Technology: Additive manufacturing

Ones to watch

Although the LCR 4.0 project comes to a close later this year, there are many SMEs currently going through the programme that are demonstrating notable plans for the future.

Inovus brings VR to the operating theatre

St Helens-based surgical simulation product design and manufacturer, Inovus Medical, is working with LCR 4.0 and the VEC to transform medical training with a new innovative virtual reality (VR) tool.

The new product will allow students and young medical professionals to train in a VR operating theatre, allowing for a more realistic experience and adding real-life dimensions to training methods to improve performance and outcomes.

"The work we have done with LCR 4.0 has been pivotal in developing a new tool that has the potential to transform how medical professionals train and ultimately the quality of care patients receive.

This project has already opened countless doors for us with key investors and stakeholders, leading to a £500K investment from the Northern Powerhouse fund. We will also welcome 10 new members of staff as a result."

To further develop the product and bring it to market, Inovus is now carrying out further product development of this and a number of other technologies and hopes to launch a suite of new high-fidelity laparoscopic simulators in early 2020. The company also has ambitious plans to take the new product to the global market to expand its international presence.
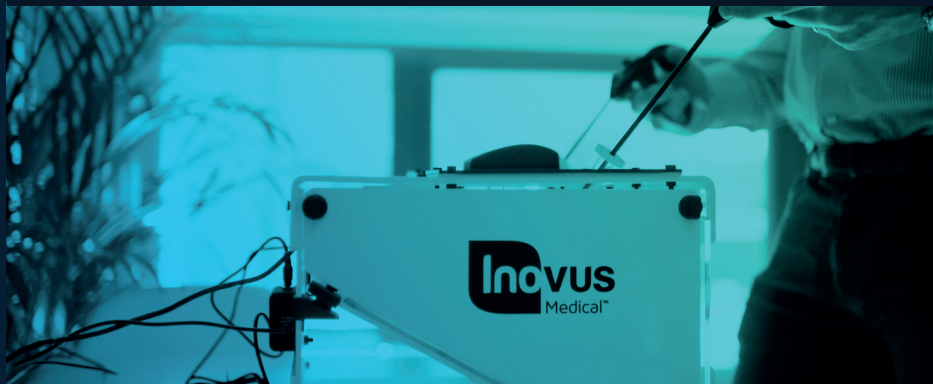
Dr Elliot Street, CEO of Inovus Medical

Technology used: Simulation   Augmented reality

Abbey Engineering set to double productivity with LCR 4.0 project

Based in Knowsley, Abbey Engineering – part of the Abbey Group - has worked with LCR 4.0 and LJMU to use big data to make more informed decisions regarding its manufacturing processes, as well as connecting and managing legacy IT systems more efficiently. As an example, the data collected has enabled the company to identify inefficiencies in its laser cutting processes, leading it to make changes to optimise manufacturing and reduce waste as a result.

"The support we received from LCR 4.0 has enabled us to use data in a smart way and make informed decisions regarding our manufacturing operations.

"This is just the start of our journey towards implementing Industry 4.0 solutions to transform our company through increased productivity. We look forward to the continued support from the LCR 4.0 team to help us reap the rewards of this technology in a practical way and help us to remain as competitive as ever in the global market."

Abbey Engineering has since invested £650K in two new CNC Laser Machines to improve productivity and open up new markets. This investment, coupled with the company's 2019 plans, is expected to accelerate productivity by 50% in the next 12 months.

Mark Dawson, Operations Director, The Abbey Group

Technology used: Big data   Systems integration

Industry 4.0: should security take top spot?

Andy Levers
Technical lead for LCR 4.0

Just as mechanisation revolutionised manufacturing during the first industrial revolution, digitisation is doing the same today. The benefits are widely known – improved productivity, agility and quality to name a few – but less mind is given to some of the accompanying challenges and to one in particular: security.

When manufacturing businesses are reaping the rewards of digitisation, it can feel like something of an inconvenience to have to consider security – not least because it can require specialist input. The fact of the matter, though, is that security shouldn't just be a consideration, but an underpinning factor of Industry 4.0 technology.

Today, hackers are more active than ever and so, without adequate security, the benefits of Industry 4.0 tech don't risk just being negated, but even reversed. Systems are left open to attack, machines can be damaged and production shut down.

Few manufacturers would argue against the need to secure digital technologies and systems, just as the machines of the first industrial revolution needed securing, but to do so is not as simple as just locking the factory door. Interestingly, only 3% of the SMEs that undertook the LCR 4.0 business support programme actually opted to focus on cyber security. This reluctance to engage could be symptomatic of the intricacies and nuances of modern cyber security requirements.

Whether it's that they don't think it applies to them, they don't understand it, or simply that innovations happening elsewhere in the business are more exciting, security is being left behind. With that in mind, there are three simple principles you can use to get up-to-speed:

1. Find your expert:
Manufacturers need people dedicated to cybersecurity, or at the very least have it covered as part of someone's role. Without that, responsibilities aren't clear, issues get missed and security slips.

2. Never stop securing:
Cybersecurity is not a one-time job. Businesses have to stay up-to-speed on the changing landscapes, keep their systems and safeguards continuously updated and keep track of how effectively security measures are working.

3. Prepare for the worst:
Simply put, you have to assume that, at some point, you might get caught out. When your systems get attached and production goes down, how quickly can you start back up? Ongoing backups and disaster recovery systems may seem costly, but when the worst happens, they'll pay for themselves and then some.

Locking today's factory door is a more complicated process than ever before, but it's crucial that manufacturers understand the necessity. Failure to do so means manufacturing could be encountering much bigger problems in the future.

> " Interestingly, only 3% of the SMEs that undertook the LCR 4.0 business support programme actually opted to focus on cyber security. "

Mass customisation:

Can UK manufacturers start to claim a bigger slice of the 'retail revolution' given the technology they now have access to?

Simon Reid
Head of Advanced Manufacturing,
Liverpool LEP

On announcing the production of the Model T, Henry Ford famously – and not without a measure of mischief, said: "Any customer can have a car painted any colour that he wants so long as it is black." He was poking fun at what he perceived to be the tendency of his salespeople to cater to the whims of customers, rather than learn about the product to explain away any such whim.

The Model T was, ultimately, offered in a range of colours, but, with car making in its infancy in 1909, Ford's quip wasn't without foundation. In trying to bring the car to the masses, initial uniformity would be key to maximising efficiency and minimising costs.

Today, the whims of consumers are to be accommodated, encouraged and indulged. Manufacturing technology has evolved to such an extent that it's not just the colours of certain products that can be chosen, but a whole range of design factors. It isn't that this "mass customisation" should be offered for the sake of it, but that there is now more value in doing so than not.

Clothing has arguably been the most high-profile and one of the earliest products for which mass customisation has been offered, but it's no longer simple colours and design elements that can be tailored. The maturation of 3D printing, for example, means that high-quality, bespoke soles for footwear can be produced on an individual basis.

But while the manufacturing technologies are now there, it's not always the manufacturers that benefit. With retailers having the means to commercialise, promote and distribute products through shopfronts and online stores, it is often they that benefit from manufacturer technologies. Given that they are effectively

> " With retailers having the means to commercialise, promote and distribute products through shopfronts and online stores, it is often they that benefit from manufacturer technologies. "

the gatekeepers of customisation technology, this begs the question: should they be seeking to take a greater piece of the retail pie, skipping the intermediary completely?

It is not cut and dried. Some manufacturers are better placed to develop their retailing than others and, indeed, some retailers to move more into manufacturing and mass customisation than others. What is certain is that it's a question that can now be considered.

For manufacturers, there are a number of factors to weigh up. How complex are the supply chains in your industry? Are there approaches that you could take? Is it feasible to make incremental steps towards direct delivery? Are there retailer relationships that need to be considered? What are the costs involved? What can you offer that retailers cannot?

Naturally, moving towards a manufacturer-retailer model requires expertise, so closer collaboration with developer and tech communities are needed, as well as relevant recruitment. Fundamentally, though, there is an opportunity there for manufacturers.

The future of advanced manufacturing in Liverpool City Region

Liverpool City Region can become, and in my opinion is becoming, a manufacturing global hotspot. Programmes like LCR 4.0 are making that possible, establishing innovative and dynamic manufacturing communities across all of our six boroughs.

We're gaining national recognition as the chosen host for the annual Manufacturers Leaders' Summit and Smart Factory Expo events, which are an excellent platform to showcase many of Liverpool City Region's technology-led businesses.

What's more, the success of the LCR 4.0 programme has led to new initiatives, such as Made Smarter UK – a new £20 million initiative designed to embed advanced digital technology across the North West's manufacturing sector – to boost productivity.

Set to engage with 3,000 SME manufacturers across the region, Made Smarter is positioning us as a testbed for new types of technologies and advanced processes. With this new programme, it is thought the region's manufacturing sector could generate a 25% increase in productivity and add £115m to the North West economy.

We are of course already engaged with SMEs working in advanced manufacturing across Liverpool City Region through the LCR 4.0 project, however Made Smarter will help new and ambitious local companies to embrace new digital technologies well into the future.

Thinking about the bigger picture, the introduction of initiatives such as our £500m Strategic Investment Fund are future proofing the Liverpool City Region. Helping to deliver more local jobs, and generating inclusive growth, the half a billion pounds available will support projects in key areas such as transport, economic development, business growth, skills, culture and housing.

In conclusion,

we're well on our way to fulfil our potential as a hub of advanced manufacturing, but what we need now is to collaborate and embrace new techniques and processes which will drive growth. Made Smarter will follow in LCR 4.0's footsteps and offer hundreds of SME manufacturers the chance to do just that, backed by a programme of guidance, advice and grants.

Steve Rotheram
Metro Mayor, Liverpool City Region