



# Network Site Visit Case Study

**Fi Innovations**  
Automating the Supply Chain  
with Digital Inventory

INDUSTRY 4.0  
Network

POWERED BY

**CallaghanInnovation**  
New Zealand's Innovation Agency

PROGRAMME PARTNERS

 **Beca**



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CONSULTING

## Automating the Supply Chain with Digital Inventory



### The Profile

Fi Innovations is an award-winning hub of creativity, with a long history of challenging convention, trialling new materials and methods. Fi continue to be early adopters through use of some of the latest additive manufacturing capabilities as they serve clients across highly regulated and specialist industries. Additive manufacturing sits alongside two other major divisions in the business - Fibreglass manufacture, with a focus in the marine industry and Resin flooring. Fi Innovations is a company built on a thirst for invention and ideas that allows it to stay ahead of the market and remain future-focused through inventing, adapting and educating.

This case study focusses on the technology and innovative approaches to interacting with customers to automate supply chains rather than the technology of 3D printing itself. For more information about 3D printing capabilities please visit: <https://f-i.co.nz/>

### Background

Fi Innovations, with the support of the provincial growth fund, invested in a 3D systems SLS additive manufacturing machine, being the first to market with their capability to manufacture a vast array of polymers and resins on a scale that is well beyond purely prototypes. Initial success led them to further investment, and they now have three cutting edge machines and a state-of-the-art design room plus a renovation of their premises to allow for this growth.

The nature of the 3D printing set up was designed to give customers very quick turnaround times on their products. The necessary interactions with customers such as quoting and receiving and verifying the 3D CAD files soon became a bottleneck to Fi Innovation's ability to deliver at pace. These customer interactions were being handled through traditional e-mail communications and a range of file sharing platforms requiring the team to 'stay on top' of the work in progress manually. This meant they

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did not have optimum visibility over priorities and were spending time on non-value add tasks.

The 3D side of the business was operating like a start-up, so it was natural to need further defining and improvement around some internal processes. In 2020, Fi Innovations partnered with Complete 3D who supplied the machines, allowing them access to a software solution that would vastly improve the workflow interaction with clients.

'Digifabster' allowed for automated quoting based on certain parameters (volume, surface area etc.), and for the upload of 3D files direct to Fi Innovations and tracking work in progress. Digifabster was a cost-effective solution as the software company themselves were at an early stage and still developing their solutions. Critically, this software acted as a real eye opener for the team who now appreciated the value that software could bring to their supply chain (without expensive investment in developing their own in-house solution). Following use of the software for 6 months, they learnt more about customer demands and the shortcomings in functionality and flexibility of the software. For example, the automated quoting was restricted to certain parameters and the software wasn't able to provide digitised key performance indicators of Quality, Productivity and Yield – meaning the team were still spending time manually collecting information on machine performance.

### The solution

Digifabster acted as a springboard for the team to go on and investigate further options that would increase the functionality and capture even more value in their client interactions. The agility with which they were able to transition to new software is testament to their innovative approach and the cost-effective nature of

subscription software solutions allowed them to test and verify quickly.

Through extensive online research and remote meetings, the team settled on a new software AMFG. From their prior experience they were able to build an accurate 'requirements' list for this new software, making the selection process quicker and more aligned to their needs. For example, there was a need to integrate this new solution with their ERP system in order to manage the invoicing process without laborious double handling.

The new AMFG software moved Fi Innovations to the next level in terms of integrating their supply chain. Some of the optimised features of their AMFG solution included:

- Instant automated quoting was now possible with much greater flexibility around the technology, material, leadtime and post-processing options.
- Introduction of an Ecatlogue solution where clients are able to store 'digital inventory' ordering what they need when they need it and optimising their physical inventory efficiency. This also provides options around automating customers supply chains on intricate and expensive parts. Whereas previously suppliers would manage cheaper consumables through KanBan methodologies, they now have the ability to manage this for more intricate engineered parts. At the most mature level, it would be feasible for clients to fully automate the reordering of components through the Fi Innovation portal using RPA or similar technology.
- Design freedom allows effective version control by the client as they have full capacity to manage the CAD files that are stored and produced, preventing 'old' drawings or files being selected for manufacture by accident. In addition, this

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design freedom stretches to infinite design changes, whereas traditional manufacture methods may require expensive moulds being made, the 3D printing allows for continuous improvements in designs to occur iteratively whilst being inexpensive.

- The system provides the highest levels of security encryption, which is essential for many of Fi Innovation's clients where products are highly regulated and sensitive.
- The software has also increased the vertical integration of the business by interacting directly with the machines to provide an accurate view of load vs capacity and acting as a decision support system around the most efficient production schedule. With the ability to 'nest' multiple client's parts in one production run, it increased capacity without investment in more machinery.
- The direct integration between the machines and the software also permits automated printing direct from the software, reducing further inefficiencies but more importantly it allows the team digital visibility of performance through automated reporting of quality, yield and productivity KPIs. All this acts to elevate the role of the team, moving from collecting that data to freeing their time to look at the insights and make decision around improving their process or product quality. Ultimately this drives the team to become a group of skilled problem solvers as well as experts on the technical side of operating the machines.
- The software permits workflows to be generated and customised, meaning in the near future the system will be able to provide automated updates internally and externally on the status of jobs and the performance of machines.
- Traceability – the 'metadata' around the production of a product is readily available for analysis. For example all parameters important in 3D printing such as temperatures

and flow rates can be captured as a product is manufactured allowing both Fi Innovation and the customer to complete detailed analysis on the performance of the resulting component against these, providing further avenues for intelligent optimisation of product quality. This next level of traceability would normally require extra levels of destructive testing or similar in highly regulated industries.

- Scalability is a key design principle in industry 4. The ability to introduce a new machine into the process seamlessly will become more important as the business grows to prevent disruption in production. The benefit of off the shelf software solutions being that they are driven to keep pace with the market and provide the functionality to allow machines to integrate quickly with operations.

### Key learnings & benefits

- Taking the stepping stone approach is possible with subscription software, trialling cheaper solutions can act as an eye opener and allows effective 'requirements' lists to be built accurately.
- Improvement in throughput / capacity doesn't have to come from extensive capital investment in machines by looking outside the immediate production process efficiencies can be identified which are often cheaper to resolve.
- Elevating the role of team members away from tasks that can be automated to the value add problem solving is essential for the business and to create an engaged workforce.
- Software such as those mentioned here can allow manufacturers to become far more in tune with their machines and what's happening. Acting to inform you around future capital decisions.

## About the site visits and Industry 4.0

The purpose of the Demonstration Network is to drive uptake of Industry 4.0 technologies among New Zealand manufacturers with the aim of increasing their productivity and global competitiveness. The Network of Site Visits (NSV) are part of the [Industry 4.0 Demonstration Network](#), which also includes a mobile showcase and smart factory showing cutting-edge industry 4.0 technologies in action. The NSV takes selected companies through a fully-funded assessment process to help them accelerate their own journey towards Industry 4.0, and sees them share their knowledge with other manufacturers.

### Further questions?

To find out more please contact the EMA or Frank Phillips at LMAC

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