

CASE STUDY

Smarter Packaging Intelligence for automotive supply chains

Idealogix is a North East-based technology company that applies systems thinking and engineering to complex logistical problems.

Its approach combines formal modelling – a mathematical technique used to verify that processes behave correctly – with digital tools including 2D and 3D visualisation. The company works to connect, advise and enable organisations to get more from the systems they rely on. Automotive supply chains, with their intricate interdependencies and just-in-time demands, are a natural setting for that kind of rigour.

THE OPPORTUNITY

Returnable transit packaging – the pallets, crates and containers that shuttle between automotive plants and their suppliers – is essential to keeping production lines moving. But tracking that packaging as it flows back through the supply chain is far from straightforward. Without reliable data on what is in transit, where it is and when it will return, suppliers are left relying on manual checking and fragmented records to manage assets that the whole operation depends on.

The stakes are significant. If an automotive plant runs out of packaging, it cannot ship components, and an assembly plant sitting idle can cost upwards of £1 million per hour. There was a clear opportunity for a technology solution to bring order to the returnable packaging loop – giving suppliers a live view of asset status, early warning of potential shortages and a platform that could adapt as demand shifts.

WHY THE COMPANY JOINED THE ACCELERATOR PROGRAMME

The Automotive Cluster Accelerator is delivered by Digital Catapult as part of the Made Smarter Innovation | Digital Supply Chain Hub – a programme designed to help manufacturers adopt digital technologies and strengthen supply chain resilience, while supporting startups and SMEs in validating solutions and building industry connections. The accelerator brings deep tech companies together with established automotive partners to tackle real supply chain challenges, providing selected companies with up to £100,000 in funding alongside direct industry access and technical support.

For Idealogix, the programme offered something that would be difficult to achieve independently – a working relationship with Trèves, an international automotive supplier. As a small, emerging startup, that kind of access is rarely available through conventional routes. The programme aligned with a specific need: to validate Idealogix's developing solution in a real industrial environment and build credibility within the automotive sector.

THE SOLUTION

Working alongside Trèves, Idealogix developed a platform designed to make the returnable packaging loop more transparent and manageable.

The solution combines two technical approaches that are rarely brought together. The first is Timed Coloured Petri Nets (TCPNs), a formal mathematical modelling method capable of representing complex, concurrent and interdependent processes and verifying their correctness. The second is game engine technology, used to deliver intuitive 2D and 3D visualisations of what is happening across the packaging loop.

In practical terms, the platform acts as a dynamic model of packaging flow that can run predictive simulations while also showing the current state of assets in real time. Users can see which packaging is on its way back, when it is expected to arrive and where shortages may be developing. That advance visibility means suppliers can re-plan before a shortage creates a crisis, rather than scrambling to respond once production is already at risk. Where traditional systems rely on manually checked, rule-based alerts and offer only fragmented visibility across the packaging loop, the Idealogix solution provides a joined-up view for decision-making, with formal modelling underpinning the accuracy of the data and integrated visualisation supporting both operational use and staff training.

The programme also surfaced wider questions about the business processes governing packaging data, around consistency, completeness and the potential for electronic monitoring, which will shape what the next phase of development looks like.

OUTCOMES AND RESULTS

By the end of the programme, Idealogix had a working proof of concept that demonstrated tangible practical value. The platform gives a clear, live view of packaging status across the supply loop, showing what packaging is coming to suppliers and when, flagging potential shortages in advance and reducing reliance on manual reporting. The team also came away with a clearer understanding of the route to TRL9 – the stage at which a solution is considered proven and ready for full commercial deployment.

The commercial opportunity is already coming into focus. Idealogix is modelling a UK serviceable available market of approximately £15.6 million per year, based on around 130 sites – 10 original equipment manufacturer (OEM) assembly plants and 120 Tier-1 suppliers using returnable transit packaging for just-in-time flows – at an indicative annual contract value of £120,000 per site. Next steps include a study to investigate specific process questions raised during the project, with the Idealogix prototype evolving alongside any findings.

Beyond the technical outcomes, the programme opened doors that matter. Idealogix built lasting connections across the automotive innovation ecosystem, gained direct exposure to automotive packaging logistics as a specialist discipline.

CUSTOMER PERSPECTIVE

For Idealogix, a small emerging startup, the accelerator needed to do several things at once: develop the solution, build credibility in a new sector and forge relationships within the automotive and innovation communities. All of this was achieved through the programme.

The access it provided to industry partners was particularly significant. Regular one-to-one sessions with Trèves and the Digital Catapult team gave the company direct insight into the real-world logistics challenges at the heart of the project, insight that shaped both the design and the direction of the platform. It also introduced Idealogix to automotive return packaging logistics as a discipline in its own right; even for an experienced team, there were new areas to explore and understand.

Dr Kirsten Sinclair, Co-Founder of Idealogix, reflects: "The one-to-one meetings with Trevés and Digital Catapult were vital – they are valuable for any project and particularly enabled understanding of their needs and gave us visibility as a small company. We really appreciated our sessions with them."

The always-on nature of Digital Catapult's support was also noted. Beyond the structured sessions, the team found it straightforward to access guidance when they needed it.

"We were surprised how easy it was to reach the Digital Supply Chain Hub team and welcomed all their input both during the programme and into the future."

Dr Kirsten Sinclair, Co-Founder, idealogix



About Idealogix

Through our systems technology services, we provide the expertise and support needed to navigate complex challenges and drive meaningful change on a journey of continuous improvement and sustainable growth.

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