



MANUFACTURING A DIGITAL FUTURE

Empowering Cheshire and Warrington's SMEs to reap the advantages of the 4th Industrial Revolution.

Cheshire & Warrington



European Union
European Regional
Development Fund

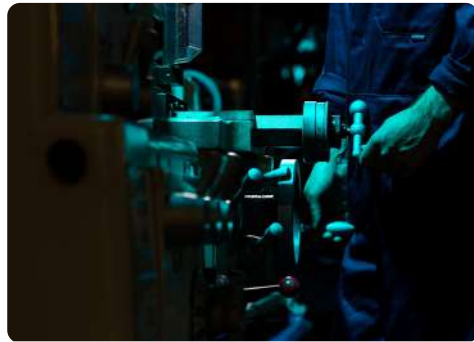




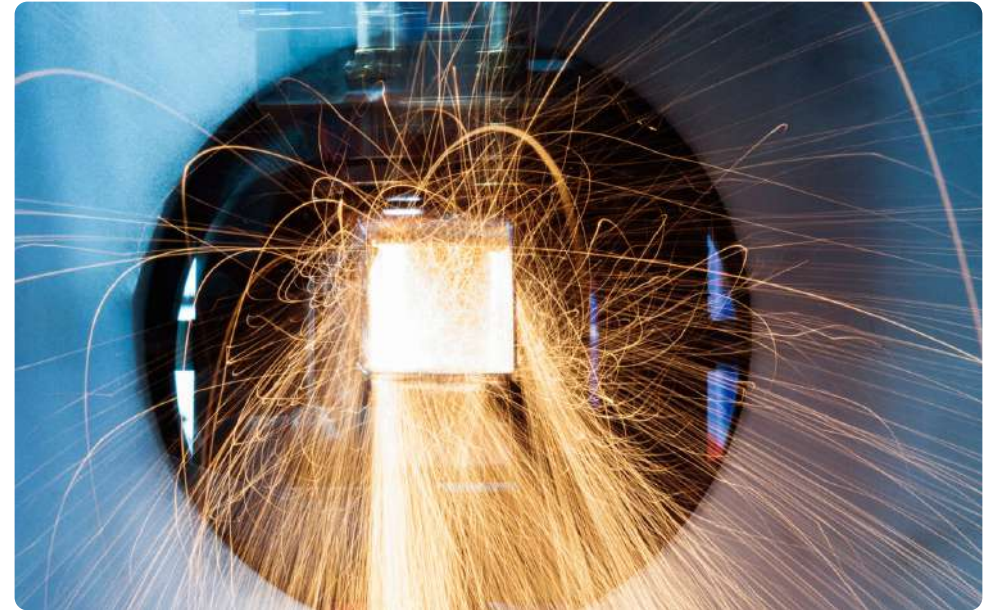
About CW4.0

CW4.0 is the first and only project of its kind that is tailored specifically to the manufacturing sector in Cheshire and Warrington and delivered by expert organisations based in the North West.

CW4.0 was established to help manufacturers and supply chain businesses to develop smarter processes and products, solve industry problems, seize opportunities and stay ahead of the competition by unleashing the potential of technologies emerging from the fourth industrial revolution (Industry 4.0).



CW4.0 has brought together the collective industry knowledge, technical expertise and R&D capabilities of the University of Liverpool's Virtual Engineering Centre (VEC), Liverpool John Moores University (LJMU), the Science and Technologies Funding Council (STFC) and the Northern Automotive Alliance.



Part-funded by the European Regional Development Fund (ERDF), CW4.0 has provided fully funded, individually tailored, hands-on support and expertise to over 130 SMEs across Cheshire and Warrington.

candw4.uk

VEC VIRTUAL
ENGINEERING
CENTRE

UNIVERSITY OF
LIVERPOOL

LIVERPOOL
JOHN MOORES
UNIVERSITY

**UK
RI** Science and
Technology
Facilities Council

Northern
automotive
Alliance

Key takeaways

📈 Business Engagement

166 businesses supported



▶ Productivity Boosted

Over half of beneficiaries reported the program directly helped them to improve productivity



👥 Job Growth

Set to create 265 full-time jobs

▶ Business Development

60% of SMEs reported they had grown their business



🗣️ Further Insights

Quotes

from CW 4.0 beneficiaries

"Fantastic, from start to finish."

"We had a great relationship with the CW 4.0 team. They were very helpful."

"CW 4.0 support allowed us to streamline a digital analysis pathway that previously took weeks into a platform that now takes just a few hours."

📈 Gross Value Added

£64m GVA set to be delivered

Success stories

Many CW4.0 projects have surpassed expectations, leading to impressive business results and fast growth from the support of the programme and its partners.

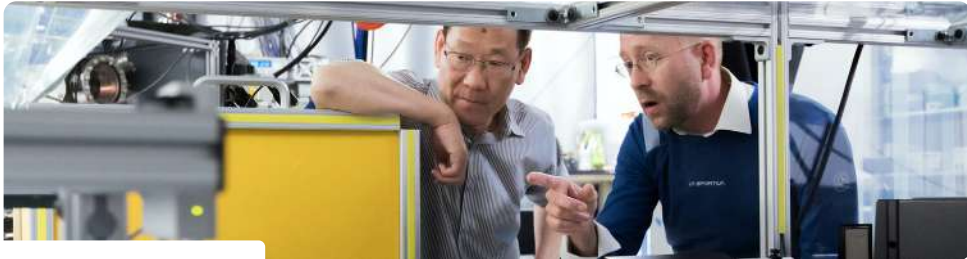


Company name: Oliver Hydrovalves

Aims: Develop a Finite Element Analysis (FEA) solver to calculate the displacements and stresses within valves.

Outcomes: The company is now able to reduce the amount of prototyping and testing needed, reducing costs and optimising the process to help the company's customers reach Net Zero targets.

Technology deployed:  Computer-aided design (CAD)  Digital simulation  Supercomputer



Company name: Faraday Battery

Aims: The electric vehicle battery manufacturer was looking for a way to measure and quantify the health of a cell in real-time.

Outcomes: The centralised remote monitoring of the health of rechargeable batteries will enable efficiency improvements, detect failures sooner, reduce costs and improve forward planning.

Technology deployed:  Machine Learning  Cloud-based server  Software dashboard and monitoring tool.



Company name: Aquacut

Aims: Expand and remodel their current state-of-the-art facility in Warrington.

Outcomes: Aquacut was able to commission all new racking throughout its warehouse facility, delivering 50% more storage capacity. Energy costs will also be reduced by installing rain harvesting to reduce their reliance on mains water.

Technology deployed:  LiDAR Scanner  Cloud data  Digital simulation



Company name: Knitwire

Aims: To reduce wastage and improve lead times.

Outcomes: Experts at LJMU were able to introduce Knitwire to Tricorn Systems' technology which simplifies stock control, order tracking and quality management. The CW4.0 team also proposed equipping Knitwire's machinery with sensors to detect wastage, enabling it to reduce its use of inefficient and unsustainable hydrocarbon-based lubricants.

Technology deployed:  Tricorn Systems  a specialist in management of Material Requirement Planning

Diagnose before you cure: why the technology sector needs to learn to speak SMEs' language.



Craig Beck

CW4.0 engagement lead

The Virtual Engineering Centre

Cheshire & Warrington benefits from one of the fastest-growing manufacturing sectors in the UK and is home to major names in global growth industries like clean energy, life sciences and automotive. With these industries all going through profound changes – from the advent of electric vehicle production, to supply chain on-shoring post-COVID and Brexit – the potential for local SMEs and supply chain businesses to capitalise on new business opportunities is vast.

But exploiting this requires businesses to change and innovate their processes and products. Not least because digitised operations are increasingly non-negotiable expectations of OEMs and customers further up the supply chain.

The economic benefits of digitisation are well established. And yet, anyone involved in digital transformation will tell you that boosting adoption in our sector is challenging, particularly when it comes to smaller firms. It's not because our SME manufacturers are lacking in innovation or ambition. Far from it. Over the last two years, we have found Cheshire & Warrington's SME manufacturers to be brimming with plans and ideas to push forward. Rather, the issue is that the technology sector has an unhelpful habit of shrouding itself in jargon and complexity, which can be alienating.



A large part of the problem is that technology providers tend to focus on the end result of adopting their products rather than why they are needed in the first place. CW4.0 was established to come at this from another angle, by first helping SMEs to diagnose their specific challenges and opportunities and then working up a digital solution in partnership.

This approach has taken us in some vastly different directions and presented our teams across with a diverse set of objectives and solutions.



We've assisted businesses in developing sophisticated new tools using augmented and virtual reality, rapidly prototyping products using simulation and 3D printing, and helped firms to hone their processes through real-time data analysis. Yet, many of the highly successful projects we've embarked on have started with a simple challenge.

For example, expanding into new premises can be risky, not least due to the potential for downtime as equipment is relocated. CW4.0 has worked with several businesses to use LiDAR scanning to map and then create an interactive digital model of their proposed new workspaces. We've then been able to help them select the best location and most efficient layout, de-risking the relocation process and minimising downtime.

Similarly, the rising energy costs have presented some immediate challenges for manufacturers who are inherently energy hungry. Using sensors, CW4.0 has enabled several businesses to monitor energy usage in real-time. Armed with this data, they're in a better position to make informed decisions on how to adjust day-to-day processes and where to invest in more efficient equipment.

Engaging with SMEs on their own terms and with a focus on their immediate challenges – rather than bombarding them with the art of the possible – is the only way we will convince more businesses to start their digital journey. And in our experience, once they start, they will continue. Alive to the potential, many of our beneficiaries have gone on to plan a broader range of digital projects as a result.



Family-owned manufacturer triples its footprint with CW4.0 support

Autac, a leading designer and manufacturer of bespoke cables to a wide range of industries, enlisted the support for CW4.0 to plan its expansion into new premises in Macclesfield. We created a digital twin of the proposed new facility, allowing Autac to plan and evaluate the most efficient and productive layout for its manufacturing processes before the move.

Challenge: Autac needed to expand its manufacturing capacity to keep up with increased customer demand, reduce lead times and create better facilities for its team. The challenge was to create the most productive, efficient, and optimised factory layout and minimise disruption to the business during the move.

Approach: The CW4.0 team used 3D laser scanning technology to create a digital version of its new premises. This enabled Autac to run multiple simulations for different layouts of its production equipment and processes to decide upon the most efficient and productive solution. Configuring its new factory in a virtual setting in advance also meant Autac was able to install its plant and equipment smoothly, minimising production downtime and ensuring the new facility was up and running as quickly as possible.

Outcome: Autac has invested in a new £2.8m state-of-the-art manufacturing facility, more than tripling its presence in Macclesfield. The new facility is expected to create over 50 new jobs in the area, and Autac is planning further investment in the site to create an innovation laboratory for its R&D functions.

David Lowe, Managing Director at Autac, said:

“While it was an incredibly exciting time for Autac, making the move to our second facility presented challenges for our day-to-day operations. This is where the support from the CW4.0 team was invaluable. With their help, we were able to virtually map out and optimise our workflow and processes which meant that we could confidently expand into our new facility helping to meet the ever-growing demands of our customers.”



Technology used:



3D laser scanning



Digital simulation



Chester start-up uses machine learning to transform first and last mile travel

Jyrney is a transport start-up which aims to integrate and better connect mobility with business travel. Its comprehensive mobility platform analyses historic trip data to predict and facilitate the on-time performance of private hire vehicles.



Challenge: Currently, the taxi and private vehicle hire industry suffers from inaccurate travel time and route descriptions which leaves vehicles idling or running late and can damage the customer experience. Jyrney was looking to create a service that optimises the allocation of available taxi fleets, providing accurate pick-up times while simultaneously connecting different ground transport operators and selecting the best options for the customer.

Approach: CW4.0 data scientists at the STFC Hartree Centre developed a machine learning algorithm and an application programming interface (API) to map and process taxi journeys. The API was designed to help Jyrney predict when a taxi would not be dispatched on time, triggering a warning system which would reallocate journeys to an alternative provider with an improved pick-up time.

Outcome: The team investigated different ways of mapping routes that led them to implement a free open-source solution for Jyrney. This solution provides optimal time management for private hire mobility companies and delivers better service to customers.

Daniel Price, Founder of Jyrney, said:

“Our collaboration with the STFC Hartree Centre proved instrumental in understanding the challenge at hand and developing an innovative solution using data-driven insights. By harnessing the potential of machine learning, we have successfully identified key improvements that significantly enhance the traveller’s experience, ensuring their journeys are seamless and punctual.”

Technology used:



Machine Learning

DEVONSHIRE BAKERY

Cheshire bakery cuts energy costs with new generation technology

Devonshire Bakery is a family-run business, operating out of Frodsham, Runcorn and Weaverham for almost 100 years. The CW4.0 team at LJMU supported the business to understand how its processes and equipment could be transformed to optimise its energy usage.

Challenge: Having multiple energy-intensive ovens in use most days means the business is particularly exposed to volatility in the price of energy. Their management team was interested to learn more about how they could optimise their energy use and how they could predict energy use to minimise or eliminate waste.

Approach: Research Engineers at Liverpool John Moore's University advised the team at Devonshire Bakery on several Industry 4.0 technologies that would make a big improvement to their day-to-day efficiencies. Output tracking devices were installed on each piece of equipment, providing the business with live data to monitor its energy usage in real-time, making it easy to identify wastage.

Outcome: This data has allowed the team to make informed decisions on how to adjust day-to-day processes, including reducing stock in freezers and altering the times that machinery is turned on and off. This data is shared throughout the whole team, meaning everyone can buy in to an evidence-based approach. The team have also been able to identify energy-efficient equipment and make an informed decision on where to invest in a new plant.

Robert Crowther, Devonshire Bakery, said:

“The key for us was maintaining our high standards in customer service and end product, whilst introducing new technology to modernise our methods. Now having access to this data, we can make small changes that don't hamper the team's working day but can make the business big savings in energy costs.”

Technology used:



Data monitoring



evove

Company name: Evove

Aims: Evove wanted to re-design its filtration membranes to improve performance and efficiency without expensive and time-consuming prototype testing.

Outcomes: Generating detailed simulations of how fluids pass through new membrane structures offered Evove unique insight into how to optimise its designs, accelerating the prototyping and testing process.

Technology deployed:



Computational fluid dynamics (CFD)



Digital simulation

EVOLUTION DENTALSTUDIO

Company name: Evolution Dental Studio

Aims: Analyse and upgrade existing digital workflow equipment and expand Evolution's capabilities with in-house manufacturing.

Outcomes: From working with experts at LJMU and gaining access to Made Smarter Grant Funding, Evolution Dental Studio is in the process of procuring an advanced 3D printer. This will bring all its manufacturing in-house to reduce outgoing costs. It will also help to reduce turnover times, enabling the business to offer 'same day' services in the future.

Technology deployed:



Value Stream Mapping (VSM)

“ Since it started in 2021, the Cheshire and Warrington Growth Hub has seen the benefits and results for local businesses who have worked with CW4.0. For SMEs, being able to access the expertise, cutting-edge research, and latest technology through this programme, has allowed them to safely explore opportunities that they may otherwise have not pursued. CW4.0 has helped these businesses develop their understanding and confidence in utilising the latest technology for tangible business benefits. ”

— **Paul Chapman**

Growth Hub Manager at
Cheshire and Warrington Growth Hub

Cheshire & Warrington



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