



How BSI created a growing series of manufacturing PASs

Creating solutions to help manufacturers adopt digital technologies

The story at a glance

- The UK's manufacturing sector risks being left behind because of its slow take-up of digital technologies.
- The High Value Manufacturing Catapult asked BSI to establish how standards could overcome barriers to technology adoption.
- BSI proposed a plan for standards adoption and development that would speed up innovation in UK manufacturing and help the sector remain globally competitive.

The starting-point

Across the world, companies are looking to strengthen their manufacturing supply chains by using new digital technologies. **However, the UK has been slow to respond – and its manufacturing industries risk being left behind.**

Digitalization can give manufacturers many new advantages. It enables them to:

- Provide more personalised, customised products.
- Make labour and resource efficiencies, leading to enhanced productivity growth.
- Achieve better inventory management and logistics.
- Create higher value services across all stages of the supply chain.

This not only helps manufacturers to cut costs – it also helps to increase their revenues, by developing innovative products and services.

Manufacturing is vital to the UK economy. It generates half of UK exports and accounts for three-quarters of business R&D, and its impact across the supply chain is far wider.

But new technologies are transforming the manufacturing landscape – and to stay internationally competitive, the UK sector needs to lead their development.

“By providing manufacturers with the cutting-edge equipment and skilled resources they need to commercialise their world-class technologies, we can help to ensure that the UK remains a world leader in high value manufacturing.”

Dick Elsy,
CEO, HVM Catapult

The challenge

Several barriers have been preventing a widespread move to digital manufacturing in the UK:

- The research required can be difficult, expensive and high-risk.
- Gaps in skills can hinder the development of new products.
- Launching a new product can incur large costs.
- Scaling up a successful new product can be extremely challenging.

A PAS is an effective way to promote adoption, a PAS can provide confidence and assurance to the businesses that use them. **High Value Manufacturing Catapult (HVMC) asked BSI to establish how a PAS could help overcome barriers to the adoption of digital manufacturing, and to propose a programme of work that would help to transform the landscape.**

HVMC is the go-to organization for advanced manufacturing technologies in the UK. It works with the country's top specialists and cutting-edge facilities in order to drive growth and innovation in manufacturing.

“The route to boosting productivity and creating new businesses, jobs and export opportunities in the UK manufacturing sector is the adoption of industrial digital technologies. PAS 1040:2019 supports this strategy.”

Head of Manufacturing and Materials, Innovate UK

The solution

To understand how the UK could become more globally competitive by increasing digital manufacturing innovation, BSI and the Institute for Manufacturing (IfM) first identified five priority opportunities for standards development:

- 1. Design for digital manufacturing** - Support the development, testing and use of product data standards and design good practice.
- 2. Simulation, verification and validation (including digital twins and in-process modelling)** – Create a faster-time to market, flexible and personalized manufacturing lines and high levels of quality - underpinned by shared data.
- 3. Intelligent data gathering and analysis** - Create a reference architecture for data gathering and analytics to enable machine learning and discover new ways to make manufacturing agile, productive and sustainable.
- 4. Rights management, data governance and security** – Establish data ownership and how revenues are distributed among collaborators.
- 5. Equipment plug and play, capability and discovery** – This enables higher productivity through manufacturing lines that can self-configure, communicate and virtualize their capabilities in the supply chain.

BSI then proposed a plan for standards adoption and development to address these areas – **critical to success for UK innovation in digital manufacturing.**



The benefits

The project has already led to the publication of 4 Publicly Available Specifications (PASs) that will help manufacturers to adopt digital technologies.

- ✔ **PAS 1040** - Helps UK manufacturers assess their readiness to adopt digital technologies. It includes guidance on using digital readiness diagnostic tools, and business factors for manufacturers to consider such as leadership, culture and processes.
- ✔ **PAS 7040** - Provides guidance on the trustworthiness and data of the networked sensors that have become vital in digital manufacturing. It examines security issues and sets out a risk management process, helping manufacturers to embed good practice and reduce risk.

- ✔ **PAS 280** – Helps manufacturers implement through-life engineering services – an approach that improves efficiency, reliability and cost savings. Designed for manufacturers, support providers, owners and end-users, the PAS helps stakeholders maximize value over a major asset's lifecycle.
- ✔ **PAS 1085** - Specifies how manufacturers and their value chains guard against cybersecurity threats. Its aim is to protect organizations' reputations and liability, intellectual property, asset safety and security, and the integrity and value of manufactured items.

These PAS's provided a fast-track approach and were each published within 9-12 months to quickly establish best practice in an innovating industry. Their development was based on the consensus of leading organizations including Aerospace Technology Institute (ATI), Babcock, BAE Systems and Ministry of Defence.



These PAS's will help the following advancements in UK digital manufacturing:

1. **International leadership** – ensuring the UK interests relating to the standards aspects of interoperability are reflected in international standards development, and that the UK is recognized as a leader in areas of national expertise.
2. **Resilient and flexible supply chains** – rapidly creating good practice in using and exploiting digital technologies, making UK SMEs more likely to adopt these capabilities.
3. **Security and trust** – increasing confidence in the use of the technology by using standards to demonstrate the security of IP, ownership, and the reliability of decision-shaping information.

4. **Innovation in the value chain** – digitizing the value chain to open it up for greater specialization and therefore innovation, potentially giving rise to new products and services.

Innovation is difficult. There are many potential stumbling-blocks before manufacturers can eventually benefit from research being commercialized, and solving this requires a collaborative approach. **BSI set out a plan to establish the path along which the participants will travel.** Along the way, standards will help to overcome the many barriers to adopting technological innovation.

By incorporating a world-class approach to topics like design, simulation, analysis and security, **BSI's roadmap will ultimately help UK manufacturing companies create globally competitive products, processes and services.**



About the High Value Manufacturing Catapult

HVMC is the UK's go-to place for manufacturing technology innovation. It was set up in 2011 by Innovate UK (the UK's innovation agency), to address the gap between early-stage technology innovation and full-scale manufactured reality. Covering the full range of manufacturing technology capabilities, HVMC offers open access to the latest industrial-scale equipment, leading expertise and an environment of collaboration between industry, academia and government. It works with thousands of businesses of all sizes and across all sectors.

About the Institute for Manufacturing

The IfM is part of the University of Cambridge. It brings together expertise in management, technology and policy to address the full spectrum of issues that can help industry and governments create sustainable economic growth.

Why BSI?

BSI lead the world in standards and our trademark Kitemark™ is recognized globally as a symbol of quality and safety. For a standard to be accepted and adopted by Governments, Industry, trade associations and businesses of all sizes it must be built on consensus and credibility. The PAS is developed through a rigorous consensus based process, evolved by BSI over more than 100 years.

Our aim

We aim to improve the quality and safety of products, services and systems by enabling the creation of standards and encouraging their use.

New standards are being developed all the time as new sectors, markets and business models emerge. The sooner these standards are in place, the faster and more efficiently growth occurs.

Take the lead in your sector

Learn more about what your business will gain by sponsoring a PAS, visit: bsigroup.com/pas

Or get in touch with us to discuss creating a PAS today!



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