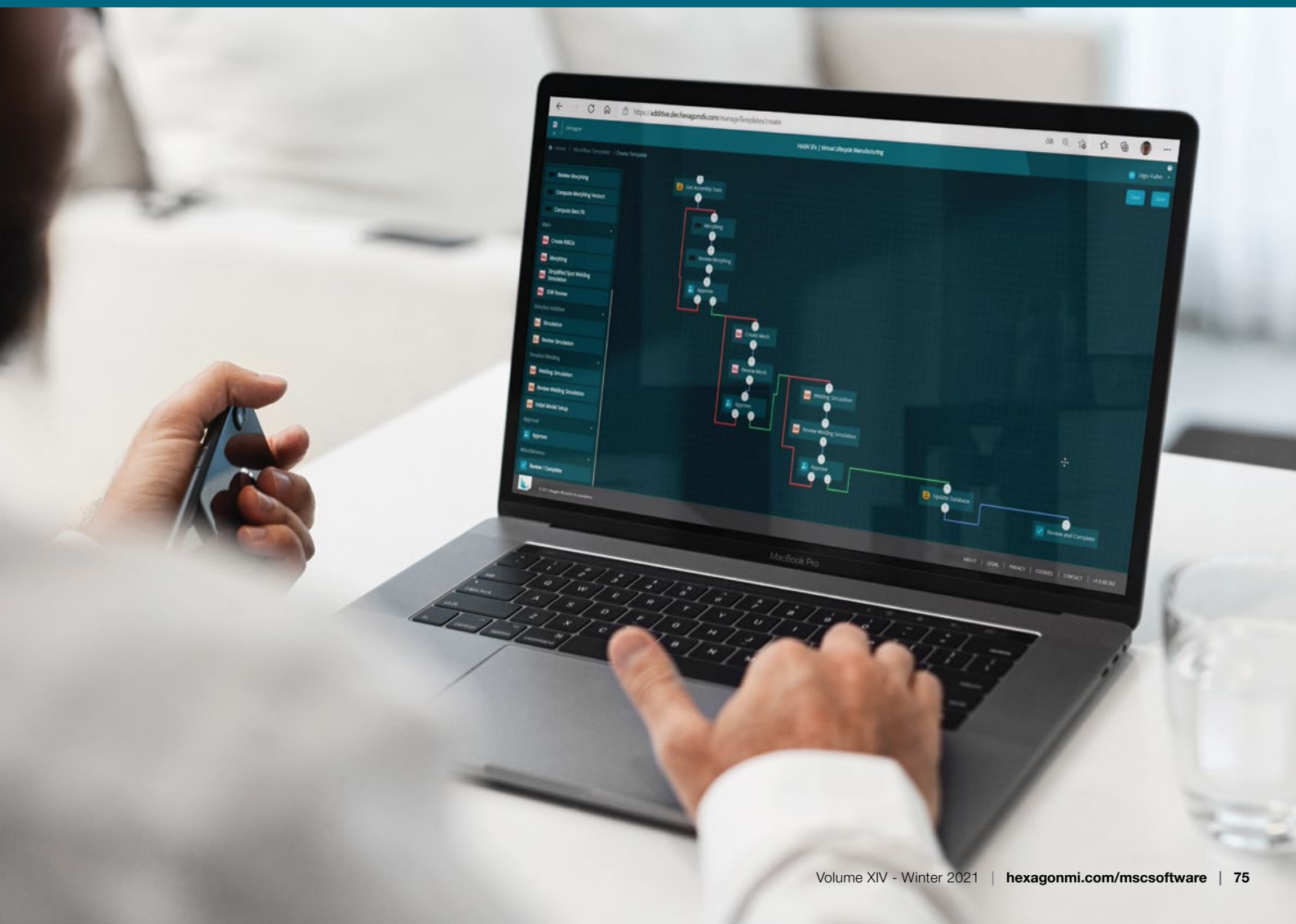
Maximising growth with engineering transformation

Manufacturers demand collaborative toolsets to leverage digital twins of the physical and virtual worlds to improve design, engineering and manufacturing effectiveness.

By Keith Perrin, Hexagon's Manufacturing Intelligence division



There has been an increased demand in agility and enhancement through optimising the value chain to meet industry protocols and full product specifications. By 2040, it is estimated 95% of validation and homologation will be done virtually, 75% cost reduction for new products introduction, and faster time to market: from 5 years to 18 months (source: UK government digitalisation roadmap, March 2021).

This just reaffirms that the term 'Engineering Integration' has attracted much attention in manufacturing research. However, there is a need to understand the role of integration in manufacturing to stay relevant and competitive in the market, therefore organisations need to look at the processes, methods, and tools that are used to engineer the product.

Engineering transformation looks at a more holistic approach based on the idea of a framework providing visibility over variant management and product line engineering (PLE), model-based system engineering (MBSE), tooling reports and process flow diagrams – just to name a few- to create a layout plan for the manufacturing process, while also defining input to control plans and qualification plans.

This Engineering Integration approach unleashes data management frameworks that automate workflows for different CAE applications, such as cost estimation, stiffness calculation and multibody dynamics. Means for integration across function boundaries include common goals, main links and consultation links. When measured data from manufacturing is introduced, this framework enables best fit part matching, while parametric simulation models automatically update the models.

Digital platform for smart manufacturing

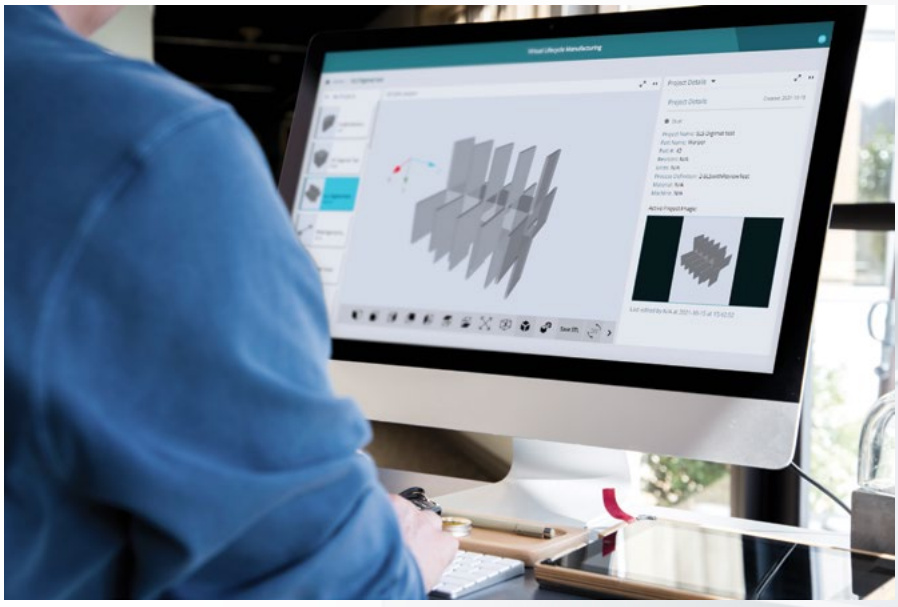
Nowadays, the most adequate answer to the current challenges is a smart platform for manufacturing built on open architecture and cloud-native principles that embraces technology from partners and third-party suppliers. A smart platform may act as the digital backbone that helps connect and integrate sensors, devices, applications, systems, machines and virtual models, helping create a fuller, richer digital twin and generating immediate real-time insight.

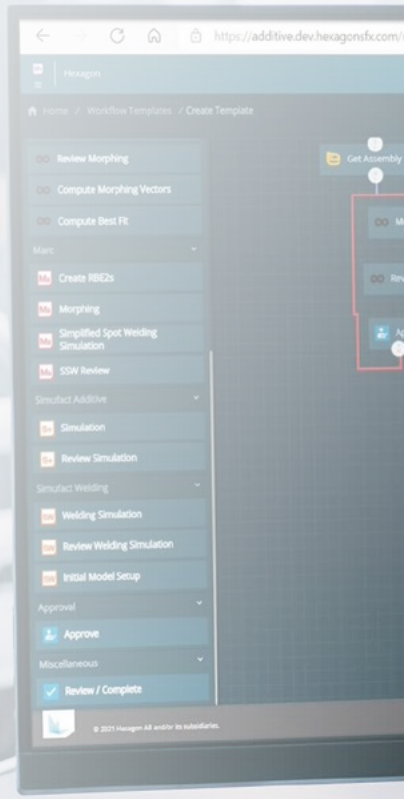
With a virtual collaborative engineering workflow management toolset, manufacturers can bring more vertically integrated teams to bear on engineering tasks, enabling them to work together more seamlessly with automated workflows during the product development lifecycle.

Companies demand cross-domain and collaborative development principles and ensures that the engineering transformation journey is successful and scalable as well. In order to achieve that, it is imperative that organisations consider an optimal way to managing the change for people and a proper solution rollout.

Hexagon's smart platform for manufacturing

Hexagon's SFx platform for smart manufacturing provides a unique blend of engineering integration solutions to ensure that complex design, engineering and production requirements are specified to deliver ROI and value based on product design improvement, part feasibility analysis, manufacturing process validation and optimisation via simulation.





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– UK government digitalisation roadmap, March 2021)

Where does the growth come from?

- Product design improvement, part feasibility analysis
- Manufacturing process parameters tuning
- Manufacturing process validation and optimisation via simulation
- Quick and early formability studies based on part geometry
- Virtual die tryout based on tooling designs
- Springback compensation
- Detailed virtual tryouts considering the real and physical environment
- Accurate material description and flow
- Prediction of part properties during the manufacturing process chain
- Consider the forming history and its impact in the assembly process
- Reduced engineering changes
- Early visibility of material cost and efficiency
- Design optimisation for cost

Learn more at hexagonmi.com/SFx